



## **P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE**

Siddhartha Nagar, Vijayawada – 520 010

*Autonomous - Re-accredited at 'A+' by the NAAC - ISO 9001 - 2015 Certified*

*College with Potential for Excellence-Phase-II (Awarded by the UGC)*

**1.1.1 - Curricula developed and implemented have relevance to the local, national, regional and global developmental needs which are reflected in Programme Outcomes (POs), Programme Specific Outcomes (PSOs) and Course Outcomes (COs) of the various Programmes offered by the Institution.**

## **POs, PSOs and COs**

## DEPARTMENT OF BBA BUSINESS ANALYTICS

### Board of Studies for the academic Year 2022-23 (ODD Semesters)

1. **Agenda:** Board of Studies meeting for ODD semesters of batches (2020-23)5<sup>th</sup> and 6<sup>th</sup> Semester, (2021-24)3<sup>rd</sup> Semester and (2022-25)1<sup>st</sup> Semester)

### 2. List of members in BOS

#### Members present:

1	Prof.Rajesh.C.Jampala, HOD, Commerce & Business Administration and Dean (Academics & Administration)	Chairman
2	Dr Padmaja Rani garu	University Nominee
3	Prof Pramod Kumar Mishra	Subject Expert
5	Sri Asgar Hussain	Alumnus
6	Ravi Tejam Tallam	Industry Expert
7	Sri Dr D Srinivasa Rao Garu	Dy- HOD
8	Sri P. Guru Prasad	Member
8	Sri D Vasu	Member

## BBA BUSINESS ANALYTICS

### LIST OF THE COURSES REVISED/ INTRODUCED IN I, III & V&VI SEMESTERS -2022-23

S.NO	TITLE OF THE COURSE	Course Code	Offered in SEM	Type of the Paper	Year of Introduction	Year of Revision	OBE with BTL	Offered to	
1	Data Management with SQL Programming Lab	LSCP05	I	Life Skill	2020-21	2022-23	YES	BBA BA	
2	Business Ressearch Methods	MGTT31A	III	Core	2018-19	2022-23(20%)	YES	BBA BA	
3	Security Analysis	MGTT39A	III	Core	2022-23	2022-23(100%)	YES	BBA BA	
4	Machine Learning & Deep Learning using Scikit Learn, Kera's & Tensor Flow	ANASET01	VI	SEC ELECTIVE A	2022-23	introduced	YES	BBA BA	
5	Machine Learning & Deep Learning using Scikit Learn, Kera's & TensorFlow Lab	ANASEP01	VI		2022-23	introduced	YES	BBA BA	
6	Big Data Analytics	ANASET02	VI		2022-23	introduced	YES	BBA BA	
7	Mongo DB Lab	ANASEP02	VI		2022-23	introduced	YES	BBA BA	
8	E Business	ANASET03	VI		2022-23	introduced	YES	BBA BA	
9	Econometrics	ANASET04	VI		2022-23	introduced	YES	BBA BA	
10	Real Time Governance System	ANASET05	VI		2022-23	introduced	YES	BBA BA	
11	Operating System	ANASET06	VI		2022-23	introduced	YES	BBA BA	
12	Advance HR Analytics	ANASET07	VI		SEC ELECTIVE B	2022-23	introduced	YES	BBA BA
13	Business Use Cases	ANASET08	VI			2022-23	introduced	YES	BBA BA
14	Portfolio Management (Finance)	ANASET09	VI			2022-23	introduced	YES	BBA BA
15	Security Analysis and Portfolio Management Lab	ANASEP09	VI	2022-23		introduced	YES	BBA BA	
16	Business Analytics and Text Mining Modelling using Python	ANASET10	VI	2022-23		introduced	YES	BBA BA	
17	Business Analytics and Text Mining Modelling using Python Lab	ANASEP10	VI	2022-23		introduced	YES	BBA BA	
18	Software Testing	ANASET11	VI	2022-23		introduced	YES	BBA BA	
19	E Commerce Application Development	ANASET12	VI	2022-23		introduced	YES	BBA BA	
20	Cyber Laws	ANASET13	VI	SEC ELECTIVE C	2022-23	introduced	YES	BBA BA	
21	Client Relationship Management	ANASET14	VI		2022-23	introduced	YES	BBA BA	
22	Marketing Analytics Using Excel and R	ANASET15	VI		2022-23	introduced	YES	BBA BA	
23	Internet of Things	ANASET16	VI		2022-23	introduced	YES	BBA BA	
24	Supply Chain Analytics	ANASET17	VI		2022-23	introduced	YES	BBA BA	
25	Project Management Analytics	ANASET18	VI		2022-23	introduced	YES	BBA BA	
26	Third internship / Project Work / On the Job Training / Apprenticeship	ANACIAP5	V	CORE PROJECT	2022-23	introduced	YES	BBA BA	

## Resolutions

1. It is resolved and recommend the revised syllabus & model question paper of **Data Management with SQL Programming Lab** with revised course code **LSC P05A** in I semester of BBA Business Analytics for the batch of students admitted in 2022-23 and onwards.
2. It is resolved and recommend the revised syllabus & model question paper of **BRM** with course code **MGTT311A** in III semester of BBA Business Analytics for the batch of students admitted in 2021-22 and onwards.
3. It is resolved to recommend to introduce **Security Analysis ( Theory )** with course code **MGTT39A** for III semester of BBA Business Analytics for the batch of students admitted in **2021-22** and onward, In Place of **Operations management** with course code **MGTT39** For the syllabus and model question paper vide Page No
4. It is resolved to recommend to introduce **Machine Learning & Deep Learning using Scikit Learn, Keras &Tensor flow** with Course code **ANASET01** for V/VI semester of BBA Business Analytics for the batch of students admitted in **2020-21** and onwards. For the syllabus and model question paper vide Page No.
5. It is resolved to recommend to introduce **Machine Learning & Deep Learning using Scikit Learn, Keras&Tensorflow (LAB)** with course code **ANASEP01** for V/VI semester of BBA Business Analytics for the batch of students admitted in **2020-21** and onwards. For the syllabus and model question paper vide Page No.
6. It is resolved to recommend to introduce **Big Data Analytics (Theory)** with course code **ANASET02** for V/VI semester of BBA Business Analytics for the batch of students admitted in **2020-21** and onwards. For the syllabus and model question paper vide Page No.

7. It is resolved to recommend to introduce **MongoDB (lab)** with course code **ANASEP02** for **V/VI** semester of BBA Business Analytics for the batch of students admitted in **2020-21** and onwards. For the syllabus and model question paper vide Page No.
8. It is resolved to recommend to introduce **E Business** with Course code **ANASET03** for **V/VI** semester of BBA Business Analytics for the batch of students admitted in **2020-21** and onwards. For the syllabus and model question paper vide Page No.
9. It is resolved to recommend to introduce **Econometrics** with Course code **ANASET04** for **V/VI** semester of BBA Business Analytics for the batch of students admitted in **2020-21** and onwards. For the syllabus and model question paper vide Page No.
10. It is resolved to recommend to introduce **Real Time Governance System** with Course code **ANASET05** for **V/VI** semester of BBA Business Analytics for the batch of students admitted in **2020-21** and onwards. For the syllabus and model question paper vide Page No.
11. It is resolved to recommend to introduce **Operating System** with Course code **ANASET06** for **V/VI** semester of BBA Business Analytics for the batch of students admitted in **2020-21** and onwards. For the syllabus and model question paper vide Page No.
12. It is resolved to recommend to introduce **Advance HR Analytics** with Course code **ANASET07** for **V/VI** semester of BBA Business Analytics for the batch of students admitted in **2020-21** and onwards. For the syllabus and model question paper vide Page No.
13. It is resolved to recommend to introduce **Business Use Cases** with Course code **ANASET08** for **V/VI** semester of BBA Business Analytics for the batch of students admitted in **2020-21** and onwards. For the syllabus and model question paper vide Page No.

14. It is resolved to recommend to introduce **Portfolio Management (Finance)** with course code **ANASET09** for **V/VI** semester of BBA Business Analytics for the batch of students admitted in **2020-21** and onwards. For the syllabus and model question paper vide Page No.
15. It is resolved to recommend to introduce **Security Analysis and Portfolio Management Lab** with course code **ANASEP09** for **V/VI** semester of BBA Business Analytics for the batch of students admitted in **2020-21** and onwards. For the syllabus and model question paper vide Page No.
16. It is resolved to recommend to introduce **Business Analytics and Text Mining Modelling using Python** with course code **ANASET10** for **V/VI** semester of BBA Business Analytics for the batch of students admitted in **2020-21** and onwards. For the syllabus and model question paper vide Page No.
17. It is resolved to recommend to introduce **Business Analytics and Text Mining Modelling using Python (LAB)** with course code **ANASEP10** for **V/VI** semester of BBA Business Analytics for the batch of students admitted in **2020-21** and onwards. For the syllabus and model question paper vide Page No.
18. It is resolved to recommend to introduce **Software Testing** with Course code **ANASET11** for **V/VI** semester of BBA Business Analytics for the batch of students admitted in **2020-21** and onwards. For the syllabus and model question paper vide Page No.
19. It is resolved to recommend to introduce **E Commerce Application Development** with Course code **ANASET12** for **V/VI** semester of BBA Business Analytics for the batch of students admitted in **2020-21** and onwards. For the syllabus and model question paper vide Page No.
20. It is resolved to recommend to introduce **Cyber Laws** with Course code **ANASET13** for **V/VI** semester of BBA Business Analytics for the batch

of students admitted in **2020-21** and onwards. For the syllabus and model question paper vide Page No.

21. It is resolved to recommend to introduce **Client Relationship Management** with Course code **ANASET14** for V/VI semester of BBA Business Analytics for the batch of students admitted in **2020-21** and onwards. For the syllabus and model question paper vide Page No.
22. It is resolved to recommend to introduce **Marketing Analytics Using Excel and R** with Course code **ANASET15** for V/VI semester of BBA Business Analytics for the batch of students admitted in **2020-21** and onwards. For the syllabus and model question paper vide Page No.
23. It is resolved to recommend to introduce **Internet of Things** with Course code **ANASET16** for V/VI semester of BBA Business Analytics for the batch of students admitted in **2020-21** and onwards. For the syllabus and model question paper vide Page No.
24. It is resolved to recommend to introduce **Supply Chain Analytics (Theory)** with course code **ANASET17** for V/VI semester of BBA Business Analytics for the batch of students admitted in **2020-21** and onwards. For the syllabus and model question paper vide Page No.
25. It is resolved to recommend to introduce **Project Management Analytics (Theory)** with course code **ANASET18** for V/VI semester of BBA Business Analytics for the batch of students admitted in **2020-21** and onwards. For the syllabus and model question paper vide Page No.
26. It is Resolved and recommend to frame the course outcomes for all courses (core, elective & cluster) in I, III, V and VI semester of **BBA Business Analytics**, in line with the guidelines of OBE following the Bloom's taxonomy, applicable for the students admitted in the academic year 2020-2021 onwards.



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### DATA MANAGEMENT WITH SQL PROGRAMMING LAB

**Offered to:** BBA – Business Analytics

**Course Code:** LSCP005A

**Course Type:** Practical (P)

**Year of offering:** 2022-23

**Year of Introduction:** 2017-18

**Percentage of Revision:** 0 %

**Year of Revision:** 2022-23

**Credits:** 2

**Semester:** I

**Max. Time:**

**Hours Taught:** 30 hrs.

**Course Prerequisites (if any):**

Basic computer literacy including ability to create and manipulate files and install software.

**Course Objectives:**

Understand the structure and design of relational databases. Understand the importance and major issues of database security and the maintenance of data integrity.

**Course Outcomes:** At the end of this course, students should be able to:

**CO1** Learn structured query language (SQL) to an intermediate/advanced level.

**CO2** Be able to write data retrieval queries and evaluate the result set.

**CO3** Be able to write SQL statements that edit existing data.

**CO4** Be able to write SQL statements that create database objects.

**CO5** Understand the structure and design of relational databases.

S.no	Program Name
1	Write Query Creating tables.
2	Adding the field for creating tables.
3	DDL commands, DML commands, DCL commands.
4	SQL constraints.
5	Insert the values to creating tables.
6	Select statement.
7	Where clause
8	Comparison operators
9	Logical Operators
10	Order by Clause
11	SQL functions
12	Displaying data from multiple tables. (joins)
13	Group by clause.
14	Update, delete.
15	sub queries

**Textbook:**

1. Alan Beaulieu, Learning SQL, 2<sup>nd</sup> edition, 'O' Reilly Publications – Tokyo
2. Paul Wilton, John Colby, Beginning SQL, Wiley Publication India Pvt Ltd – New Delhi.





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## **BUSINESS RESEARCH METHODS**

**Offered to:** BBA – Business Analytics

**Course Code:** MGT T311A

**Course Type:** Core (TH)

**Year of Introduction:** 2018-19

**Year of offering:** 2022-23

**Year of Revision:** 2022-23

**Percentage of Revision:** 20

**Semester:** III

**Credits:** 4

**Hours Taught:** 60 hrs.

**Max. Time:** 3 Hours

**Course Prerequisites (if any):**

**Course Description:**

**Course Objectives:**

The aim of this course is to provide the student with a basic understanding of research methodology with a specific reference to business context.

**Course Outcomes:** At the end of this course, students should be able to:

**CO1:** Describe the process of Business Research, its scope and importance (**PO1, PO5, PO7 & PSO1**)

**CO2:** Identify the dimensions of Research methodology and the types of Research design (**PO1, PO5, PO7 & PSO1**)

**CO3:** Appreciate the importance of sampling design in research along with the methods of Sampling (**PO1, PO5, PO7 & PSO1**)

**CO4:** Describe how research data is analyzed along with research report preparation (**PO1, PO5, PO7 & PSO1**)

**CO5:** To know the importance of Intellectual property rights, which plays a vital role in advanced Technical and Scientific disciplines. (**PO1, PO6, PO7**)

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## Course Details

Unit	Learning Units	Lecture Hours
I	<b>Introduction to Business Research</b> Definition & Meaning of Business Research - Importance of Business Research - Steps in Business Research process - Scope of Business Research - Ethics in Business Research	12
II	<b>Research Design</b> Elements of Research methodology - Types of Research design – Exploratory Research design, Descriptive Research design and Experimental Research design - Features of a good research design	12
III	<b>Data Collection &amp; Sampling Design</b> Primary Data: Meaning and Types - Primary data collection methods and instruments - Process of designing a Questionnaire - Secondary Data: Meaning and Sources - Meaning of Sampling – Steps in sampling process – Types of sampling collection.	12
IV	<b>Data Analysis &amp; Preparation of Research Report</b> Steps in Data Preparation - Data Analytical techniques in Business Research – Univariate Analysis, Bivariate Analysis, and Multivariate Analysis (An Overview) - Structure of a Business Research Report	12
V	<b>Intellectual Property Rights:</b> Introduction to IPR – Types of IPR – Conditions for grant of Patent – Process of Product patent – Copyright – Types of copyrights – Trademark – Conditions for trademark registration – Geographical Indications – Trade Secrets.	12

### Textbook:

1. Shashi.K.Gupta & Praneet Rangi: Research Methodology: Kalyani Publishers
2. Neeraj Pandey, Khushdeep Dharni, Intellectual Property Rights, PHI Pvt Limited, New Delhi.

### Recommended Reference book:

1. D.R.Cooper & P.S.Schindler: Business Research Methods: 9<sup>th</sup> Ed. Tata McGraw Hill Education.
2. Naval Bajpai: Business Research Methods: Pearson Education India.
3. Research Methods for Business: Uma Sekaran and Roger Bougie, WILEY publications

**Course Delivery method:** Face-to-face

**Course has focus on:** Foundation

### Websites of Interest :

1. <https://www.questionpro.com/blog/business-research/>
2. <https://researchguides.ben.edu/c.php?g=282050&p=4036581#:~:text=Primary%20data%20refers%20to%20the,collected%20by%20someone%20else%20earlier.&text=Surveys%2C%20observations%2C%20experiments%2C%20questionnaire,journal%20articles%2C%20internal%20records%20etc.>
3. <https://www.formpl.us/blog/research-report#:~:text=A%20research%20report%20is%20a,and%20accurate%20source%20of%20information.>
4. [INTELLECTUAL PROPERTY RIGHTS - Google Books](#)

## Model Question Paper Structure for BRM

**Max.: 75 Marks  
Marks**

**Min. Pass: 30**

### Section-A

**Answer Any Five  
25Marks)**

**(5 x 5M =**

1. Write the Importance to Business Research. (L2)
2. Discuss about Ethics in Business Research. (L3)
3. What are Features of Good Research Design(L4)
4. Discuss about Primary data Vs Secondary data (L5)
5. Write about Sampling(L2)
6. What do you mean by Univariate Analysis(L2)
7. Discuss the importance of IPR. (L4)
8. Explain the types of IPR (L4)

### Section-B

**Answer the following questions  
50Marks)**

**(5 x 10M =**

9. (a) What is Business Research and explain the importance of research in business. (L2)  
or  
(b) Explain the Business research steps in detail. (L3)
10. (a) What is Research Design? Discuss its elements. (L3)  
or  
(b). State the types of research design with examples. (L4)
11. (a) What is Primary data? Explain its collection methods and instruments. (L2)  
or  
(b) Explain the secondary data with merits and limitations of secondary data. (L2)
12. (a) Explain the meaning of sampling with steps of collecting sampling. (L2)  
or  
(b) Discuss the data analysis techniques in detail. (L3)
13. (a) What is Copy Rights? Discuss the types of Copyrights. (L2)  
or  
(b) Write an importance on Geographical indication and trade secrets in IPR. (L4)



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## **SECURITY ANALYSIS**

**Offered to:** BBA – Business Analytics

**Course Type:** Core (TH)

**Year of Introduction:** 2021-22

**Year of Revision:**

**Semester:** III

**Hours Taught:** 60 hrs.

**Course Code:**

**Year of offering:** 2022-23

**Percentage of Revision:** 0

**Credits:** 4

**Max. Time:** 3 Hours

**Course Prerequisites (if any):**

**Course Description:**

**Course Objectives:**

This course provides a broad overview of investment management, focusing on the application of finance theory to the issue faced by Investment managers and investors in general and to provide conceptual foundation for the purpose of undertaking Investment analysis for securities.

**Course Outcomes:** At the end of this course, students should be able to:

**CO1** To provide a theoretical and practical background in the field of investments. (L1 &L2)

**CO2** Designing and managing the bond as well as equity portfolios in the real word. (L1 & L2)

**CO3** Valuing equity and debt instruments (L1 & L2)

**CO4** Measuring the Security and Debt performances. (L3)

## Syllabus

### Course Details

Unit	Learning Units	Lecture Hours
I	<p><b>Introduction to Investment:</b></p> <p>Concept of Investment and process – Investment objectives and Constrains – Investment Classification – Financial markets and instruments – Primary and Secondary market – Trading, clearing and Settlement procedures – market indices.</p>	12
II	<p><b>Concept of Return:</b></p> <p>Introduction to return – Calculation of return – Stock valuation models – Dividend discount models – constant growth model – two stage growth model – the 3-phase model – valuation through P/E ratio.</p>	12
III	<p><b>Concept of Risk:</b></p> <p>Introduction to risk – Types of risk (Systematic risk and Unsystematic risk) – Measurements of risk – Ex-post risk – Ex-ante risk – Standard deviation – Characteristic regression line – Correlation.</p>	12
IV	<p><b>Valuation of Fixed income securities:</b></p> <p>Concept of Bond basics – Classification of Debt securities – Valuation of Bonds (Redeemable, Non-redeemable and Convertible) - Bond value theorems (Required rate of return, Coupon rate and Bond value) - Bond Duration.</p>	12
V	<p><b>Fundamental and Technical Analysis:</b></p> <p>Economic Analysis – Economic Forecasting – industry analysis – analytical tools – Company analysis – Dow theory – Elliot wave theory.</p>	12

**Textbook:**

1. Vanita Tripathi, Security analysis and Portfolio Management, Taxmann publications. New Delhi.
2. Punithavathy Pandian – Security analysis and Portfolio management – Vikas Publications.
3. Rajiv Srivastava - Investment Management – Wiley publications – New Delhi.
4. Dr. R.P. Rustagi - Investment Management theory and Practices - Sultan Chand & Sons – New Delhi.
5. Dr. Preethi Singh – Investment management – Himalaya Publishing House – New Delhi
6. Prasanna Chandra – Investment analysis and Portfolio Management – Tata Mec – Chennai

**Recommended Reference book:**

1. Business Analysis and Valuation using financial statements by Palepu, Healy and Bernard (PHB), 3rd edition, Cengage Learning.
2. Chapters of book: Corporate Finance by Ross, Westerfield, Jaffe and Kakani, 8th Edition, Tata Mc Graw Hill
3. Security Analysis and Portfolio Management by Fisher and Jordan, Prentice Hall India.
4. Damodaran on Valuation (AD)-Security Analysis for Investment and Corporate Finance, 2nd edition, Wiley.
5. Investment Analysis and Portfolio Management by Railley and Brown, Cengage

**Course Delivery method:** Face-to-face

**Course has focus on:** Foundation

**Websites of Interest:**

1. [Introduction to Investing: A Beginner's Guide to Asset Classes \(investopedia.com\)](http://investopedia.com)
2. [Introduction to Investments - Meaning, Objectives and Elements - MBA Knowledge Base \(mbaknol.com\)](http://mbaknol.com)
3. [How to Calculate Return on Security Investment \(netwrix.com\)](http://netwrix.com)
4. [Investment Risk Share and Stock Risk | Davy Select](#)
5. [Introduction to Fixed Income Valuation | IFT World](#)

6. [Difference Between Fundamental and Technical Analysis \(with Comparison Chart\) - Key Differences](#)

7. [Security Analysis and Portfolio Management - Google Books](#)

**Co-curricular Activities:** (Case Studies)

## Model Question Paper Structure for Security Analysis

**Max.: 75 Marks  
Marks**

**Min. Pass: 30**

### Section-A

**Answer Any Five**

**(5 x 5M = 25Marks)**

1. Investment Objectives. (L3)
2. Differentiate Primary vs Secondary market (L2)
3. What is Two stage growth model? (L4)
4. Discuss Price Earnings ratio. (L2)
5. Differentiate Systematic vs Unsystematic risk (L3)
6. Write about Ex-Ante and Ex-Post risk (L1)
7. Write the Time value of money (L4)
8. Explain the Company analysis (L2)

### Section-B

**Answer the following questions**

**(5 x 10M = 50Marks)**

9. (a) What is Investment? write briefly Investment process. (L2)  
or  
(b) Explain Securities trading, clearing and settlement procedures. (L3)
10. (a) What is return on investment? Discuss stock valuation models. (L2)  
or  
(b) A company (ABC Ltd) that has paid a dividend of Rs. 4 this year – assuming a higher growth for the next 3 year at 15% and stable growth of 4% thereafter. Let's calculate the value using a two – stage dividend discount model. (L3)
11. (a) What is Security Risk? Discuss how many types of risk impact on securities. (L4)  
or  
(b) The stock of Z sells for Rs.50 per share, and the same offer the following payoff for the next year: (L3)

Economy	Dividend (Rs.)	Stock price (Rs.)
Boom Economy	3.00	51
Good Economy	2.00	47
Normal Economy	1.60	44
Recession Economy	0.86	33

Calculate the Standard deviation when all the four scenarios re given are equally likely.

12. (a) Explain the fixed income securities and types of fixed income securities. (L2)  
or  
(b) A zero-coupon bond having face value Rs. 1000 and 3 years to maturity is being sold in the market at a yield to maturity of 6%. Calculate its Duration. (L2)
13. (a) What is Fundamental Analysis? Discuss in detail. (L5)  
or  
(b) How Elliot Wave theory benefit to investor? Explain in brief. (L4)





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## MACHINE LEARNING & DEEP LEARNING USING SCIKIT LEARN, KERAS & TENSORFLOW

**Offered to:** BBA – Business Analytics

**Course Code:** ANASET01

**Course Type:** Core (TH)

**Year of Introduction:** 2019-20

**Year of offering:** 2022-2023

**Year of Revision:** 2021

**Percentage of Revision:** NIL

**Semester:** VI

**Credits:** 3

**Hours Taught:** 60 hrs.

**Max. Time:** 3 Hours

**Course Prerequisites (if any):**

**Course Description:**

**Course Objectives:**

To equip Students with skills and knowledge in the field of Machine Learning and Deep Learning and also familiarize the students with the practical aspects of this field and gradually teach them the industrial usage of machine learning and deep learning of various applications.

**Course Outcomes:** At the end of this course, students should be able to:

C1: To give complete overview on business analytics its developments in new era (PO1, PO3)

C2: To Show case the need of visual appeal to the data for better understanding (PO2, PO3)

C3: To Make student understand about the data and data drive concepts and levels (PO4, PO6)

C4: Discuss about the validity of data and collection of data and arrangement of data (PO5, PO6)

### Syllabus

Syllabus		
Unit	Learning Units	Lecture Hours
I	<b>Chapter 1:</b> Advanced Regression and Regularization: Lasso, Ridge Regression. Advanced Classification Models: Bagging and Boosting. Time Series Forecasting: AR, MA and ARMA models	12
II	<b>Chapter II</b> Introduction to Deep Learning. Deep Learning Vs Machine Learning. Inspiration of Neural Networks from Brain. The Perceptron: the simple idea behind neural networks. Artificial Neuron and It's architecture. Input and output layers in neural networks. Activation functions. Loss Functions. Optimizers.	12
III	<b>Chapter III</b> Artificial Neural Networks. Architecture. Input and output layers in neural networks. Activation functions. Loss Functions. Optimizers. Training a neural net. Feed Forward Mechanism. Back propagation in neural networks. Gradient Descent	12

	Algorithm. Updating weights and biases.	
<b>IV</b>	<b>Chapter IV</b> Introduction to Tensorflow and Keras. Building ANN with Keras. Problems of vanishing gradient and exploding gradient. Modifications to neural networks. Regularization, Normalization, Dropouts. Hand Digit Recognition in keras. Regression with neural networks.	<b>12</b>
<b>V</b>	<b>Chapter V</b> Introduction to Convolution Neural Networks (CNN). Meaning of Convolution. Architecture of CNN. Filters, Padding, Data Preprocessing in CNN. Alexnet, Googlenet. Image Classification with CNN using Keras. Transfer Learning in CNN.	<b>12</b>

**Textbook:**

1. Hands-On Machine Learning with Scikit-Learn, Keras and Tensor Flow: Concepts, Tools and Techniques to Build Intelligent Systems, Aurelian Geron, O'REILLY (available online to download)
2. Deep learning with python: Francois Cholet, Manning publishers (available online to download)

**Recommended Reference book:**

1. <https://www.oreilly.com/library/view/hands-on-machine-learning/9781492032632/><https://www.simplilearn.com/what-is-business-analytics-article>
2. [https://www.knowledgeisle.com/wp-content/uploads/2019/12/2-Aur%C3%A9lien-G%C3%A9ron-Hands-On-Machine-Learning-with-Scikit-Learn-Keras-and-Tensorflow\\_-Concepts-Tools-and-Techniques-to-Build-Intelligent-Systems-O%E2%80%99Reilly-Media-2019.pdf](https://www.knowledgeisle.com/wp-content/uploads/2019/12/2-Aur%C3%A9lien-G%C3%A9ron-Hands-On-Machine-Learning-with-Scikit-Learn-Keras-and-Tensorflow_-Concepts-Tools-and-Techniques-to-Build-Intelligent-Systems-O%E2%80%99Reilly-Media-2019.pdf)<https://www.gooddata.com/blog/>

**Course Delivery method :** Face-to-face

**Course has focus on :** Machine Learning & Deep Learning

**Websites of Interest:**

- <https://stackshare.io/stackups/keras-vs-scikit-learn-vs-tensorflow>
- <https://blog.fastforwardlabs.com/2016/02/24/hello-world-in-keras-or-scikit-learn-versus-keras.html>
- <https://www.tensorflow.org/resources/learn-ml>
- <https://www.tensorflow.org/>

**Co-curricular Activities:** (Case Studies)

## MODEL QUESTION PAPER

### MACHINE LEARNING & DEEP LEARNING WITH SCIKIT – LEARN, KERAS & TENSORFLOW

Answer all questions

5\*15 = 75

1. a. Examine the problems with Linear Regression in Machine Learning? How can we overcome them with Lasso and Ridge Regression? (L3)

**Or**

- b. Write pseudo code for conducting Lasso and Ridge Regression in R using the R packages, caret and glmnet. The data is Boston from MASS package. (L3)

2. a. Define and explain Deep Learning. Draw a suitable diagram for an Artificial Neural Network with input layer, two hidden layers and an output layer. (L2)

**Or**

- b. What is Perceptron? Explain it's architecture with a suitable diagram and write the basic steps in the working of perceptron with a numerical example. (L2)

3. a. What is an activation function in neural network? What is its role in Deep Learning? Examine some of the important activation functions in Neural Networks. (L3)

**Or**

- b. What is back propagation in neural networks? Examine the working of gradient descent algorithm. (L2)

4. a. Explain about Tensorflow and Keras libraries. Examine the various models and layers in Keras library with regard to Artificial Neural Networks (ANN). (L2)

**Or**

- b. Write pseudo code for classification problem of handwritten digits data in keras library. (L2)

5. a. What is Convolutional Neural Network? Explain its architecture with detailed visualization. (L3)

**Or**

- b. Write pseudo code for image classification using keras library on fashion mnist data set. (L3)



# P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

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## MACHINE LEARNING & DEEP LEARNING WITH SCIKIT – LEARN, KERAS & TENSORFLOW LAB

**Offered to:** BBA – Business Analytics

**Course Code:** ANASEP01

**Course Type:** Core (P)

**Year of Introduction:** 2019-20

**Year of offering:** 2022-2023

**Year of Revision:** 2021

**Percentage of Revision:** NIL

**Semester:** VI

**Credits:** 2

**Hours Taught:**

**Max.Time:** 3 Hours

**Course Prerequisites (if any):**

**Course Description:**

**Course Objectives:**

**Course Outcomes:** At the end of this course, students should be able to:

- C1: To give complete overview on business analytics its developments in new era (PO1, PO3)
- C2: To Show case the need of visual appeal to the data for better understanding (PO2, P03)
- C3: To Make student understand about the data and data drive concepts and levels (PO4, PO6)
- C4: Discuss about the validity of data and collection of data and arrangement of data (P05, PO6)

### Syllabus

Chapter No	Theme	Topics Covered
1	Introduction to Jupyter Notebook	Setting up working Directory in Jupyter – cell,code, markdown and various operators
2	Introduction to Pandas library for Data Manipulation	Various Functions in Pandas
3	Advanced Machine Learning in R	Lasso and Ridge Regression
4	Advanced Machine Learning in R	XG Boost Algorithm for classification
5	Deep Learning with keras in Pyhton	Introduction to keras Library
6	Artificial Neural Networks	Hand digit recognition with keras
7	ConvolutionalNeural Networks	Image classification with keras
8	Recurrent Neural Networks	Stock Price Prediction Using RNN



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## BIGDATA ANALYTICS

**Offered to:** BBA – Business Analytics

**Course Code:** ANASET02

**Course Type:** Core (TH)

**Year of Introduction:** 2019 - 20

**Year of offering:** 2022-23

**Year of Revision:**

**Percentage of Revision:** 00

**Semester:** VI

**Credits:** 3

**Hours Taught:**

**Max. Time:** 3 Hours

**Course Prerequisites (if any):**

**Course Description:**

**Course Objectives:**

The objective of this course is to enable student with understanding of the concepts of BIG DATA and to describe the big data analytics with critical evaluations and also committed to data-driven decision making to automate and optimize business processes.

**Course Outcomes:** At the end of this course, students should be able to:

- CO1:** To impart an overview of Identify Big Data and its Business Implications with its contents and scope
- CO2:** To recognize the characteristics of Hadoop Map Reduce and to optimize business decisions and to create competitive advantage with BIG Data Analytics
- CO3:** To understand the concept of Apache PIG in Hadoop Echo System
- CO4:** To understand the concept of Apache HIVE in Hadoop Echo System.
- CO5:** To understand the concept of Apache H Base and also with Introduction of Apache Spark

Syllabus		
Unit	Learning Units	Lecture Hours
I	<b>Introduction to Big Data</b> Big Data concept, Features & challenges - Hadoop and its features - Hadoop Ecosystem and Hadoop Components - Hadoop Architecture and Cluster	12
II	<b>Hadoop Mapreduce</b> Concept, YARN components and YARN architecture - YARN workflow - YARN Mapreduce application execution flow	12
III	<b>Introduction to Apache PIG</b> PIG Components & Execution - PIG data types - Data models in PIG	12
IV	<b>APACHE HIVE</b> Introduction, Architecture and components - Data types and data models - HIVE partitioning and bucketing - HIVE tables	12
V	<b>APACHE HBase</b> Introduction to HBase - HIVE data loading techniques - Run modes configuration and data models - Introduction to Apache Spark	12

Prescribed Text Books			
	Author	Title	Publisher
	<b>Raj Kamal (Author), Preeti Saxena (Author)</b>	Big Data Analytics, Introduction to Hadoop, Spark, and Machine-Learning Paperback	<b>McGraw Hill Education</b> <b>16 February 2019</b> ISBN-13 <b>978-9353164966</b>
	subhashini Chellappan Seema Acharya (Author)	Big Data and Analytics 2ed Paperback	1 January 2019

Reference Text Book			
	Author	Title	Publisher
1	Tom White	“ Hadoop: The Definitive Guide” Third Edit	O’reily Media, 2012
2	Seema Acharya, Subhasini Chellappan,	"Big Data Analytics"	Wiley 2015

**Course Delivery method:** Face-to-face

**Course has focus on:** Foundation

**Websites of Interest:**

1. <https://www.guru99.com/what-is-big-data.html>
2. <https://www.geeksforgeeks.org/hadoop-features-of-hadoop-which-makes-it-popular/>
3. <https://www.analyticsvidhya.com/blog/2020/10/introduction-hadoop-ecosystem/>
4. <https://www.geeksforgeeks.org/hadoop-yarn-architecture/#:~:text=Application%20workflow%20in%20Hadoop%20YARN,containers%20from%20the%20Resource%20Manager>
5. <https://www.folkstalk.com/2013/07/pig-data-types-primitive-and-complex.html>

**Co-curricular Activities: (Case Studies)**

**Model Question Paper**

**Max.: 75 Marks**

**Mi. Pass: 30 Marks**

**Answer the following questions**

**(5 x 15M = 75 Marks)**

1. a)  
b) (Or)
2. a)  
b) (Or)
3. a)  
b) (Or)
4. a)  
b) (Or)
5. a)  
b) (Or)



# P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

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## Mongo DB

**Offered to:** BBA – Business Analytics

**Course Code:** ANASEP02

**Course Type:** Core (P)

**Year of Introduction:** 2019-20

**Year of offering:** 2022-2023

**Year of Revision:** 2021

**Percentage of Revision:** NIL

**Semester:** VI

**Credits:** 2

**Hours Taught:**

**Max. Time:** 3 Hours

**Course Prerequisites (if any):**

**Course Description:**

**Course Objectives:**

The main objective of this course is to provide the student with a conceptual understanding of Business analytics, Business Intelligence & Data Visualization, Data Visualization, Data mining in the functional areas of Management

**Course Outcomes:** At the end of this course, students should be able to:

- C1: To give complete overview on business analytics its developments in new era (PO1, PO3)
- C2: To Show case the need of visual appeal to the data for better understanding (PO2, P03)
- C3: To Make student understand about the data and data drive concepts and levels (PO4, PO6)
- C4: Discuss about the validity of data and collection of data and arrangement of data (P05, PO6)

Syllabus		
Unit	Learning Units	Lecture Hours
I	<b>Unit I: Introduction to Mongo DB:</b> Introduction to NoSQL Database, Introduction to NoSQL Databases What is Mongo DB, Why Mongo DB, Difference between MongoDB & RDBMS, Installation & Configuration, Downloading Installing and Running, Installing MongoDB Version 3.0.6 on Windows, Features and Tools	06
II	<b>Unit II: Basics of Mongo DB</b> Creating First Database and First Collection in MongoDB 4.0, Inserting One Document with insert One () method, Multiple Documents Insertion in MongoDB 4.0- insert Many () method, Bulk Insert with insert () method and duplicate id, Creating Document and Saving it to Collection	06
III	<b>Unit III: Creating Collections</b> Dropping a Database, creating a Collection - Using db. create Collection (name, options), Dropping a Collection, MongoDB CRUD Operations - Create, Read, Update and Delete Creating/Inserting a document in collection, Inserting Array of	06



	Documents	
<b>IV</b>	<b>UNIT IV: Indexing and Objects</b> Introduction to Indexes Creating Index, Finding Indexes, Dropping Index, Object Ids in MongoDB Section Overview, Understanding Object Ids, Creating Object Ids, Advantages of Object Ids created by MongoDB, Disadvantages of Object Ids created by MongoDB	<b>06</b>
<b>V</b>	<b>UNIT V: Mongo DB Functions:</b> Aggregation Framework in MongoDB, Aggregation Framework in MongoDB, Using distinct () and count (), Sorting documents, Skip, Arrays, Indexes. Relationships in MongoDB (Basics)	<b>06</b>

**Textbook:**

1. Manu Sharma, Mongo DB Complete Guide, bpb Publishers, New Delhi.
2. Practical MongoDB: Architecting Developing and Administering MongoDB by Shakuntala Gupta, Apress publication, Hyderabad.
3. MongoDB: The Definitive Guide – Powerful and Scalable Data Storage, Third Edition Paperback.

**Recommended Reference book:**

1. MongoDB Basics 1st ed. Edition , by Peter Membrey (Author), David Hows (Contributor), Eelco Plugge (Contributor)

**Course Delivery method:** Face-to-face/ Lab

**Course has focused on:** Skill Development.

**Websites of Interest:**

- <https://www.tutorialspoint.com/mongodb/index.htm>  
<https://www.npmjs.com/package/mongodb>

**Co-curricular Activities:** (Case Studies)



# P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

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## E - BUSINESS

**Offered to:** BBA – Business Analytics

**Course Code:** ANASET03

**Course Type:** Core (TH)

**Year of Introduction:** 2022-23

**Year of offering:** 2022-2023

**Year of Revision:** 2023

**Percentage of Revision:** NIL

**Semester:** VI

**Credits:** 4

**Hours Taught:** 60 hrs.

**Max. Time:** 3 Hours

**Course Prerequisites (if any):**

**Course Description:**

**Course Objectives:**

**Course Outcomes:**

Syllabus		
Unit	Learning Units	Lecture Hours
I	<b>UNIT I: E-Business: Introduction to e-business:</b> Definition of e-business - Characteristics - Elements of e-business - E- business roles - Impact of e-business - Challenges of e-business - Difference between e-business	12
II	<b>UNIT II E Business Technical Platforms:</b> E-business Network Technology Basis - Basic knowledge to Computer Network (Intranet\Extranet\Intranet\LAN\WAN\MAN) - 5 levels of IT-induced configuration - IS-IT Models Diamond Model - Characteristics of Internet based software and e business solutions	12
III	<b>UNIT III Developing E-Business Models:</b> E- business structure - Evolution of e-business and its stages - E-Business Model Ontology Classification to e-Business -Corporation Rethinking the e-Business model.	12
IV	<b>UNIT IV-E Business Strategies:</b> Generic Strategies of E Business - Working of e – market - Transactions at e-market - Strategies for marketing for selling on the web – Advertising supported - Advertising subscription mixed model - Fee for transaction model Sales and Promotions Strategies for Purchasing and support activities - Payment System for e-Business -Traditional payment model, Characteristics of payment system, SET Protocol for credit card payment, E-cash ,E-check ,Smart cards.	12
V	<b>UNIT V E-business Applications:</b> Strategic planning process - E-Stock an e-Supply Chain -Management Definition to SCM - Element of SC, Key issues in SCM -CRM ERP, Procurement	12

**Textbook:**

1. Amir Manzoor, E- Business an Introduction, LAP LAMBERT Publications.
2. Colin Combi, Introduction to E-Business Management and Strategy, Elsevier publications.

**Recommended Reference book:**

1. Rana Tassabehji, Applying E-Commerce in Business, SAGE Publications.

**Course Delivery method:** Face-to-face

**Course has focus on:** Foundation, Database Management, Practical and Entrepreneurship

**Websites of Interest:**

1. [e-Business : Introduction, Types, Features, Concepts, Solved Questions \(toppr.com\)](#)
2. [15 Best Ecommerce Platforms: Pros and Cons + Pricing Comparison | BigCommerce](#)
3. [6 Types of eCommerce Business Models | Elastic Path](#)
4. [E-business strategy | Smart Insights](#)
5. [Types of E-Business Applications \(bizfluent.com\)](#)

**Co-curricular Activities:** (Case Studies)

**Model Question Paper**

**Max.: 75 Marks**

**Mi. Pass: 30 Marks**

**Answer the following questions**

**(5 x 15M = 75 Marks)**

1. a)

(Or)

b)

2. a)

(Or)

b)

3. a)

(Or)

b)

4. a)

(Or)

b)

5. a)

(Or)

b)



# P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

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## ECONOMETRICS

**Offered to:** BBA – Business Analytics

**Course Type:** Core (TH)

**Year of Introduction:** 2022-23

**Year of Revision:** 2023

**Semester:** VI

**Hours Taught:** 60 hrs.

**Course Prerequisites (if any):**

**Course Description:**

**Course Objectives:**

**Course Outcomes:**

**Course Code:** ANASET04

**Year of offering:** 2022-2023

**Percentage of Revision:** NIL

**Credits:** 4

**Max. Time:** 3 Hours

Syllabus		
Unit	Learning Units	Lecture Hours
I	<b>UNIT-I: Introduction to Econometrics</b> - nature and scope of Econometrics. Different data types – cross section, time series and panel data. Simple Linear Regression model and Multiple Linear Regression Model. Estimation of parameters - goodness of fit – R <sup>2</sup> and adjusted R <sup>2</sup> - partial regression coefficients; testing hypotheses.	12
II	<b>UNIT-II: Classical Linear Regression Model (CLRM)</b> - Practical Aspects of the CLRM Model Assumptions - detection and remedies - Multicollinearity, Heteroscedasticity, Autocorrelation and Model Selection.	12
III	<b>UNIT-III: Deterministic and Stochastic Trends</b> - Stationarity - Unit Roots – Testing of stationarity using Dickey-Fuller - Augmented Dickey-Fuller Tests – Phillips Peron test.	12
IV	<b>UNIT-IV: Testing Causality - Granger's Causality Test- Vector Auto regression Technique – Vector Error Correction Model. Testing for Co integration - Engel-Granger Co integration test – Johansson Co integration test – Auto Regressive Distributed Lag (ARDL) model.</b>	12
V	<b>UNIT-V: Forecasting - Autoregressive Models</b> - Moving Average Models - Autoregressive Moving Average Models - Autoregressive Integrated Moving Average Models – Auto Regressive Conditional Heteroscedasticity (ARCH) model and Generalized Auto Regressive Conditional Heteroscedasticity (GARCH) model.	12

**Textbook:**

1. Jeffrey M. Wooldridge, Introductory Econometrics: A Modern Approach. Cengage Learning.
2. Sankar Kumar Bhumika, Principles of Econometrics, A modern approach using Eviews, Oxford University press.

**Recommended Reference book:**

1. S. Shyamala, Navdeep kaur, Introductory Econometrics, Vishal Publication Co.
2. R. Carter Hill, William E. Griffiths and Guay C. Lim, Principles of Econometrics, Wiley Publications.

**Course Delivery method:** Face-to-face

**Course has focus on:** Foundation, Database Management, Practical and Entrepreneurship

**Websites of Interest:**

1. [Microsoft Word - Chapter1-Econometrics- IntroductionToEconometrics.doc \(iitk.ac.in\)](#)
2. [06mesmet.pdf \(le.ac.uk\)](#)
3. [9.4 Stochastic and deterministic trends | Forecasting: Principles and Practice \(2nd ed\) \(otexts.com\)](#)
4. [Granger Causality Test - an overview | ScienceDirect Topics](#)

**Co-curricular Activities:** (Case Studies)

## Model Question Paper

**Max.: 75 Marks**

**Mi. Pass: 30 Marks**

**Answer the following questions**

**(5 x 15M = 75 Marks)**

1. a)

(Or)

b)

2. a)

(Or)

b)

3. a)

(Or)

b)

4. a)

(Or)

b)

5. a)

(Or)

b)



# P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

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## REAL TIME GOVERNANCE SYSTEM (RTGS)

**Offered to:** BBA – Business Analytics

**Course Code:** ANASET05

**Course Type:** Core (TH)

**Year of Introduction:** 2022-23

**Year of offering:** 2022-2023

**Year of Revision:** 2023

**Percentage of Revision:** NIL

**Semester:** VI

**Credits:** 4

**Hours Taught:** 60 hrs.

**Max. Time:** 3 Hours

**Course Prerequisites (if any):**

**Course Description:**

**Course Objectives:**

**Course Outcomes:**

Syllabus		
Unit	Learning Units	Lecture Hours
I	<b>UNIT 1: Introduction to E-Governance</b> Government, Governance and Good Governance, what is E-Governance or Electronic Governance? E-Government and E-Governance: A conceptual Analysis, Objectives, Components, application domains, four phase model, implementing E-Governance, issues while implementing E-Governance, Opportunities, and challenges. Types of E-Governance, what is Real-Time Governance (RTG), Real Time Governance Society (RTGS)	12
II	<b>UNIT 2: E-Governance Infrastructure</b> Data Systems infrastructure, Executive Information Systems, Management Information Systems, Knowledge Management Systems, Transaction Processing Systems. Legal Infrastructural preparedness, IT Act 2000, Challenges to Indian law and cybercrime scenario in India, Amendments of the Indian IT Act. Institutional Infrastructural preparedness, Internet, intranet, extranet • Human Infrastructural preparedness, Top-level management, Middle-level management, Low-level management • Technological Infrastructural preparedness, Information and communications technology, Data Warehousing, Cloud Computing.	12
III	<b>UNIT 3: E-Governance: Country Experience</b> INDIA, US, UK, AUSTRALIA, DUBAI	12
IV	<b>UNIT 4: E-Governance in India 12hrs</b> Andhra Pradesh, Karnataka, Kerala , Uttar Pradesh , Madhya Pradesh , West Bengal ,Gujarat	12



V	<b>UNIT 5: Latest Applications in Real Time Governance</b> Agriculture, Rural Development, Health care, Education, Tourism , Commerce and Trade	12
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**Textbook:**

1. E-Governance: concepts and case studies| CSR Prabhu| Prentice-Hall|
2. E-Governance| Niranjani, Sanhari Mishra | Himalaya Publishing House

**Recommended Reference book:**

**Course Delivery method:** Face-to-face

**Course has focus on:** Foundation, Database Management, Practical and Entrepreneurship

**Websites of Interest:**

1. <http://www.egov4dev.org/success/case/>
2. <https://vikaspedia.in/e-governance/resources-for-vles>
3. <https://altametrics.com/en/information-systems/information-system-types.html>
4. <https://core.ap.gov.in/CMDashBoard/Index.aspx>

**Co-curricular Activities:** (Case Studies)

**Model Question Paper**

**Max.: 75 Marks**

**Mi. Pass: 30 Marks**

**Answer the following questions**

**(5 x 15M = 75 Marks)**

1. a)

(Or)

b)

2. a)

(Or)

b)

3. a)

(Or)

b)

4. a)

(Or)

b)

5. a)

(Or)

b)



# P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

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## OPERATING SYSTEMS

**Offered to:** BBA – Business Analytics

**Course Code:** ANASET06

**Course Type:** LAB

**Year of Introduction:**

**Year of offering:** 2022-2023

**Year of Revision:**

**Percentage of Revision:** NIL

**Semester:** VI

**Credits:** 4

**Hours Taught:** 60 hrs.

**Maxime:** 3 Hours

**Course Prerequisites**

(if any): Course

**Description:**

**Course Objectives:**

**Course Outcomes:**

### Course Objectives:

1. Learn about Overview of Computer hardware and Operating Systems.
2. Learn basics about Process management.
3. Learn about Memory management
4. Learn about Storage management
5. Learn about Linux, Windows Client and Windows Server OS Operations.

Course Outcome No	Upon successful completion of this course, students should have the knowledge and skills to:	Program Outcome No
CO1	Understand the Computer hardware and operating systems basics	PO7
CO2	Understand the concept of Process management.	PO7
CO3	Understand the concepts of Memory management	PO7
CO4	Understand the concepts of Storage management	PO7
CO5	Understand and know about Linux, Windows Client and Windows Server OS	PO1

**Unit I :Introduction to Operating Systems****12 periods**

- **Computer Basics:** Definition of a Computer - Characteristics and Applications of Computers – Block Diagram of a Digital Computer – Classification of Computers based on size and working
- **Hardware Basics:** Central Processing Unit – I/O Devices-Memory Devices- Secondary storage devices
- **Operating System Basics:** OS Definition, Functions, OS as a Resource Manager, Types of OS, Evolution of OS, Operating System Operations, Operating System Services, User Operating System Interface, System Calls, Types of System Calls.

**Unit II:Process Management****12 periods**

Basic Concepts, Process Scheduling, Operations on Processes, Inter-process Communication, Scheduling Criteria, Scheduling Algorithms, Multiple Processor Scheduling

**Unit III: Memory Management****12 periods**

Memory Management Strategies, Swapping, Contiguous Memory Allocation, Paging, Segmentation, Virtual Memory Management, Demand Paging, Page Replacement Techniques and Algorithms

**Unit IV: Storage Management****12 periods**

File Concept, Access Methods, Directory Structure, Protection, Implementing File Systems, File System Structure, Directory Implementation, Allocation Methods, Free Space Management, Efficiency and Performance, Recovery

**Unit V : Operating Systems****12 periods**

- **Introduction to Linux:** Versions, Components, Features; Installation of Linux OS, Managing Directories, Managing Files
- **Introduction to Windows:** Versions, GUI Components, Features; Installation of Client OS and Server OS, Installation of Roles and Features, Managing Users and Groups, Managing Devices and Printers, Storage Management, Managing and Monitoring of Server, Backup & Restoration

**Text Book**

Silberschatz Galvin Gange, 2008, Operating System Concepts, 6<sup>th</sup> edn, Wiley India (P) Ltd., New Delhi

- Operating System Concepts, Seventh Edition by Abraham Silberschatz, Peter Baer Galvin and Greg Gagne (2009) [[PDF](#)]
- Windows 10 All-in-One For Dummies By Woody Leonhard, Ciprian Rusen (2021) [[PDF](#)]

**Reference Books**

- [Operating Systems - Silberschatz, Galvin](#)
- [Operating System – Neso Academy](#)

**Web Resources**

[https://www.tutorialspoint.com/computer\\_fundamentals/index.htm](https://www.tutorialspoint.com/computer_fundamentals/index.htm)

[https://www.tutorialspoint.com/operating\\_system/index.htm](https://www.tutorialspoint.com/operating_system/index.htm)

[https://www.tutorialspoint.com/windows\\_server\\_2012/index.htm](https://www.tutorialspoint.com/windows_server_2012/index.htm)

**Recommended Co – Curricular Activities:**

(Co-curricular activities shall not promote copying from textbook or from others work and shall encourage self/independent and group learning)

**A. Measurable**

1. Assignments (in writing and doing forms on the aspects of syllabus content and outside the syllabus content. Shall be individual and challenging)
2. Student seminars (on topics of the syllabus and related aspects (individual activity))
3. Quiz (on topics where the content can be compiled by smaller aspects and data (Individuals or groups as teams))
4. Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual participation and contribution of students shall be ensured (team activity))

**B. General**

1. Group Discussion
2. Others

**Model Question Paper**

**Max.: 75 Marks**

**Mi. Pass: 30 Marks**

**Answer the following questions**

**(5 x 15M = 75 Marks)**

1. a)

(Or)

b)

2. a)

(Or)

b)

3. a)

(Or)

b)

4. a)

(Or)

b)

5. a)

(Or)

b)



# P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

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## ADVANCED HR ANALYTICS

**Offered to:** BBA – Business Analytics

**Course Code:** ANASET07

**Course Type:** Core (TH)

**Year of Introduction:** 2022-23

**Year of offering:** 2022-2023

**Year of Revision:** 2023

**Percentage of Revision:** NIL

**Semester:** VI

**Credits:** 4

**Hours Taught:** 60 hrs.

**Max. Time:** 3 Hours

**Course Prerequisites (if any):**

**Course Description:**

**Course Objectives:**

**Course Outcomes:**

<b>Syllabus</b>		
<b>Unit</b>	<b>Learning Units</b>	<b>Lecture Hours</b>
<b>I</b>	<b>UNIT I: Introduction to HR Analytics</b>  Concepts and definitions- Aligning Human Resources to Business through HR Analytics – Steps for Alignment of HR Analytics- Checklists for Strategies and Business-aligned HR Analytics-Importance of HR Analytics-HR Analytics Framework and Models.	<b>12</b>
<b>II</b>	<b>UNIT II HR Business Process and HR Analytics</b>  Introduction- Statistics and Statistical Modelling for HR Research and HR Decision-making-HR Research Tools and Techniques-Data Analysis for HR-HRIS for Decision Making-HR Metrics- Compelling reasons for HR Analytics.	<b>12</b>
<b>III</b>	<b>UNIT III HR Analytics and Data</b>  HR Data and data Quality- HR Data collection – Big data for Human Resources- Process of data Collection for HR Analytics- HR Reporting- Data Visualization-Performing Root cause Analysis	<b>12</b>
<b>IV</b>	<b>UNIT IV- Descriptive Analytics and Predictive Analytics in HR</b>  Introduction- Creating HR Dashboards Using Microsoft Excel- Slicing and Dicing of HR Data: Pivot Table	<b>12</b>

	Applications- Applications of Tableau in HR Data Visualization.  HR Predictive Modelling- Predictive Analytics Tools and Techniques- Applications of Correlation and Linear Regression - HR Analytics Applications of Comparison of Means and ANOVA.	
<b>V</b>	<b>UNIT V Machine Learning and HR Analytics</b>  HR Analytics Applications of Neural Networks- HR Analytics Applications of Classification and Regression Trees (CART) and Ensemble Techniques- HR Analytics Applications of Factor Analysis and Cluster Analysis.	<b>12</b>

**Textbook:**

1. Kirsten Edwards, Dr Martin R. Edwards, Predictive HR Analytics, Kogan page publications.
2. Fermin Diez, Mark Bussin, Venessa Lee, Fundamentals of HR Analytics, Emerald Publications.

**Recommended Reference book:**

1. Christopher M. Rosett, Austin Hagerty, Introducing Hr Analytics with Machine Learning. Springer Publications.

**Course Delivery method:** Face-to-face

**Course has focus on:** Foundation, Database Management, Practical and Entrepreneurship

**Websites of Interest:**

1. [Introducing HR Analytics with Machine Learning - Google Books](#)
2. [What is HR Analytics? Human Resources Analytics \[Updated 2021\] | AIHR](#)
3. [HR ANALYTICS & BUSINESS PROCESS \(linkedin.com\)](#)
4. [Three Types of HR Analytics: Descriptive, Predictive, and Prescriptive \(employeecycle.com\)](#)
5. [Machine Learning in the HR Industry: Trends and Example of Using | CodeTiburon](#)

**Co-curricular Activities:** (Case Studies)



**Model Question Paper**

**Max.: 75 Marks**

**Mi. Pass: 30 Marks**

**Answer the following questions**

**(5 x 15M = 75 Marks)**

1. a)  
b) (Or)
2. a)  
b) (Or)
3. a)  
b) (Or)
4. a)  
b) (Or)
5. a)  
b) (Or)



# P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

Siddhartha Nagar, Vijayawada – 520 010

Autonomous - ISO 9001 – 2015 Certified

## BUSINESS USE CASES & DEPLOYMENT OF ML MODELS

**Offered to:** BBA – Business Analytics

**Course Code:** ANASET08

**Course Type:** LAB

**Year of Introduction:** 2017-19

**Year of offering:** 2021-2022

**Year of Revision:** 2021

**Percentage of Revision:** NIL

**Semester:** VI

**Credits:** 4

**Hours Taught:** 60 hrs.

**Maxime:** 3 Hours

**Course Prerequisites (if any):**

**Course Description:**

**Course Objectives:**

**Course Outcomes:**

### Syllabus

Case Study 1	Predicting Heart Disease using Machine Learning
Case Study 2	Credit card Fraud Analysis
Case Study 3	Sentiment Analysis or Topic Mining
Case Study 4	Artificial Neural Network for Customer's Exit Prediction from Bank
Case Study 5	Data Visualization tools & techniques
Deployment of Machine Learning Models	Deployment of ML model
Deployment of Machine Learning Models	Deployment of NLP Model

**Textbook:**

**Recommended Reference book:**

**Course Delivery method:** Face-to-face

**Course has focus on:** Foundation and Practical

**Websites of Interest:**

**building-a-web-application-to-deploy-machine-learning-models-e224269c1331**

<https://www.freecodecamp.org/news/deploy-your-machine-learning-models-for-free/>

<https://www.analyticsvidhya.com/blog/2017/09/machine-learning-models-as-apis-using-flask/>

<https://stackoverflow.blog/2020/10/12/how-to-put-machine-learning-models-into-production/>

**Co-curricular Activities:**



# P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

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## PORTFOLIO MANAGEMENT

**Offered to:** BBA – Business Analytics

**Course Type:** Core (TH)

**Course Code:**ANASET09

**Year of Introduction:** 2022-23

**Year of offering:** 2022-23

**Year of Revision:**

**Percentage of Revision:** 0

**Semester:** VI

**Credits:** 3

**Hours Taught:** 60 hrs.

**Max. Time:** 3 Hours

**Course Prerequisites (if any):**

**Course Description:**

**Course Objectives:**

This course provides a broad overview of investment management, focusing on the application of finance theory to the issue faced by Investment managers and investors in general and to provide conceptual foundation for the purpose of undertaking Investment analysis for Securities and Portfolio management.

**Course Outcomes:** At the end of this course, students should be able to:

**CO1** To provide a theoretical and practical background in the field of investments. (L1 &L2)

**CO2** Designing and managing the bond as well as equity portfolios in the real word. (L1 & L2)

**CO3** Valuing equity and debt instruments (L1 & L2)

**CO4** Measuring the Security and Debt performances. (L3)

### Syllabus

#### Course Details

Unit	Learning Units	Lecture Hours
I	<b>Introduction to Portfolio management &amp; Efficient market Theory:</b> Concept of Portfolio management – Objective of Portfolio construction – Types of portfolio investment Random walk theory – The Efficient market hypothesis – Forms of Market Efficiency,	12

II	<b>Portfolio Analysis</b> Expected return of Portfolio – Risk of Portfolio – Reduction of portfolio risk through diversification (Security returns perfectly positively correlated, Security returns perfectly negatively correlated, Security returns Uncorrelated) – Risk-Return Calculations of Portfolio with more than two securities.	12
III	<b>Portfolio Selection</b> Feasible set of Portfolios (Efficient set of Portfolios) – Selection of Optimal portfolio (Markowitz model) – Limitations of Markowitz Model – CAPM model	12
IV	<b>Portfolio Revision</b> Meaning of portfolio revision – Need for revision – Constrains in portfolio revision – Portfolio revision strategies – Formula plans (Constant rupee value plan, Constant Ratio plan, Dollar cost averaging)	12
V	<b>Portfolio Evolution &amp; Mutual funds</b> Meaning – Need – evaluation perspective (Sharpe’s Measure, Treynor’s Measure, Jensen’s Measure) – Introduction to Mutual fund – Types –evaluation of Mutual funds.	12

**Textbook:**

1. S. Kevin – Portfolio Management – PHI Learning Pvt Limited – New Delhi.
2. V.K. Bhalla – Investment Management – Sultan Chand & Sons – New Delhi.
3. Punithavathy Pandian – Security analysis and Portfolio management – Vikas Publications.
4. Rajiv Srivastava - Investment Management – Wiley publications – New Delhi.
5. Dr. R.P. Rustagi - Investment Management theory and Practices - Sultan Chand & Sons – New Delhi.
6. Dr. Preethi Singh – Investment management – Himalaya Publishing House – New Delhi
7. Prasanna Chandra – Investment analysis and Portfolio Management – Tata Mec – Chennai

**Recommended Reference book:**

1. Robert A. Weigand – Applied Equity analysis and Portfolio Management - Wiley & Sons – New Jersey.
2. Dr. Preethi Singh – Investment management – Himalaya Publishing House – New Delhi

**Course Delivery method:** Face-to-face

**Course has focus on:** Foundation

**Websites of Interest:**

1. [Security Analysis and Portfolio Management - Google Books](#)
2. [security analysis and portfolio management - google books](#)
3. [Portfolio Types | Types of Portfolio Investment | Angel One](#)
4. [Forms of Market Efficiency: Weak, Strong, and Semi-Strong \(investopedia.com\)](#)
5. [Concept of Risk-Return in Portfolio Context \(With Formulas\) \(yourarticlelibrary.com\)](#)
6. [1.3 Portfolio Return and Risk \(The more the merrier...\) - Defining Attitudes Towards and Alternative Measures of Risk | Coursera](#)
7. [security analysis and portfolio management - google books](#)
8. [Optimal Portfolio Selection \(pace.edu\)](#)

**Co-curricular Activities:** (Case Studies)

**Model Question Paper**

**Max.: 75 Marks**

**Mi. Pass: 30 Marks**

**Answer the following questions**

**(5 x 15M = 75 Marks)**

1. a)  
b) (Or)
2. a)  
b) (Or)
3. a)  
b) (Or)
4. a)  
b) (Or)
5. a)  
b) (Or)



# P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

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## SECURITY ANALYSIS AND PORTFOLIO MANAGEMENT LAB

**Offered to:** BBA – Business Analytics

**Course Type:** Core (P)

**Course Code:** ANASEP09

**Year of Introduction:** 2022-23

**Year of offering:** 2022-23

**Year of Revision:** Nil

**Percentage of Revision:** 0

**Semester:** VI

**Credits:** 2

**Hours Taught:**

**Max. Time:**

**Course Prerequisites (if any):**

**Course Description:**

### List of Experiments

S.no	Topic Covered
1	Financial Statistics (Sample Mean, Standard Deviation, Variance, Covariance and Correlation)
2	Security Expected Return and Risk calculation
3	Portfolio Expected Return and Risk calculation.
4	Stock price prediction using Regression.
5	Dividend Discount models for Securities
6	Valuation of bond and bond duration
7	Optimal portfolio selection (Markowitz Model)
8	Portfolio Evolution by Sharpe's, Treynor's and Jense's model

**Textbook:**

1. Financial Analytics with R: Building a Laptop Laboratory for Data Science

**Recommended Reference book:**

**Course Delivery method:** Excel and R language

**Course has focus on:** Skill Development



# P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

Siddhartha Nagar, Vijayawada – 520 010  
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## BUSINESS ANALYTICS & TEXT MINING MODELLING LAB

**Offered to:** BBA – Business Analytics

**Course Code:** ANASEP10

**Course Type:** Core (P)

**Year of Introduction:** 2019-20

**Year of offering:** 2022-2023

**Year of Revision:** 2022

**Percentage of Revision:** NIL

**Semester:** VI

**Credits:** 2

**Hours Taught:**

**Max. Time:** 3 Hours

**Course Prerequisites (if any):**

**Course Description:**

**Course Objectives:**

**Course Outcomes:**

### Syllabus

#### List of Experiments (4 hours per week)

Chapter No	Theme	Topics Covered
1	Time series Models-1	ARIMA Model
2	Time Series Models-II	SARIMA Model
3	Conjoint Analysis	Conjoint Analysis with R.
4	RFM Analysis	RFM Analysis with R
5	Recommendation Systems	Recommendation Systems with R
6	Text mining modelling using NLTK	Text Corpus; Sentence Tokenization, Word Tokenization; Removing special Characters; Expanding contractions; Removing Stop words
7	Text mining modelling using NLTK	Building a text classifier
8	Cluster Analysis	Building Country Clusters



**Textbook:****Recommended Reference book:**

1. Python Data Visualisation Cookbook. Igor Milovanović, Packit Publishing
2. Witten, I.H., 2004. Text Mining. Available at <https://www.cs.waikato.ac.nz/~ihw/papers/04-IHWText Mining.pdf>, Accessed On: 30 October 2017.
3. Wu, W., Chen, Y. and Seng, D., 2017. Implementation of Web Mining Algorithm Based on Cloud Computing. Intelligent Automation & Soft Computing, pp. 1-6. Available at <http://dx.doi.org/10.1080/10798587.2017.1316077>, Accessed: on 20 October 2017.
4. Xu, Y., Yin, Y. and Yin, J., 2017. Tackling topic general words in topic modeling. Engineering Applications of Artificial Intelligence, 62, pp.124-133. Accessed On: 28 October 2017

**Course Delivery method:** Face-to-face

**Course has focus on:** Foundation,

**Websites of Interest:**

**Co-curricular Activities:**



# P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

Siddhartha Nagar, Vijayawada – 520 010  
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## BUSINESS ANALYTICS AND TEXT MINING MODELING

**Offered to:** BBA – Business Analytics

**Course Code:** ANASET10

**Course Type:** Core (TH)

**Year of Introduction:** 2019-20

**Year of offering:** 2022-2023

**Year of Revision:** 2022

**Percentage of Revision:** NIL

**Semester:** VI

**Credits:** 3

**Hours Taught:**

**Max. Time:** 3 Hours

**Course Prerequisites (if any):**

**Course Description:**

**Course Objectives:**

The Main objective of this course is to impart knowledge of Visualization on use of text mining techniques for deriving business intelligence to achieve organizational goals.

**Course Outcomes:** At the end of this course, students should be able to:

- C1: To give complete overview on business analytics its developments in new era (PO1, PO3)
- C2: To Show case the need of visual appeal to the data for better understanding (PO2, PO3)
- C3: To Make student understand about the data and data drive concepts and levels (PO4, PO6)
- C4: Discuss about the validity of data and collection of data and arrangement of data (P05, P06)

Syllabus		
Unit	Learning Units	Lecture Hours
I	<b>Time Series Analytics</b> AR Models, MA models, ARMA Models, ARIMA Models, SARIMA Models	12
II	<b>Retail Analytics</b> Conjoint Analysis, RFM Analysis, Recommendation Systems	12
III	<b>Text analytics and NLP:</b> Text analysis operations with NLTK. Tokenization, Stop words; Lexicon Normalization: Stemming and Lemmatization, POS Tagging, Text Classification.	12

<b>IV</b>	<b>Sentiment Analysis.</b> Types of sentiment analysis. Performing Sentiment Analysis with text classification. Naive Bays' model for sentiment classification.	<b>12</b>
<b>V</b>	<b>Business Use Case Studies:</b> Data Pre-processing and Visualization, Credit Card Fraud Detection, Stock Prices Prediction.	<b>12</b>

**Textbook:**

1. Python Data Visualisation Cookbook. Igor Milovanovic, Packit Publishing.
2. Python for Data Analysis: Data Wrangling with Pandas, NumPy, and Python by Wes McKinney (2017)
3. Text Analytics with Python: A Practical Real-World Approach to Gaining Actionable Insights from Your Data by Dipanjan Sarkar (2016).

**Recommended Reference book:**

**Course Delivery method:** Face-to-face

**Course has focus on:** Foundation

**Websites of Interest:**

**Co-curricular Activities:** (Case Studies)

Semester End Examination

**P.B. Siddhartha College of Arts & Science**  
**Bachelor of Business Administration. Business Analytics**  
**Business Analytics (Visualisation) & Text Mining Modelling Using Python (MGT T65)**

Answer All Questions.

15\*5=75 Marks

1.

- a. Define data visualisation and explain the analytical patterns of data visualisation and how they are helpful for Business Management (L1)

**Or**

- b. Explain the fundamental principles of data visualisation and provide the list of plots that are suitable for univariate numeric and categorical variables. (L3)

2.

- a. Explain the pandas library visualisation functions both at data frame level and series level. You should provide the pandas plotting syntax for both numeric and categorical variables. (L2)

**Or**

- b. What is Matplotlib library in Python ? Explain it's basic features. Write pseudo code for creating the basic structure of a plot with Matplotlib. (L1)

3.

- a. Consider the average heights and weights of persons aged 8 to 16 stored in the following lists: (L2)

height = [121.9,124.5,129.5,134.6,139.7,147.3, 152.4, 157.5,162.6]

weight= [19.7,21.3,23.5,25.9,28.5,32.1,35.7,39.6, 43.2]

From the above data write pseudo code to create line plots for height and weight with axis labels, title, different colours for lines width different widths and marker shape is '\*' .

**Or**

- b. What are the basic features of Seaborn library? Write pseudo code to create
- pairplot for numeric variables in a data frame
  - Im plot between two numeric variables with heuristic of a grouping variable. (L3)

4.

- a. What is the purpose of NLTK library in python? Explain it's basic features. Write pseudo code using NLTK library for Stemming, Lemmatisation and Tokenisation. (L1)

**Or**

- b. Explain the basic text processing methods with python with pseudo code. (L2)

5.

- a. What is sentiment analysis? Explain different types of sentiment analysis. (L1)

**Or**

- b. Explain the various steps with appropriate pseudo code for text classification using Bayes Classifiers(L1)



# P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

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## SOFTWARE TESTING

**Offered to:** BBA – Business Analytics

**Course Code:** ANASET11

**Course Type:** Core (TH)

**Year of Introduction:** 2022-23

**Year of offering:** 2022-2023

**Year of Revision:** 2023

**Percentage of Revision:** NIL

**Semester:** VI

**Credits:** 4

**Hours Taught:** 60 hrs.

**Max. Time:** 3 Hours

**Course Prerequisites (if any):**

**Course Description:**

**Course Objectives:**

**Course Outcomes:**

Syllabus		
Unit	Learning Units	Lecture Hours
I	<b>UNIT-I</b>  Introduction: Purpose of testing, Dichotomies, model for testing, consequences of bugs, taxonomy of Bugs. Flow Graphs and Path testing: Basics concepts of path testing, predicates, path predicates and Achievable paths, path sensitizing, path instrumentation, application of path testing.	12
II	<b>UNIT II</b>  Transaction Flow Testing: Transaction flow, transaction flow testing techniques.  Dataflow testing: Basics of dataflow testing, strategies in dataflow testing, application of dataflow testing.	12
III	<b>UNIT III HR Analytics and Data</b>  Domain Testing: domains and paths, Nice & ugly domains, domain testing domains and interfaces Testing, domain and interface testing, domains, and testability.	12
IV	<b>UNIT IV-</b>  Paths, Path products and Regular Expressions: Path products & path expression, reduction procedure, Applications, regular expressions & flow anomaly detection. Logic Based Testing: Overview,	12

	decision tables, path expressions kv charts, specifications.	
<b>V</b>	<b>UNIT V</b>  State, State Graphs and Transition testing: State graphs, good & bad state graphs state testing, Testability tips. Graph Matrices and Application: Motivational overview, matrix of graph, relations, power of a matrix, Node reduction algorithm, building tools. (Student should be given an exposure to a tool like J Meter or Win runner.)	<b>12</b>

**Textbook:**

1. Ralf Bierig, Stephen Brown, Edgar Galvan, Essentials of Software testing, Cambridge University press.
2. Paul Ammann, Jeff Offutt, Introduction to Software Testing, Cambridge University Press.
3. Sandeep Desai, Abhishek Srivastava, Software Testing: Practical approach, PHI learning pvt limited.

**Recommended Reference book:**

1. Peter Farrell-Vinay, Manage Software Testing, Auerbach publications.

**Course Delivery method:** Face-to-face

**Course has focus on:** Foundation, Database Management, Practical and Entrepreneurship

**Websites of Interest:**

1. [Introduction To Software Testing - International Software Test Institute \(test-institute.org\)](http://test-institute.org)
2. [Transaction Flow Testing | Sakshi Education](http://www.sakshieducation.com)
3. [Domain Testing in Software Engineering - GeeksforGeeks](http://www.geeksforgeeks.com)
4. [www.gpcet.ac.in/wp-content/uploads/2017/03/UNIT-4-2-files-merged.pdf](http://www.gpcet.ac.in/wp-content/uploads/2017/03/UNIT-4-2-files-merged.pdf)

**Co-curricular Activities:** (Case Studies)

## Model Question Paper

**Max.: 75 Marks**

**Mi. Pass: 30 Marks**

**Answer the following questions**

**(5 x 15M = 75 Marks)**

1. a)

(Or)

b)

2. a)

(Or)

b)

3. a)

(Or)

b)

4. a)

(Or)

b)

5. a)

(Or)

b)



# P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

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## E – COMMERCE APPLICATION DEVELOPMENT

**Offered to:** BBA – Business Analytics

**Course Code:** ANASET12

**Course Type:** Theory

**Year of Introduction:** 2022

**Year of offering:** 2022-2023

**Year of Revision:**

**Percentage of Revision:** NIL

**Semester:** VI

**Credits:** 4

**Hours Taught:** 60 hrs.

**Maxime:** 3 Hours

Course Prerequisites (if any): Course Objectives

To educate students in ecommerce and ecommerce applications.

Course Outcomes

Upon successful completion of the course, a student will be able to:

CO1: To apply in an integrative and summative fashion the students' knowledge in all fields of business studies by drafting a website presence plan. (PO6, PO7)

CO2: To understand the factors needed in order to be a successful in ecommerce (PO6, PO7)

CO3: To gain the skills to bring together knowledge gathered about the different components of building a web presence (PO6, PO7)

CO4: To critically think about problems and issues that might pop up during the establishment of the web presence (PO6, PO7)

CO5: To apply Word Press as a content management system (CMS), Plan their website by choosing colour schemes, fonts, layouts, and more . (PO6, PO7)

## II. Syllabus

### Unit-1: (10h)

Introduction to E– commerce: Meaning and concept – E– commerce , E– commerce v/s Traditional Commerce , E– Business & E– Commerce – History of E– Commerce , EDI – Importance, features & benefits of E– Commerce , Impacts, Challenges & Limitations of E– Commerce

### Unit-2: (12h)

Business models of E – Commerce: Business to Business , Business to customers ,Customers to Customers , Business to Government , Business to Employee , Influencing factors of successful E– Commerce , Architectural framework of Electronic Commerce , Web based E Commerce Architecture. Internet Commerce

### Unit-3: (12h)

Electronic data Interchange , EDI Technology ,EDI- Communications , EDI Agreements , E– Commerce payment system. Digital Economy

### Unit -4: (13h)

A Page on the web - HTML Basics , Client Side scripting -JAVA SCRIPT basics , Server side Scripting- PHP basics.

### Unit-5: (13h)

Logging in to Your Word press Site , word press dash board , creating your first post , adding photos and images , creating hyper link , adding categories and tags



### **III. Textbooks:**

1. Turban, Rainer, and Potter, Introduction to E-Commerce, second edition, 2003
2. H. M. Deitel, P. J. Deitel and T. R. Nieto, E-Business and E-Commerce: How to Programe, Prentice hall, 2001
3. WordPress All-in-One For Dummies -written by Lisa Sabin Wilson with contributions by Michael Torbert, Andrea Rennick, Cory Miller, and Kevin Palmer

### **Reference Books:**

1. Elias. M. Awad, "Electronic Commerce", Prentice-Hall of India Pvt Ltd.
2. Ravi Kalakota, Andrew B. Whinston, "Electronic Commerce-A Manager's guide", Addison-Wesley
3. <https://w3cschools.com>
4. David Whiteley, E-Commerce: Strategy, Technologies and Applications, Tata McGraw Hill.

### **IV. Co-Curricular Activities:**

(Co-curricular activities shall not promote copying from textbook or from others work and shall encourage self/independent and group learning)

#### **A. Measurable**

1. Assignments (in writing and doing forms on the aspects of syllabus content and outside the syllabus content. Shall be individual and challenging)
2. Student seminars (on topics of the syllabus and related aspects (individual activity))
3. Quiz (on topics where the content can be compiled by smaller aspects and data (Individuals or groups as teams))
4. Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual participation and contribution of students shall be ensured (team activity))

#### **B. General**

1. Group Discussion
2. Try to solve MCQ's available online.

**Model Question Paper**

**Max.: 75 Marks**

**Mi. Pass: 30 Marks**

**Answer the following questions**

**(5 x 15M = 75 Marks)**

1. a)  
b) (Or)
2. a)  
b) (Or)
3. a)  
b) (Or)
4. a)  
b) (Or)
5. a)  
b) (Or)



# P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

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## CYBER LAWS

**Offered to:** BBA – Business Analytics

**Course Code:** ANASET13

**Course Type:** Core (TH)

**Year of Introduction:** 2022-23

**Year of offering:** 2022-2023

**Year of Revision:** 2023

**Percentage of Revision:** NIL

**Semester:** VI

**Credits:** 4

**Hours Taught:** 60 hrs.

**Max. Time:** 3 Hours

**Course Prerequisites (if any):**

**Course Description:**

**Course Objectives:**

**Course Outcomes:**

Syllabus		
Unit	Learning Units	Lecture Hours
I	Introduction: Computers and its Impact in Society, Overview of Computer and Web Technology, Need for Cyber Law, Cyber Jurisprudence at International and Indian Level.	12
II	Cyber laws – international perspectives: UN & International Telecommunications Union (ITU) initiatives, Council of Europe – Budapest convention on cybercrime, Asia Pacific Economic Cooperation (APEC), Organization for Economic Cooperation and Development (OECD), World Bank, Commonwealth of Nations	12
III	Constitutional & Human Rights Issues in Cyberspace: Freedom of Speech and Expression in Cyber space, Right to Access Cyberspace – Access to Internet, Right to Privacy, Right to Data	12
IV	Cyber Crimes & Legal Framework: Cyber Crimes against Individuals, Institution and State, Hacking, Digital Forgery, Cyber Stalking/Harassment, Cyber Pornography, Identity Theft & Fraud, Cyber terrorism, Cyber Defamation, Different offences under IT Act, 2000.	12
V	Cyber Torts: Cyber Defamation, Different Types of Civil Wrongs under the IT Act, 2000, Intellectual Property Issues in Cyber Space, Interface with Copyright Law, Interface with Patent Law, Trademarks & Domain Names Related issues	12

**Textbook:**

1. Chris Reeds & John Angel, Computer Law, OUP, New York, (2007).
2. Justice Yatindra Singh, Cyber Laws, Universal Law Publishing Co, New Delhi,
3. Verman. K , Mittal Raman, Legal Dimensions of Cyber Space, Indian Law Institute, New D
4. Jonathan Rosenoer, Cyber Law, Springer, New York, (1997).
5. Sudhir Naib, The Information Technology Act, 2005: A Handbook, OUP, New York, (2011)
6. S. R. Bhansali, Technology Act, 2000, University Book House Pvt. Ltd., Jaipur (2003).
7. Vasu Deva, Cyber Crimes and Law Enforcement, Commonwealth Publishers, New Delhi, (2003).

**Recommended Reference book:**

**Course Delivery method:** Face-to-face

**Course has focus on:** Foundation, Database Management, Practical and Entrepreneurship

**Websites of Interest:**

**Co-curricular Activities:** (Case Studies)

**Model Question Paper**

**Max.: 75 Marks**

**Mi. Pass: 30 Marks**

**Answer the following questions**

**(5 x 15M = 75 Marks)**

1. a)  
b) (Or)
2. a)  
b) (Or)
3. a)  
b) (Or)
4. a)  
b) (Or)
5. a)  
b) (Or)



# P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

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## CLIENT RELATIONSHIP MANAGEMENT

**Offered to:** BBA – Business Analytics

**Course Code:** ANASET14

**Course Type:** Core (TH)

**Year of Introduction:** 2022-23

**Year of offering:** 2022-2023

**Year of Revision:** 2023

**Percentage of Revision:** NIL

**Semester:** VI

**Credits:** 4

**Hours Taught:** 60 hrs.

**Max. Time:** 3 Hours

**Course Prerequisites (if any):**

**Course Description:**

**Course Objectives:**

**Course Outcomes:**

Syllabus		
Unit	Learning Units	Lecture Hours
I	<b>Unit I</b> <b>The Interface</b> - Versions, Frames, Important application menus and modules, Content Frame, UI Settings, and Personalization <b>Lists and Forms</b> – List V2 versus List V3, Lists and Tables, Forms	12
II	<b>Unit II</b> <b>UI Customization</b> – Branding your Instance, Custom Themes, UI-Impacting System Properties, Configuring Service Portal UI, creating a Custom Homepage, Styling Pages, and Widgets, setting up the War Room page, Styling the CMS	12
III	<b>Unit III</b> <b>Understanding Data and Relationships</b> – One to many relationships in ServiceNow, many to many relationships in ServiceNow, enforcing one to one relationship, Defining Custom Relationships, Database table inheritance	12
IV	<b>Unit IV</b> <b>Tasks and Workflows</b> –Important Task fields, Journals, and the activity formatter, Extending the task table, Workflows, SLAs, Approvals, Assignment, Creating Task fields <b>UI and Data Policies</b> –UI Policies, reverse if false, Scripting in UI policies, UI Policy Order, Data Policies, Converting between data and UI Policies, Data Policies versus ACLs	12

<b>V</b>	<b>Unit V</b> <b>User Administration and Security</b> –Users, Groups and Roles, Emails and Notifications, User Preferences, ACLs – Security Rules <b>Introduction to Scripting</b> –Client-side versus Server-side APIs, where scripting is supported, Integrated development environment	<b>12</b>
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**Textbook:**

1. David A. Po-Chedley, Client Relationship Management, HRD Press.
2. V. Kumar, Werner Reinartz, Customer Relationship Management, Springer publications.

**Recommended Reference book:**

1. Francis Buttle, Stan Maklan, Customer Relationship Management, Routledge publications,

**Course Delivery method:** Face-to-face

**Course has focus on:** Foundation, Database Management, Practical and Entrepreneurship

**Websites of Interest:**

1. [Ch-1-Introduction-to-CRM.pdf \(aissmschmct.in\)](#)
2. [https://support.industrysoftware.automation.siemens.com/docs/teamcenter/10.1/PDF/en\\_US/tdocExt/pdf/client\\_customization\\_programmers\\_guide.pdf](https://support.industrysoftware.automation.siemens.com/docs/teamcenter/10.1/PDF/en_US/tdocExt/pdf/client_customization_programmers_guide.pdf)
3. [Guide to Customer Relations: Definition, Benefits, and Tips \(helpscout.com\)](#)

**Co-curricular Activities:** (Case Studies)

**Model Question Paper**

**Max.: 75 Marks**

**Mi. Pass: 30 Marks**

**Answer the following questions**

**(5 x 15M = 75 Marks)**

1. a)  
b) (Or)
2. a)  
b) (Or)
3. a)  
b) (Or)
4. a)  
b) (Or)
5. a)  
b) (Or)





# P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

Siddhartha Nagar, Vijayawada – 520 010

Autonomous - ISO 9001 - 2015 Certified

## MARKETING ANALYTICS (USING EXCEL & R)

**Offered to :** BBA – Business Analytics

**Course Code :** ANASET15

**Course Type :** Core (TH)

**Year of Introduction :** 2017 -19

**Year of offering :** 2021

**Year of Revision :**

**Percentage of Revision :** 00

**Semester :** V

**Credits :** 4

**Hours Taught :** 60 hrs.

**Max.Time :** 3 Hours

**Course Prerequisites (if any):**

**Course Description:**

**Course Objectives:**

**Course Outcomes:** At the end of this course, students should be able to:

Syllabus		
Unit	Learning Units	Lecture Hours
I	Introduction to R Programming: – Installation of R & R Studio – Layout of R Studio - Vectors – Matrix and Creating a Data Frame - Data Manipulation: IF Else – Loops, Functions –Types of Data – Packages.	12
II	Marketing Analytics: - Introduction – Need of Marketing Analytics, Want & Demand – Significance of Marketing Analytics - What Consumers Want – How to Know what Consumers Want – Methods to Find out the information.	12
III	ConJoint Analysis: Introduction to ConJoint Analysis – Types of Preference Data- Choice based – ConJoint Analysis – ConJoint Attributes – Pricing Decisions using conjoint Analysis – Confusion Matrix.	12
IV	Market Basket Analysis: - Introduction of Market Basket Analysis – Uses of Market Basket Analysis - Association Rules – Apriori Algorithm - Frequent item set - Support – Confidence	12
V	Recommendation Engine & Retail Analytics – Introduction – Significance of Recommendation Engine – Collaborative Filtering Method – Problems with Collaborative Filtering – Content Based	12

	Recommendation.	
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Prescribed Text Books			
	Author	Title	Publisher
1	Chris Chapman and Elea McDonnell Feit	R for Marketing Research and Analytics	
2	by <a href="#">Wayne L. Winston</a> (Author)	Marketing Analytics: Data-Driven Techniques with Microsoft Excel 1st Edition	<a href="#">By Pearson</a> by Thomas W. Miller Paperback

Reference Text Book			
	Author	Title	Publisher
1	Stephan Sorger	Marketing Analytics	Amazon Digital Services
2	Dave Jacobs	“Marketing Analytics: Optimize Your Business with Data Science in R, Python, and SQL”	Dave Jacobs

**Course Delivery method :** Face-to-face

**Course has focus on :** Foundation

**Websites of Interest :**

1. <https://www.marketingevolution.com/marketing-essentials/marketing-analytics>
2. [https://www.sas.com/en\\_us/insights/marketing/marketing-analytics.html](https://www.sas.com/en_us/insights/marketing/marketing-analytics.html)
3. <https://mailchimp.com/marketing-glossary/marketing-analytics/>
4. <https://www.martechadvisor.com/articles/marketing-analytics/marketing-analytics-martech-101-basics/>

**Co-curricular Activities:** (Case Studies)

**Model Question Paper**

**Max.: 75 Marks**

**Mi. Pass: 30 Marks**

**Answer the following questions**

**(5 x 15M = 75 Marks)**

1. a)  
b) (Or)
2. a)  
b) (Or)
3. a)  
b) (Or)
4. a)  
b) (Or)
5. a)  
b) (Or)



# P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

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Autonomous - ISO 9001 - 2015 Certified

## INTERNET OF THINGS

**Offered to:** BBA – Business Analytics

**Course Code:** ANASET16

**Course Type:** Core (TH)

**Year of Introduction:** 2022-23

**Year of offering:** 2022-2023

**Year of Revision:** 2023

**Percentage of Revision:** NIL

**Semester:** VI

**Credits:** 4

**Hours Taught:** 60 hrs.

**Max. Time:** 3 Hours

**Course Prerequisites (if any):**

**Course Description:**

**Course Objectives:**

**Course Outcomes:**

Syllabus		
Unit	Learning Units	Lecture Hours
I	<p><b>UNIT-I</b> Fundamentals of IoT: Introduction, Definitions &amp; Characteristics of IoT, IoT Architectures, Physical &amp; Logical Design of IoT, Enabling Technologies in IoT, History of IoT, About Things in IoT, The Identifiers in IoT, About the Internet in IoT, IoT frameworks, IoT and M2M.</p> <p>Applications of IoT: Home Automation, Energy, Retail Management, Logistics, Agriculture, Health, and Lifestyle, Industrial IoT, Legal challenges, IoT design Ethics, IoT in Environmental Protection.</p>	12
II	<p><b>UNIT-II</b> Sensors Networks: Definition, Types of Sensors, Types of Actuators, Examples and Working, IoT Development Boards: Arduino IDE and Board Types, Raspberry Pi Development Kit, RFID Principles and components, Wireless Sensor Networks: History and Context, the node, Connecting nodes, Networking Nodes, WSN and IoT.</p>	12
III	<p><b>UNIT 3:</b> Wireless Technologies for IoT: WPAN Technologies for IoT: IEEE 802.15.4, Zigbee, HART, NFC, ZWave, BLE, Bacnet and Modbus. IP Based Protocols for IoT IPv6, 6LowPAN, LoRA, RPL, REST, AMQP, CoAP, MQTT. Edge connectivity and protocols.</p>	12
IV	<p><b>UNIT 4:</b> Arduino Simulation Environment: Arduino Uno Architecture, Setting up the IDE, Writing Arduino Software, Arduino</p>	12

	<p>Libraries,Basics of Embedded C programming for Arduino,InterfacingLED,pushbuttonandbuzzerwithArduino,InterfacingArduino withLCD.</p> <p>Sensor&amp;ActuatorswithArduino OverviewofSensorsworking, AnalogandDigitalSensors,InterfacingofTemperature,Humidity,Motion,LightandGasSensorswithArduino,Interfacing of Actuators with Arduino,Interfacing of Relay Switch and Servomotor with Arduino.</p>	
V	<p><b>UNIT 5:</b> Developing IOT's:Implementation of IoT with Arduino, Connecting and using various IoTCloud Based Platforms such as Blynk, Thingspeak, AWS IoT, Google Cloud IoT Core etc.CloudComputing, FogComputing, PrivacyandSecurityIssues inIoT.</p>	12

**Textbook:**

1. Internet of Things - A Hands-on Approach, ArshdeepBahga and Vijay Madiseti,UniversitiesPress, 2015, ISBN: 9788173719547
2. Vijay Madiseti and ArshdeepBahga, “Internet of Things (A Hands-onApproach)”, 1stEdition, VPT, 2014
3. DanielMinoli,—“BuildingtheInternetofThingswithIPv6andMIPv6:TheEvolvingWorldof M2MCommunications”,ISBN:978-1-118-47347-4,WillyPublications
4. PethuruRajandAnupamaC.Raman,"TheInternetofThings:EnablingTechnologies,Platforms ,and UseCases", CRCPress
5. Opensourcesoftware/learningwebsites
  - a. [http://www.cse.wustl.edu/~jain/cse570-15/ftp/iot\\_prot/index.html](http://www.cse.wustl.edu/~jain/cse570-15/ftp/iot_prot/index.html)
  - b. Contiki(OpensourceIoToperatingsystem)
  - c. Ardudroid(opensourceIoTproject)
  - d. IoTToolkit (smartobjectAPIgateway servicereferenceimplementation)

**Recommended Reference book:**

**Course Delivery method:** Face-to-face

**Course has focus on:** Foundation, Database Management, Practical and Entrepreneurship

**Websites of Interest:**

1. <https://github.com/connectIOT/iottoolkit>
2. <https://github.com/connectIOT/iottoolkithttps://www.arduino.cc/>
3. [https://onlinecourses.nptel.ac.in/noc17\\_cs22/course](https://onlinecourses.nptel.ac.in/noc17_cs22/course)
4. <https://blynk.io>(Mobileapp)

**Co-curricular Activities:** (Case Studies)

**Model Question Paper**

**Max.: 75 Marks**

**Mi. Pass: 30 Marks**

**Answer the following questions**

**(5 x 15M = 75 Marks)**

1. a)

(Or)

b)

2. a)

(Or)

b)

3. a)

(Or)

b)

4. a)

(Or)

b)

5. a)

(Or)

b)



# P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

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## SUPPLY CHAIN ANALYTICS

**Offered to:** BBA – Business Analytics

**Course Code:** ANASET17

**Course Type:** Core (TH)

**Year of Introduction:** 2018-19

**Year of offering:** 2022-2023

**Year of Revision:** 2021

**Percentage of Revision:** NIL

**Semester:** VI

**Credits:** 4

**Hours Taught:** 60 hrs.

**Max. Time:** 3 Hours

**Course Prerequisites (if any):**

**Course Description:**

**Course Objectives:**

1. Understand the Importance of Basic Business Analytics and Optimization
2. Understand the Importance of Basic Supply Chain Analytics and Optimization
3. Analyze the level of uncertainty associated with the supply of products and services targeted customers
4. Explain the role of application of Descriptive analytics in a Supply chain
5. Explain the role of application of Predictive analytics in a Supply chain

**Course Outcomes:**

Syllabus		
Unit	Learning Units	Lecture Hours
I	<b>Introduction to Supply Chain Analytics</b> Introduction to supply chain analytics -Evolution of Supply chain analytics -Supply chain planning -Different Views of supply chain - Analytics in Supply chain	12
II	<b>UNIT II Supply Chain Strategies</b> Supply Chain Strategy - Supply chain Drivers -Developing a supply chain Strategy -Strategic Fit in Supply Chain -Demand forecasting in Supply chain	12
III	<b>Unit III Inventory and Network Analysis</b> Inventory management in Supply chain - Echelon Model of Inventory management–Network design in Supply chain -Network design of Global - Alternative channels of distribution	12
IV	<b>Analytics in Supply Chain</b> Optimum level of Product Availability -Time value of money in supply chain Analytics –Predictive modeling in forecasting Supply chain analytics -Representation of uncertainty in Supply chain (Binominal Modeling) - Trends Challenges and Future of Supply chain	12

<b>V</b>	<b>Supply Chain Techniques</b> Bull-Whip Effect and time series Analysis -Exponential smoothing method forecasting Tracking signal and seasonality model	<b>12</b>
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**Textbook:**

1. Overview of workforce scheduling software Production and Inventory Management Journal  
Building a collaboration architecture for a global supply chain by G I Campbell; S Humair

**Recommended Reference book:**

**Course Delivery method:** Face-to-face

**Course has focus on:** Foundation, Entrepreneurship

**Websites of Interest:**

<https://www.netsuite.com/portal/resource/articles/erp/supply-chain-analytics.shtml>

<https://www.edx.org/course/supply-chain-analytics>

<https://www.gartner.com/en/supply-chain/insights/supply-chain-analytics>

**Co-curricular Activities:** (Case Studies)



## Model Question Paper

**Max.: 75 Marks**

**Mi. Pass: 30 Marks**

**Answer the following questions**

**(5 x 15M = 75 Marks)**

1. a)  
b) (Or)
2. a)  
b) (Or)
3. a)  
b) (Or)
4. a)  
b) (Or)
5. a)  
b) (Or)



# P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

Siddhartha Nagar, Vijayawada – 520 010  
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## PROJECT MANAGEMENT ANALYTICS

**Offered to:** BBA – Business Analytics

**Course Type:** Core (TH)

**Year of Introduction:** 2019-20

**Year of Revision:** 2021

**Semester:** VI

**Hours Taught:** 60 hrs.

**Course Prerequisites (if any):**

**Course Description:**

**Course Objectives:**

**Course Outcomes:**

**Course Code:** ANASET18

**Year of offering:** 2022-2023

**Percentage of Revision:** NIL

**Credits:** 4

**Max. Time:** 3 Hours

Syllabus		
Unit	Learning Units	Lecture Hours
I	<b>Introduction:</b> Meaning, Scope and Objectives, Types of Projects, Generation and Screening of Ideas, Generation of Ideas, Monitoring the Environment, Corporate Appraisal, Preliminary Screening - Problems of Project management. Project Management Analytics - Why Is Analytics Important in Project Management? How Can Project Managers Use Analytics in Project Management? Project Management Analytics Approach.	12
II	<b>Data-Driven Decision-Making:</b> Characteristics of a Good Decision- Decision-Making Factors - Importance of Decisive Project Managers. Automation and Management of the Decision-Making Process - Data-Driven Decision-Making-Data-Driven Decision-Making Process Challenges	12
III	<b>Statistical Applications in Project Management:</b> Statistical Tools and Techniques for Project Management -Probability Theory - Probability Distributions -Critical- Path Method (CPM) -Program Evaluation and Review Technique (PERT)- Graphical Evaluation and Review Technique (GERT).	12
IV	<b>Human Aspects of Project Management:</b> Manpower Planning - Human Ergonomics - Estimation - Pre requisites for Successful Project Implementation.	12

<b>V</b>	<b>Closing of the Project:</b> Types of project termination, Termination procedure and evaluation of Termination possibilities.	<b>12</b>
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**Textbook:**

1. Prasanna Chandra, Project–Planning–Analyses, Selection, Implementation and Review. ‘Tata Mc Graw Hill Publishing Co.
2. Harjit Singh, Project management Analytics, A Data Driven Approach to Make rational and effective Project Decisions.

**Recommended Reference book:**

1. Project Management, 3e Paperback Pearson India; 3rd edition (1 January 2004) ISBN-10 9788177580365
2. Project management ,8e , K. Nagarajan, New Age International Publishers, New Delhi.

**Course Delivery method:** Face-to-face

**Course has focus on :** Foundation , Database Management , Practical and Entrepreneurship

**Websites of Interest :**

<https://www.tutorialspoint.com/mongodb/index.htm>

<https://github.com/mongodb/mongo>

<https://www.linkedin.com/company/mongodbin>

<https://www.guru99.com/mongodb-tutorials.html>

<https://www.kdnuggets.com/2019/06/approaches-deploying-machine-learning-production.html>

**Co-curricular Activities:** (Case Studies)

**Model Question Paper**

**Max.: 75 Marks**

**Mi. Pass: 30 Marks**

**Answer the following questions**

**(5 x 15M = 75 Marks)**

1. a)

(Or)

b)

2. a)

(Or)

b)

3. a)

(Or)

b)

4. a)

(Or)

b)

5. a)

(Or)

b)

**BOARD OF STUDIES (FOR I, III & V SEMESTERS DURING 2022-23)****Date: 29<sup>th</sup> August 2022**

Minutes of the meeting of Board of Studies in Business Administration conducted in the Department of Business Administration:

**Members Present:**

1.	Prof.Rajesh.C.Jampala, HOD, Commerce & Business Administration and Dean (Academics & Administration)	Chairman
2.	Dr.D.Suryachandra Rao, Professor, Business Management, Krishna University,Machilipatnam.	University Nominee
3.	Prof. B.K.S Prakasa Rao, College of Business and Economics, Bule Hora, Ethiopia.	Subject Expert
4.	Prof. Murali Manohar, VIT Business School, Vellore.	Subject Expert
5.	Sri.Ravi Teja Tallam, HR Manager,Trigyn Technologies Ltd., Vijayawada.	Industry Expert
6.	Mr.K.V. Ramesh Chandra, Lecturer in BBA	Member
7.	Mr.K. Vijay, Lecturer in BBA	Member
8.	Mr.D.Edukondalu, Lecturer in BBA	Member
9.	Ms.V.G.V.Rajani, Lecturer in BBA	Member

**Resolutions:**

1. It is resolved and recommended to introduce Stores Management with course code MGTSET01 in V semester of B.B.A. General Programme for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from **4 to 6.**
2. It is resolved and recommended to introduce Warehouse Management with course code MGTSET02 in V semester of B.B.A. General Programme for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from **7 to 9.**
3. It is resolved and recommended to introduce Purchase Management with course code MGTSET03 in V semester of B.B.A. General Programme for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from **10 to 12.**
4. It is resolved and recommended to introduce Logistics & Supply chain Management with course code MGTSET04 in V semester of B.B.A. General Programme for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from **13 to 15.**
5. It is resolved and recommended to introduce Brand Management with course code MGTSET05 in V semester of B.B.A. General Programme for the batch of students admitted

in 2020-21 and onwards. For the syllabus and model question paper vide page number from **16 to 18.**

6. It is resolved and recommended to introduce Customer Relationship Management with course code MGTSET06 in V semester of B.B.A. General Programme for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from **19 to 21.**
7. It is resolved and recommended to introduce Strategic HRM with course code MGTSET07 in V semester of B.B.A. General Programme for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from **22 to 24.**
8. It is resolved and recommended to introduce Compensation Management with course code MGTSET08 in V semester of B.B.A. General Programme for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from **25 to 27.**
9. It is resolved and recommended to introduce Industrial Relations with course code MGTSET09 in V semester of B.B.A. General Programme for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from **28 to 30.**
10. It is resolved and recommended to introduce Global HRM with course code MGTSET10 in V semester of B.B.A. General Programme for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from **31 to 33.**
11. It is resolved and recommended to introduce Talent Management with course code MGTSET11 in V semester of B.B.A. General Programme for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from **34 to 36.**
12. It is resolved and recommended to introduce Training & Development with course code MGTSET12 in V semester of B.B.A. General Programme for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from **37 to 39.**
13. It is resolved and recommended to introduce Cost Accounting with course code MGTSET13 in V semester of B.B.A. General Programme for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from **40 to 42.**
14. It is resolved and recommended to introduce Taxation with course code MGTSET14 in V semester of B.B.A. General Programme for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from **43 to 46.**

- 15.** It is resolved and recommended to introduce Management Accounting with course code MGTSET15 in V semester of B.B.A. General Programme for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from **47 to 49.**
- 16.** It is resolved and recommended to introduce Investment Management with course code MGTSET16 in V semester of B.B.A. General Programme for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from **50 to 52.**
- 17.** It is resolved and recommended to introduce Financial Management with course code MGTSET17 in V semester of B.B.A. General Programme for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from **53 to 56.**
- 18.** It is resolved and recommended to introduce Financial Services with course code MGTSET18 in V semester of B.B.A. General Programme for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from **57 to 59.**

**P.B.Siddhartha College of Arts & Science**  
**Bachelor of Business Administration**  
**Series A SECs in RETAILING for Semester–V**  
**STORES MANAGEMENT**

Course Code: MGTSET01

No. of Hours per week: 5

No. of Credits: 4

Max. Marks: 100

External: 75M

Internal: 25M

**Objective:** The main objective of this course is to provide the student a basic overview how the stores are professionally managed.

**Course Outcomes:**

At the end of the course, the student will be able –

CO1 To enable the student with the concept stores, its responsibilities, and its relationships with Other departments. (PO1, PO3, PO5, PO7, PSO2)

CO2 To understand various methods of material receipts and issues, maintenance of various records. (PO1, PO3, PO5, PO7 PSO2)

CO3 To understand the stock controlling techniques, safety of stock and prevention from deterioration. (PO1, PO3, PO5, PO6, PO7 PSO2)

CO4 To impart the knowledge about stores operations i.e., measurement of Stores efficiency, safety directives on store operations and control mechanism. (PO1, PO3, PO5, PO6, PO7 PSO2)

CO5 To understand the procedure manuals, its contents, preparation of manuals and its publication, distribution, and its implementations. (PO1, PO3, PO5, PO7 PSO2)

**UNIT I STORES FUNCTION**

1.1 Types of stores

1.2 Stores Responsibilities

1.3 Relationships with Other Departments

1.4 Inter-Relationship among Stores, Logistics & Supply Chain

1.5 Coding of materials

1.6 Methods of Coding

**UNIT II MATERIAL RECEIPT, ISSUE AND MAINTENANCE OF RECORDS**

2.1 Receipts from Suppliers

2.2 Inspection

2.3 Authorization of issues

2.4 Methods of issue

2.5 Records and Systems

2.6 Manual Systems

2.7 Computerized Systems

2.8 Recent Developments

**UNIT III STOCK CONTROL TECHNIQUES**

3.1 Approaches to Stock Control

3.2 ABC Analysis

3.3 Provision of Safety Stock

3.4 Stocktaking Procedure

3.5 Obsolescence and Redundancy

3.6 Prevention of Deterioration

3.7 Stock Checking

**UNIT IV STORES OPERATIONS**



- 4.1 Storehouse Location
- 4.2 Centralization of Storage
- 4.3 Measurement of Stores efficiency
- 4.4 Health and Safety directives on stores operations
- 4.5 Manual and Mechanical lifting
- 4.6 Control of Substances Hazardous to Health & the related Regulations
- 4.7 Storage Equipment

## **UNIT V      PROCEDURE MANUALS**

- 5.1 Need for Procedure Manuals
- 5.2 Preparation of the Procedure Manuals
- 5.3 Contents of the Procedure Manuals
- 5.4 Publication and Distribution of Manuals
- 5.5 Implementation of the Manuals

### **References:**

1. Jessop David & Morrison Alex, Storage and Supply of Materials, Pearson Education Ltd. England.
2. Saleemi N.A., Store keeping and Stock Control Simplified, Saleemi Publications Ltd., Nairobi.
3. Gopalakrishnan P. & Sundaresan. M., Materials Management-An Integrated Approach, PHI.
4. Gopala Krishan, Purchasing and Materials Management, Tata McGraw-Hill Education.

### **Web links:**

- [www.managementhelp.org](http://www.managementhelp.org)
- [www.slideshare.net](http://www.slideshare.net)
- [www.yourarticlelibrary.com](http://www.yourarticlelibrary.com)

## **CURRICULAR ACTIVITIES**

1. Class-room activities:
  - Question-answer sessions at the end of each unit
  - Scheduled Quizzes at the end of each unit
  - Written assignments on assigned topics
2. Library activities:  
Reading textbooks on an assigned topic and preparation of notes as per the syllabus.
3. Smart Classroom Activity:  
Setting up Google Classroom for effective delivery of subject inputs.

## **CO-CURRICULAR ACTIVITIES**

- Group discussion on Stock Control techniques and Stores operations
- Power point presentations on assigned topics

P.B.Siddhartha College of Arts & Science  
**Bachelor of Business Administration**  
**STORES MANAGEMENT**  
**Model Question Paper**

**Max. Marks: 75**  
**Time: 3 Hrs.**

Course Code: MGTSET01

**Semester – V**

**Section A**

**Answer any FIVE of the following:**

5 x 5 = 25M

1. Explain logistics supply chain management. (CO1, L2)
2. Explain manual system of stores management. (CO2, L2)
3. Explain ABC analysis. (CO3, L2)
4. Storage equipment. Explain(CO4, L2)
5. Contents of the manual. (CO5, L2)
6. Explain the concept of stock checking. (CO3, L2)
7. Theft and pilferage (CO4, L2)
8. Need for stock control. (CO3, L2)

**Section B**

**Answer the following:**

5 x 10 = 50M

9. a) Explain the relationship stores department with other departments (CO1, L2)  
Or  
b) Explain cooling Q materials. What are the methods of coding? (CO1, L2)
10. a) Explain the computerized system of monitoring records, receipts with an example. (CO2, L3)  
Or  
b) What is inspection? Methods of Inspection and explain methods of issue. (CO2, L3)
11. a) Explain different stock control techniques. (CO3, L2)  
Or  
b) Determine the factors responsible to cause damage to materials in store? How to minimize it? (CO3, L2)
12. a) Explain different types of store houses in detail. (CO4, L2)  
Or  
b) Explain health and safety measures to stores operation. Explain manual and mechanical lifting (CO4, L2)
13. a) Explain need and contents of a manual. (CO5, L2)  
Or  
b) Explain publication and distribution. How to implement manual? (CO5, L2)

**P.B.Siddhartha College of Arts & Science**  
**Bachelor of Business Administration**  
**Series A SECs in RETAILING for Semester–V**  
**WAREHOUSE MANAGEMENT**

Course Code: MGTSET02  
No. of Hours per week: 5  
No. of Credits: 4

Max. Marks: 100  
External: 75M  
Internal: 25M

**Objective:** The main objective of the course is to impart conceptual understanding on warehousing operations and their significance in retailing business.

**Course Outcomes:**

At the end of the course, the student will be able –

- CO1 To understand the functioning of warehouse and its advantages and limitations for an organization. (PO1, PO2, PO7) PSO4
- CO2 To understand the role of warehousing in retail, role of government in warehousing and relation among warehousing and supply chain. (PO1, PO2, PO5, PO7) – PSO4
- CO3 To provide the knowledge about the storage space necessary for operations and continuous monitoring for operations. (PO1, PO2, PO4) – PSO4
- CO4 To understand the health and safety perspectives at warehouse and assessment of risk at warehouse and up gradation of the technology used in warehouse. (PO1, PO3, PO6) – PSO4
- CO5 To understand various warehouse practices followed by successful companies and ICT applications used for world - class warehousing. (PO2, PO5 PO6) – PSO4

**UNIT I INTRODUCTION TO WAREHOUSE MANAGEMENT**

- 1.1 Functions in Warehouse Management
- 1.2 Warehousing Cost
- 1.3 Warehousing Management System (WMS)
- 1.4 Strategic planning for Warehousing
- 1.5 Advantages and Limitations of Warehousing

**UNIT II ROLE OF WAREHOUSING IN RETAIL**

- 2.1 Challenges in Retail Warehousing
- 2.2 Role of Warehousing in Retail management
- 2.3 Retail product tracking in Warehouse
- 2.4 Role of Government in Warehousing
- 2.5 Inter-Relationship in between Warehousing and Supply Chain

**UNIT III WAREHOUSE OPERATIONS**

- 3.1 Warehouse Structure
- 3.2 Inventory Receiving
- 3.3 Picking, Locating and Dispatching
- 3.4 Maintenance, Security and Safety
- 3.5 Records Maintenance

**UNIT IV HEALTH AND SAFETY PERSPECTIVE**

- 4.1 Health and Safety Risks at Warehouse
- 4.2 Assessment of Risks
- 4.3 Management of Health and Safety risks
- 4.4 Bar Code Scanners, Wireless LAN, Mobile Computers and RFID

## **UNIT V      WAREHOUSING PRACTICES**

- 5.1 Warehousing Practices at FCI – Case study
- 5.2 Warehousing Practices at CWC – Case study
- 5.3 Warehousing Practices at Hindustan Unilever Limited – Case study
- 5.4 Warehousing Practices at Wal-Mart – Case study
- 5.5 ICT Applications to achieve world-class Warehousing

### **References:**

1. Edward H. Frazelle, World Class Warehousing and Material Handling.
2. Gwynne Richards, Warehouse Management: A Complete guide to improving efficiency and minimizing costs in the modern warehouse, Kogan Page, London.
3. Stuart Emmett, Excellence in Warehouse Management: How to Minimize costs and Maximize Value, John Wiley & Sons, Ltd., London.
4. James A. Tompkins & Jerry D. Smith, The Warehouse Management Handbook, Tompkins Press, North Carolina.
5. David E. Mulcahy & Joachim Sydow, Supply Chain Logistics Program for Warehouse Management, CRC Press, New York.

### **Web links:**

- [www.managementhelp.org](http://www.managementhelp.org)
- [www.slideshare.net](http://www.slideshare.net)
- [www.yourarticlelibrary.com](http://www.yourarticlelibrary.com)

### **CURRICULAR ACTIVITIES**

1. Class-room activities:
  - Question-answer sessions at the end of each unit
  - Scheduled Quizzes at the end of each unit
  - Written assignments on assigned topics
2. Library activities:  
Reading textbooks on an assigned topic and preparation of notes as per the syllabus.
3. Smart Classroom Activity:  
Setting up Google Classroom for effective delivery of subject inputs.

### **CO-CURRICULAR ACTIVITIES**

- Group discussion on World class Warehousing Metrics
- Power point presentations on assigned topics

**PARVATHANENI BRAHMAYYA SIDDHARTHA COLLEGE OF ARTS AND SCIENCE**

**MODEL QUESTION PAPER**

**WAREHOUSE MANAGEMENT**

Semester: **V**

Course Code: **MGTSET02**

Time: **3 Hrs.**

Max. Marks: **75**

**SECTION – A**

**Answer any five of the following:**

**5x5=25M**

1. Warehousing Cost (**CO1, L2**)
2. Types of Warehousing (**CO3, L2**)
3. Warehousing in fashion retail(**CO2, L2**)
4. Structure of Warehouse (**CO3, L2**)
5. Wireless LAN and Mobile Computer(**CO4, L2**)
6. Health and Safety risks at Warehouse (**CO4, L2**)
7. World class warehousing (**CO5, L2**)
8. Role of Central Warehousing Corporation(**CO5, L2**)

**SECTION – B**

**Answer the following questions:**

**5x10=50M**

9. (a) Define Warehousing. Explain the functions and the management systems of Warehousing (**CO1, L2**).

**Or**

- (b) Describe the Strategic planning for warehousing. (**CO1, L2**)

10. (a) Explain the role of Government in Warehousing. (**CO2, L2**)

**Or**

- (b) What is RFID? Describe the benefits of RFID. (**CO2, L2**).

11. (a) Write about safety and security measures for warehouse operations.(**CO3, L3**)

**Or**

- (b) Explain the process of records maintenance at warehousing. (**CO3, L3**)

12. (a) How are the health and safety hazards managed at warehouses? Explain.(**CO4, L2**)

**Or**

- (b) What is a Bar Code Scanner? Elucidate its advantages and disadvantages. (**CO4, L2**)

13. (a) Explain the warehousing practices of FCI. (**CO5, L2**)

**Or**

- (b) What is World-Class Warehousing? Discuss various practices in World – Class Warehousing.(**CO5, L2**)

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**P.B.Siddhartha College of Arts & Science**  
**Bachelor of Business Administration**  
**Series A SECs in RETAILING for Semester–V**  
**PURCHASE MANAGEMENT**

Course Code: MGTSET03  
No. of Hours per week: 5  
No. of Credits: 4

Max. Marks: 100  
External: 75M  
Internal: 25M

**Objective:** The main objective of this course is to provide the student basic knowledge about the functionality and the intricacies involved in Purchase Management.

**Course Outcomes:**

At the end of the course, the student will be able –

CO1 To understand the functions, methods and practices of Purchase at local and international levels (PO1, PO2, PO6) – PSO4

CO2 To understand the Purchase procedures and mechanisms and different categories of tenders. (PO1, PO4, PO6, PO7) – PSO4

CO3 To understand the analysis, evaluation and rating of vendors while purchasing. (PO1, PO5) – PSO4

CO4 To understand the relationships among buyers and suppliers and their information sharing to find effective solutions. (PO2, PO3) – PSO4

CO5 To understand the concept of JIT and their challenges and prerequisites of cross functional teams for success (PO1, PO6) – PSO4

**UNIT I INTRODUCTION TO PURCHASE MANAGEMENT**

- 1.1 Definition & Meaning of Purchase Management
- 1.2 Components of Purchase Management
- 1.3 Relationship between Purchasing function and Supply chain in an Organization
- 1.4 Major principles of Purchase Management
- 1.5 Significance of Purchase Management

**UNIT II PURCHASING FUNCTION**

- 2.1 Local Vs. Global sources of purchase – Advantages and Limitations
- 2.2 Purchasing Methods
- 2.3 Purchasing procedure
- 2.4 Economic Order Quantity (EOQ) and Reorder Level
- 2.5 Types of Tenders and Tendering process
- 2.6 E – Procurement

**UNIT III VENDOR MANAGEMENT**

- 3.1 Types of Vendors
- 3.2 Sources for identification of Vendors
- 3.3 Criteria used for selection of Vendors
- 3.4 Methodology for Evaluation of Vendors
- 3.5 Vendor Performance metrics

**UNIT IV BUYER-SUPPLIER RELATIONSHIPS**

- 4.1 Types of Buyer-Supplier relationships
- 4.2 ZOPA & BATNA in Negotiation process
- 4.3 Impact of Negotiation on Buyer-Supplier Relationships
- 4.4 Factors affecting collaborative relationships between Buyer & Seller
- 4.5 Significance of Positive Relationships between Buyer & Seller

## **UNIT V        EMERGING CONCEPTS IN PURCHASE MANAGEMENT**

5.1 JIT Purchasing & its advantages

5.2 Pre-Requisites for successful implementation of JIT Purchasing

5.3 Role of Cross-functional teams in Purchase Management

5.4 Challenges of Cross-Functional Teams

5.5 Prerequisites to success of Cross-Functional Teams

### **References:**

1. Dobler & Burt, Purchasing and Supply Management, McGraw Hill.
2. P. Gopala Krishan, Purchasing and Materials Management, Tata McGraw-Hill Education.
3. L.N. Aggarwal & Parag Diwan, Management & Production Systems, National Publishing House.
4. N.G. Nair, Production and Operations Management, Tata McGraw Hill Publishing Co. Ltd.
5. Gopalakrishnan P. & Sundaresan. M., Materials Management-An Integrated Approach, PHI.

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[www.slideshare.net](http://www.slideshare.net)

[www.yourarticlelibrary.com](http://www.yourarticlelibrary.com)

### **CURRICULAR ACTIVITIES**

1. Class-room activities:

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Reading textbooks on an assigned topic and preparation of notes as per the syllabus.

3. Smart Classroom Activity:

Setting up Google Classroom for effective delivery of subject inputs.

### **CO-CURRICULAR ACTIVITIES**

- Group discussion on EOQ, Reorder Level and JIT
- Power point presentations on assigned topics

P.B.Siddhartha College of Arts & Science  
**Bachelor of Business Administration**  
**PURCHASE MANAGEMENT**  
**Model Question Paper**

Semester: V  
Max. Marks: 75

Course Code: MGTSET03

Time: 3 Hrs.

**Section A**

5 x 5 = 25M

**Answer any FIVE of the following:**

1. What is e – procurement? (CO2, L2)
2. Explain major principles of Purchase Management. (CO1, L2)
3. Describe various types of tenders. (CO2, L2)
4. What are different types of vendors? (CO3, L2)
5. Describe ZOPA & BATNA in Negotiation process. (CO4, L2)
6. Write about cross functional teams. (CO5, L2)
7. What is Reorder Level? (CO2, L2)
8. How an organization makes purchase decisions? (CO2, L2)

**Section B**

5 x 10 = 50M

**Answer the following:**

9. a) Define purchase. Explain the sources of purchase in detail. (CO1, L2)  
Or  
b) Write about various purchasing methods. (CO1, L2)
10. a) Write about the process of purchasing elaborately. (CO2, L2)  
Or  
b) What is tendering? Discuss various forms of tenders. (CO2, L2)
11. a) Who is vendor? Write about vendor selection process. (CO3, L3)  
Or  
b) What is vendor analysis? Explain vendor evaluation process in detail. (CO3, L3)
12. a) Who is supplier? How to build supplier relationships? (CO4, L2)  
Or  
b) How to develop and manage collaborative and alliance relationships? (CO4, L2)
13. a) Discuss the challenges faced by cross – functional teams. (CO5, L2)  
Or  
b) Write about the importance of JIT in the supply management. (CO5, L2)



**P.B.Siddhartha College of Arts & Science**  
**Bachelor of Business Administration**  
**Series A SECs in RETAILING for Semester–V**  
**LOGISTICS & SUPPLYCHAIN MANAGEMENT**

Course Code: MGTSET04  
No. of Hours per week: 5  
No. of Credits: 4

Max. Marks: 100  
External: 75M  
Internal: 25M

**Objective:** The main objective of this course is to provide the student basic knowledge about the functionality and the intricacies involved in Purchase Management.

**Course Outcomes:**

At the end of the course, the student will be able –

- CO1 To Understand the fundamentals of Supply Chain Management (SCM) including its role in An organization (PO1, PO2, PO6) – PSO4
- CO2 To Understand the various concepts in SCM like Vendor Management, Value chain and Cross Docking (PO1, PO4, PO6, PO7) – PSO4
- CO3 To understand the relationships among Logistics, Inventory and Transportation to find effective solutions. (PO2, PO3) – PSO4
- CO4 To understand the functions of a Distribution Centre and the flexibility availed by outsourcing certain functions. (PO2, PO3) – PSO4
- CO5 To understand the challenges and prerequisites of E-Logistics and E-Supplychain Management. (PO1, PO6) – PSO4

**UNIT I FUNDAMENTALS OF SUPPLYCHAIN MANAGEMENT**

- 1.1 Concept of Supply Chain Management
- 1.2 Objectives of Supply Chain Management
- 1.3 Evolution of Supply Chain Management
- 1.4 Issues involved in developing the Supply Chain Management
- 1.5 Supply Chain Integration

**UNIT II SUPPLYCHAIN MANAGEMENT OPERATIONS**

- 2.1 Characteristics of Integrated Supply Chain Management
- 2.2 Vendor Management
- 2.3 Value Chain
- 2.4 Innovations in Supply Chain Management
- 2.5 Collaborative Planning, Forecasting and Replenishment
- 2.6 Cross Docking

**UNIT III LOGISTICS AND TRANSPORTATION MANAGEMENT**

- 3.1 Evolution of Retail Logistics
- 3.2 Functions of Inventory Management
- 3.3 Essential elements of Transportation Management
- 3.4 Characteristics of Multimodal Transport
- 3.5 Modal Comparisons
- 3.6 International Air Cargo Transport
- 3.7 Coastal and Ocean transportation

**UNIT IV DISTRIBUTION CENTRE**

- 4.1 Functions of a Distribution Centre
- 4.2 Management of Inbound and Outbound Logistics
- 4.3 Quick Response Delivery System
- 4.4 Logistics of Electronic Retailing

4.5 3PL & other outsourcing methods

## **UNIT V E-SUPPLY CHAIN**

5.1 Coordinating a supply chain in E-business

5.2 Financial evaluation of supply chain decisions

5.3 Activities of E-Logistics & E-SCM

5.4 Supply Chain Monitoring and Control

5.5 Inventory Management Using Wireless Devices

### **References:**

1. Haffey, D., (2015), Digital Business and E-Commerce Management: Strategy, Implementation and Practice, 6th Edition, Pearson Education Limited, United Kingdom.
2. Michael Hugos and Chris Thomas, (2005), Supply Chain Management in the Retail industry, John Wiley & Sons, Hoboken, NJ.
3. Michael Levy and Barton A Weitz, (2017), Retailing Management - Global Edition, 8th Edition, McGraw Hill Higher Education, New Delhi.
4. Sunil Chopra and Peter Meindl, (2014), Supply Chain Management: Strategy, Planning, and Operation, 6th Revised Edition, Pearson Education India, Noida.
5. Dobler & Burt, Purchasing and Supply Management, McGraw Hill.
6. P. Gopala Krishan, Purchasing and Materials Management, Tata McGraw-Hill Education.

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[www.slideshare.net](http://www.slideshare.net)

[www.yourarticlelibrary.com](http://www.yourarticlelibrary.com)

### **CURRICULAR ACTIVITIES**

1. Class-room activities:

- Question-answer sessions at the end of each unit
- Scheduled Quizzes at the end of each unit
- Written assignments on assigned topics

2. Library activities:

Reading textbooks on an assigned topic and preparation of notes as per the syllabus.

3. Smart Classroom Activity:

Setting up Google Classroom for effective delivery of subject inputs.

### **CO-CURRICULAR ACTIVITIES**

- Group discussion on E-Logistics & Supply chain Management
- Power point presentations on assigned topics

**P.B.SIDDHARTHA COLLEGE OF ARTS AND SCIENCE :: VIJAYAWADA**  
**Course: LOGISTICS & SUPPLYCHAIN MANAGEMENT**

Semester: V

Course Code: MGTSET04

Time: 3 Hrs.

Max. Marks: 75

**SEMESTER END MODEL QUESTION PAPER**

**TITLE:**

**COURSE CODE:**

**Time: 3 Hours**

**Max. Marks: 75**

**Roll No:**

\*\*\*\*\*

**SECTION A**

Answer any **FIVE** questions:

5 X 5 = 25 Marks

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.

**SECTION B**

Answer the following :

5 X 10 = 50 Marks

UNIT - I

9. a)

OR

b)

UNIT - II

10. a)

OR

b)

UNIT - III

11. a)

OR

b)

UNIT - IV

12. a)

OR

b)

UNIT - V

13. a)

OR

b)

\*\*\*\*\*

**P.B.Siddhartha College of Arts & Science**  
**Bachelor of Business Administration**  
**Series A SECs in RETAILING for Semester–V**  
**BRAND MANAGEMENT**

Course Code: MGTSET05  
No. of Hours per week: 5  
No. of Credits: 4

Max. Marks: 100  
External: 75M  
Internal: 25M

**Objective:** To understand and appreciate the significant influence of Brands and their reach in ensuring customer retention and continued loyalty.

**Course Outcomes:**

At the end of the course, the student will be able –

- CO1 To understand the process of Branding and the essential elements of Branding. (PO1, PO2, PO7) PSO4
- CO2 To understand the role of Brand Positioning and Brand Equity for the success of a business. (PO1, PO2, PO5, PO7) – PSO4
- CO3 To provide the knowledge about various perspectives of consumers on Brands, and the Brand influence on Buying decisions of consumers. (PO1, PO2, PO4) – PSO4
- CO4 To understand the Branding Strategies and factors affecting Branding Strategies. (PO1, PO3, PO6) – PSO4
- CO5 To understand how to manage Brand image and the related advantages therein for the business organization. (PO2, PO5 PO6) – PSO4

**UNIT I INTRODUCTION TO BRANDING**

- 1.1 Definition and meaning of a Brand
- 1.2 Differences between Brands and Products
- 1.3 Essential elements of Branding
- 1.4 Steps in Branding process
- 1.5 Anatomy of a Brand
- 1.6 Brand levels

**UNIT II BRAND POSITIONING AND BRAND EQUITY**

- 2.1 Brand positioning Vs. Product Positioning
- 2.2 Brand Positioning and its significance
- 2.3 3C's of Brand Positioning
- 2.4 Importance of Points of parity and Points of difference
- 2.5 Measuring Brand Equity
- 2.6 Influence of Brand Positioning on Brand Equity

**UNIT III CONSUMER PERSPECTIVES ON BRAND**

- 3.1 Brand influence on Buying decision of Consumer
- 3.2 Stages in Consumer decision making Process
- 3.3 Post purchase behaviour
- 3.4 Factors influencing the choice of Brand
- 3.5 Types of Brand Loyalty

**UNIT IV BRANDING STRATEGIES**

- 4.1 Product Branding
- 4.2 Service Branding
- 4.3 Corporate Branding
- 4.4 Co-Branding
- 4.5 Online Branding

#### 4.6 Factors affecting Branding strategies

### **UNIT V      MANAGING BRAND IMAGE**

#### 5.1 Common Brand Awareness problems

#### 5.2 Brand revitalization

#### 5.3 Brand Elimination

#### 5.4 Brand Extension

#### 5.5 Advantages of Managing Brand image

#### 5.6 Challenges of Brand Management

#### **References:**

1. Harsh .V, Verma, Brand Management , Excel Books New Delhi 2002
2. Bhall. A.K, Brand Management, Macmillan Publication ,New Delhi 2011
3. Mahim, Sagar, Brand Management, Ane Books, New Delhi 2009.
4. Subroto Sengupta, Brand Positioning strategies for competitive advantage, Tata McGraw Hill, 2010.

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[www.slideshare.net](http://www.slideshare.net)

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### **CURRICULAR ACTIVITIES**

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Reading textbooks on an assigned topic and preparation of notes as per the syllabus.

#### 3. Smart Classroom Activity:

Setting up Google Classroom for effective delivery of subject inputs.

### **CO-CURRICULAR ACTIVITIES**

- Group discussion on Branding Strategies
- Power point presentations on assigned topics

**P.B.SIDDHARTHA COLLEGE OF ARTS AND SCIENCE :: VIJAYAWADA**  
**Course: BRAND MANAGEMENT**

Semester: V

Course Code: MGTSET05

Time: 3 Hrs.

Max. Marks: 75

**SEMESTER END MODEL QUESTION PAPER**

**TITLE:**

**COURSE CODE:**

**Time: 3 Hours**

**Max. Marks: 75**

**Roll No:**

\*\*\*\*\*

**SECTION A**

Answer any **FIVE** questions:

5 X 5 = 25 Marks

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.

**SECTION B**

Answer the following :

5 X 10 = 50 Marks

UNIT - I

9. a)

OR

b)

UNIT - II

10. a)

OR

b)

UNIT - III

11. a)

OR

b)

UNIT - IV

12. a)

OR

b)

UNIT - V

13. a)

OR

b)

\*\*\*\*\*

**P.B.Siddhartha College of Arts & Science**  
**Bachelor of Business Administration**  
**Series A SECs in RETAILING for Semester–V**  
**CUSTOMER RELATIONSHIP MANAGEMENT**

Course Code: MGTSET06

No. of Hours per week: 5

No. of Credits: 4

Max. Marks: 100

External: 75M

Internal: 25M

**Objective:** To inculcate the fundamental knowledge on Applications of CRM in the contemporary business units and their reach in ensuring customer retention and Loyalty.

**Course Outcomes:**

At the end of the course, the student will be able –

CO1 To understand the process of Branding and the essential elements of Branding. (PO1, PO2, PO7) PSO4

CO2 To understand the role of Brand Positioning and Brand Equity for the success of a business. (PO1, PO2, PO5, PO7) – PSO4

CO3 To provide the knowledge about various perspectives of consumers on Brands, and the Brand influence on Buying decisions of consumers. (PO1, PO2, PO4) – PSO4

CO4 To understand the Branding Strategies and factors affecting Branding Strategies. (PO1, PO3, PO6) – PSO4

CO5 To understand how to manage Brand image and the related advantages therein for the business organization. (PO2, PO5 PO6) – PSO4

**UNIT I INTRODUCTION TO CUSTOMER RELATIONSHIP MANAGEMENT**

1.1 Essential Components of Customer Relationship Management (CRM)

1.2 Steps in CRM Process

1.3 Importance of CRM

1.4 Limitations of CRM

1.5 Pre-Requisites for effective CRM

**UNIT II CRM CONCEPTS**

2.1 Types of Customer Loyalty

2.2 Planning and Managing Customer Loyalty Programmes

2.3 Stages of Customer Life Cycle

2.4 Customer Lifetime Value (CLV)

2.5 Customer Experience Management

2.6 Customer Touch point Analysis

**UNIT III MANAGING CUSTOMER RELATIONS**

1.1 Roll of Call Centres in CRM

1.2 Multi-Channel CRM

1.3 Impact of CRM on Marketing Strategy

1.4 Impact of CRM on Sales Strategy

1.5 Impact of CRM on Customer Service Strategy

**UNIT IV IMPLEMENTATION OF E-CRM**

1.1 Operational E-CRM

1.2 Collaborative E-CRM

1.3 Analytical E-CRM

1.4 Pre-Requisites for implementing E-CRM

1.5 Challenges in E-CRM implementation

## **UNIT V      PRIVACY & ETHICS IN CRM**

- 1.1 Ethical considerations in CRM
- 1.2 Consumer Privacy Concerns
- 1.3 Measures to protect Customer Data
- 1.4 Organisation Privacy concerns
- 1.5 Future of CRM

### **References:**

1. Urvashi Makkar & Harinder Kumar Makkar “Customer Relationship Management” Tata McGraw Hill Education – ed.2012
2. P.P. Singh & N. Jinender Kumar “Customer Relationship Management”, Regal Publication, ed.2009
3. Jill Dyché “ The CRM handbook: a business guide to customer relationship management” Addison – Wesley, ed.2002.

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### **CURRICULAR ACTIVITIES**

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3. Smart Classroom Activity:  
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### **CO-CURRICULAR ACTIVITIES**

- Group discussion on CRM Concepts
- Power point presentations on assigned topics



**P.B.SIDDHARTHA COLLEGE OF ARTS AND SCIENCE :: VIJAYAWADA**  
**Course: CUSTOMER RELATIONSHIP MANAGEMENT**

Semester: V

Course Code: MGTSET06

Time: 3 Hrs.

Max. Marks: 75

**SEMESTER END MODEL QUESTION PAPER**

**TITLE:**

**COURSE CODE:**

**Time: 3 Hours**

**Max. Marks: 75**

**Roll No:**

\*\*\*\*\*

**SECTION A**

Answer any **FIVE** questions:

5 X 5 = 25 Marks

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.

**SECTION B**

Answer the following :

5 X 10 = 50 Marks

UNIT - I

9. a)

OR

b)

UNIT - II

10. a)

OR

b)

UNIT - III

11. a)

OR

b)

UNIT - IV

12. a)

OR

b)

UNIT - V

13. a)

OR

b)

\*\*\*\*\*

**P.B.Siddhartha College of Arts & Science**  
**Bachelor of Business Administration**  
**Series B SECs in HRM for Semester-V**  
**STRATEGIC HUMAN RESOURCE MANAGEMENT**

Course Code: MGTSET07  
Semester – V  
No. of Credits: 4

Max. Marks: 100  
External: 75M  
Internal: 25M

**Objective:** The main objective of this course is to provide the student with a conceptual understanding of Strategic Human Resource Management and its impact on organizational performance.

**Course Outcomes:**

At the end of the course, the student will be able –

- CO1 To understand the dimensions of strategic human resource management and the forces influencing the same. (PO1, PO2, PO3, PO5, PSO4)
- CO2 To understand the process of environmental scanning and the intricacies involved in formulating long term objectives. (PO1, PO2, PO3, PO5, PO7, PSO4)
- CO3 To understand the concept Human Resource Strategy (HRS) and its impact on organizational performance. (PO1, PO2, PO3, PO5, PO7, PSO4)
- CO4 To understand the optimum utilization of human resources and strategically oriented performance management systems. (PO1, PO2, PO3, PO5, PO7, PSO4)
- CO5 To understand to develop an integrated Human Resource Management (HRM) strategy. (PO1, PO2, PO3, PO5, PO7, PSO4)

**UNIT I STRATEGIC HR MANAGEMENT**

- 1.1 Nature and Significance of Strategic HR Management
- 1.2 Dimensions of Strategic HR Decisions
- 1.3 Strategic HR Management Model and components
- 1.4 HR Strategy Formulation
- 1.5 Forces Influencing the HR Strategy Formulation - Porter's Model

**UNIT II ENVIRONMENT FORECASTING**

- 1.1 Analyzing the Company Profile, Long-Term Objectives and Strategies
- 1.2 Role of Structure, Leadership and Culture
- 1.3 Institutionalizing the Strategy
- 1.4 Strategy Implementation
- 1.5 Evaluating the Strategy
- 1.6 Corporate Strategy and Global Strategy

**UNIT III HUMAN RESOURCE STRATEGY**

- 1.1 Concept and Approaches to HR Strategy
- 1.2 HR Strategy and Business Strategy
- 1.3 Change in HR Management Strategies
- 1.4 Training and Development Strategies
- 1.5 Organizational Performance oriented HR Strategies
- 1.6 Difficulties in implementation of HR Strategy

**UNIT IV STRATEGIC HUMAN RESOURCE PROCESSES**

- 4.1 Work force Utilization and Employment Practices
- 4.2 Efficient Utilization of Human Resources
- 4.3 Dealing with employee shortages and selection of employees
- 4.4 Dealing with employee surpluses and special implementation challenges

4.5 Reward and development systems

4.6 Strategically Oriented Performance Management Systems and compensation systems

## **UNIT V INTEGRATED HRM STRATEGY**

5.1 Role of HR department in Strategy Formulation

5.2 Integrating Human Resources in Strategic Decisions

5.3 Role of HRIS

5.4 Integrated HRM Strategy: Some Key Issues

5.5 HRM Strategy for Future

### **References:**

1. Mabey, Christefer and Salman, Graeme: Strategic Human Resource Management, Beacon Book, New Delhi .
2. Salaman, Graeme: Human Resource Strategies, Sage Publications, New Delhi .
3. Bowman, Cliff: The Essense of Strategic Management, Prentice Hall, New Delhi .
4. Monappa, Arun and Engineer, Mahrukh: Liberalisation and Human Resource Management, Response Books, New Delhi .
5. Starkey, Ken and Mc Kainlyu, alan: Corporate Strategy and Human Resources, Beacon Books, New Delhi .
6. Druker, Peter F: Managing for the future, Butterworth – Heinmann Ltd., Oxford .

### **Web links:**

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[www.slideshare.net](http://www.slideshare.net)

[www.yourarticlelibrary.com](http://www.yourarticlelibrary.com)

### **CURRICULAR ACTIVITIES**

1. Class-room activities:

- Question-answer sessions at the end of each unit
- Scheduled Quizzes at the end of each unit
- Written assignments on assigned topics

2. Library activities:

Reading textbooks on an assigned topic and preparation of notes as per the syllabus

3. Smart Classroom Activity:

Setting up Google Classroom for effective delivery of subject inputs

### **CO-CURRICULAR ACTIVITIES**

- Group discussion on HRS
- Power point presentations on assigned topics

**P.B.SIDDHARTHA COLLEGE OF ARTS AND SCIENCE :: VIJAYAWADA**  
**Course: STRATEGIC HUMAN RESOURCE MANAGEMENT**

Semester: V

Course Code: MGTSET07

Time: 3 Hrs.

Max. Marks: 75

**SEMESTER END MODEL QUESTION PAPER**

**TITLE:**

**COURSE CODE:**

**Time: 3 Hours**

**Max. Marks: 75**

**Roll No:**

\*\*\*\*\*

**SECTION A**

Answer any **FIVE** questions:

5 X 5 = 25 Marks

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.

**SECTION B**

Answer the following :

5 X 10 = 50 Marks

UNIT - I

9. a)

OR

b)

UNIT - II

10. a)

OR

b)

UNIT - III

11. a)

OR

b)

UNIT - IV

12. a)

OR

b)

UNIT - V

13. a)

OR

b)

\*\*\*\*\*

**P.B.Siddhartha College of Arts & Science**

**Bachelor of Business Administration  
Series B SECs in HRM for Semester-V  
COMPENSATION MANAGEMENT**

Course Code: MGTSET08

Semester – V

No. of Credits: 4

Max. Marks: 100

External: 75M

Internal: 25M

**Objective:** The main objective of this course is to provide the student with a conceptual understanding of Compensation Management and the nuances involved in employee compensation management.

**Course Outcomes:**

At the end of the course, the student will be able –

- CO1 To understand the principles of Employee Compensation Management and various concepts of wages. (PO1, PO2, PO3, PO5, PSO4)
- CO2 To understand the process of job evaluation and the factors that determine wages as well as wage differentials. (PO1, PO2, PO3, PO5, PO7, PSO4)
- CO3 To understand the process of wage fixation and role of wage board & pay commission. (PO1, PO2, PO3, PO5, PO7, PSO4)
- CO4 To understand different kinds of wage payment methods and the importance of linking wages with employee productivity. (PO1, PO2, PO3, PO5, PO7, PSO4)
- CO5 To understand various wage components and role of HR department in compensation management. (PO1, PO2, PO3, PO5, PO7, PSO4)

**UNIT I COMPENSATION MANAGEMENT**

- 1.1 Principles of Compensation Management
- 1.2 Significance of Compensation Management
- 1.3 Definitions of Wage and Salary
- 1.4 Minimum Wage, Fair Wage and Living Wage
- 1.5 Nominal Vs. Real Wages in Indian & Global contexts
- 1.6 Elements of Compensation Policy

**UNIT II WAGE DETERMINATION**

- 2.1 Principles of wage determination
- 2.2 Wage determinant Factors
- 2.3 Job Evaluation and its Role in Wage Determination
- 2.4 Factors affecting Wage Differentials

**UNIT III WAGE FIXATION**

- 1.1 Factors affecting wage fixation
- 1.2 Statutory Wage Fixation
- 1.3 Role of Wage Boards
- 1.4 Collective Bargaining for wage fixation
- 1.5 Role of Pay Commission

**UNIT IV WAGE PAYMENT METHODS**

- 4.1 Time and Piece Rate Systems
- 4.2 Payment by Results (PBR)
- 4.3 Principles for Installing Incentive System
- 4.4 Linking Wages with Productivity
- 4.5 Wage incentive Schemes in India and abroad

## **UNIT V      WAGE COMPONENTS**

- 5.1 Wage components
- 5.2 Basic Wage and Dearness Allowance
- 5.3 Bonus and General Allowances
- 5.4 Fringe Benefits
- 5.5 Managerial Compensation

### **References:**

1. Aswathappa, K: Human Resources and Personnel Management, Tata Mc Graw Hill Publishing Company Ltd, New Delhi , 2004.
2. Belcher, W. David: Wage and Salary Administration, Prentice-Hall, Inc, Englewood Cliffs, New Jersey, 1962.
3. Bhagoliwala, T.N: Economics of Labour and Industrial Relations, Sahitya Bhavan Publications, Agra .
4. Chatterjee, N.N: Management of Personnel in Indian Enterprises, Allied Book Agency, Calcutta .
5. Sarma, A.M: Understanding Wage System, Himalaya Publishing House, Mumbai, 2004.

### **Web links:**

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### **CURRICULAR ACTIVITIES**

1. Class-room activities:
  - Question-answer sessions at the end of each unit
  - Scheduled Quizzes at the end of each unit
  - Written assignments on assigned topics
2. Library activities:  
Reading textbooks on an assigned topic and preparation of notes as per the syllabus
3. Smart Classroom Activity:  
Setting up Google Classroom for effective delivery of subject inputs

### **CO-CURRICULAR ACTIVITIES**

- Group discussion on Wage components
- Power point presentations on assigned topics

**P.B.SIDDHARTHA COLLEGE OF ARTS AND SCIENCE :: VIJAYAWADA**  
**Course: COMPENSATION MANAGEMENT**

Semester: V

Course Code: MGTSET08

Time: 3 Hrs.

Max. Marks: 75

**SEMESTER END MODEL QUESTION PAPER**

**TITLE:**

**COURSE CODE:**

**Time: 3 Hours**

**Max. Marks: 75**

**Roll No:**

\*\*\*\*\*

**SECTION A**

Answer any **FIVE** questions:

5 X 5 = 25 Marks

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.

**SECTION B**

Answer the following :

5 X 10 = 50 Marks

UNIT - I

9. a)

OR

b)

UNIT - II

10. a)

OR

b)

UNIT - III

11. a)

OR

b)

UNIT - IV

12. a)

OR

b)

UNIT - V

13. a)

OR

b)

\*\*\*\*\*

**P.B.Siddhartha College of Arts & Science**

**Bachelor of Business Administration  
Series B SECs in HRM for Semester–V  
INDUSTRIAL RELATIONS**

Course Code: MGTSET09

No. of Hours per week: 5

No. of Credits: 4

Max. Marks: 100

External: 75M

Internal: 25M

**Objective:** The main objective of the course is to impart the student a conceptual understanding on industrial relations scenario in India with a focus on the impact of industrial disputes, trade unions and collective bargaining on industrial relations.

**Course Outcomes:**

At the end of the course, the student will be able –

- CO1 To impart an overview of industrial relations, its contents, scope, programs and its functional requirement of successful industrial relations. (PO1, PO3, PO4, PO5, PSO2)
- CO2 To understand various industrial disputes and procedures followed for the settlement and to understand the organs of industrial peace and the grievance redressal procedure. (PO1, PO3, PO4, PO5, PO7, PSO2)
- CO3 To understand the concept and functions of trade unions, various types of trade unions and trade union movement in changing business context. (PO1, PO3, PO4, PO5, PO7 PSO2)
- CO4 To impart the knowledge about the workers participating in management and level, forms of participation and various causes of failure of joint management council. (PO1, PO3, PO4, PO5, PSO2)
- CO5 To understand the concept of collective bargaining, its necessity, importance, principles and process of negotiations. (PO1, PO3, PO4, PO5, PO7, PSO2)

**UNIT I AN OVERVIEW ON INDUSTRIAL RELATIONS**

- 1.1 Scope of Industrial Relations
- 1.2 Contents of Industrial Relations
- 1.3 Stakeholders of Industrial Relations
- 1.4 Industrial Relations programmes
- 1.5 An Overview on Factories Act and Industrial Disputes Act

**UNIT II INDUSTRIAL DISPUTES**

- 2.1 Types of Disputes
- 2.2 Causes of industrial disputes
- 2.3 Procedure for the settlement of industrial disputes
- 2.4 Organs of Industrial peace - Tripartite Machinery, code of discipline and voluntary arbitration
- 2.5 Grievance Redressal procedure

**UNIT III TRADE UNIONS**

- 3.1 Meaning of Trade unions and their features
- 3.2 Objectives and functions of trade unions
- 3.3 Types of Trade Unions in India
- 3.4 Trade Union movement in changing business context – A Case study on Trade Unions in IT Industry in India

**UNIT IV PARTICIPATIVE MANAGEMENT**

- 4.1 Objectives of workers participation in management
- 4.2 Levels of participation
- 4.3 Forms of participation in India
- 4.4 Causes for failure of joint management councils in India



## **UNIT V COLLECTIVE BARGAINING**

- 5.1 Meaning and Features of collective bargaining
- 5.2 Importance of collective bargaining
- 5.3 Principles of Collective Bargaining
- 5.4 Process of negotiation
- 5.5 Contract administration

### **References:**

1. P. Subba Rao, Industrial Relationship, Himalaya Publishers.
2. Arun Monappa, Industrial Relations – ArunMonappa, Sultan Chand Publishers
3. Pramod Verma, Management of Industrial Relations, Himalaya publishing house
4. Charles Myeres: Industrial Relations in India

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- [www.slideshare.net](http://www.slideshare.net)
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### **CURRICULAR ACTIVITIES**

1. Class-room activities:
  - Question-answer sessions at the end of each unit
  - Scheduled Quizzes at the end of each unit
  - Written assignments on assigned topics
2. Library activities:  
Reading textbooks on an assigned topic and preparation of notes as per the syllabus
3. Smart Classroom Activity:  
Setting up Google Classroom for effective delivery of subject inputs

### **CO-CURRICULAR ACTIVITIES**

- Group discussion on Industrial disputes
- Power point presentations on assigned topics

**PARVATHANENI BRAHMAYYA SIDDHARTHA COLLEGE OF ARTS AND SCIENCE**

**MODEL QUESTION PAPER**

Semester: V

Course Code: MGTSET09

Time: 3 Hrs.

Max. Marks: 75

**Industrial Relations (BBA programme)**

Semester: V

Time: 3 Hrs.

Max. Marks: 75

**Section – A**

Answer any five of the following:

5x5=25m

1. Scope of Industrial relations (CO1, L2)
2. Outline Industrial relations programmes (CO1, L2)
3. Summarise the procedure for settlement of Industrial Disputes (CO2, L2)
4. Explain Organs of Industrial Peace (CO2, L2)
5. Explain types of trade unions in India. (CO3, L2)
6. Illustrate Causes of failure of joint management council (CO4, L2)
7. Appraise Process of negotiation (CO5, L2)
8. Discuss about the Contract administration (CO5, L2)

**Section – B**

Answer the following questions:

5x10=50m

**Unit – I**

9. (a) Define Industrial Relations and explain contents & actors in Industrial relations (CO1, L2)  
Or  
(b) Describe Industrial Disputes Act (CO1, L2)

**Unit – II**

10. (a) Classify Industrial Disputes and explain causes for Industrial Disputes. (CO2, L3)  
Or  
(b) Distinguish between Grievance & Dispute and state grievance redressal procedure. (CO2, L3)

**Unit – III**

11. (a) Describe features, objectives and functions of Trade Unions. (CO3, L2)  
Or  
(b) Describe the changes occurred in Trade Union movement in current business scenario (CO3, L2)

**Unit – IV**

12. (a) Illustrate the objectives of workers participation in India. (CO4, L2)  
Or  
(b) Express the levels of workers participation in management. (CO4, L2)

**Unit – V**

13. (a) Discuss Meaning, features & importance of Collective Bargaining. (CO5, L2)  
Or  
(b) Analyse principles of Collective Bargaining. (CO5, L2)

\* \* \*

**P.B.Siddhartha College of Arts & Science**  
**Bachelor of Business Administration**  
**Series B SECs in HRM for Semester–V**  
**GLOBAL HUMANRESOURCE MANAGEMENT**

Course Code: MGTSET10  
No. of Hours per week: 5  
No. of Credits: 4

Max. Marks: 100  
External: 75M  
Internal: 25M

**Objective:** The main objective of the course is to impart conceptual understanding on application of HRM policies and practices at global level with a focus on emerging issues in global Human resource management.

**Course Outcomes:**

At the end of the course, the student will be able –

CO1: Describe functions and various issues pertaining to Global Human Resource Management (PO1, PO5, PO7, PSO1, PSO4)

CO2: Identify various recruitment and selection methods employed in International context (PO1, PO5, PO7, PSO1, PSO4)

CO3: Identify the important elements of Performance Management System internationally (PO1, PO5, PO7, PSO1, PSO4)

CO4: Appreciate various Training and Development methods employed in International context (PO1, PO5, PO7, PSO1, PSO4)

CO5: Describe various issues relevant to International compensation (PO1, PO5, PO7, PSO1, PSO4)

**UNIT I CONCEPTS OF GLOBAL HRM**

- 1.1 Reasons for emergence of GHRM
- 1.2 Difference between GHRM and Domestic HRM
- 1.3 Organizational dynamics and GHRM
- 1.4 Role of culture in GHRM
- 1.5 Challenges of Global Human Resource Management

**UNIT II RECRUITMENT AND SELECTION IN INTERNATIONAL CONTEXT**

- 2.1 International staff: Parent Country Nationals, Third Country Nationals and Host Country Nationals
- 2.2 Recruitment method using Head-Hunters
- 2.3 Cross-national advertising (An Overview)
- 2.4 Criteria for E-Recruitment and Selection
- 2.5 Techniques for E-Recruitment and Selection
- 2.6 Interview methods for international selection

**UNIT III PERFORMANCE MANAGEMENT**

- 3.1 A conceptual background on Performance management
- 3.2 Stages in Performance management cycle
- 3.3 Criteria considered for appraisal of international employees
- 3.4 Issues and challenges in international performance management
- 3.5 Performance management practices across the globe

**UNIT IV TRAINING AND DEVELOPMENT IN GLOBAL CONTEXT**

- 4.1 Expatriate training and Repatriate training for international staff
- 4.2 Methods of training and development (An Overview)
- 4.3 Stages in Career Development
- 4.4 Developing international staff and multinational teams
- 4.5 Knowledge transfer in multinational companies

## **UNIT V INTERNATIONAL COMPENSATION**

- 5.1 Forms of International compensation
- 5.2 Factors that influence compensation policy
- 5.3 Key components of international compensation
- 5.4 Compensation practices across the globe
- 5.5 Social security systems across the globe
- 5.6 Global compensation and emerging issues

### **References:**

1. Monir H. Tayeb, International Human Resource Management, Oxford University Press, 2005.
2. Peter J. Dowling, Denise E. Welch, International Human Resource Management, Cengage Learning.
3. Aswathappa K, Sadhna Das, International Human Resource Management, Mc Graw Hill.
4. Evans, Pucik, Barsoux, The Global Challenge: Framework for International Human Resource Management - Tata McGraw-Hill Irwin.
5. Tony Edwards, Chris Rees, International Human Resource Management, Person Education.
6. Rao P. L., International Human resource Management, Excel Books.
7. Chris Brewster, International Human resource Management, University Press.

### **Web links:**

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- [www.yourarticlelibrary.com](http://www.yourarticlelibrary.com)

### **CURRICULAR ACTIVITIES**

1. Class-room activities:
  - Question-answer sessions at the end of each unit
  - Scheduled Quizzes at the end of each unit
  - Written assignments on assigned topics
2. Library activities:  
Reading textbooks on an assigned topic and preparation of notes as per the syllabus
3. Smart Classroom Activity:  
Setting up Google Classroom for effective delivery of subject inputs

### **CO-CURRICULAR ACTIVITIES**

- Group discussion on Expatriation and Repatriation
- Power point presentations on assigned topics

**P.B.Siddhartha College of Arts & Science**  
**Global Human Resource Management**

Semester: V

Course Code: MGTSET10

Time: 3 Hrs.

Max. Marks: 75

**Model Question Paper**

**Max. Marks: 75**

**Time: 3 Hrs.**

**Semester – V**

**Section A**

**Answer any FIVE of the following:**

**5 X 5 = 25M**

1. Role of culture in GHRM (CO1, L2)
2. Reasons for emergence of GHRM (CO1, L2)
3. E – Recruitment selection criteria.(CO2, L2)
4. Cross national advertising. (CO2, L2)
5. Appraisal of expatriate. (CO4, L2)
6. Career development. (CO4, L2)
7. Knowledge transfer in multinational companies. (CO4, L2)
8. What are the factors influencing compensation policy? (CO5, L2)

**Section B**

**Answer any FIVE of the following:**

**5 X 10 = 50M**

**Unit I**

9. A) Explain the concept of GHRM as distinct from domestic human resource management. (CO1, L2)

**(OR)**

- B) Explain the organizational dynamics and integration human resource management. (CO1, L2)

**Unit II**

10. A) Explain the scope of recruitment method using the Head-Hunters in a Global organization. (CO2, L2)

**(OR)**

- B) Discuss about the Parent Country, Third Country and Host Country Nationals.(CO2, L2)

**Unit III**

11. A) What are the issues and challenges in international performance management? (CO3, L2)

**(OR)**

- B) Define Performance Appraisal. Explain the methods of Performance Appraisal. (CO3, L2)

**Unit IV**

12. A) What are the key aspects of successful expatriate training? (CO4, L3)

**(OR)**

- B) Discuss about the training and development of international staff. (CO4, L3)

**Unit V**

13. A) Explain the key components of international compensation.(CO5, L2)

**(OR)**

- B) Write a note on social security system across the countries in international compensation. (CO5, L2)

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**P.B.Siddhartha College of Arts & Science**

**Bachelor of Business Administration  
Series B SECs in HRM for Semester–V  
TALENT MANAGEMENT**

Course Code: MGTSET11

No. of Hours per week: 5

No. of Credits: 4

Max. Marks: 100

External: 75M

Internal: 25M

**Objective:** The main objective of the course is to provide the student with a broader understanding of various issues pertaining to talent management with a stress on challenges and the related strategies for a better management.

**Course Outcomes:**

At the end of the course, the student will be able –

CO1: Describe functions and various initiatives of Talent Management in organisational context (PO1, PO5, PO7, PSO1, PSO4)

CO2: Identify the functional dimensions of Competency mapping (PO1, PO5, PO7, PSO1, PSO4)

CO3: Identify the important elements of Performance Management System (PO1, PO5, PO7, PSO1, PSO4)

CO4: Appreciate the dimensions of Employee engagement in business organisations (PO1, PO5, PO7, PSO1, PSO4)

CO5: Describe various methods of succession planning and the related challenges (PO1, PO5, PO7, PSO1, PSO4)

**UNIT I AN OVERVIEW ON TALENT MANAGEMENT**

1.1 Meaning and significance of talent management

1.2 Attracting talent and retaining talent

1.3 Right sizing the workforce

1.4 Work Life Balance (WLB) initiatives

1.5 Providing HR leadership to business

**UNIT II COMPETENCY MAPPING**

2.1 Definition of competency mapping

2.2 Steps in Competency mapping procedure

2.3 Types of competencies

2.4 Iceberg model of Competency mapping

2.5 Generic model of Leadership Competency mapping

2.6 Significance of Competency Mapping

**UNIT III PERFORMANCE MANAGEMENT SYSTEMS**

3.1 Frame work of Performance Management System (PMS)

3.2 Methods of PMS

3.3 Framework for confirmation of probation

3.4 Performance Improvement Plans (PIP)

3.3 Performance management & reward systems

3.4 Performance linked career planning

3.5 Promotion policy

**UNIT IV EMPLOYEE ENGAGEMENT**

4.1 Significance of Employee engagement

4.2 Conceptual framework of employee engagement

4.3 Behaviours associated with engaged employees - engaged, not engaged, actively disengaged

#### 4.4 Parameters to measure employee engagement

### **UNIT V      SUCCESSION PLANNING**

#### 5.1 Importance of Succession planning

#### 5.2 Methods of Succession Planning

#### 5.3 Succession planning strategies

#### 5.3 Challenges in Succession planning – Case Studies of Tata Group and Infosys

#### **References:**

1. Lyle M. Spencer, Signe M. Spencer, Competence at work - John Wiley 1993
2. Naik G.P, Competency mapping - Assessment and Growth -, IIHRM, 2010.
3. Herman Aguinis, Performance Management, Pearson Education, 2007.
4. Lance A. Berger & Dorothy R. Berger, Talent Management Hand Book, Tata McGraw Hill.

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### **CURRICULAR ACTIVITIES**

#### 1. Class-room activities:

- Question-answer sessions at the end of each unit
- Scheduled Quizzes at the end of each unit
- Written assignments on assigned topics

#### 2. Library activities:

Reading textbooks on an assigned topic and preparation of notes as per the syllabus

#### 3. Smart Classroom Activity:

Setting up Google Classroom for effective delivery of subject inputs

### **CO-CURRICULAR ACTIVITIES**

- Group discussion on Competency Mapping models
- Power point presentations on assigned topics

P.B.Siddhartha College of Arts & Science  
**Bachelor of Business Administration**  
**TALENT MANAGEMENT**

Semester: V

Course Code: MGTSET11

Time: 3 Hrs.

Max. Marks: 75

**Model Question Paper**

**Max. Marks: 75**

**Semester – V**

**Time: 3 Hrs.**

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**Section A**

5 x 5 = 25M

**Answer any FIVE of the following:**

1. Explain the meaning and significance of talent management. (CO1, L2)
2. Define competency mapping. Explain the characteristics of individual in competency. (CO2, L2)
3. What is performance management system and explain performance management frame work? (CO3, L2)
4. Explain the conceptual framework of employee engagement. (CO4, L2)
5. Explain the behaviors associated with actively disengaged employees. (CO4, L2)
6. Define succession planning and explain the challenges in succession planning. (CO5, L2)
7. What is work life balance and explain its initiatives? (CO1,L2)
8. Discuss about promotion policy. (CO3, L2)

**Section B**

5 x 10 = 50M

**Answer the following:**

9. a) What is talent management and explain the strategies in attracting and retaining talented employees? (CO1, L2)  
Or  
b) Explain how HR Leadership provides right sizing the work force. (CO1, L2)
10. a) Explain the basic competency mapping models. (CO2, L2)  
Or  
b) Explain the steps involved in competency mapping. (CO2, L2)
11. a) Explain how performance management and rewards systems linked with promotion policy. (CO3, L3)  
Or  
b) Explain various methods of performance management systems. (CO3, L3)
12. a) What is employee engagement and explain the significance of employee engagement. (CO4, L2)  
Or  
b) Explain the behaviors associated with employee engagement. (CO4, L2)
13. a) Explain various methods of succession planning. (CO5, L2)  
Or  
b) Discuss the importance and challenges in succession planning. (CO5, L2)



**P.B.Siddhartha College of Arts & Science**

**Bachelor of Business Administration  
Series B SECs in HRM for Semester–V  
TRAINING AND DEVELOPMENT**

Course Code: MGTSET12

No. of Hours per week: 5

No. of Credits: 4

Max. Marks: 100

External: 75M

Internal: 25M

**Objective:** The main objective of the course is to impart conceptual understanding to the student on designing and implementation of different kinds of training and development techniques that contribute to skill development of human resources in business organizations.

**Course Outcomes:**

At the end of the course, the student will be able –

CO1 To introduce the concept of training , its need and importance and responsibility for training. (PO1, PO2, PO7) – PSO4

CO2 To understand the training programs, policy support material for training and the training for different employees (PO2, PO5, PO7) – PSO4

CO3 To understand the various training methods suitable for the employees. (PO1, PO2, PO4) – PSO4

CO4 To provide knowledge about various development methods and programmes at different levels. (PO1, PO3, PO6) – PSO4

CO5 To understand the concept of coaching and counselling and various methods involved in it. (PO2, PO5, PO6) – PSO4

**UNIT I AN INTRODUCTION TO TRAINING & DEVELOPMENT**

1.1 Meaning of training

1.2 Need and importance of Training

1.3 Objectives of Training

1.4 Responsibility for Training

1.5 Essential elements of a Training Programme

**UNIT II TRAINING POLICY**

2.1 Training Policy

2.2 Steps in designing a Training programme

2.3 Training Material

2.4 Training period

2.5 Selection of employees for training

2.6 Pre & Post training assessment

**UNIT III TRAINING METHODS**

1.1 On the Job Training

1.2 Simulation and Vestibule Training

1.3 Demonstration and Apprenticeship

1.4 Training by Experienced Workmen and Supervisors

1.5 Off the Job training methods: Lecturers, Conference method, Seminar and Team Discussion

1.6 Off the Job training methods (Contd.): Case Studies, Role playing and Programmed Instruction

1.7 Pros & Cons of Online training

1.8 Role of LMS in training

**UNIT IV EXECUTIVE DEVELOPMENT PROGRAMMES**

4.1 Importance of Management Development programmes

4.2 Objectives of Development programmes

- 4.3 Stages in development programs
- 4.4 Components of development program
- 4.5 Factors inhibiting Development

## **UNIT V METHODS OF EXECUTIVE DEVELOPMENT**

- 5.1 Methods: Management syndicate, Incident process, In- Basket and Sensitivity Training
- 5.2 Methods (Contd.): Special Projects, Committee assignments, conferences and Management Games

### **References:**

- 1.P.Subba Rao, VSP, Rao, Human Resource Management; Konark Publishing Houses, Mumbai.
- 2.SubasGurg& S C Jain, Managing Human Resource, Arihant Publications, Jaipur.
- 3.Bearddwell&LenHoldmen, Human Resource Management, Macmillan Publisher.
- 4. P.L.Rao, ” Training & Development”, Excel Books, New Delhi.

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## **CURRICULAR ACTIVITIES**

- 1. Class-room activities:
  - Question-answer sessions at the end of each unit
  - Scheduled Quizzes at the end of each unit
  - Written assignments on assigned topics
- 2. Library activities:  
Reading textbooks on an assigned topic and preparation of notes as per the syllabus
- 3. Smart Classroom Activity:  
Setting up Google Classroom for effective delivery of subject inputs

## **CO-CURRICULAR ACTIVITIES**

- Group discussion on Training & Development methods
- Power point presentations on assigned topics

**P.B.Siddhartha College of Arts & Science  
TRAINING AND DEVELOPMENT**

Semester: V

Course Code: MGTSET12

Time: 3 Hrs.

Max. Marks: 75

**Model Question Paper**

**Max. Marks: 75**

**Semester – V**

**Time: 3 Hrs.**

**Section – A**

**Answer any five of the following:**

**5x5=25m**

1. State the objectives of the training. (CO1, L2)
2. Discuss the need of effective training Program (CO1, L2)
3. Write about training policy and training courses (CO2, L2)
4. Explain about Role playing. (CO3, L2)
5. List the components of development program (CO4, L2)
6. Discuss about simulation and apprenticeship. (CO3, L2)
7. State the methods of In-Basket Counselling (CO5, L2)
8. Write a note on Sensitivity Training (CO5, L2)

**Section – B**

**Answer the following questions:**

**5x10=50m**

**Unit – I**

9. (a) What is meant by training & explain needs and importance of training (CO1, L2)

Or

- (b) What do you mean by training needs? Discuss the responsibility for training in organizations (CO1, L2)

**Unit – II**

10. (a) Discuss the training program steps in detail. (CO2, L2)

Or

- (b) Explain about training courses and training for different employees (CO2, L2)

**Unit – III**

1. (a) What do you understand by off-the job training? Explain various methods of off-the job training? (CO3, L2)

Or

- (b) Under what circumstances vestibule training, apprenticeship training should be given? (CO3, L2)

**Unit – IV**

12. (a) what is management development? Justify the factors inhibiting Development (CO4, L2)

Or

- (b) Explain the purpose and objectives of development programs. (CO4, L2)

**Unit – V**

13. (a) How do the concept of special projects, committee assignments, relates the growth of Executives in an Organization (CO5, L3)

Or

- (b) What do you mean by sensitivity training? Explain the merits and demerits of sensitivity training. (CO5, L3)

**P.B.Siddhartha College of Arts & Science**  
**Bachelor of Business Administration**  
**Series C SECs in FINANCE for Semester–V**  
**COST ACCOUNTING**

Course Code: MGTSET13  
No. of Hours per week: 5  
No. of Credits: 4

Max. Marks: 100  
External: 75M  
Internal: 25M

**Objective:** The main aim of this course is to make the students understand the elements of ascertainment of cost and control of cost.

**Course Outcomes:**

At the end of the course, the student will be able –

- CO1 To introduce the concept of cost accounting and imparting skill of drawing a cost sheet (PO1, PO2, PO5: PSO2)
- CO2 To impart the knowledge of the concept of material costing and its practical calculations (PO1, PO2, PO5, PSO2)
- CO3 To impart the knowledge of the concept of labour costing and its practical calculations (PO1, PO2, PO5, PSO2)
- CO4 To impart the knowledge of the concept of overheads and its practical calculations (PO1, PO2, PO5, PSO2)
- CO5 To impart the knowledge of the concept of Job and contract costing and its practical Calculations (PO1, PO2, PO5, PSO2)

**UNIT I INTRODUCTION TO COST ACCOUNTING**

- 1.1 Nature of Cost accounting
- 1.2 Scope of Cost accounting
- 1.3 Advantages and Limitations of Cost accounting
- 1.4 Financial accounting Vs. Cost accounting
- 1.5 Management accounting Vs. Cost accounting
- 1.6 Installation of Costing system and the practical difficulties involved
- 1.7 Steps to overcome the difficulties
- 1.8 Preparation of cost sheet (Problems)

**UNIT II MATERIAL COST**

- 2.1 Meaning of Material cost
- 2.2 Need for Material control
- 2.3 Essentials of material control
- 2.4 EOQ and Calculation of Stock levels (Problems)
- 2.5 Bin cards and Stores ledger
- 2.6 Pricing of issues of material from stores (Problems)
- 2.7 Inventory control and ABC analysis (Problems)

**UNIT III LABOUR COST**

- 1.1 Meaning of Labour Cost
- 1.2 Control over labour cost
- 1.3 Time and motion study
- 1.4 Time keeping and time booking
- 1.5 Labour Remuneration method (Problems)
- 1.6 Idle time and overtime treatment
- 1.7 Labour turnover – Meaning, causes and costs (Theory)

**UNIT IV OVERHEADS**

- 4.1 Definition of overheads
- 4.2 Classification of overheads
- 4.3 Steps in Overhead Accounting
- 4.4 Allocation and absorption of overheads to cost centres
- 4.5 Reapportionment to service departments (Problems)

## **UNIT V      JOB COSTING AND CONTRACT COSTING**

- 5.1 Preparation of Job cost sheet
- 5.2 Preparation of contract account
- 5.3 Ascertaining profit on incomplete contracts (Problems)

### **References:**

1. Cost Accounting By S.P.Jain & K.L.Narang – Kalyani publishers, New Delhi.
2. Practical Costing By Khanna, Panday and others – S.Chand & Co., New Delhi.

### **Web links:**

- [www.managementhelp.org](http://www.managementhelp.org)
- [www.slideshare.net](http://www.slideshare.net)
- [www.yourarticlelibrary.com](http://www.yourarticlelibrary.com)

## **CURRICULAR ACTIVITIES**

1. Class-room activities:
  - Question-answer sessions at the end of each unit
  - Scheduled Quizzes at the end of each unit
  - Written assignments on assigned topics
2. Library activities:  
Reading textbooks on an assigned topic and preparation of notes as per the syllabus
3. Smart Classroom Activity:  
Setting up Google Classroom for effective delivery of subject inputs

## **CO-CURRICULAR ACTIVITIES**

- Group discussion on Material Cost and Labour Cost
- Power point presentations on assigned topics

**P.B.SIDDHARTHA COLLEGE OF ARTS AND SCIENCE :: VIJAYAWADA**  
**Course: COST ACCOUNTING**

Semester: V

Course Code: MGTSET13

Time: 3 Hrs.

Max. Marks: 75

**SEMESTER END MODEL QUESTION PAPER**

**TITLE:**

**COURSE CODE:**

**Time: 3 Hours**

**Max. Marks: 75**

**Roll No:**

\*\*\*\*\*

**SECTION A**

Answer any **FIVE** questions:

5 X 5 = 25 Marks

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.

**SECTION B**

Answer the following :

5 X 10 = 50 Marks

UNIT - I

9. a)

OR

b)

UNIT - II

10. a)

OR

b)

UNIT - III

11. a)

OR

b)

UNIT - IV

12. a)

OR

b)

UNIT - V

13. a)

OR

b)

\*\*\*\*\*

**P.B.Siddhartha College of Arts & Science**  
**Bachelor of Business Administration**  
**Series C SECs in FINANCE for Semester–V**  
**TAXATION**

Course Code: MGTSET14  
No. of Hours per week: 5  
No. of Credits: 4

Max. Marks: 100  
External: 75M  
Internal: 25M

**Objective:** The main objective of the course is to impart conceptual understanding on taxation structure in India with a special focus on income tax computation and assessment and also to provide the student with a basic understanding on tax liabilities & the related deductions, rebates and reliefs.

**Course Outcomes:**

At the end of the course, the student will be able –

- CO1 To understand the basic concepts and definitions under the Income Tax Act, 1961 and the concept of residential status theoretically and practically. (PO1, PO3, PO5, PSO2)
- CO2 To Acquire knowledge about Computation of Income from head salary with allowances and perquisites theoretically and practically. (PO1, PO3, PO5, PSO2)
- CO3 To Acquire knowledge about Computation of Income from head house property under various circumstances theoretically and practically. (PO1, PO3, PO5, PSO2)
- CO4 To Acquire knowledge about of Income from head profit or gains from business or profession and capital gains and its provisions, exemptions and various deductions theoretically. (PO1, PO3, PO5, PSO2)
- CO5 To Acquire knowledge about the computation of total income and tax liability of an individual and firm considering deductions from gross total income, various rebates and reliefs and acquire knowledge about e- filing also theoretically. (PO1, PO3, PO5, PSO2)

**UNIT I BASIC CONCEPTS OF INCOME TAX**

- 1.1 Basic concepts of Income, agricultural income, Person and an Assesse
- 1.2 Meanings of assessment year, previous year, gross total income and total income
- 1.3 Maximum marginal rate of tax
- 1.4 Concept of Residential status
- 1.5 Scope of total income on the basis of residential status
- 1.6 Exempted income

**UNIT II COMPUTATION OF INCOME FROM SALARY**

- 2.1 Computation of income under different heads: Salaries – Allowances – Perquisites
- 2.2 Profit in lieu of salary
- 2.3 Gratuity, Pension

**UNIT III COMPUTATION OF INCOME FROM HOUSE PROPERTY**

- 3.1 Annual Value of House property
- 3.2 Computation under different circumstances
- 3.3 Deduction from annual value

**UNIT IV PROFITS AND GAINS OF BUSINESS OR PROFESSION AND CAPITAL GAINS (THEORY ONLY)**

- 4.1 Allowable expenses and not allowable expenses
- 4.2 General deductions
- 4.3 Provisions relating to Depreciation

4.4 Capital Assets – Long term and Short term

4.5 Exempted Capital gains

## **UNIT V COMPUTATION OF TOTAL INCOME AND TAX LIABILITY (Theory)**

5.1 Income of other persons included in Assessee's total income

5.2 Deductions from gross total income

5.3 Rebates and reliefs

5.4 Tax liability of an individual and firm

5.5 E- Filing

### **References:**

1. Vinod K. Singhania: Direct Taxes - Law and Practice, Taxman Publication.
2. B.B. Lal: Direct Taxes, Konark Publisher (P) Ltd.
3. Bhagwati Prasad : Direct Taxes – Law and Practice, WishwaPrakashan.
4. Dr. Mehrotra and Goyal: Direct Taxes – Law and Practice, Sahitya Bhavan Publication.
5. DinakarPagare: Law and Practice of Income Tax, Sultan Chand and sons.
6. Gaur & Narang: Income Tax.

### **Web links:**

[www.managementhelp.org](http://www.managementhelp.org)

[www.slideshare.net](http://www.slideshare.net)

[www.yourarticlelibrary.com](http://www.yourarticlelibrary.com)

### **CURRICULAR ACTIVITIES**

1. Class-room activities:

- Question-answer sessions at the end of each unit
- Scheduled Quizzes at the end of each unit
- Written assignments on assigned topics

2. Library activities:

Reading textbooks on an assigned topic and preparation of notes as per the syllabus

3. Smart Classroom Activity:

Setting up Google Classroom for effective delivery of subject inputs

### **CO-CURRICULAR ACTIVITIES**

- Group discussion on Capital gains and Tax liability
- Power point presentations on assigned topics



P.B.Siddhartha College of Arts & Science  
**Bachelor of Business Administration**  
**TAXATION**

Semester: V

Course Code: MGTSET14

Time: 3 Hrs.

Max. Marks: 75

**Model Question Paper**

**Max. Marks: 75**

**Semester – V**

**Time: 3 Hrs.**

**SECTION – A**

**Answer any five of the following:**

**5x5=25 Marks**

- 1) Residential status of an individual (CO1, L2)
- 2) Person and Assessee (CO1, L2)
- 3) Different allowances under the head 'Salaries'(CO2, L2)
- 4) Concept of ownership under the head 'Income from house property'(CO3, L2)
- 5) Deductions from income from house property(CO3, L2)
- 6) Nature and Scope of GST.(CO5, L2)
- 7) Define Import and Importer(CO4, L2)
- 8) Adjudicating Authority.(CO4, L2)

**SECTION – B**

**Answer the following:**

**5x10=50 Marks**

**UNIT – I**

- 9) a) What are exempted incomes and explain the exempted incomes as per Sec. 10 (CO1, L2)

**OR**

- b) Following are the incomes of Mr. Emanuel for the previous year 2015 -16

- 1) Profit from business in Bangalore Rs. 10,000.
- 2) Income accrued in India but received in Japan Rs. 4,000.
- 3) Profit from business in Canada but received in India Rs. 5,000
- 4) Income from house property in Karachi received in Bombay Rs,4,000
- 5) Profit from business established in England and deposited there, the business being controlled from India Rs. 20,000.
- 6) Income from house property in America and deposited there Rs. 2,000.
- 7) Past untaxed income brought into India during the previous year Rs. 10,000.

Compute his total Income for the assessment year 2016-17 if he is

- i) Resident ii) Not Ordinarily resident and iii) Non – Resident. (CO1, L2)

**UNIT – II**

- 10) a) What is perquisite? How they are treated for income tax purpose?(CO2, L2)

**OR**

- b) Mr. X an employee of Ranchi (Population 15 lakhs) based company provides the following particulars of his salary income:

	<b>Rs.</b>
i) Basic Salary	12,000 p.m.
ii) Profit Bonus	12,000

iii) Commission on turnover achieved by Mr. X	42,000
iv) Entertainment allowance	2,000 p.m.
v) Club facility	6,000
vi) Transport allowance	1,000 p.m.
vii) Free use of car of more than 1.6 lt. capacity for both personal and employment purpose: expenses are met by employer.	
viii) Rent free house provided by employer. Lease rent paid by employer	6,000 p.m.
ix) Free Education facility for three children of the employee: (Bills issued in the name of employer)	22,500
x) Gas, water and electricity bills issued in the name of employee but paid by employer	16,800

Compute income under the head salary for the assessment year 2016-17.(CO2, L2)

### UNIT – III

- 11) a) Mr. Surinder Kumar owns a house at Delhi. During the previous year 2014 -15, 3/4<sup>th</sup> portion of the house is occupied for self- residence for full year and 1/4<sup>th</sup> portion is let out for residential purpose from 1-04-2014 to 31-12-2014 on a rent of Rs.700p.m. From 01-01-2015 this portion was used for own residence by him. Municipal Valuation of the entire house is Rs.20,000 and fair rental value is Rs.24,000. Expenses incurred in respect of house property were: Municipal Taxes Rs. 6,000; Repairs Rs. 2,000 ; Fire Insurance premium Rs. 3,500 ; Land Revenue Rs. 4,000 and Ground Rent Rs. 200. These expenses were paid during the year. A loan Rs. 60,000 was taken on 1-04-2011 @ 15% p.a for the construction of the house which was completed on 31-01-2012. Loan is still outstanding. Find out his income from house property for the assessment year 2015-16.(CO3, L3)

**OR**

- b) Mr. Mohan Rao owns a residential house property. It has two equal residential units – Unit – I and Unit – II. While Unit –I is self occupied by Mohan Rao for his residential purpose; Unit- II is a let out (rent beings Rs. 6,000 per month, rent of two months could not be recovered). Municipal value of the property is Rs.1, 30,000, standard rent is Rs 1, 25,000 and fair rent is Rs. 1, 40,000. Municipal Tax is imposed @ 15 percent which is paid by Mohan Rao. Other expenses for the previous year 2015-16 being repairs Rs. 800, Insurance Rs, 1,500 , interest on capital (borrowed during 1999) for constructing the property : Rs.63,000.  
Find the house property income of Mohan Rao for the assessment year 2016-17. (CO3, L3)

### UNIT- IV

- 12) a) Explain the Types of GST. (CO4, L2)

**OR**

- b) Explain the Merits and Demerits of GST (CO4, L2)

### UNIT –V

- 13) a) Explain the Types of Customs Duty. (CO5, L2)

**OR**

- b) Explain the salient features of Customs Act, 1962. (CO5, L2)

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**P.B.Siddhartha College of Arts & Science**  
**Bachelor of Business Administration**  
**Series C SECs in FINANCE for Semester–V**  
**MANAGEMENT ACCOUNTING**

Course Code: MGTSET15  
No. of Hours per week: 5  
No. of Credits: 4

Max. Marks: 100  
External: 75M  
Internal: 25M

**Objective:** The main objective of this course is to provide the student with a conceptual understanding of Management Accounting along with an ability to apply certain Management Accounting techniques.

**Course Outcomes:**

At the end of the course, the student will be able –

- CO1 To understand the overview about the concept of management accounting. (PO1, PO2, PO3, PO5: PSO2)
- CO2 To impart the skill of drawing various financial statement analyses with required interpretations. (PO1, PO2, PO3, PO5: PSO2)
- CO3 To understand the formats of funds and cash flow and it's preparation as per the requirement in business. (PO1, PO2, PO5: PSO2)
- CO4 To understand the concept of budget and impart the skill of drawing the various budgets required in the organization. (PO1, PO2, PO3, PO5: PSO2)
- CO5 To understand the concept of marginal costing and break even analysis. (PO1, PO2, PO3, PO5: PSO2)

**UNIT I INTRODUCTION TO MANAGEMENT ACCOUNTING**

- 1.1 Nature and characteristics of Management accounting
- 1.2 Scope of Management accounting
- 1.3 Objectives and purpose of Management accounting
- 1.4 Distinction between Financial accounting and Management accounting
- 1.5 Need and importance of Management accounting
- 1.6 Limitations of Management accounting

**UNIT II FINANCIAL STATEMENT ANALYSIS**

- 1.1 Nature of Financial statements
- 1.2 Formats of income statements and balance sheet
- 1.3 Analysis and interpretation of financial statements
- 1.4 Comparative statements
- 1.5 Trend analysis
- 1.6 Common size statement analysis
- 1.7 Ratio analysis: Meaning, significance and limitations
- 1.8 Types of Ratios (Problems)

**UNIT III FUNDS FLOW STATEMENT & CASH FLOW STATEMENT**

- 1.1 Funds flow statement: Meaning and Importance
- 1.2 Statement of sources & application of funds
- 1.3 Cash flow statement: Meaning and Significance
- 1.4 Comparison between funds flow & cash flow statements
- 1.5 Procedure for preparing Funds Flow and Cash flow statements (AS –3 revised) (Problems)

**UNIT IV BUDGETARY CONTROL**

- 4.1 Budget, Budgeting & Budgetary control
- 4.2 Objectives of a budgetary control system

- 4.3 Advantages & limitations of budgetary control
- 4.4 Types of budgets
- 4.5 Preparation of production, purchase, sales and cash budgets (Problems)

#### **UNIT V MARGINAL COSTING AND BREAK-EVEN ANALYSIS**

- 5.1 Concept of Marginal costing
- 5.2 Benefits and limitations of Marginal costing
- 5.3 Break-even analysis
- 5.4 Break-even point: Assumptions and limitations (Problems)
- 5.5 Standard costing: Meaning, advantages and limitations (Theory only)

#### **References:**

1. Principles of Management Accounting  
By Dr.S.N.Maheswari – S.Chand & Sons, New Delhi.
2. Management Accounting – Principles & Practice  
By R.K.Sharma & S.K.Gupta – Kalyani publishers, New Delhi.

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- [www.yourarticlelibrary.com](http://www.yourarticlelibrary.com)

#### **CURRICULAR ACTIVITIES**

1. Class-room activities:
  - Question-answer sessions at the end of each unit
  - Scheduled Quizzes at the end of each unit
  - Written assignments on assigned topics
2. Library activities:  
Reading textbooks on an assigned topic and preparation of notes as per the syllabus
3. Smart Classroom Activity:  
Setting up Google Classroom for effective delivery of subject inputs

#### **CO-CURRICULAR ACTIVITIES**

- Group discussion on Budgetary Control
- Power point presentations on assigned topics

**P.B.SIDDHARTHA COLLEGE OF ARTS AND SCIENCE :: VIJAYAWADA**  
**Course: MANAGEMENT ACCOUNTING**

Semester: V

Course Code: MGTSET15

Time: 3 Hrs.

Max. Marks: 75

**SEMESTER END MODEL QUESTION PAPER**

**TITLE:**

**COURSE CODE:**

**Time: 3 Hours**

**Max. Marks: 75**

**Roll No:**

\*\*\*\*\*

**SECTION A**

Answer any **FIVE** questions:

5 X 5 = 25 Marks

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.

**SECTION B**

Answer the following :

5 X 10 = 50 Marks

UNIT - I

9. a)

OR

b)

UNIT - II

10. a)

OR

b)

UNIT - III

11. a)

OR

b)

UNIT - IV

12. a)

OR

b)

UNIT - V

13. a)

OR

b)

\*\*\*\*\*

**P.B.Siddhartha College of Arts & Science**  
**Bachelor of Business Administration**  
**Series C SECs in FINANCE for Semester–V**  
**INVESTMENT MANAGEMENT**

Course Code: MGTSET16  
No. of Hours per week: 5  
No. of Credits: 4

Max. Marks: 100  
External: 75M  
Internal: 25M

**Objective:** The main objective of the course is to introduce the concept of investment and analytical approach regarding the valuation investment.

**Course Outcomes:**

At the end of the course, the student will be able –

- CO1 To introduce the concept, process and instruments of the investment , process of investment and instruments of investments (PO1, PO2, PO3, PO5, PSO4)
- CO2 To understand the concept of primary and secondary market, Pre and post issues management and functioning of stock exchanges in India. (PO1, PO2, PO3, PO5, PO7, PSO4)
- CO3 To understand the concepts of risk and returns theoretically and practically. (PO1, PO2, PO3, PO5, PO7, PSO4)
- CO4 To understand the valuation of securities and bonds theoretically and practically. (PO1, PO2, PO3, PO5, PO7, PSO4)
- CO5 To understand the fundamental analysis and theories , charts and trends to be considered for analysing market value of share prices of companies. (PO1, PO2, PO3, PO5, PO7, PSO4)

**UNIT I AN INTRODUCTION TO INVESTMENT CONCEPTS**

- 1.1 Attributes of Investment
- 1.2 Investment and speculation
- 1.3 Features of a good investment
- 1.4 Investment Process
- 1.5 Investment Instruments
- 1.6 Derivatives

**UNIT II SECURITIES MARKET**

- 2.1 Concept of Primary Market
- 2.2 Issue Management, Pre and Post Issue Management
- 2.3 Concept of Secondary Market
- 2.4 Major Players in the secondary market
- 2.5 Functioning of Stock Exchanges
- 2.6 Leading Stock Exchanges in India

**UNIT III RISK AND RETURN CONCEPTS**

- 3.1 Types of Risk- Systematic risk, Unsystematic risk
- 3.2 Measures of Risk and returns
- 3.3 Calculation of Risk and Return

**UNIT IV FUNDAMENTAL AND TECHNICAL ANALYSIS**

- 4.1 Fundamental analysis- Economy, Industry and Company Analysis.
- 4.2 Technical Analysis
  - 4.2.1 Theories- Dow Theory, Eliot wave theory
  - 4.2.2 Charts-Types,
  - 4.2.3 Trend and Trend Reversal Patterns

4.2.4 Moving averages, ROC, RSI, Market Indicators.

## **UNIT V VALUATION OF SECURITIES**

5.1 Valuation of Fixed income securities

5.2 Valuation of Bonds and Debentures

5.3 Valuation of Equity shares

5.4 Dividend Valuation models

### **References:**

1. Investment Analysis and Portfolio management – Prasanna Chandra, TMH, 2010.
2. Security Analysis & Portfolio Management – PunithavathyPandian, Vikas, 2005.
3. Investment Management – Bhalla V. K, S.Chand, 2011.
4. Security Analysis & Portfolio Management – Fisher and Jordan, Pearson, 2011.
5. Security Analysis & Portfolio Management- Kevin S, PHI, 2011.
6. Investment Analysis & Portfolio Management– Reilly, Cengage Learning.
7. Investments: Principles and Concepts – Charles P. Jones, Wiley, 2010.

### **Web links:**

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[www.slideshare.net](http://www.slideshare.net)

[www.yourarticlelibrary.com](http://www.yourarticlelibrary.com)

## **CURRICULAR ACTIVITIES**

1. Class-room activities:

- Question-answer sessions at the end of each unit
- Scheduled Quizzes at the end of each unit
- Written assignments on assigned topics

2. Library activities:

Reading textbooks on an assigned topic and preparation of notes as per the syllabus

3. Smart Classroom Activity:

Setting up Google Classroom for effective delivery of subject inputs

## **CO-CURRICULAR ACTIVITIES**

- Group discussion on Risk & Return concepts
- Power point presentations on assigned topics

**P.B.SIDDHARTHA COLLEGE OF ARTS AND SCIENCE :: VIJAYAWADA**  
**Course: INVESTMENT MANAGEMENT**

Semester: V

Course Code: MGTSET16

Time: **3 Hrs.**

Max. Marks: **75**

**SEMESTER END MODEL QUESTION PAPER**

**TITLE:**

**COURSE CODE:**

**Time: 3 Hours**

**Max. Marks: 75**

**Roll No:**

\*\*\*\*\*

**SECTION A**

Answer any **FIVE** questions:

5 X 5 = 25 Marks

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.

**SECTION B**

Answer the following :

5 X 10 = 50 Marks

UNIT - I

9. a)

OR

b)

UNIT - II

10. a)

OR

b)

UNIT - III

11. a)

OR

b)

UNIT - IV

12. a)

OR

b)

UNIT - V

13. a)

OR

b)

\*\*\*\*\*



**P.B.Siddhartha College of Arts & Science**  
**Bachelor of Business Administration**  
**Series C SECs in FINANCE for Semester–V**  
**FINANCIAL MANAGEMENT**

Course Code: MGTSET17  
No. of Hours per week: 5  
No. of Credits: 4

Max. Marks: 100  
External: 75M  
Internal: 25M

**Objective:** The main objective of this course is to introduce the concepts of finance, sources of finance, allocation and management of finance.

**Course Outcomes:**

At the end of the course, the student will be able –

- CO1 To introduce to the students the functional department of finance management and acquaint its nature and scope and its financial goals and various functions and decisions in finance. (PO1, PO5 PSO2)
- CO2 To understand concept of capital budgeting and its techniques theoretically and practically. (PO1, PO3, PO5, PO7 PSO2)
- CO3 To understand the concept of working capital , its sources, functions and financing of working capital and the management of inventory , cash and receivables. (PO1, PO3, PO5, PO7 PSO2)
- CO4 To understand concept of capital structure and cost of capital theoretically and practically and also the measurement of leverages. (PO1, PO3, PO5, PO6, PO7 PSO2)
- CO5 To understand concept of dividend policy, its determinants various theories theoretically and practically. (PO1, PO3, PO5, PO6, PO7 PSO2)

**UNIT I INTRODUCTION TO FINANCIAL MANAGEMENT**

- 1.1 Meaning of Finance
- 1.2 Nature and scope of finance
- 1.3 Profit maximization Vs. Wealth maximization
- 1.4 Finance functions
- 1.5 Investment, financing and dividend decisions

**UNIT II CAPITAL BUDGETING**

- 2.1 Nature of investment decisions
- 2.2 Capital Budgeting Techniques - net present value, internal rate of return, profitability Index, payback period and accounting rate of return
- 2.3 Capital rationing
- 2.4 Risk analysis in capital budgeting

**UNIT III WORKING CAPITAL**

- 3.1 Meaning of Working capital
- 3.2 Significance of Working capital
- 3.3 Types of working capital
- 3.4 Working capital cycle
- 3.5 Financing of working capital
- 3.6 Sources of working capital
- 3.7 Management of inventory
- 3.8 Management of cash
- 3.9 Management of account receivables
- 3.10 Dimensions of Working capital management

**UNIT IV CAPITAL STRUCTURE THEORIES**

- 4.1 Traditional and MM hypotheses
- 4.2 Determinants of capital structure
- 4.3 Meaning of Cost of capital
- 4.4 Significance of cost of capital
- 4.5 Calculation of cost of debt, preference capital, equity capital and retained earnings
- 4.6 Operating, financial and combined leverages
- 4.7 Measurement of leverages

## **UNIT V        DIVIDEND DECISIONS**

- 5.1 Types of dividend
- 5.2 Dividend theories
- 5.3 Determinants of dividend policy

### **References:**

1. Bhattacharya, Hrishikesh: Working Capital Management: Strategies & Techniques; PHC.
2. Chandra, Prasanna: Financial Management; Tata McGraw Hill, Delhi.
3. Pandey, I.M.: Financial Management, Prentice Hall of India, New Delhi.
4. Vanhorne, J.C.: Financial Management and Policy; Prentice Hall of India, New Delhi.

### **Web links:**

- [www.managementhelp.org](http://www.managementhelp.org)
- [www.slideshare.net](http://www.slideshare.net)
- [www.yourarticlelibrary.com](http://www.yourarticlelibrary.com)

## **CURRICULAR ACTIVITIES**

1. Class-room activities:
  - Question-answer sessions at the end of each unit
  - Scheduled Quizzes at the end of each unit
  - Written assignments on assigned topics
2. Library activities:
  - Reading textbooks on an assigned topic and preparation of notes as per the syllabus
3. Smart Classroom Activity:
  - Setting up Google Classroom for effective delivery of subject inputs

## **CO-CURRICULAR ACTIVITIES**

- Group discussion on Capital Budgeting Concepts
- Power point presentations on assigned topics

**Model Question paper**  
**FINANCIAL MANAGEMENT**

Semester: V

Course Code: MGTSET17

Time: 3 Hrs.

Max. Marks: 75

**SEMESTER : V**

**TIME : 3 hours**

**Max. Marks : 75M**

**Pass. Min. : 30M**

**SECTION – A**

Answer any **FIVE** of the following:

5x5=25 Marks

- 1) Wealth maximization (CO1, L2)
- 2) Profit maximization (CO1, L2)
- 3) Importance of capital budgeting (CO2, L1)
- 4) Importance of cost of capital(CO4, L1)
- 5) NOI approach (CO4, L2)
- 6) Types of leverages(CO4, L2)
- 7) Cash management (CO5, L1)
- 8) Forms of dividend (CO5, L1)

**SECTION – B**

Answer the following:

5x10=50 Marks

**UNIT – I**

- 9) a) Explain the nature and scope of financial management (CO1, L2)

**OR**

- b) What is financial management? What are the functions of financial manager? Explain.  
(CO1, L2)

**UNIT – II**

- 10) a) What are the factors affecting the capital budgeting? (CO2, L3)

**OR**

- b) A company is consulting an investment proposal to install a new machine. The project will cost Rs. 50,000. The tax rate is 50% and the company follows straight line method of depreciation, assuming the discount rate 10%. The net earnings before depreciation and tax (EBDT) are as follows:

Year	1	2	3	4	5	6
EBDT	10,000	11,000	14,000	15,000	25,000	-

Evaluate the project using

- A) Payback period      b) ARR      c) NPV      (CO2, L3)

**UNIT – III**

11) a) Explain the factors affecting working capital. (CO3, L2)

**OR**

b) Discuss the techniques of inventory management. (CO3, L2)

**UNIT- IV**

12) a) Discuss the net operating income approach and net income approach (CO4, L3)

**OR**

b) XYZ Company supplied the following information to you and requested to compute Weighted average cost of capital based on book value as well as market values. (CO4, L3)

<u>Sources of finance</u>	<u>Book value</u>	<u>Market value</u>	<u>after tax cost</u>
	Rs.	Rs.	(%)
Equity capital	10, 00,000	15, 00,000	12
Long term debt	8, 00,000	7, 50,000	7
Short term debt	<u>2, 00,000</u>	<u>2, 00,000</u>	4
Total	<u>20, 00,000</u>	<u>24, 50,000</u>	

**UNIT -V**

13) a) Explain the determinants of dividend policy (CO5, L3)

**OR**

b) The earnings per share of a company are Rs. 10 and the rate of capitalization applicable to the company is 12%. The company has before it an option of adopting a payment ratio of 25% (or) 50% (or) 75%. Using Walter's formula of dividend pay-out, compute the market value of the company's share if the productivity of retained earnings is (i) 12% (ii) 8% (iii) 5%. (CO5, L3)

**P.B.Siddhartha College of Arts & Science**  
**Bachelor of Business Administration**  
**Series C SECs in FINANCE for Semester–V**  
**FINANCIAL SERVICES**

Course Code: MGTSET18  
No. of Hours per week: 5  
No. of Credits: 4

Max. Marks: 100  
External: 75M  
Internal: 25M

**Objective:** The main objective of the course is to impart conceptual understanding on the role of financial services and instruments provided to the society and alerting the uncertainties.

**Course Outcomes:**

At the end of the course, the student will be able –

- CO1 To introduce the concept of the Financial Markets and Financial services, and various guidelines of SEBI on Financial services (PO1, PO2, PO3, PO5, PSO4)
- CO2 To understand an overview of factoring services, merchant banking and Venture capital financing (PO1, PO2, PO3, PO5, PSO4)
- CO3 To understand the concept of leasing, types of lease and hire purchase agreements (PO1, PO2, PO3, PO5, PO7, PSO4)
- CO4 To impart the knowledge about Mutual funds and Insurance services (PO1, PO2, PO3, PO5, PO7, PSO4)
- CO5 To obtain the knowledge on Demat services and Credit rating services in India (PO1, PO2, PO3, PO5, PO7 PSO4)

**UNIT I INTRODUCTION TO FINANCIAL MARKETS AND FINANCIAL SERVICES**

- 1.1 Role & functions of Financial Markets
- 1.2 Types of Financial Markets
- 1.3 Significance of Financial Services
- 1.4 Types/ categories of financial services
- 1.5 SEBI Guidelines on financial services
- 1.6 Emerging trends in Financial services
- 1.7 Prospects of Financial services in India

**UNIT II FACTORING AND MERCHANT BANKING**

- 1.1 Meaning of factoring services
- 1.2 Types of Factoring services in India
- 1.3 Features of Merchant banking
- 1.4 Functions of Merchant banking
- 1.5 Venture capital financing

**UNIT III LEASE FINANCING AND HIRE PURCHASING**

- 3.1 Characteristics of Lease Financing
- 3.2 Types of Lease
- 3.3 Advantages of Leasing process
- 3.4 Limitations of Leasing process
- 3.5 Features of Hire Purchasing
- 3.6 Procedure for Hire purchase Agreement
- 3.7 Differences between Lease Financing and Hire Purchasing

**UNIT IV MUTUAL FUNDS AND INSURANCE**

- 4.1 Meaning of Mutual Fund
- 4.2 Types of Mutual Funds

- 4.3 Functions of Mutual Funds
- 4.4 SEBI guidelines on Mutual Funds
- 4.5 Concept of Insurance
- 4.6 Classification of Insurance
- 4.7 Role and functions of IRDA

## **UNIT V        DEMAT SERVICES AND CREDIT RATING SERVICES**

- 5.1 Concept of Dematerialization of shares
- 5.2 Types of Demat Account
- 5.3 Steps involved in Dematerialization
- 5.4 Rematerialization of shares
- 5.5 Role & functions of NSDL and CDSL (An Overview)
- 5.6 Credit rating agencies in India (An Overview)
- 5.7 Process of Credit rating in India

### **References:**

1. Khan M.Y., Financial Services, Tata McGraw Hill Education Private Limited, New Delhi.
2. Vasant Desai, Financial Markets and Financial Services, Himalaya Publishing, Mumbai.
3. Siddaiah, T., Financial Services, Pearson
4. TripatyNaliniPrava, Financial Services, Prentice Hall of India, New Delhi.
5. Guruswamy.S, Financial Services, Tata McGraw Hill Education Pvt. Ltd., New Delhi.
6. V. Avadhani, Financial Services in India, Himalaya Publishing House, Mumbai.
7. Rajesh Kothari, “Financial Services in India”, Sage Publications

### **Web links:**

- [www.managementhelp.org](http://www.managementhelp.org)
- [www.slideshare.net](http://www.slideshare.net)
- [www.yourarticlelibrary.com](http://www.yourarticlelibrary.com)

### **CURRICULAR ACTIVITIES**

1. Class-room activities:
  - Question-answer sessions at the end of each unit
  - Scheduled Quizzes at the end of each unit
  - Written assignments on assigned topics
2. Library activities:
  - Reading textbooks on an assigned topic and preparation of notes as per the syllabus
3. Smart Classroom Activity:
  - Setting up Google Classroom for effective delivery of subject inputs

### **CO-CURRICULAR ACTIVITIES**

- Group discussion on Housing Finance
- Power point presentations on assigned topics

**P.B.SIDDHARTHA COLLEGE OF ARTS AND SCIENCE :: VIJAYAWADA**  
**Course: FINANCIAL SERVICES**

Semester: V

Course Code: MGTSET18

Time: 3 Hrs.

Max. Marks: 75

**SEMESTER END MODEL QUESTION PAPER**

**TITLE:**

**COURSE CODE:**

**Time: 3 Hours**

**Max. Marks: 75**

**Roll No:**

\*\*\*\*\*

**SECTION A**

Answer any **FIVE** questions:

5 X 5 = 25 Marks

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.

**SECTION B**

Answer the following :

5 X 10 = 50 Marks

UNIT - I

9. a)

OR

b)

UNIT - II

10. a)

OR

b)

UNIT - III

11. a)

OR

b)

UNIT - IV

12. a)

OR

b)

UNIT - V

13. a)

OR

b)

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## DEPARTMENT OF BBA BUSINESS ANALYTICS

### Board of Studies for the academic Year 2022-23 (ODD Semesters)

- 1. Agenda:**Board of Studies meeting for ODD semesters of batches (2020-23)5<sup>th</sup>and 6<sup>th</sup>Semester,(2021-24)3<sup>rd</sup>Semester and (2022-25)1<sup>st</sup>Semester)
- 2. List of members in BOS**

#### Members present:

1	Prof.Rajesh.C.Jampala, HOD, Commerce & Business Administration and Dean (Academics & Administration)	Chairman
2	Dr Padmaja Rani garu	University Nominee
3	Prof Pramod Kumar Mishra	Subject Expert
5	Sri Asgar Hussain	Alumnus
6	Ravi Tejam Tallam	Industry Expert
7	Sri Dr D Srinivasa Rao Garu	Dy- HOD
8	Sri P. Guru Prasad	Member
8	Sri D Vasu	Member



## BBA BUSINESS ANALYTICS

### LIST OF THE COURSES REVISED/ INTRODUCED IN I, III & V&VI SEMESTERS -2022-23

S.NO	TITLE OF THE COURSE	Course Code	Offered in SEM	Type of the Paper	Year of Introduction	Year of Revision	OBE with BTL	Offered to	
1	Data Management with SQL Programming Lab	LSCP05	I	Life Skill	2020-21	2022-23	YES	BBA BA	
2	Business Resesearch Methods	MGTT31A	III	Core	2018-19	2022-23(20%)	YES	BBA BA	
3	Security Analysis	MGTT39A	III	Core	2022-23	2022-23(100%)	YES	BBA BA	
4	Machine Learning & Deep Learning using Scikit Learn, Kera's & Tensor Flow	ANASET01	VI	SEC ELECTIVE A	2022-23	introduced	YES	BBA BA	
5	Machine Learning & Deep Learning using Scikit Learn, Kera's & TensorFlow Lab	ANASEP01	VI		2022-23	introduced	YES	BBA BA	
6	Big Data Analytics	ANASET02	VI		2022-23	introduced	YES	BBA BA	
7	Mongo DB Lab	ANASEP02	VI		2022-23	introduced	YES	BBA BA	
8	E Business	ANASET03	VI		2022-23	introduced	YES	BBA BA	
9	Econometrics	ANASET04	VI		2022-23	introduced	YES	BBA BA	
10	Real Time Governance System	ANASET05	VI		2022-23	introduced	YES	BBA BA	
11	Operating System	ANASET06	VI		2022-23	introduced	YES	BBA BA	
12	Advance HR Analytics	ANASET07	VI		SEC ELECTIVE B	2022-23	introduced	YES	BBA BA
13	Business Use Cases	ANASET08	VI			2022-23	introduced	YES	BBA BA
14	Portfolio Management (Finance)	ANASET09	VI			2022-23	introduced	YES	BBA BA
15	Security Analysis and Portfolio Management Lab	ANASEP09	VI	2022-23		introduced	YES	BBA BA	
16	Business Analytics and Text Mining Modelling using Python	ANASET10	VI	2022-23		introduced	YES	BBA BA	
17	Business Analytics and Text Mining Modelling using Python Lab	ANASEP10	VI	2022-23		introduced	YES	BBA BA	
18	Software Testing	ANASET11	VI	2022-23		introduced	YES	BBA BA	
19	E Commerce Application Development	ANASET12	VI	2022-23		introduced	YES	BBA BA	
20	Cyber Laws	ANASET13	VI	SEC ELECTIVE C	2022-23	introduced	YES	BBA BA	
21	Client Relationship Management	ANASET14	VI		2022-23	introduced	YES	BBA BA	
22	Marketing Analytics Using Excel and R	ANASET15	VI		2022-23	introduced	YES	BBA BA	
23	Internet of Things	ANASET16	VI		2022-23	introduced	YES	BBA BA	
24	Supply Chain Analytics	ANASET17	VI		2022-23	introduced	YES	BBA BA	
25	Project Management Analytics	ANASET18	VI		2022-23	introduced	YES	BBA BA	
26	Third internship / Project Work / On the Job Training / Apprenticeship	ANACIAP5	V	CORE PROJECT	2022-23	introduced	YES	BBA BA	

## Resolutions

1. It is resolved and recommend the revised syllabus & model question paper of **Data Management with SQL Programming Lab** with revised course code **LSC P05A** in I semester of BBA Business Analytics for the batch of students admitted in 2022-23 and onwards.
2. It is resolved and recommend the revised syllabus & model question paper of **BRM** with course code **MGTT311A** in III semester of BBA Business Analytics for the batch of students admitted in 2021-22 and onwards.
3. It is resolved to recommend to introduce **Security Analysis ( Theory )** with course code **MGTT39A** for III semester of BBA Business Analytics for the batch of students admitted in **2021-22** and onward, In Place of **Operations management** with course code **MGTT39** For the syllabus and model question paper vide Page No
4. It is resolved to recommend to introduce **Machine Learning & Deep Learning using Scikit Learn, Keras &Tensor flow** with Course code **ANASET01** for **V/VI** semester of BBA Business Analytics for the batch of students admitted in **2020-21** and onwards. For the syllabus and model question paper vide Page No.
5. It is resolved to recommend to introduce **Machine Learning & Deep Learning using Scikit Learn, Keras&Tensorflow (LAB)** with course code **ANASEP01** for **V/VI** semester of BBA Business Analytics for the batch of students admitted in **2020-21** and onwards. For the syllabus and model question paper vide Page No.
6. It is resolved to recommend to introduce **Big Data Analytics (Theory)** with course code **ANASET02** for **V/VI** semester of BBA Business Analytics for the batch of students admitted in **2020-21** and onwards. For the syllabus and model question paper vide Page No.

7. It is resolved to recommend to introduce **MongoDB (lab)** with course code **ANASEP02** for **V/VI** semester of BBA Business Analytics for the batch of students admitted in **2020-21** and onwards. For the syllabus and model question paper vide Page No.
8. It is resolved to recommend to introduce **E Business** with Course code **ANASET03** for **V/VI** semester of BBA Business Analytics for the batch of students admitted in **2020-21** and onwards. For the syllabus and model question paper vide Page No.
9. It is resolved to recommend to introduce **Econometrics** with Course code **ANASET04** for **V/VI** semester of BBA Business Analytics for the batch of students admitted in **2020-21** and onwards. For the syllabus and model question paper vide Page No.
10. It is resolved to recommend to introduce **Real Time Governance System** with Course code **ANASET05** for **V/VI** semester of BBA Business Analytics for the batch of students admitted in **2020-21** and onwards. For the syllabus and model question paper vide Page No.
11. It is resolved to recommend to introduce **Operating System** with Course code **ANASET06** for **V/VI** semester of BBA Business Analytics for the batch of students admitted in **2020-21** and onwards. For the syllabus and model question paper vide Page No.
12. It is resolved to recommend to introduce **Advance HR Analytics** with Course code **ANASET07** for **V/VI** semester of BBA Business Analytics for the batch of students admitted in **2020-21** and onwards. For the syllabus and model question paper vide Page No.
13. It is resolved to recommend to introduce **Business Use Cases** with Course code **ANASET08** for **V/VI** semester of BBA Business Analytics for the batch of students admitted in **2020-21** and onwards. For the syllabus and model question paper vide Page No.

14. It is resolved to recommend to introduce **Portfolio Management (Finance)** with course code **ANASET09** for **V/VI** semester of BBA Business Analytics for the batch of students admitted in **2020-21** and onwards. For the syllabus and model question paper vide Page No.
15. It is resolved to recommend to introduce **Security Analysis and Portfolio Management Lab** with course code **ANASEP09** for **V/VI** semester of BBA Business Analytics for the batch of students admitted in **2020-21** and onwards. For the syllabus and model question paper vide Page No.
16. It is resolved to recommend to introduce **Business Analytics and Text Mining Modelling using Python** with course code **ANASET10** for **V/VI** semester of BBA Business Analytics for the batch of students admitted in **2020-21** and onwards. For the syllabus and model question paper vide Page No.
17. It is resolved to recommend to introduce **Business Analytics and Text Mining Modelling using Python (LAB)** with course code **ANASEP10** for **V/VI** semester of BBA Business Analytics for the batch of students admitted in **2020-21** and onwards. For the syllabus and model question paper vide Page No.
18. It is resolved to recommend to introduce **Software Testing** with Course code **ANASET11** for **V/VI** semester of BBA Business Analytics for the batch of students admitted in **2020-21** and onwards. For the syllabus and model question paper vide Page No.
19. It is resolved to recommend to introduce **E Commerce Application Development** with Course code **ANASET12** for **V/VI** semester of BBA Business Analytics for the batch of students admitted in **2020-21** and onwards. For the syllabus and model question paper vide Page No.
20. It is resolved to recommend to introduce **Cyber Laws** with Course code **ANASET13** for **V/VI** semester of BBA Business Analytics for the batch

of students admitted in **2020-21** and onwards. For the syllabus and model question paper vide Page No.

21. It is resolved to recommend to introduce **Client Relationship Management** with Course code **ANASET14** for **V/VI** semester of BBA Business Analytics for the batch of students admitted in **2020-21** and onwards. For the syllabus and model question paper vide Page No.
22. It is resolved to recommend to introduce **Marketing Analytics Using Excel and R** with Course code **ANASET15** for **V/VI** semester of BBA Business Analytics for the batch of students admitted in **2020-21** and onwards. For the syllabus and model question paper vide Page No.
23. It is resolved to recommend to introduce **Internet of Things** with Course code **ANASET16** for **V/VI** semester of BBA Business Analytics for the batch of students admitted in **2020-21** and onwards. For the syllabus and model question paper vide Page No.
24. It is resolved to recommend to introduce **Supply Chain Analytics (Theory)** with course code **ANASET17** for **V/VI** semester of BBA Business Analytics for the batch of students admitted in **2020-21** and onwards. For the syllabus and model question paper vide Page No.
25. It is resolved to recommend to introduce **Project Management Analytics (Theory)** with course code **ANASET18** for **V/VI** semester of BBA Business Analytics for the batch of students admitted in **2020-21** and onwards. For the syllabus and model question paper vide Page No.
26. It is Resolved and recommend to frame the course outcomes for all courses (core, elective & cluster) in I, III, V and VI semester of **BBA Business Analytics**, in line with the guidelines of OBE following the Bloom's taxonomy, applicable for the students admitted in the academic year 2020-2021 onwards.



# P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

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## DATA MANAGEMENT WITH SQL PROGRAMMING LAB

**Offered to:** BBA – Business Analytics

**Course Code:** LSCP005A

**Course Type:** Practical (P)

**Year of offering:** 2022-23

**Year of Introduction:** 2017-18

**Percentage of Revision:** 0 %

**Year of Revision:** 2022-23

**Credits:** 2

**Semester:** I

**Max. Time:**

**Hours Taught:** 30 hrs.

### Course Prerequisites (if any):

Basic computer literacy including ability to create and manipulate files and install software.

### Course Objectives:

Understand the structure and design of relational databases. Understand the importance and major issues of database security and the maintenance of data integrity.

**Course Outcomes:** At the end of this course, students should be able to:

**CO1** Learn structured query language (SQL) to an intermediate/advanced level.

**CO2** Be able to write data retrieval queries and evaluate the result set.

**CO3** Be able to write SQL statements that edit existing data.

**CO4** Be able to write SQL statements that create database objects.

**CO5** Understand the structure and design of relational databases.

S.no	Program Name
1	Write Query Creating tables.
2	Adding the field for creating tables.
3	DDL commands, DML commands, DCL commands.
4	SQL constraints.
5	Insert the values to creating tables.
6	Select statement.
7	Where clause
8	Comparison operators
9	Logical Operators
10	Order by Clause
11	SQL functions
12	Displaying data from multiple tables. (joins)
13	Group by clause.
14	Update, delete.
15	sub queries

### Textbook:

1. Alan Beaulieu, Learning SQL, 2<sup>nd</sup> edition, 'O' Reilly Publications – Tokyo
2. Paul Wilton, John Colby, Beginning SQL, Wiley Publication India Pvt Ltd – New Delhi.



# **P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE**

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## **BUSINESS RESEARCH METHODS**

**Offered to:** BBA – Business Analytics  
T311A

**Course Code:** MGT

**Course Type:** Core (TH)

**Year of Introduction:** 2018-19  
23

**Year of offering:** 2022-

**Year of Revision:** 2022-23  
20

**Percentage of Revision:**

**Semester:** III

**Credits:** 4

**Hours Taught:** 60 hrs.

**Max. Time:** 3 Hours

**Course Prerequisites (if any):**

**Course Description:**

**Course Objectives:**

The aim of this course is to provide the student with a basic understanding of research methodology with a specific reference to business context.

**Course Outcomes:** At the end of this course, students should be able to:

**CO1:** Describe the process of Business Research, its scope and importance (**PO1, PO5, PO7 & PSO1**)

**CO2:** Identify the dimensions of Research methodology and the types of Research design (**PO1, PO5, PO7 & PSO1**)

**CO3:** Appreciate the importance of sampling design in research along with the methods of Sampling (**PO1, PO5, PO7 & PSO1**)

**CO4:** Describe how research data is analyzed along with research report preparation (**PO1, PO5, PO7 & PSO1**)

**CO5:** To know the importance of Intellectual property rights, which plays a vital role in advanced Technical and Scientific disciplines. (**PO1, PO6, PO7**)

## Course Details

Unit	Learning Units	Lecture Hours
I	<b>Introduction to Business Research</b> Definition & Meaning of Business Research - Importance of Business Research - Steps in Business Research process - Scope of Business Research - Ethics in Business Research	12
II	<b>Research Design</b> Elements of Research methodology - Types of Research design – Exploratory Research design, Descriptive Research design and Experimental Research design - Features of a good research design	12
III	<b>Data Collection &amp; Sampling Design</b> Primary Data: Meaning and Types - Primary data collection methods and instruments - Process of designing a Questionnaire - Secondary Data: Meaning and Sources - Meaning of Sampling – Steps in sampling process – Types of sampling collection.	12
IV	<b>Data Analysis &amp; Preparation of Research Report</b> Steps in Data Preparation - Data Analytical techniques in Business Research – Univariate Analysis, Bivariate Analysis, and Multivariate Analysis (An Overview) - Structure of a Business Research Report	12
V	<b>Intellectual Property Rights:</b> Introduction to IPR – Types of IPR – Conditions for grant of Patent – Process of Product patent – Copyright – Types of copyrights – Trademark – Conditions for trademark registration – Geographical Indications – Trade Secrets.	12

### Textbook:

1. Shashi.K.Gupta & Praneet Rangi: Research Methodology: Kalyani Publishers
2. Neeraj Pandey, Khushdeep Dharni, Intellectual Property Rights, PHI Pvt Limited, New Delhi.

### Recommended Reference book:

1. D.R.Cooper & P.S.Schindler: Business Research Methods: 9<sup>th</sup> Ed. Tata McGraw Hill Education.
2. Naval Bajpai: Business Research Methods: Pearson Education India.
3. Research Methods for Business: Uma Sekaran and Roger Bougie, WILEY publications

**Course Delivery method:** Face-to-face

**Course has focus on:** Foundation

### Websites of Interest :

1. <https://www.questionpro.com/blog/business-research/>
2. <https://researchguides.ben.edu/c.php?g=282050&p=4036581#:~:text=Primary%20data%20refers%20to%20the,collected%20by%20someone%20else%20earlier.&text=Surveys%2C%20observations%2C%20experiments%2C%20questionnaire,journal%20articles%2C%20internal%20records%20etc.>
3. <https://www.formpl.us/blog/research-report#:~:text=A%20research%20report%20is%20a,and%20accurate%20source%20of%20information.>
4. [INTELLECTUAL PROPERTY RIGHTS - Google Books](#)



## Model Question Paper Structure for BRM

**Max.: 75 Marks  
Marks**

**Min. Pass: 30**

### Section-A

**Answer Any Five  
25Marks)**

**(5 x 5M =**

1. Write the Importance to Business Research. (L2)
2. Discuss about Ethics in Business Research. (L3)
3. What are Features of Good Research Design(L4)
4. Discuss about Primary data Vs Secondary data (L5)
5. Write about Sampling(L2)
6. What do you mean by Univariate Analysis(L2)
7. Discuss the importance of IPR. (L4)
8. Explain the types of IPR (L4)

### Section-B

**Answer the following questions  
50Marks)**

**(5 x 10M =**

9. (a) What is Business Research and explain the importance of research in business. (L2)  
or  
(b) Explain the Business research steps in detail. (L3)
10. (a) What is Research Design? Discuss its elements. (L3)  
or  
(b). State the types of research design with examples. (L4)
11. (a) What is Primary data? Explain its collection methods and instruments. (L2)  
or  
(b) Explain the secondary data with merits and limitations of secondary data. (L2)
12. (a) Explain the meaning of sampling with steps of collecting sampling. (L2)  
or  
(b) Discuss the data analysis techniques in detail. (L3)
13. (a) What is Copy Rights? Discuss the types of Copyrights. (L2)  
or  
(b) Write an importance on Geographical indication and trade secrets in IPR. (L4)



# P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

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## SECURITY ANALYSIS

**Offered to:** BBA – Business Analytics

**Course Type:** Core (TH)

**Year of Introduction:** 2021-22  
2022-23

**Year of Revision:**  
**Revision:** 0

**Semester:** III

**Hours Taught:** 60 hrs.

**Course Code:**

**Year of offering:**

**Percentage of**

**Credits:** 4

**Max. Time:** 3 Hours

**Course Prerequisites (if any):**

**Course Description:**

**Course Objectives:**

This course provides a broad overview of investment management, focusing on the application of finance theory to the issue faced by Investment managers and investors in general and to provide conceptual foundation for the purpose of undertaking Investment analysis for securities.

**Course Outcomes:** At the end of this course, students should be able to:

**CO1** To provide a theoretical and practical background in the field of investments. (L1 &L2)

**CO2** Designing and managing the bond as well as equity portfolios in the real word. (L1 & L2)

**CO3** Valuing equity and debt instruments (L1 & L2)

**CO4** Measuring the Security and Debt performances. (L3)

## Syllabus

### Course Details

Unit	Learning Units	Lecture Hours
I	<b>Introduction to Investment:</b> Concept of Investment and process – Investment objectives and Constrains – Investment Classification – Financial markets and instruments – Primary and Secondary market – Trading, clearing and Settlement procedures – market indices.	12
II	<b>Concept of Return:</b> Introduction to return – Calculation of return – Stock valuation models – Dividend discount models – constant growth model – two stage growth model – the 3-phase model – valuation through P/E ratio.	12
III	<b>Concept of Risk:</b> Introduction to risk – Types of risk (Systematic risk and Unsystematic risk) – Measurements of risk – Ex-post risk – Ex-ante risk – Standard deviation – Characteristic regression line – Correlation.	12
IV	<b>Valuation of Fixed income securities:</b> Concept of Bond basics – Classification of Debt securities – Valuation of Bonds (Redeemable, Non-redeemable and Convertible) - Bond value theorems (Required rate of return, Coupon rate and Bond value) - Bond Duration.	12
V	<b>Fundamental and Technical Analysis:</b> Economic Analysis – Economic Forecasting – industry analysis – analytical tools – Company analysis – Dow theory – Elliot wave theory.	12

**Textbook:**

1. Vanita Tripathi, Security analysis and Portfolio Management, Taxmann publications. New Delhi.
2. Punithavathy Pandian – Security analysis and Portfolio management – Vikas Publications.
3. Rajiv Srivastava - Investment Management – Wiley publications – New Delhi.
4. Dr. R.P. Rustagi - Investment Management theory and Practices - Sultan Chand & Sons – New Delhi.
5. Dr. Preethi Singh – Investment management – Himalaya Publishing House – New Delhi
6. Prasanna Chandra – Investment analysis and Portfolio Management – Tata Mec – Chennai

**Recommended Reference book:**

1. Business Analysis and Valuation using financial statements by Palepu, Healy and Bernard (PHB), 3rd edition, Cengage Learning.
2. Chapters of book: Corporate Finance by Ross, Westerfield, Jaffe and Kakani, 8th Edition, Tata Mc Graw Hill
3. Security Analysis and Portfolio Management by Fisher and Jordan, Prentice Hall India.
4. Damodaran on Valuation (AD)-Security Analysis for Investment and Corporate Finance, 2nd edition, Wiley.
5. Investment Analysis and Portfolio Management by Railley and Brown, Cengage

**Course Delivery method:** Face-to-face

**Course has focus on:** Foundation

**Websites of Interest:**

1. [Introduction to Investing: A Beginner's Guide to Asset Classes \(investopedia.com\)](http://investopedia.com)
2. [Introduction to Investments - Meaning, Objectives and Elements - MBA Knowledge Base \(mbaknol.com\)](http://mbaknol.com)
3. [How to Calculate Return on Security Investment \(netwrix.com\)](http://netwrix.com)
4. [Investment Risk Share and Stock Risk | Davy Select](#)
5. [Introduction to Fixed Income Valuation | IFT World](#)

6. [Difference Between Fundamental and Technical Analysis \(with Comparison Chart\) - Key Differences](#)

7. [Security Analysis and Portfolio Management - Google Books](#)

**Co-curricular Activities:** (Case Studies)

## Model Question Paper Structure for HRM

**Max.: 75 Marks  
Marks**

**Min. Pass: 30**

### Section-A

**Answer Any Five**

**(5 x 5M = 25Marks)**

1. Investment Objectives. (L3)
2. Differentiate Primary vs Secondary market (L2)
3. What is Two stage growth model? (L4)
4. Discuss Price Earnings ratio. (L2)
5. Differentiate Systematic vs Unsystematic risk (L3)
6. Write about Ex-Ante and Ex-Post risk (L1)
7. Write the Time value of money (L4)
8. Explain the Company analysis (L2)

### Section-B

**Answer the following questions**

**(5 x 10M = 50Marks)**

9. (a) What is Investment? write briefly Investment process. (L2)  
or  
(b) Explain Securities trading, clearing and settlement procedures. (L3)
10. (a) What is return on investment? Discuss stock valuation models. (L2)  
or  
(b) A company (ABC Ltd) that has paid a dividend of Rs. 4 this year – assuming a higher growth for the next 3 year at 15% and stable growth of 4% thereafter. Let's calculate the value using a two – stage dividend discount model. (L3)
11. (a) What is Security Risk? Discuss how many types of risk impact on securities. (L4)  
or  
(b) The stock of Z sells for Rs.50 per share, and the same offer the following payoff for the next year: (L3)

Economy	Dividend (Rs.)	Stock price (Rs.)
Boom Economy	3.00	51
Good Economy	2.00	47
Normal Economy	1.60	44
Recession Economy	0.86	33

Calculate the Standard deviation when all the four scenarios re given are equally likely.

12. (a) Explain the fixed income securities and types of fixed income securities. (L2)  
or  
(b) A zero-coupon bond having face value Rs. 1000 and 3 years to maturity is being sold in the market at a yield to maturity of 6%. Calculate its Duration. (L2)
13. (a) What is Fundamental Analysis? Discuss in detail. (L5)  
or  
(b) How Elliot Wave theory benefit to investor? Explain in brief. (L4)



# P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

Siddhartha Nagar, Vijayawada – 520 010

Autonomous - ISO 9001 - 2015 Certified

## MACHINE LEARNING & DEEP LEARNING USING SCIKIT LEARN, KERAS & TENSORFLOW

**Offered to:** BBA – Business Analytics

**Course Code:** ANASET01

**Course Type:** Core (TH)

**Year of Introduction:** 2019-20  
2023

**Year of offering:** 2022-

**Year of Revision:** 2021  
NIL

**Percentage of Revision:**

**Semester:** VI

**Credits:** 3

**Hours Taught:** 60 hrs.

**Max. Time:** 3 Hours

**Course Prerequisites (if any):**

**Course Description:**

**Course Objectives:**

To equip Students with skills and knowledge in the field of Machine Learning and Deep Learning and also familiarize the students with the practical aspects of this field and gradually teach them the industrial usage of machine learning and deep learning of various applications.

**Course Outcomes:** At the end of this course, students should be able to:

C1: To give complete overview on business analytics its developments in new era (PO1, PO3)

C2: To Show case the need of visual appeal to the data for better understanding (PO2, PO3)

C3: To Make student understand about the data and data drive concepts and levels (PO4, PO6)

C4: Discuss about the validity of data and collection of data and arrangement of data (PO5, PO6)

### Syllabus

Syllabus		
Unit	Learning Units	Lecture Hours
I	<b>Chapter 1:</b> Advanced Regression and Regularization: Lasso, Ridge Regression. Advanced Classification Models: Bagging and Boosting. Time Series Forecasting: AR, MA and ARMA models	12
II	<b>Chapter II</b> Introduction to Deep Learning. Deep Learning Vs Machine Learning. Inspiration of Neural Networks from Brain. The Perceptron: the simple idea behind neural networks. Artificial Neuron and It's architecture. Input and output layers in neural networks. Activation functions. Loss Functions. Optimizers.	12
III	<b>Chapter III</b> Artificial Neural Networks. Architecture. Input and output layers in neural networks. Activation functions. Loss Functions. Optimizers. Training a neural net. Feed Forward Mechanism. Back propagation in neural networks. Gradient Descent	12

	Algorithm. Updating weights and biases.	
<b>IV</b>	<b>Chapter IV</b> Introduction to Tensorflow and Keras. Building ANN with Keras. Problems of vanishing gradient and exploding gradient. Modifications to neural networks. Regularization, Normalization, Dropouts. Hand Digit Recognition in keras. Regression with neural networks.	<b>12</b>
<b>V</b>	<b>Chapter V</b> Introduction to Convolution Neural Networks (CNN). Meaning of Convolution. Architecture of CNN. Filters, Padding, Data Preprocessing in CNN. Alexnet, Googlenet. Image Classification with CNN using Keras. Transfer Learning in CNN.	<b>12</b>

**Textbook:**

1. Hands-On Machine Learning with Scikit-Learn, Keras and Tensor Flow: Concepts, Tools and Techniques to Build Intelligent Systems, Aurelian Geron, O'REILLY (available online to download)
2. Deep learning with python: Francois Cholet, Manning publishers (available online to download)

**Recommended Reference book:**

1. <https://www.oreilly.com/library/view/hands-on-machine-learning/9781492032632/><https://www.simplilearn.com/what-is-business-analytics-article>
2. [https://www.knowledgeisle.com/wp-content/uploads/2019/12/2-Aur%C3%A9lien-G%C3%A9ron-Hands-On-Machine-Learning-with-Scikit-Learn-Keras-and-Tensorflow\\_-Concepts-Tools-and-Techniques-to-Build-Intelligent-Systems-O%E2%80%99Reilly-Media-2019.pdf](https://www.knowledgeisle.com/wp-content/uploads/2019/12/2-Aur%C3%A9lien-G%C3%A9ron-Hands-On-Machine-Learning-with-Scikit-Learn-Keras-and-Tensorflow_-Concepts-Tools-and-Techniques-to-Build-Intelligent-Systems-O%E2%80%99Reilly-Media-2019.pdf)<https://www.gooddata.com/blog/>

**Course Delivery method :** Face-to-face

**Course has focus on :** Machine Learning & Deep Learning

**Websites of Interest:**

- <https://stackshare.io/stackups/keras-vs-scikit-learn-vs-tensorflow>
- <https://blog.fastforwardlabs.com/2016/02/24/hello-world-in-keras-or-scikit-learn-versus-keras.html>
- <https://www.tensorflow.org/resources/learn-ml>
- <https://www.tensorflow.org/>

**Co-curricular Activities:** (Case Studies)



## MODEL QUESTION PAPER

### MACHINE LEARNING & DEEP LEARNING WITH SCIKIT – LEARN, KERAS & TENSORFLOW

Answer all questions

5\*15 = 75

1. a. Examine the problems with Linear Regression in Machine Learning? How can we overcome them with Lasso and Ridge Regression? (L3)

**Or**

- b. Write pseudo code for conducting Lasso and Ridge Regression in R using the R packages, caret and glmnet. The data is Boston from MASS package. (L3)
2. a. Define and explain Deep Learning. Draw a suitable diagram for an Artificial Neural Network with input layer, two hidden layers and an output layer. (L2)

**Or**

- b. What is Perceptron? Explain its architecture with a suitable diagram and write the basic steps in the working of perceptron with a numerical example. (L2)
3. a. What is an activation function in neural network? What is its role in Deep Learning? Examine some of the important activation functions in Neural Networks. (L3)

**Or**

- b. What is back propagation in neural networks? Examine the working of gradient descent algorithm. (L2)
4. a. Explain about Tensorflow and Keras libraries. Examine the various models and layers in Keras library with regard to Artificial Neural Networks (ANN). (L2)

**Or**

- b. Write pseudo code for classification problem of handwritten digits data in keras library. (L2)
5. a. What is Convolutional Neural Network? Explain its architecture with detailed visualization. (L3)

**Or**

- b. Write pseudo code for image classification using keras library on fashion mnist data set. (L3)



# P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

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## MACHINE LEARNING & DEEP LEARNING WITH SCIKIT – LEARN, KERAS & TENSORFLOW LAB

**Offered to:** BBA – Business Analytics

**Course Code:** ANASEP01

**Course Type:** Core (P)

**Year of Introduction:** 2019-20  
2023

**Year of offering:** 2022-

**Year of Revision:** 2021  
NIL

**Percentage of Revision:**

**Semester:** VI

**Credits:** 2

**Hours Taught:**

**Max.Time:** 3 Hours

**Course Prerequisites (if any):**

### Course Description:

### Course Objectives:

**Course Outcomes:** At the end of this course, students should be able to:

C1: To give complete overview on business analytics its developments in new era (PO1, PO3)

C2: To Show case the need of visual appeal to the data for better understanding (PO2, PO3)

C3: To Make student understand about the data and data drive concepts and levels (PO4, PO6)

C4: Discuss about the validity of data and collection of data and arrangement of data (PO5, PO6)

### Syllabus

Chapter No	Theme	Topics Covered
1	Introduction to Jupyter Notebook	Setting up working Directory in Jupyter – cell,code, markdown and various operators
2	Introduction to Pandas library for Data Manipulation	Various Functions in Pandas
3	Advanced Machine Learning in R	Lasso and Ridge Regression
4	Advanced Machine Learning in R	XG Boost Algorithm for classification
5	Deep Learning with keras in Pyhton	Introduction to keras Library
6	Artificial Neural Networks	Hand digit recognition with keras
7	Convolutional Neural Networks	Image classification with keras
8	Recurrent Neural Networks	Stock Price Prediction Using RNN



# P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

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## BIGDATA ANALYTICS

**Offered to:** BBA – Business Analytics

**Course Code:** ANASET02

**Course Type:** Core (TH)

**Year of Introduction:** 2019 - 20

**Year of offering:** 2022-23

**Year of Revision:**

**Percentage of Revision:** 00

**Semester:** VI

**Credits:** 3

**Hours Taught:**

**Max. Time:** 3 Hours

**Course Prerequisites (if any):**

**Course Description:**

**Course Objectives:**

The objective of this course is to enable student with understanding of the concepts of BIG DATA and to describe the big data analytics with critical evaluations and also committed to data-driven decision making to automate and optimize business processes.

**Course Outcomes:** At the end of this course, students should be able to:

**CO1:** To impart an overview of Identify Big Data and its Business Implications with its contents and scope

**CO2:** To recognize the characteristics of Hadoop Map Reduce and to optimize business decisions and to create competitive advantage with BIG Data Analytics

**CO3:** To understand the concept of Apache PIG in Hadoop Echo System

**CO4:** To understand the concept of Apache HIVE in Hadoop Echo System.

**CO5:** To understand the concept of Apache H Base and also with Introduction of Apache Spark

Unit	Learning Units	Lecture Hours
I	<b>Introduction to Big Data</b> Big Data concept, Features & challenges - Hadoop and its features - Hadoop Ecosystem and Hadoop Components - Hadoop Architecture and Cluster	12
II	<b>Hadoop Mapreduce</b> Concept, YARN components and YARN architecture - YARN workflow - YARN Mapreduce application execution flow	12
III	<b>Introduction to Apache PIG</b> PIG Components & Execution - PIG data types - Data models in	12

	PIG	
IV	<b>APACHE HIVE</b> Introduction, Architecture and components - Data types and data models - HIVE partitioning and bucketing - HIVE tables	12
V	<b>APACHE HBase</b> Introduction to HBase - HIVE data loading techniques - Run modes configuration and data models - Introduction to Apache Spark	12

#### Prescribed Text Books

	Author	Title	Publisher
	<b>Raj Kamal (Author), Preeti Saxena (Author)</b>	Big Data Analytics, Introduction to Hadoop, Spark, and Machine-Learning Paperback	<b>McGraw Hill Education</b> <b>16 February 2019</b> ISBN-13 <b>978-9353164966</b>
	subhashini Chellappan Seema Acharya (Author)	Big Data and Analytics 2ed Paperback	1 January 2019

#### Reference Text Book

	Author	Title	Publisher
1	Tom White	“ Hadoop: The Definitive Guide” Third Edit	O’reily Media, 2012
2	Seema Acharya, Subhasini Chellappan,	"Big Data Analytics"	Wiley 2015

**Course Delivery method:** Face-to-face

**Course has focus on:** Foundation

**Websites of Interest:**

1. <https://www.guru99.com/what-is-big-data.html>
2. <https://www.geeksforgeeks.org/hadoop-features-of-hadoop-which-makes-it-popular/>
3. <https://www.analyticsvidhya.com/blog/2020/10/introduction-hadoop-ecosystem/>
4. <https://www.geeksforgeeks.org/hadoop-yarn-architecture/#:~:text=Application%20workflow%20in%20Hadoop%20YARN,containers%20from%20the%20Resource%20Manager>
5. <https://www.folkstalk.com/2013/07/pig-data-types-primitive-and-complex.html>

**Co-curricular Activities:** (Case Studies)

**Model Question Paper for  
BIGDATA ANALYTICS**

**Max.: 75 Marks  
Marks**

**Min. Pass: 30**

**Section-A**

**Answer Any Five (5 x 5M = 25Marks) at least one from each unit**

1. Explain 4 v of Bigdata (L3)
2. Explain the Features of Hadoop. (L1)
3. What is Yarn and components of YARN (L3)
4. Write about introduction and importance of the PIG (L2)
5. What is HIVE, how does it work in the real time world (L2)
6. What is HBase and explain the need of HBase in real world. (L3)
7. Difference between SQL and No Sql how does NoSql Started (L2)
8. Explain briefly data generation procedure Traditional data (L2)

**Section-B**

**Answer the following questions (5 x 10M = 50Marks)**

**Unit I**

9. (a) Write the definition of BIGDATA and computational view of Bigdata? (L2)  
or  
(b) Briefly explain key advantages of Hadoop and Key advantages of Hadoop? (L3)

**Unit II**

10. (a) Briefly discuss about YARN Application and Work-flow (L2)  
or  
(b) Explain Map-reduce program and frame work (L3)

**Unit III**

11. (a) Explain briefly PIG Execution modes and Architecture (L3)  
or  
(b) Pig Execution Procedure. (L3)

**Unit IV**

12. (a) Write the procedure for HIVE Architecture and components  
or  
(b) Explain HIVE data Types. (L3)

**Unit V**

13. (a) Explain Hbase data model and physical model. (L3)  
or  
(b) What is HBase and explain the need of HBase in real world. (L2)



# P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

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## Mongo DB

**Offered to:** BBA – Business Analytics

**Course Code:** ANASEP02

**Course Type:** Core (P)

**Year of Introduction:** 2019-20  
2023

**Year of offering:** 2022-

**Year of Revision:** 2021  
NIL

**Percentage of Revision:**

**Semester:** VI

**Credits:** 2

**Hours Taught:**

**Max. Time:** 3 Hours

**Course Prerequisites (if any):**

**Course Description:**

**Course Objectives:**

The main objective of this course is to provide the student with a conceptual understanding of Business analytics, Business Intelligence & Data Visualization, Data Visualization, Data mining in the functional areas of Management

**Course Outcomes:** At the end of this course, students should be able to:

- C1: To give complete overview on business analytics its developments in new era (PO1, PO3)
- C2: To Show case the need of visual appeal to the data for better understanding (PO2, PO3)
- C3: To Make student understand about the data and data drive concepts and levels (PO4, PO6)
- C4: Discuss about the validity of data and collection of data and arrangement of data (PO5, PO6)

Syllabus		
Unit	Learning Units	Lecture Hours
I	<b>Unit I: Introduction to Mongo DB:</b> Introduction to NoSQL Database, Introduction to NoSQL Databases What is Mongo DB, Why Mongo DB, Difference between MongoDB & RDBMS, Installation & Configuration, Downloading Installing and Running, Installing MongoDB Version 3.0.6 on Windows, Features and Tools	06
II	<b>Unit II: Basics of Mongo DB</b> Creating First Database and First Collection in MongoDB 4.0, Inserting One Document with insert One () method, Multiple Documents Insertion in MongoDB 4.0- insert Many () method, Bulk Insert with insert () method and duplicate id, Creating Document and Saving it to Collection	06
III	<b>Unit III: Creating Collections</b> Dropping a Database, creating a Collection - Using db. create Collection (name, options), Dropping a Collection, MongoDB CRUD Operations - Create, Read, Update and Delete Creating/Inserting a document in collection, Inserting Array of Documents	06

<b>IV</b>	<b>UNIT IV: Indexing and Objects</b> Introduction to Indexes Creating Index, Finding Indexes, Dropping Index, Object Ids in MongoDB Section Overview, Understanding Object Ids, Creating Object Ids, Advantages of Object Ids created by MongoDB, Disadvantages of Object Ids created by MongoDB	<b>06</b>
<b>V</b>	<b>UNIT V: Mongo DB Functions:</b> Aggregation Framework in MongoDB, Aggregation Framework in MongoDB, Using distinct () and count (), Sorting documents, Skip, Arrays, Indexes. Relationships in MongoDB (Basics)	<b>06</b>

**Textbook:**

3. Manu Sharma, Mongo DB Complete Guide, bpb Publishers, New Delhi.
4. Practical MongoDB: Architecting Developing and Administering MongoDB by Shakuntala Gupta, Apress publication, Hyderabad.
5. MongoDB: The Definitive Guide – Powerful and Scalable Data Storage, Third Edition Paperback.

**Recommended Reference book:**

1. MongoDB Basics 1st ed. Edition , by Peter Membrey (Author), David Hows (Contributor), Eelco Plugge (Contributor)

**Course Delivery method:** Face-to-face/ Lab

**Course has focused on:** Skill Development.

**Websites of Interest:**

- <https://www.tutorialspoint.com/mongodb/index.htm>  
<https://www.npmjs.com/package/mongodb>

**Co-curricular Activities:** (Case Studies)



# P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

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## E - BUSINESS

Offered to: BBA – Business Analytics

Course Code: ANASET03

Course Type: Core (TH)

Year of Introduction: 2022-23  
2023

Year of offering: 2022-

Year of Revision: 2023  
NIL

Percentage of Revision:

Semester: VI

Credits: 4

Hours Taught: 60 hrs.

Max. Time: 3 Hours

Course Prerequisites (if any):

Course Description:

Course Objectives:

Course Outcomes:

Syllabus		
Unit	Learning Units	Lecture Hours
I	<b>UNIT I: E-Business: Introduction to e-business:</b> Definition of e-business - Characteristics - Elements of e-business - E- business roles - Impact of e-business - Challenges of e-business - Difference between e-business	12
II	<b>UNIT II E Business Technical Platforms:</b> E-business Network Technology Basis - Basic knowledge to Computer Network (Intranet\Extranet\Intranet\LAN\WAN\MAN) - 5 levels of IT-induced configuration - IS-IT Models Diamond Model - Characteristics of Internet based software and e business solutions	12
III	<b>UNIT III Developing E-Business Models:</b> E- business structure - Evolution of e-business and its stages - E-Business Model Ontology Classification to e-Business -Corporation Rethinking the e-Business model.	12
IV	<b>UNIT IV-E Business Strategies:</b> Generic Strategies of E Business - Working of e – market - Transactions at e-market - Strategies for marketing for selling on the web – Advertising supported - Advertising subscription mixed model - Fee for transaction model Sales and Promotions Strategies for Purchasing and support activities - Payment System for e-Business -Traditional payment model, Characteristics of payment system, SET Protocol for credit card payment, E-cash ,E-check ,Smart cards.	12
V	<b>UNIT V E-business Applications:</b> Strategic planning process - E-Stock an e-Supply Chain -Management Definition to SCM - Element of SC, Key issues in SCM -CRM ERP, Procurement	12



**Textbook:**

1. Amir Manzoor, E- Business an Introduction, LAP LAMBERT Publications.
2. Colin Combi, Introduction to E-Business Management and Strategy, Elsevier publications.

**Recommended Reference book:**

1. Rana Tassabehji, Applying E-Commerce in Business, SAGE Publications.

**Course Delivery method:** Face-to-face

**Course has focus on:** Foundation, Database Management, Practical and Entrepreneurship

**Websites of Interest:**

1. [e-Business : Introduction, Types, Features, Concepts, Solved Questions \(toppr.com\)](#)
2. [15 Best Ecommerce Platforms: Pros and Cons + Pricing Comparison | BigCommerce](#)
3. [6 Types of eCommerce Business Models | Elastic Path](#)
4. [E-business strategy | Smart Insights](#)
5. [Types of E-Business Applications \(bizfluent.com\)](#)

**Co-curricular Activities:** (Case Studies)

**Model Question Paper for Econometrics**

**Max.: 75 Marks**

**Mi. Pass: 30 Marks**

**Answer the following questions  
Marks)**

**(5 x 15M = 75**

1. a) (Or)  
b)
2. a) (Or)  
b)
3. a) (Or)  
b)
4. a) (Or)  
b)
5. a) (Or)  
b)



# P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

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## ECONOMETRICS

Offered to: BBA – Business Analytics

Course Code: ANASET04

Course Type: Core (TH)

Year of Introduction: 2022-23  
2023

Year of offering: 2022-

Year of Revision: 2023  
NIL

Percentage of Revision:

Semester: VI

Credits: 4

Hours Taught: 60 hrs.

Max. Time: 3 Hours

Course Prerequisites (if any):

Course Description:

Course Objectives:

Course Outcomes:

Syllabus		
Unit	Learning Units	Lecture Hours
I	<b>UNIT-I: Introduction to Econometrics</b> - nature and scope of Econometrics. Different data types – cross section, time series and panel data. Simple Linear Regression model and Multiple Linear Regression Model. Estimation of parameters - goodness of fit – R <sup>2</sup> and adjusted R <sup>2</sup> - partial regression coefficients; testing hypotheses.	12
II	<b>UNIT-II: Classical Linear Regression Model (CLRM)</b> - Practical Aspects of the CLRM Model Assumptions - detection and remedies - Multicollinearity, Heteroscedasticity, Autocorrelation and Model Selection.	12
III	<b>UNIT-III: Deterministic and Stochastic Trends</b> - Stationarity - Unit Roots – Testing of stationarity using Dickey-Fuller - Augmented Dickey-Fuller Tests – Phillips Peron test.	12
IV	<b>UNIT-IV: Testing Causality - Granger's Causality Test</b> - Vector Auto regression Technique – Vector Error Correction Model. Testing for Co integration - Engel-Granger Co integration test – Johansson Co integration test – Auto Regressive Distributed Lag (ARDL) model.	12
V	<b>UNIT-V: Forecasting - Autoregressive Models</b> - Moving Average Models - Autoregressive Moving Average Models - Autoregressive Integrated Moving Average Models – Auto Regressive Conditional Heteroscedasticity (ARCH) model and Generalized Auto Regressive Conditional Heteroscedasticity (GARCH) model.	12

**Textbook:**

3. Jeffrey M. Wooldridge, Introductory Econometrics: A Modern Approach. Cengage Learning.
4. Sankar Kumar Bhumika, Principles of Econometrics, A modern approach using Eviews, Oxford University press.

**Recommended Reference book:**

1. S. Shyamala, Navdeep kaur, Introductory Econometrics, Vishal Publication Co.
2. R. Carter Hill, William E. Griffiths and Guay C. Lim, Principles of Econometrics, Wiley Publications.

**Course Delivery method:** Face-to-face

**Course has focus on:** Foundation, Database Management, Practical and Entrepreneurship

**Websites of Interest:**

1. [Microsoft Word - Chapter1-Econometrics- IntroductionToEconometrics.doc \(iitk.ac.in\)](#)
2. [06mesmet.pdf \(le.ac.uk\)](#)
3. [9.4 Stochastic and deterministic trends | Forecasting: Principles and Practice \(2nd ed\) \(otexts.com\)](#)
4. [Granger Causality Test - an overview | ScienceDirect Topics](#)

**Co-curricular Activities:** (Case Studies)

**Model Question Paper for Econometrics**

**Max.: 75 Marks**

**Mi. Pass: 30 Marks**

**Answer the following questions  
Marks)**

**(5 x 15M = 75**

6. a) (Or)  
b)
7. a) (Or)  
b)
8. a) (Or)  
b)
9. a) (Or)  
b)
10. a) (Or)  
b)



# P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

Siddhartha Nagar, Vijayawada – 520 010

*Autonomous - ISO 9001 - 2015 Certified*

## REAL TIME GOVERNANCE SYSTEM (RTGS)

**Offered to:** BBA – Business Analytics

**Course Code:** ANASET05

**Course Type:** Core (TH)

**Year of Introduction:** 2022-23  
2023

**Year of offering:** 2022-

**Year of Revision:** 2023  
NIL

**Percentage of Revision:**

**Semester:** VI

**Credits:** 4

**Hours Taught:** 60 hrs.

**Max. Time:** 3 Hours

**Course Prerequisites (if any):**

**Course Description:**

**Course Objectives:**

**Course Outcomes:**

Syllabus		
Unit	Learning Units	Lecture Hours
I	<b>UNIT 1: Introduction to E-Governance</b> Government, Governance and Good Governance, what is E-Governance or Electronic Governance? E-Government and E-Governance: A conceptual Analysis, Objectives, Components, application domains, four phase model, implementing E-Governance, issues while implementing E-Governance, Opportunities, and challenges. Types of E-Governance, what is Real-Time Governance (RTG), Real Time Governance Society (RTGS)	12
II	<b>UNIT 2: E-Governance Infrastructure</b> Data Systems infrastructure, Executive Information Systems, Management Information Systems, Knowledge Management Systems, Transaction Processing Systems. Legal Infrastructural preparedness, IT Act 2000, Challenges to Indian law and cybercrime scenario in India, Amendments of the Indian IT Act. Institutional Infrastructural preparedness, Internet, intranet, extranet • Human Infrastructural preparedness, Top-level management, Middle-level management, Low-level management • Technological Infrastructural preparedness, Information and communications technology, Data Warehousing, Cloud Computing.	12
III	<b>UNIT 3: E-Governance: Country Experience</b> INDIA, US, UK, AUSTRALIA, DUBAI	12
IV	<b>UNIT 4: E-Governance in India 12hrs</b> Andhra Pradesh, Karnataka, Kerala , Uttar Pradesh , Madhya Pradesh , West Bengal ,Gujarat	12

<b>V</b>	<b>UNIT 5: Latest Applications in Real Time Governance</b> Agriculture, Rural Development, Health care, Education, Tourism , Commerce and Trade	<b>12</b>
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**Textbook:**

5. E-Governance: concepts and case studies| CSR Prabhu| Prentice-Hall|
6. E-Governance| Niranjani, Sanhari Mishra | Himalaya Publishing House

**Recommended Reference book:**

**Course Delivery method:** Face-to-face

**Course has focus on:** Foundation, Database Management, Practical and Entrepreneurship

**Websites of Interest:**

1. <http://www.egov4dev.org/success/case/>
2. <https://vikaspedia.in/e-governance/resources-for-vles>
3. <https://altametrics.com/en/information-systems/information-system-types.html>
4. <https://core.ap.gov.in/CMDashBoard/Index.aspx>

**Co-curricular Activities:** (Case Studies)

**Model Question Paper for Econometrics**

**Max.: 75 Marks**

**Mi. Pass: 30 Marks**

**Answer the following questions  
Marks)**

**(5 x 15M = 75**

11. a) (Or)  
b)
12. a) (Or)  
b)
13. a) (Or)  
b)
14. a) (Or)  
b)
15. a) (Or)  
b)





# PB. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

Siddhartha Nagar, Vijayawada – 520 010

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## OPERATING SYSTEMS

**Offered to:** BBA – Business Analytics

**Course**

**Code:** ANASET06

**Course Type:** LAB

Year of Introduction:  
2023

Year of offering: 2022-

**Year of Revision:**  
**Revision:** NIL

**Percentage of**

Semester: VI

Credits: 4

**Hours Taught:** 60 hrs.

**Maxime:** 3 Hours

Course Prerequisites (if

any): Course Description:

### Course Objectives:

Course Outcomes:

### Course Objectives:

1. Learn about Overview of Computer hardware and Operating Systems.
2. Learn basics about Process management.
3. Learn about Memory management
4. Learn about Storage management
5. Learn about Linux, Windows Client and Windows Server OS Operations.

Course Outcome No	Upon successful completion of this course, students should have the knowledge and skills to:	Program Outcome No
CO1	Understand the Computer hardware and operating systems basics	PO7
CO2	Understand the concept of Process management.	PO7
CO3	Understand the concepts of Memory management	PO7
CO4	Understand the concepts of Storage management	PO7
CO5	Understand and know about Linux, Windows Client and Windows Server OS	PO1

**Unit I :Introduction to Operating Systems****12 periods**

- **Computer Basics:** Definition of a Computer - Characteristics and Applications of Computers – Block Diagram of a Digital Computer – Classification of Computers based on size and working
- **Hardware Basics:** Central Processing Unit – I/O Devices-Memory Devices- Secondary storage devices
- **Operating System Basics:** OS Definition, Functions, OS as a Resource Manager, Types of OS, Evolution of OS, Operating System Operations, Operating System Services, User Operating System Interface, System Calls, Types of System Calls.

**Unit II :Process Management****12 periods**

Basic Concepts, Process Scheduling, Operations on Processes, Inter-process Communication, Scheduling Criteria, Scheduling Algorithms, Multiple Processor Scheduling

**Unit III: Memory Management****12 periods**

Memory Management Strategies, Swapping, Contiguous Memory Allocation, Paging, Segmentation, Virtual Memory Management, Demand Paging, Page Replacement Techniques and Algorithms

**Unit IV: Storage Management****12 periods**

File Concept, Access Methods, Directory Structure, Protection, Implementing File Systems, File System Structure, Directory Implementation, Allocation Methods, Free Space Management, Efficiency and Performance, Recovery

**Unit V : Operating Systems****12 periods**

- **Introduction to Linux:** Versions, Components, Features; Installation of Linux OS, Managing Directories, Managing Files
- **Introduction to Windows:** Versions, GUI Components, Features; Installation of Client OS and Server OS, Installation of Roles and Features, Managing Users and Groups, Managing Devices and Printers, Storage Management, Managing and Monitoring of Server, Backup & Restoration

**Text Book**

SilberschatzGalving Gange,2008, Operating System Concepts,6<sup>th</sup>edn, Wiley India (P) Ltd.,New Delhi

- Operating System Concepts, Seventh Edition by Abraham Silberschatz, Peter Baer Galvin and Greg Gagne (2009) [[PDF](#)]
- Windows 10 All-in-One For Dummies By Woody Leonhard, CiprianRusen (2021) [[PDF](#)]

**Reference Books**

- [Operating Systems - Silberschatz, Galvin](#)
- [Operating System – Neso Academy](#)

**Web Resources**

[https://www.tutorialspoint.com/computer\\_fundamentals/index.htm](https://www.tutorialspoint.com/computer_fundamentals/index.htm)

[https://www.tutorialspoint.com/operating\\_system/index.htm](https://www.tutorialspoint.com/operating_system/index.htm)

[https://www.tutorialspoint.com/windows\\_server\\_2012/index.htm](https://www.tutorialspoint.com/windows_server_2012/index.htm)

**Recommended Co – Curricular Activities:**

(Co-curricular activities shall not promote copying from textbook or from others work and shall encourage self/independent and group learning)

**A. Measurable**

1. Assignments (in writing and doing forms on the aspects of syllabus content and outside the syllabus content. Shall be individual and challenging)
2. Student seminars (on topics of the syllabus and related aspects (individual activity))
3. Quiz (on topics where the content can be compiled by smaller aspects and data (Individuals or groups as teams))
4. Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual participation and contribution of students shall be ensured (team activity))

**B. General**

1. Group Discussion
2. Others



# P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

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## ADVANCED HR ANALYTICS

**Offered to:** BBA – Business Analytics  
ANASET07

**Course Type:** Core (TH)

**Year of Introduction:** 2022-23  
2023

**Year of Revision:** 2023  
NIL

**Semester:** VI

**Hours Taught:** 60 hrs.

**Course Prerequisites (if any):**

**Course Description:**

**Course Objectives:**

**Course Outcomes:**

**Course Code:**

**Year of offering:** 2022-

**Percentage of Revision:**

**Credits:** 4

**Max. Time:** 3 Hours

Syllabus		
Unit	Learning Units	Lecture Hours
I	<b>UNIT I: Introduction to HR Analytics</b>  Concepts and definitions- Aligning Human Resources to Business through HR Analytics – Steps for Alignment of HR Analytics- Checklists for Strategies and Business-aligned HR Analytics-Importance of HR Analytics-HR Analytics Framework and Models.	12
II	<b>UNIT II HR Business Process and HR Analytics</b>  Introduction- Statistics and Statistical Modelling for HR Research and HR Decision-making-HR Research Tools and Techniques-Data Analysis for HR-HRIS for Decision Making-HR Metrics- Compelling reasons for HR Analytics.	12

<b>III</b>	<b>UNIT III HR Analytics and Data</b>  HR Data and data Quality- HR Data collection – Big data for Human Resources- Process of data Collection for HR Analytics- HR Reporting- Data Visualization-Performing Root cause Analysis	<b>12</b>
<b>IV</b>	<b>UNIT IV- Descriptive Analytics and Predictive Analytics in HR</b>  Introduction- Creating HR Dashboards Using Microsoft Excel- Slicing and Dicing of HR Data: Pivot Table Applications- Applications of Tableau in HR Data Visualization.  HR Predictive Modelling- Predictive Analytics Tools and Techniques- Applications of Correlation and Linear Regression - HR Analytics Applications of Comparison of Means and ANOVA.	<b>12</b>
<b>V</b>	<b>UNIT V Machine Learning and HR Analytics</b>  HR Analytics Applications of Neural Networks- HR Analytics Applications of Classification and Regression Trees (CART) and Ensemble Techniques- HR Analytics Applications of Factor Analysis and Cluster Analysis.	<b>12</b>

**Textbook:**

7. Kirsten Edwards, Dr Martin R. Edwards, Predictive HR Analytics, Kogan page publications.
8. Fermin Diez, Mark Bussin, Venessa Lee, Fundamentals of HR Analytics, Emerald Publications.

**Recommended Reference book:**

2. Christopher M. Rosett, Austin Hagerty, Introducing Hr Analytics with Machine Learning. Springer Publications.

**Course Delivery method:** Face-to-face

**Course has focus on:** Foundation, Database Management, Practical and Entrepreneurship

**Websites of Interest:**

1. [Introducing HR Analytics with Machine Learning - Google Books](#)
2. [What is HR Analytics? Human Resources Analytics \[Updated 2021\] | AIHR](#)
3. [HR ANALYTICS & BUSINESS PROCESS \(linkedin.com\)](#)
4. [Three Types of HR Analytics: Descriptive, Predictive, and Prescriptive \(employeeecycle.com\)](#)
5. [Machine Learning in the HR Industry: Trends and Example of Using | CodeTiburon](#)

**Co-curricular Activities: (Case Studies)**

**Model Question Paper for Econometrics**

**Max.: 75 Marks  
Marks**

**Mi. Pass: 30**

**Answer the following questions  
Marks)**

**(5 x 15M = 75**

16. a)

(Or)

b)

17. a)

(Or)

b)

18. a)

(Or)

b)

19. a)

(Or)

b)

20. a)

(Or)

b)



# PB. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

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## BUSINESS USE CASES & DEPLOYMENT OF ML MODELS

**Offered to:** BBA – Business Analytics

**Course**

**Code:** ANASET08 **Course Type:** LAB

Year of Introduction: 2017-19  
2022

Year of offering: 2021-

**Year of Revision: 2021**  
**Revision: NIL**

**Percentage of**

Semester: VI

Credits: 4

**Hours Taught:** 60 hrs.

**Maxime:** 3 Hours

Course Prerequisites

(if any): Course

Description:

### Course Objectives:

Course Outcomes:

### Syllabus

Case Study 1	Predicting Heart Disease using Machine Learning
Case Study 2	Credit card Fraud Analysis
Case Study 3	Sentiment Analysis or Topic Mining
Case Study 4	Artificial Neural Network for Customer's Exit Prediction from Bank
Case Study 5	Data Visualization tools & techniques
Deployment of Machine Learning Models	Deployment of ML model
Deployment of Machine Learning Models	Deployment of NLP Model

Textbook:

**Recommended Reference book:**

**Course Delivery method:** Face-to-face

**Course has focus on:** Foundation and Practical

Websites of Interest:

**building-a-web-application-to-deploy-machine-learning-models-e224269c1331** <https://www.freecodecamp.org/news/deploy-your-machine-learning-models-for-free/>  
<https://www.analyticsvidhya.com/blog/2017/09/machine-learning-models-as-apis-using-flask/>  
<https://stackoverflow.blog/2020/10/12/how-to-put-machine-learning-models-into-production/>

**Co-curricular Activities:**





# P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

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## PORTFOLIO MANAGEMENT

**Offered to:** BBA – Business Analytics

**Course Type:** Core (TH)

**Code:**ANASET09

**Year of Introduction:** 2022-23  
2022-23

**Year of Revision:**  
**Revision:** 0

**Semester:** VI

**Hours Taught:** 60 hrs.

**Course**

**Year of offering:**

**Percentage of**

**Credits:** 3

**Max. Time:** 3 Hours

**Course Prerequisites (if any):**

**Course Description:**

**Course Objectives:**

This course provides a broad overview of investment management, focusing on the application of finance theory to the issue faced by Investment managers and investors in general and to provide conceptual foundation for the purpose of undertaking Investment analysis for Securities and Portfolio management.

**Course Outcomes:** At the end of this course, students should be able to:

**CO1** To provide a theoretical and practical background in the field of investments. (L1 &L2)

**CO2** Designing and managing the bond as well as equity portfolios in the real word. (L1 & L2)

**CO3** Valuing equity and debt instruments (L1 & L2)

**CO4** Measuring the Security and Debt performances. (L3)

### Syllabus

#### Course Details

<b>Unit</b>	<b>Learning Units</b>	<b>Lecture Hours</b>
I	<p><b>Introduction to Portfolio management &amp; Efficient market Theory:</b></p> <p>Concept of Portfolio management – Objective of Portfolio construction – Types of portfolio investment  Random walk theory – The Efficient market hypothesis  – Forms of Market Efficiency,</p>	12
II	<p><b>Portfolio Analysis</b></p> <p>Expected return of Portfolio – Risk of Portfolio – Reduction of portfolio risk through diversification (Security returns perfectly positively correlated, Security returns perfectly negatively correlated, Security returns Uncorrelated) – Risk-Return Calculations of Portfolio with more than two securities.</p>	12
III	<p><b>Portfolio Selection</b></p> <p>Feasible set of Portfolios (Efficient set of Portfolios) – Selection of Optimal portfolio (Markowitz model) – Limitations of Markowitz Model – CAPM model</p>	12
IV	<p><b>Portfolio Revision</b></p> <p>Meaning of portfolio revision – Need for revision – Constrains in portfolio revision – Portfolio revision strategies – Formula plans (Constant rupee value plan, Constant Ratio plan, Dollar cost averaging)</p>	12
V	<p><b>Portfolio Evolution &amp; Mutual funds</b></p> <p>Meaning – Need – evaluation perspective (Sharpe's Measure, Treynor's Measure, Jensen's Measure) – Introduction to Mutual fund – Types –evaluation of Mutual funds.</p>	12

**Textbook:**

7. S. Kevin – Portfolio Management – PHI Learning Pvt Limited – New Delhi.
8. V.K. Bhalla – Investment Management – Sultan Chand & Sons – New Delhi.

9. Punithavathy Pandian – Security analysis and Portfolio management – Vikas Publications.
10. Rajiv Srivastava - Investment Management – Wiley publications – New Delhi.
11. Dr. R.P. Rustagi - Investment Management theory and Practices - Sultan Chand & Sons – New Delhi.
12. Dr. Preethi Singh – Investment management – Himalaya Publishing House – New Delhi
13. Prasanna Chandra – Investment analysis and Portfolio Management – Tata Mec – Chennai

**Recommended Reference book:**

1. Robert A. Weigand – Applied Equity analysis and Portfolio Management - Wiley & Sons – New Jersey.
2. Dr. Preethi Singh – Investment management – Himalaya Publishing House – New Delhi

**Course Delivery method:** Face-to-face

**Course has focus on:** Foundation

**Websites of Interest:**

8. [Security Analysis and Portfolio Management - Google Books](#)
9. [security analysis and portfolio management - google books](#)
10. [Portfolio Types | Types of Portfolio Investment | Angel One](#)
11. [Forms of Market Efficiency: Weak, Strong, and Semi-Strong \(investopedia.com\)](#)
12. [Concept of Risk-Return in Portfolio Context \(With Formulas\) \(yourarticlelibrary.com\)](#)
13. [1.3 Portfolio Return and Risk \(The more the merrier...\) - Defining Attitudes Towards and Alternative Measures of Risk | Coursera](#)
14. [security analysis and portfolio management - google books](#)
15. [Optimal Portfolio Selection \(pace.edu\)](#)

**Co-curricular Activities:** (Case Studies)

## Model Question Paper Structure for HRM

Max.: 75 Marks

Min. Pass: 30 Marks

### Section-A

Answer Any Five

(5 x 5M = 25Marks)

1. What are the Objectives of Portfolio Management (L2)
2. Explain the Forms of Market Efficiency (L2)
3. Discuss Expected return of Portfolio (L2)
4. Write the need for portfolio diversification (L1)
5. Importance of CAPM Model (L2)
6. Explain about the Single and Multiple index (L2)
7. Need for revision of Portfolio (L3)
8. How many types of Mutual funds (L2)

### Section-B

Answer the following questions  
50Marks)

(5 x 10M =

9. (a) What is Portfolio Management? Explain its types for investment. (L2)  
or

(b) Explain the Efficient market hypotheses in detail (L2)

10. (a) What is Portfolio Risk? How to minimize the portfolio risk through diversification. (L2)

or

(b) Two securities P and Q are considered for investment. Compute the risk and return of the portfolio assuming the two securities, whose correlation coefficient of returns is  $-0.84$ , are combined in the following proportions in the portfolio: (a) 0: 100, (b) 10: 90, (c) 20: 80, (d) 50: 50, (e) 80: 20, (f) 90: 10, (g) 100: 0. The historical risk-return of the two securities is as follows: (L3)

Security	Risk % (Std. Dev)	Return %
P	20	15
Q	30	20

11. (a) How portfolio selection made, discuss based on the Markowitz model. (L4)  
or

(b) Explain the Capital Asset pricing theory in detail. (L2)

12. (a) Why Portfolio revision is need? Explain constrains involved in portfolio revision. (L2)

or

(b) Discuss the Portfolio management by formula plans? (L2)

13. (a) What is Mutual funds? Explain its types in detail. (L5)

or

(b) A client has three portfolio choices, each with the following characteristics

	Expected Return	Volatility	Beta
Portfolio A	15	12	10
Portfolio B	18	14	11
Portfolio C	12	9	5

The efficient market portfolio has an expected return of 20% and a standard deviation of 12% and the risk-free rate of interest is 5%. Based on the Sharpe ratio for each portfolio, the client should choose.



# P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

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## SECURITY ANALYSIS AND PORTFOLIO MANAGMENT LAB

**Offered to:** BBA – Business Analytics

**Course Type:** Core (P)**Course Code:** ANASEP09

**Year of Introduction:** 2022-23

**Year of offering:** 2022-23

**Year of Revision:** Nil

**Percentage of Revision:** 0

**Semester:** VI

**Credits:** 2

**Hours Taught:**

**Max. Time:**

**Course Prerequisites (if any):**

**Course Description:**

### List of Experiments

S.no	Topic Covered
1	Financial Statistics (Sample Mean, Standard Deviation, Variance, Covariance and Correlation)
2	Security Expected Return and Risk calculation
3	Portfolio Expected Return and Risk calculation.
4	Stock price prediction using Regression.
5	Dividend Discount models for Securities
6	Valuation of bond and bond duration
7	Optimal portfolio selection (Markowitz Model)
8	Portfolio Evolution by Sharpe's, Treynor's and Jense's model

### Textbook:

1. Financial Analytics with R: Building a Laptop Laboratory for Data Science

### Recommended Reference book:

**Course Delivery method:** Excel and R language

**Course has focus on:** Skill Development



# P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

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## BUSINESS ANALYTICS AND TEXT MINING MODELING

**Offered to:** BBA – Business Analytics  
**ANASET10**

**Course Code:**

**Course Type:** Core (TH)

**Year of Introduction:** 2019-20  
**2023**

**Year of offering:** 2022-

**Year of Revision:** 2022  
**NIL**

**Percentage of Revision:**

**Semester:** VI

**Credits:** 3

**Hours Taught:**

**Max. Time:** 3 Hours

**Course Prerequisites (if any):**

**Course Description:**

**Course Objectives:**

The Main objective of this course is to impart knowledge of Visualization on use of text mining techniques for deriving business intelligence to achieve organizational goals.

**Course Outcomes:** At the end of this course, students should be able to:

C1: To give complete overview on business analytics its developments in new era (PO1, PO3)

C2: To Show case the need of visual appeal to the data for better understanding (PO2, PO3)

C3: To Make student understand about the data and data drive concepts and levels (PO4, PO6)

C4: Discuss about the validity of data and collection of data and arrangement of data (PO5, PO6)

<b>Syllabus</b>		
<b>Unit</b>	<b>Learning Units</b>	<b>Lecture Hours</b>
<b>I</b>	<b>Time Series Analytics</b> AR Models, MA models, ARMA Models, ARIMA Models, SARIMA Models	<b>12</b>

<b>II</b>	<b>Retail Analytics</b> Conjoint Analysis, RFM Analysis, Recommendation Systems	<b>12</b>
<b>III</b>	<b>Text analytics and NLP:</b> Text analysis operations with NLTK. Tokenization, Stop words; Lexicon Normalization: Stemming and Lemmatization, POS Tagging, Text Classification.	<b>12</b>
<b>IV</b>	<b>Sentiment Analysis.</b> Types of sentiment analysis. Performing Sentiment Analysis with text classification. Naive Bays' model for sentiment classification.	<b>12</b>
<b>V</b>	<b>Business Use Case Studies:</b> Data Pre-processing and Visualization, Credit Card Fraud Detection, Stock Prices Prediction.	<b>12</b>

**Textbook:**

1. Python Data Visualisation Cookbook. Igor Milovanovic, Packit Publishing.
2. Python for Data Analysis: Data Wrangling with Pandas, NumPy, and Python by Wes McKinney (2017)
3. Text Analytics with Python: A Practical Real-World Approach to Gaining Actionable Insights from Your Data by Dipanjan Sarkar (2016).

**Recommended Reference book:**

**Course Delivery method:** Face-to-face

**Course has focus on:** Foundation

**Websites of Interest:**

**Co-curricular Activities:** (Case Studies)

## Semester End Examination

### P.B. Siddhartha College of Arts & Science Bachelor of Business Administration. Business Analytics

#### Business Analytics (Visualisation) & Text Mining Modelling Using Python (MGT T65)

Answer All Questions.

15\*5=75 Marks

1.

- a. Define data visualisation and explain the analytical patterns of data visualisation and how they are helpful for Business Management (L1)

**Or**

- b. Explain the fundamental principles of data visualisation and provide the list of plots that are suitable for univariate numeric and categorical variables. (L3)

2.

- a. Explain the pandas library visualisation functions both at data frame level and series level. You should provide the pandas plotting syntax for both numeric and categorical variables. (L2)

**Or**

- b. What is Matplotlib library in Python ? Explain it's basic features. Write pseudo code for creating the basic structure of a plot with Matplotlib. (L1)

3.

- a. Consider the average heights and weights of persons aged 8 to 16 stored in the following lists: (L2)

```
height = [121.9,124.5,129.5,134.6,139.7,147.3, 152.4, 157.5,162.6]
```

```
weight= [19.7,21.3,23.5,25.9,28.5,32.1,35.7,39.6, 43.2]
```

From the above data write pseudo code to create line plots for height and weight with axis labels, title, different colours for lines width different widths and marker shape is '\*' .

**Or**

- b. What are the basic features of Seaborn library? Write pseudo code to create
- pairplot for numeric variables in a data frame
  - lm plot between two numeric variables with heuristic of a grouping variable. (L3)

4.

- a. What is the purpose of NLTK library in python? Explain it's basic features. Write pseudo code using NLTK library for Stemming, Lemmatisation and Tokenisation. (L1)

**Or**

- b. Explain the basic text processing methods with python with pseudo code. (L2)

5.

- a. What is sentiment analysis? Explain different types of sentiment analysis. (L1)

**Or**

- b. Explain the various steps with appropriate pseudo code for text classification using Bayes Classifiers(L1)





# P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

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## BUSINESS ANALYTICS & TEXT MINING MODELLING LAB

**Offered to:** BBA – Business Analytics  
**ANASEP10**

**Course Code:**

**Course Type:** Core (P)

**Year of Introduction:** 2019-20  
**2023**

**Year of offering:** 2022-

**Year of Revision:** 2022  
**NIL**

**Percentage of Revision:**

**Semester:** VI

**Credits:** 2

**Hours Taught:**

**Max. Time:** 3 Hours

### Syllabus List of Experiments (4 hours per week)

Chapter No	Theme	Topics Covered
1	Time series Models-1	ARIMA Model
2	Time Series Models-II	SARIMA Model
3	Conjoint Analysis	Conjoint Analysis with R.
4	RFM Analysis	RFM Analysis with R
5	Recommendation Systems	Recommendation Systems with R
6	Text mining modelling using NLTK	Text Corpus; Sentence Tokenization, Word Tokenization; Removing special Characters; Expanding contractions; Removing Stop words
7	Text mining modelling using NLTK	Building a text classifier
8	Cluster Analysis	Building Country Clusters

**Textbook:**

**Recommended Reference book:**

1. Python Data Visualisation Cookbook. Igor Milovanović, Packit Publishing
2. Witten, I.H., 2004. Text Mining. Available at <https://www.cs.waikato.ac.nz/~ihw/papers/04-IHWText Mining.pdf>, Accessed On: 30 October 2017.
3. Wu, W., Chen, Y. and Seng, D., 2017. Implementation of Web Mining Algorithm Based on Cloud Computing. Intelligent Automation & Soft Computing, pp. 1-6. Available at <http://dx.doi.org/10.1080/10798587.2017.1316077>, Accessed: on 20 October 2017.
4. Xu, Y., Yin, Y. and Yin, J., 2017. Tackling topic general words in topic modeling. Engineering Applications of Artificial Intelligence, 62, pp.124-133. Accessed On: 28 October 2017

**Course Delivery method:** Face-to-face

**Course has focus on:** Foundation,

**Websites of Interest:**

**Co-curricular Activities:**



# P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

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## SOFTWARE TESTING

**Offered to:** BBA – Business Analytics  
ANASET11

**Course Code:**

**Course Type:** Core (TH)

**Year of Introduction:** 2022-23  
2023

**Year of offering:** 2022-

**Year of Revision:** 2023  
NIL

**Percentage of Revision:**

**Semester:** VI

**Credits:** 4

**Hours Taught:** 60 hrs.

**Max. Time:** 3 Hours

**Course Prerequisites (if any):**

**Course Description:**

**Course Objectives:**

**Course Outcomes:**

Syllabus		
Unit	Learning Units	Lecture Hours
I	<b>UNIT-I</b>  Introduction: Purpose of testing, Dichotomies, model for testing, consequences of bugs, taxonomy of Bugs. Flow Graphs and Path testing: Basics concepts of path testing, predicates, path predicates and Achievable paths, path sensitizing, path instrumentation, application of path testing.	12
II	<b>UNIT II</b>  Transaction Flow Testing: Transaction flow, transaction flow testing techniques.  Dataflow testing: Basics of dataflow testing, strategies in dataflow testing, application of dataflow testing.	12
III	<b>UNIT III HR Analytics and Data</b>  Domain Testing: domains and paths, Nice & ugly domains, domain testing domains and interfaces Testing, domain and interface testing, domains, and testability.	12
IV	<b>UNIT IV-</b>	12

	Paths, Path products and Regular Expressions: Path products & path expression, reduction procedure, Applications, regular expressions & flow anomaly detection. Logic Based Testing: Overview, decision tables, path expressions kv charts, specifications.	
<b>V</b>	<b>UNIT V</b>  State, State Graphs and Transition testing: State graphs, good & bad state graphs state testing, Testability tips. Graph Matrices and Application: Motivational overview, matrix of graph, relations, power of a matrix, Node reduction algorithm, building tools. (Student should be given an exposure to a tool like J Meter or Win runner.)	<b>12</b>

**Textbook:**

9. Ralf Bierig, Stephen Brown, Edgar Galvan, Essentials of Software testing, Cambridge University press.
10. Paul Ammann, Jeff Offutt, Introduction to Software Testing, Cambridge University Press.
11. [Sandeep Desai](#), [Abhishek Srivastava](#), Software Testing: Practical approach, PHI learning pvt limited.

**Recommended Reference book:**

3. [Peter Farrell-Vinay](#), Manage Software Testing, Auerbach publications.

**Course Delivery method:** Face-to-face

**Course has focus on:** Foundation, Database Management, Practical and Entrepreneurship

**Websites of Interest:**

5. [Introduction To Software Testing - International Software Test Institute \(test-institute.org\)](http://test-institute.org)
6. [Transaction Flow Testing | Sakshi Education](#)
7. [Domain Testing in Software Engineering - GeeksforGeeks](#)
8. [www.gpcet.ac.in/wp-content/uploads/2017/03/UNIT-4-2-files-merged.pdf](http://www.gpcet.ac.in/wp-content/uploads/2017/03/UNIT-4-2-files-merged.pdf)

**Co-curricular Activities:** (Case Studies)

**Model Question Paper for Econometrics**

**Max.: 75 Marks  
Marks**

**Mi. Pass: 30**

**Answer the following questions**

**(5 x 15M = 75 Marks)**

1 a)

(Or)

b)

2 a)

(Or)

b)

3 a)

(Or)

b)

4 a)

(Or)

b)

5 a)

(Or)

b)



# P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

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## E – COMMERCE APPLICATION DEVELOPMENT

**Offered to:** BBA – Business Analytics

**Course Code:**

**ANASET12**

**Course Type:** Theory

Year of Introduction: 2022

Year of offering: 2022-2023

**Year of Revision:**

**Percentage of Revision: NIL**

Semester: VI

Credits: 4

**Hours Taught:** 60 hrs.

**Maxime:** 3 Hours

Course Prerequisites (if any): Course Objectives

To educate students in ecommerce and ecommerce applications.

Course Outcomes

Upon successful completion of the course, a student will be able to:

CO1: To apply in an integrative and summative fashion the students' knowledge in all fields of business studies by drafting a website presence plan. (PO6, PO7)

CO2: To understand the factors needed in order to be a successful in ecommerce (PO6, PO7)

CO3: To gain the skills to bring together knowledge gathered about the different components of building a web presence (PO6, PO7)

CO4: To critically think about problems and issues that might pop up during the establishment of the web presence (PO6, PO7)

CO5: To apply Word Press as a content management system (CMS), Plan their website by choosing colour schemes, fonts, layouts, and more . (PO6, PO7)

## II. Syllabus

### Unit-1: (10h)

Introduction to E– commerce: Meaning and concept – E– commerce , E– commerce v/s Traditional Commerce , E– Business & E– Commerce – History of E– Commerce , EDI – Importance, features & benefits of E– Commerce , Impacts, Challenges & Limitations of E– Commerce

### Unit-2: (12h)

Business models of E – Commerce: Business to Business , Business to customers ,Customers to Customers , Business to Government , Business to Employee , Influencing factors of successful E– Commerce , Architectural framework of Electronic Commerce , Web based E Commerce Architecture. Internet Commerce

### Unit-3: (12h)

Electronic data Interchange , EDI Technology ,EDI- Communications , EDI Agreements , E– Commerce payment system. Digital Economy

**Unit -4: (13h)**

A Page on the web - HTML Basics , Client Side scripting -JAVA SCRIPT basics , Server side Scripting- PHP basics.

**Unit-5: (13h)**

Logging in to Your Word press Site , word press dash board , creating your first post , adding photos and images , creating hyper link , adding categories and tags

**III. Textbooks:**

1. Turban, Rainer, and Potter, Introduction to E-Commerce, second edition, 2003
2. H. M. Deitel, P. J. Deitel and T. R. Nieto, E-Business and E-Commerce: How to Programe, Prentice hall, 2001
3. WordPress All-in-One For Dummies -written by Lisa Sabin Wilson with contributions by Michael Torbert, Andrea Rennick, Cory Miller, and Kevin Palmer

**Reference Books:**

1. Elias. M. Awad, "Electronic Commerce", Prentice-Hall of India Pvt Ltd.
2. Ravi Kalakota, Andrew B. Whinston, "Electronic Commerce-A Manager's guide", Addison-Wesley
3. <https://w3cschools.com>
4. David Whiteley, E-Commerce: Strategy, Technologies and Applications, Tata McGraw Hill.

**IV. Co-Curricular Activities:**

(Co-curricular activities shall not promote copying from textbook or from others work and shall encourage self/independent and group learning)

**A. Measurable**

1. Assignments (in writing and doing forms on the aspects of syllabus content and outside the syllabus content. Shall be individual and challenging)
2. Student seminars (on topics of the syllabus and related aspects (individual activity))
3. Quiz (on topics where the content can be compiled by smaller aspects and data (Individuals or groups as teams))
4. Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual participation and contribution of students shall be ensured (team activity))

**B. General**

1. Group Discussion
2. Try to solve MCQ's available online.



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## CYBER LAWS

**Offered to:** BBA – Business Analytics  
**ANASET13**  
**Course Type:** Core (TH)

**Course Code:**

**Year of Introduction:** 2022-23  
**2023**

**Year of offering:** 2022-

**Year of Revision:** 2023  
**NIL**

**Percentage of Revision:**

**Semester:** VI

**Credits:** 4

**Hours Taught:** 60 hrs.

**Max. Time:** 3 Hours

**Course Prerequisites (if any):**

**Course Description:**

**Course Objectives:**

**Course Outcomes:**

<b>Syllabus</b>		
<b>Unit</b>	<b>Learning Units</b>	<b>Lecture Hours</b>
<b>I</b>	Introduction: Computers and its Impact in Society, Overview of Computer and Web Technology, Need for Cyber Law, Cyber Jurisprudence at International and Indian Level.	<b>12</b>
<b>II</b>	Cyber laws – international perspectives: UN & International Telecommunications Union (ITU) initiatives, Council of Europe – Budapest convention on cybercrime, Asia Pacific Economic Cooperation (APEC), Organization for Economic Cooperation and Development (OECD), World Bank, Commonwealth of Nations	<b>12</b>
<b>III</b>	Constitutional & Human Rights Issues in Cyberspace: Freedom of Speech and Expression in Cyber space, right to Access Cyberspace – Access to Internet, Right to Privacy, Right to Data	<b>12</b>
<b>IV</b>	Cyber Crimes & Legal Framework: Cyber Crimes against Individuals, Institution and State, Hacking, Digital Forgery, Cyber Stalking/Harassment, Cyber Pornography, Identity Theft & Fraud,	<b>12</b>



	Cyber terrorism, Cyber Defamation, Different offences under IT Act, 2000.	
<b>V</b>	Cyber Torts: Cyber Defamation, Different Types of Civil Wrong under the IT Act, 2000, Intellectual Property Issues in Cyber Space, Interface with Copyright Law, Interface with Patent Law, Trademarks & Domain Names Related issues	<b>12</b>

**Textbook:**

1. Chris Reeds & John Angel, Computer Law, OUP, New York, (2007).
2. Justice Yatindra Singh, Cyber Laws, Universal Law Publishing Co, New Delhi,
3. Verman. K., Mittal Raman, Legal Dimensions of Cyber Space, Indian Law Institute, New D
4. Jonathan Rosenoer, Cyber Law, Springer, New York, (1997).
5. Sudhir Naib, The Information Technology Act, 2005: A Handbook, OUP, New York, (2011)
6. S. R. Bhansali, Technology Act, 2000, University Book House Pvt. Ltd., Jaipur (2003).
7. Vasu Deva, Cyber Crimes and Law Enforcement, Commonwealth Publishers, New Delhi, (2003).

**Recommended Reference book:**

**Course Delivery method:** Face-to-face

**Course has focus on:** Foundation, Database Management, Practical and Entrepreneurship

**Websites of Interest:**

**Co-curricular Activities:** (Case Studies)

**Model Question Paper for Cyber Law**

**Max.: 75 Marks  
Marks**

**Mi. Pass: 30**

**Answer the following questions  
Marks)**

**(5 x 15M = 75**

21. a)

(Or)

b)

22. a)

(Or)

b)

23. a)

(Or)

b)

24. a)

(Or)

b)

25. a)

(Or)

b)



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## CLIENT RELATIONSHIP MANAGEMENT

**Offered to:** BBA – Business Analytics  
**ANASET14**

**Course Code:**

**Course Type:** Core (TH)

**Year of Introduction:** 2022-23  
**2023**

**Year of offering:** 2022-

**Year of Revision:** 2023  
**NIL**

**Percentage of Revision:**

**Semester:** VI

**Credits:** 4

**Hours Taught:** 60 hrs.

**Max. Time:** 3 Hours

**Course Prerequisites (if any):**

**Course Description:**

**Course Objectives:**

**Course Outcomes:**

Syllabus		
Unit	Learning Units	Lecture Hours
I	<b>Unit I</b> <b>The Interface</b> - Versions, Frames, Important application menus and modules, Content Frame, UI Settings, and Personalization <b>Lists and Forms</b> – List V2 versus List V3, Lists and Tables, Forms	12
II	<b>Unit II</b> <b>UI Customization</b> – Branding your Instance, Custom Themes, UI-Impacting System Properties, Configuring Service Portal UI, creating a Custom Homepage, Styling Pages, and Widgets, setting up the War Room page, Styling the CMS	12
III	<b>Unit III</b> <b>Understanding Data and Relationships</b> – One to many relationships in ServiceNow, many to many relationships in ServiceNow, enforcing one to one relationship, Defining Custom Relationships, Database table inheritance	12
IV	<b>Unit IV</b>	12

	<p><b>Tasks and Workflows</b> –Important Task fields, Journals, and the activity formatter, Extending the task table, Workflows, SLAs, Approvals, Assignment, Creating Task fields</p> <p><b>UI and Data Policies</b> –UI Policies, reverse if false, Scripting in UI policies, UI Policy Order, Data Policies, Converting between data and UI Policies, Data Policies versus ACLs</p>	
<b>V</b>	<p><b>Unit V</b></p> <p><b>User Administration and Security</b> –Users, Groups and Roles, Emails and Notifications, User Preferences, ACLs – Security Rules</p> <p><b>Introduction to Scripting</b> –Client-side versus Server-side APIs, where scripting is supported, Integrated development environment</p>	<b>12</b>

**Textbook:**

12. David A. Po-Chedley, Client Relationship Management, HRD Press.
13. V. Kumar, Werner Reinartz, Customer Relationship Management, Springer publications.

**Recommended Reference book:**

4. Francis Buttle, Stan Maklan, Customer Relationship Management, Routledge publications,

**Course Delivery method:** Face-to-face

**Course has focus on:** Foundation, Database Management, Practical and Entrepreneurship

**Websites of Interest:**

1. [Ch-1-Introduction-to-CRM.pdf \(aissmschmct.in\)](http://aissmschmct.in)
2. [https://support.industrysoftware.automation.siemens.com/docs/teamcenter/10.1/PDF/en\\_US/tdocExt/pdf/client\\_customization\\_programmers\\_guide.pdf](https://support.industrysoftware.automation.siemens.com/docs/teamcenter/10.1/PDF/en_US/tdocExt/pdf/client_customization_programmers_guide.pdf)
3. [Guide to Customer Relations: Definition, Benefits, and Tips \(helpscout.com\)](http://helpscout.com)

**Co-curricular Activities:** (Case Studies)

**Max.: 75 Marks  
Marks**

**Mi. Pass: 30**

**Answer the following questions  
Marks)**

**(5 x 15M = 75**

26. a)

(Or)

b)

27. a)

(Or)

b)

28. a)

(Or)

b)

29. a)

(Or)

b)

30. a)

(Or)

b)



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## MARKETING ANALYTICS (USING EXCEL & R)

**Offered to :** BBA – Business Analytics  
**ANASET15**

**Course Code :**

**Course Type :** Core (TH)

**Year of Introduction :** 2017 -19

**Year of offering :** 2021

**Year of Revision :**  
00

**Percentage of Revision :**

**Semester :** V

**Credits :** 4

**Hours Taught :** 60 hrs.

**Max.Time :** 3 Hours

**Course Prerequisites (if any):**

**Course Description:**

**Course Objectives:**

**Course Outcomes:** At the end of this course, students should be able to:

Syllabus		
Unit	Learning Units	Lecture Hours
I	Introduction to R Programming: – Installation of R & R Studio – Layout of R Studio - Vectors – Matrix and Creating a Data Frame - Data Manipulation: IF Else – Loops, Functions –Types of Data – Packages.	12
II	Marketing Analytics: - Introduction – Need of Marketing Analytics, Want & Demand – Significance of Marketing Analytics - What Consumers Want – How to Know what Consumers Want – Methods to Find out the information.	12
III	ConJoint Analysis: Introduction to ConJoint Analysis – Types of Preference Data- Choice based – ConJoint Analysis – ConJoint Attributes – Pricing Decisions using conjoint Analysis – Confusion Matrix.	12
IV	Market Basket Analysis: - Introduction of Market	12

	Basket Analysis – Uses of Market Basket Analysis - Association Rules – Apriori Algorithm - Frequent item set - Support – Confidence	
V	Recommendation Engine & Retail Analytics – Introduction – Significance of Recommendation Engine – Collaborative Filtering Method – Problems with Collaborative Filtering – Content Based Recommendation.	12

Prescribed Text Books			
	Author	Title	Publisher
1	Chris Chapman and Elea McDonnell Feit	R for Marketing Research and Analytics	
2	by <a href="#">Wayne L. Winston</a> (Author)	Marketing Analytics: Data-Driven Techniques with Microsoft Excel 1st Edition	<a href="#">By Pearson</a> by Thomas W. Miller Paperback

Reference Text Book			
	Author	Title	Publisher
1	Stephan Sorger	Marketing Analytics	Amazon Digital Services
2	Dave Jacobs	“Marketing Analytics: Optimize Your Business with Data Science in R, Python, and SQL”	Dave Jacobs

**Course Delivery method :** Face-to-face

**Course has focus on :** Foundation

**Websites of Interest :**

1. <https://www.marketingevolution.com/marketing-essentials/marketing-analytics>
2. [https://www.sas.com/en\\_us/insights/marketing/marketing-analytics.html](https://www.sas.com/en_us/insights/marketing/marketing-analytics.html)
3. <https://mailchimp.com/marketing-glossary/marketing-analytics/>
4. <https://www.martechadvisor.com/articles/marketing-analytics/marketing-analytics-martech-101-basics/>

**Co-curricular Activities:** (Case Studies)

## Model Question Paper Structure for Marketing Analytics (Using Excel & R)

**Max.: 75 Marks  
Marks**

**Min.Pass : 30**

### Section-A

**Answer Any Five  
25Marks)**

**(5 x 5M =**

9. What is the layout of R Studio explain the four sub-windows. (L1)
10. Explain the concept of a vector in R and various types of it (L2)
11. Explain the concept of Marketing Analytics (L3)
12. What is meant by Support and Confidence in Association Rules? (L2)
13. What is meant by Conjoint Analysis and explain its types. (L3)
14. What are the types of data in R Programming(L3)
15. Explain the concept of a Factor in R and what is the code for creating it ? (L2)
16. Explain the concept of Lift and Confidence in conjoint analysis. (L4)

### Section-B

**Answer the following questions  
50Marks)**

**(5 x 10M =**

9. (a) Explain two different methods to create a data frame in R.. (L2)  
or  
(b) Explain the various stages in conjoint analysis in R using an imaginary data set.. (L3)
10. (a) What is Market Basket Analysis? Where it is used? Examine the work flow of Market Basket Analysis using R- 'arules' package. (L3)  
or  
(b). Explain what customer wants and what are the tools to know what customer wants. (L4)
11. (a) Explain the various methods of sub-setting a data frame in R (L2)  
or  
(b) Explain the four looping functions with examples in R Program. (L2)
12. (a) Explain the different ways in which Organizations Use Marketing Analytics (L2)  
or  
(b) Explain the various types of data structures available in R Program (L2)
13. (a) What is Data Analysis? Explain steps in data preparation. (L2)  
or  
(b) (L3)





# P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

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## INTERNET OF THINGS

**Offered to:** BBA – Business Analytics  
**ANASET16**

**Course Code:**

**Course Type:** Core (TH)

**Year of Introduction:** 2022-23  
**2023**

**Year of offering:** 2022-

**Year of Revision:** 2023  
**NIL**

**Percentage of Revision:**

**Semester:** VI

**Credits:** 4

**Hours Taught:** 60 hrs.

**Max. Time:** 3 Hours

**Course Prerequisites (if any):**

**Course Description:**

**Course Objectives:**

**Course Outcomes:**

Syllabus		
Unit	Learning Units	Lecture Hours
I	<b>UNIT-I</b> Fundamentals of IoT: Introduction, Definitions & Characteristics of IoT, IoT Architectures, Physical & Logical Design of IoT, Enabling Technologies in IoT, History of IoT, About Things in IoT, The Identifiers in IoT, About the Internet in IoT, IoT frameworks, IoT and M2M.  Applications of IoT: Home Automation, Energy, Retail Management, Logistics, Agriculture, Health, and Lifestyle, Industrial IoT, Legal challenges, IoT design Ethics, IoT in Environmental Protection.	12

<b>II</b>	<b>UNIT-II</b> Sensors Networks: Definition, Types of Sensors, Types of Actuators, Examples and Working, IoT Development Boards: Arduino IDE and Board Types, Raspberry Pi Development Kit, RFID Principles and components, Wireless Sensor Networks: History and Context, the node, Connecting nodes, Networking Nodes, WSN and IoT.	<b>12</b>
<b>II</b> <b>I</b>	<b>UNIT 3:</b> Wireless Technologies for IoT: WPAN Technologies for IoT: IEEE 802.15.4, Zigbee, HART, NFC, ZWave, BLE, Bacnet and Modbus. IP Based Protocols for IoT IPv6, 6LoWPAN, LoRA, RPL, REST, AMPQ, CoAP, MQTT. Edge connectivity and protocols.	<b>12</b>
<b>I</b> <b>V</b>	<b>UNIT 4:</b> Arduino Simulation Environment: Arduino Uno Architecture, Setting up the IDE, Writing Arduino Software, Arduino Libraries, Basics of Embedded C programming for Arduino, Interfacing LED, push button and buzzer with Arduino, Interfacing Arduino with LCD.  Sensor & Actuators with Arduino Overview of Sensors working, Analog and Digital Sensors, Interfacing of Temperature, Humidity, Motion, Light and Gas Sensors with Arduino, Interfacing of Actuators with Arduino, Interfacing of Relay Switch and Servomotor with Arduino.	<b>12</b>
<b>V</b>	<b>UNIT 5:</b> Developing IOT's: Implementation of IoT with Arduino, Connecting and using various IoT Cloud Based Platforms such as Blynk, Thingspeak, AWS IoT, Google Cloud IoT Core etc. Cloud Computing, Fog Computing, Privacy and Security Issues in IoT.	<b>12</b>

**Textbook:**

1. Internet of Things - A Hands-on Approach, Arshdeep Bahga and Vijay Madisetti, Universities Press, 2015, ISBN: 9788173719547
2. Vijay Madisetti and Arshdeep Bahga, "Internet of Things (A Hands-on Approach)", 1st Edition, VPT, 2014
3. Daniel Minoli,—"Building the Internet of Things with IPv6 and MIPv6: The Evolving World of M2M Communications", ISBN: 978-1-118-47347-4, Wiley Publications
4. Pethuru Raj and Anupama C. Raman, "The Internet of Things: Enabling Technologies, Platforms, and Use Cases", CRC Press
5. Open source software/learning websites
  - a. [http://www.cse.wustl.edu/~jain/cse570-15/ftp/iot\\_prot/index.html](http://www.cse.wustl.edu/~jain/cse570-15/ftp/iot_prot/index.html)
  - b. Contiki (Open source IoT operating system)
  - c. Ardudroid (open source IoT project)
  - d. IoT Toolkit (smart object API gateway service reference implementation)

**Recommended Reference book:**

**Course Delivery method:** Face-to-face

**Course has focus on:** Foundation, Database Management, Practical and Entrepreneurship

**Websites of Interest:**

1. <https://github.com/connectIOT/iottoolkit>
2. <https://github.com/connectIOT/iottoolkithttps://www.arduino.cc/>
3. [https://onlinecourses.nptel.ac.in/noc17\\_cs22/course](https://onlinecourses.nptel.ac.in/noc17_cs22/course)
4. <https://blynk.io>(Mobileapp)

**Co-curricular Activities:** (Case Studies)

**Model Question Paper for INTERNET OF THINGS**

**Max.: 75 Marks**

**Mi. Pass: 30**

**Marks**

**Answer the following questions**

**(5 x 15M = 75 Marks)**

1. a)

(Or)

b)

2. a)

(Or)

b)

3. a)

(Or)

b)

4. a)

(Or)

b)

5. a)

(Or)

b)



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## SUPPLY CHAIN ANALYTICS

**Offered to:** BBA – Business Analytics  
**ANASET17 Course Type:** Core (TH)

**Course Code:**

**Year of Introduction:** 2018-19  
**2023**

**Year of offering:** 2022-

**Year of Revision:** 2021  
**NIL**

**Percentage of Revision:**

**Semester:** VI

**Credits:** 4

**Hours Taught:** 60 hrs.

**Max. Time:** 3 Hours

**Course Prerequisites (if any):**

**Course Description:**

**Course Objectives:**

1. Understand the Importance of Basic Business Analytics and Optimization
2. Understand the Importance of Basic Supply Chain Analytics and Optimization
3. Analyze the level of uncertainty associated with the supply of products and services targeted customers
4. Explain the role of application of Descriptive analytics in a Supply chain
5. Explain the role of application of Predictive analytics in a Supply chain

**Course Outcomes:**

<b>Syllabus</b>		
<b>Unit</b>	<b>Learning Units</b>	<b>Lecture Hours</b>
<b>I</b>	<b>Introduction to Supply Chain Analytics</b> Introduction to supply chain analytics -Evolution of Supply chain analytics -Supply chain planning -Different Views of supply chain - Analytics in Supply chain	<b>12</b>
<b>II</b>	<b>UNIT II Supply Chain Strategies</b> Supply Chain Strategy - Supply chain Drivers -Developing a supply chain Strategy -Strategic Fit in Supply Chain -Demand forecasting in Supply chain	<b>12</b>
<b>III</b>	<b>Unit III Inventory and Network Analysis</b> Inventory management in Supply chain - Echelon Model of Inventory management–Network design in Supply chain -Network design of Global -Alternative channels of distribution	<b>12</b>
<b>IV</b>	<b>Analytics in Supply Chain</b>	<b>12</b>

	Optimum level of Product Availability -Time value of money in supply chain Analytics –Predictive modeling in forecasting Supply chain analytics -Representation of uncertainty in Supply chain (Binominal Modeling) -Trends Challenges and Future of Supply chain	
<b>V</b>	<b>Supply Chain Techniques</b> Bull-Whip Effect and time series Analysis -Exponential smoothing method forecasting Tracking signal and seasonality model	<b>12</b>

**Textbook:**

1. Overview of workforce scheduling software Production and Inventory Management Journal Building a collaboration architecture for a global supply chain by G I Campbell; S Humair

**Recommended Reference book:**

**Course Delivery method:** Face-to-face

**Course has focus on:** Foundation, Entrepreneurship

**Websites of Interest:**

<https://www.netsuite.com/portal/resource/articles/erp/supply-chain-analytics.shtml>

<https://www.edx.org/course/supply-chain-analytics>

<https://www.gartner.com/en/supply-chain/insights/supply-chain-analytics>

**Co-curricular Activities:** (Case Studies)

## Model Question Paper for Fundamentals of Business Analytics

**Max.: 75 Marks**

**Mi. Pass: 30 Marks**

### Section-A

**Answer Any Five**

**(5 x 5M = 25Marks)**

1. Write about the need of Business Analytics? (L1)
2. Define the applications of Business Analytics? (L3)
3. Write about Wisdom Hierarchy? (L2)
4. Explain the importance of Business Intelligence (BI)? (L1)
5. Write about ETL? (L2)
6. What do you mean by Data Preparation? (L4)
7. Explain about Health Care Analytics? (L4)
8. What do you mean by Data Science? (L3)

### Section-B

**Answer the following questions (5 x 10M = 50Marks)**

9. a) Explain in detail regarding Descriptive, Predictive Analytics & Prescriptive Analytics? (L3)  
(Or)  
b) What is Big Data? Briefly Explain the Characteristics and importance of Big Data? (L3)
10. a) What do you mean by Data visualization? Briefly Explain the tools in Data Visualization? (L4)  
(Or)  
b) Write at least 5 popular Business Intelligence Tools with explanation? (L1)
11. a) Define Data Mining and explain the process of Implementing Data Mining? (L1)  
(Or)  
b) Explain in detail regarding Outliers and the reasons for occurring of Outliers? (L2)
12. a) Describe Marketing Analytics and highlight the advantages of Marketing Analytics? (L2)  
(Or)  
b) Explain Financial Analytics and the Important Factors in Finance analytics? (L3)
13. a) Explain the scope & Importance of Business Analytics? (L1)  
(Or)  
b) Describe Machine Learning and the Types of Machine Learning? (L2, L4)



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## PROJECT MANAGEMENT ANALYTICS

**Offered to:** BBA – Business Analytics

**Course Code:**

**ANASET18**

**Course Type:** Core (TH)

**Year of Introduction:** 2019-20  
**2023**

**Year of offering:** 2022-

**Year of Revision:** 2021  
**NIL**

**Percentage of Revision:**

**Semester:** VI

**Credits:** 4

**Hours Taught:** 60 hrs.

**Max. Time:** 3 Hours

**Course Prerequisites (if any):**

**Course Description:**

**Course Objectives:**

**Course Outcomes:**

<b>Syllabus</b>		
<b>Unit</b>	<b>Learning Units</b>	<b>Lecture Hours</b>
<b>I</b>	<b>Introduction:</b> Meaning, Scope and Objectives, Types of Projects, Generation and Screening of Ideas, Generation of Ideas, Monitoring the Environment, Corporate Appraisal, Preliminary Screening - Problems of Project management. Project Management Analytics - Why Is Analytics Important in Project Management? How Can Project Managers Use Analytics in Project Management? Project Management Analytics Approach.	<b>12</b>
<b>II</b>	<b>Data-Driven Decision-Making:</b> Characteristics of a Good Decision- Decision-Making Factors - Importance of Decisive Project Managers. Automation and Management of the Decision-Making Process - Data-Driven Decision-Making-Data-Driven Decision-Making Process Challenges	<b>12</b>



<b>III</b>	<b>Statistical Applications in Project Management:</b> Statistical Tools and Techniques for Project Management -Probability Theory - Probability Distributions -Critical-Path Method (CPM) -Program Evaluation and Review Technique (PERT)-Graphical Evaluation and Review Technique (GERT).	<b>12</b>
<b>IV</b>	<b>Human Aspects of Project Management:</b> Manpower Planning - Human Ergonomics - Estimation - Pre requisites for Successful Project Implementation.	<b>12</b>
<b>V</b>	<b>Closing of the Project:</b> Types of project termination, Termination procedure and evaluation of Termination possibilities.	<b>12</b>

**Textbook:**

1. Prasanna Chandra, Project–Planning–Analyses, Selection, Implementation and Review. ‘Tata Mc Graw Hill Publishing Co.
2. Harjit Singh, Project management Analytics, A Data Driven Approach to Make rational and effective Project Decisions.

**Recommended Reference book:**

3. Project Management, 3e Paperback Pearson India; 3rd edition (1 January 2004) ISBN-10 9788177580365
4. Project management ,8e , K. Nagarajan, New Age International Publishers, New Delhi.

**Course Delivery method:** Face-to-face

**Course has focus on :** Foundation , Database Management , Practical and Entrepreneurship

**Websites of Interest :**

<https://www.tutorialspoint.com/mongodb/index.htm>

<https://github.com/mongodb/mongo>

<https://www.linkedin.com/company/mongodbin>

<https://www.guru99.com/mongodb-tutorials.html>

<https://www.kdnuggets.com/2019/06/approaches-deploying-machine-learning-production.html>

**Co-curricular Activities:** (Case Studies)

## Model Question Paper for Fundamentals of Business Analytics

**Max.: 75 Marks  
Marks**

**Mi. Pass: 30**

### Section-A

**Answer Any Five**

**(5 x 5M = 25Marks)**

1. Write about the need of Business Analytics? (L1)
2. Define the applications of Business Analytics? (L3)
3. Write about Wisdom Hierarchy? (L2)
4. Explain the importance of Business Intelligence (BI)? (L1)
5. Write about ETL? (L2)
6. What do you mean by Data Preparation? (L4)
7. Explain about Health Care Analytics? (L4)
8. What do you mean by Data Science? (L3)

### Section-B

**Answer the following questions  
50Marks)**

**(5 x 10M =**

9. a) Explain in detail regarding Descriptive, Predictive Analytics & Prescriptive Analytics? (L3)  
(Or)  
b) What is Big Data? Briefly Explain the Characteristics and importance of Big Data? (L3)
10. a) What do you mean by Data visualization? Briefly Explain the tools in Data Visualization? (L4)  
(Or)  
b) Write at least 5 popular Business Intelligence Tools with explanation? (L1)
11. a) Define Data Mining and explain the process of Implementing Data Mining? (L1)  
(Or)  
b) Explain in detail regarding Outliers and the reasons for occurring of Outliers? (L2)
12. a) Describe Marketing Analytics and highlight the advantages of Marketing Analytics? (L2)  
(Or)  
b) Explain Financial Analytics and the Important Factors in Finance analytics? (L3)
13. a) Explain the scope & Importance of Business Analytics? (L1)  
(Or)  
b) Describe Machine Learning and the Types of Machine Learning? (L2, L4)

## MBA COURSE STRUCTURE

### I SEMESTER

Course Code	Course Name	Teaching Hours/week			CORE /IDC/DS E/SEC/O EC/MOOCs	Internal Marks	External Marks	No. of Credits
		Lecture	Practical	Tutorial				
22BA101	Management Process & Organizational Behavior	4	0	0	Core	30	70	4
22BA102	Managerial Economics	4	0	0	Core	30	70	4
22BA103	Business Environment	4	0	0	Core	30	70	4
22BA104	Financial Reporting and Analysis	4	1	0	Core	30	70	4
22BA105	Business Analytics for Managerial Decision Making	4	1	0	Core	30	70	4
22BA106	Managerial Communication	3	1	0	Core	30	70	3
22PG101	Personality Development Through Life Enlightenment Skills	3	1	0	Core	30	70	3
<b>LAB/PRACTICAL/FIELDWORK</b>								
22BA1L1	Spread Sheet & Accounting Packages	0	4	0	Core	30	70	2
<b>TOTAL FOR FIRST SEMESTER</b>		<b>26</b>	<b>08</b>	<b>0</b>	<b>-</b>	<b>240</b>	<b>560</b>	<b>28</b>

## II SEMESTER

Course Code	Course Name	Teaching Hours/week			COR E /IDC/D SE/SE C/OEC / MOOC S	Internal Marks	External Marks	No. of Credits
		Lecture	Practical	Tutorial				
22BA201	Marketing Management	4	0	0	Core	30	70	4
22BA202	Human Resource Management	4	0	0	Core	30	70	4
22BA203	Financial Management	4	1	0	Core	30	70	4
22BA204	Entrepreneurship & Small Business Management	3	1	0	Core	30	70	3
22PG201	Research Methodology & IPR	3	1	0	Core	30	70	3
22BA205	Operations Research	4	1	0	Core	30	70	4
<b>DOMAINSPECIFICSELECTIVECOURSES(CHOOSEANYONE)</b>								
22BA206(I)	Leadership and Change Management	4	0	0	DS E	30	70	4
22BA206(II)	Consumer Behavior	4	0	0	DS E	30	70	4
22BA206(III)	Cost and Management Accounting	4	0	0	DS E	30	70	4
<b>LAB/PRACTICAL/FIELDWORK</b>								
22BA2L1	Selling & Negotiation skills	0	4	0	Core	30	70	2
<b>TOTALFORSECONDSEMESTER</b>		<b>26</b>	<b>8</b>	<b>0</b>	<b>-</b>	<b>240</b>	<b>560</b>	<b>28</b>
<p><b>At the end of 2<sup>nd</sup> semester, every student must undergo summer Internship/ Apprenticeship/ Project work/ Industrial Training/ Research based Project work for Six weeks and must prepare a report concerned as per approved project guidelines and submit the same to the University 14days before the commencement of third semester end examinations.</b></p>								

### III SEMESTER

Course Code	Course Name	Teaching Hours/week			COR E /IDC/D SE/ SEC/O EC/M OOCs	Intern al Marks	Extern al Marks	N o. of Cred its
		Lectur e	Practica l	Tutori al				
22BA301	Strategic Management	3	0	0	Cor e	30	70	3
<b>DOMAINSPECIFIC ELECTIVE COURSES (CHOOSE ANY FIVE)</b>								
22BA302	B2B Marketing	4	1	0	DS E	30	70	4
22BA303	Product & Brand Management	4	1	0	DS E	30	70	4
22BA304	Digital Marketing	4	1	0	DS E	30	70	4
22BA305	Customer Relationship Management	4	1	0	DS E	30	70	4
22BA312	Human Resource Planning And Development	4	1	0	DS E	30	70	4
22BA313	Performance & Reward Management	4	1	0	DS E	30	70	4
22BA314	Managerial Competencies and Employee Development	4	1	0	DS E	30	70	4
22BA321	Behavioral Finance	4	1	0	DS E	30	70	4
22BA322	Security Analysis and Portfolio Management	4	1	0	DS E	30	70	4
22BA323	Management of Banks and Financial Institutions	4	1	0	DS E	30	70	4
<b>LAB/PRACTICAL/FIELDWORK</b>								
22BA3L1	Crisis Management Skills	0	4	0	Cor e	30	70	2
<b>OPEN ELECTIVE (INTERDISCIPLINARY/MULTIDISCIPLINARY) COURSES (CHOOSE ANY ONE)</b>								
22OE301(I)	Stress Management	3	0	0	OE C	30	70	3
22OE301(II)	Design Thinking	3	0	0	OE C	30	70	3
22 OE301 (III)	IT for Managers	3	0	0	OE C	30	70	3
22 OE301 (IV)	Managing the Self	3	0	0	OE C	30	70	3
22 OE301 (V)	Total Quality Management	3	0	0	OE C	30	70	3
<b>TOTAL FOR THIRD SEMESTER</b>		<b>26</b>	<b>9</b>	<b>-</b>	<b>-</b>	<b>240</b>	<b>560</b>	<b>28</b>

## IV SEMESTER

Course Code	Course Name	Teaching Hours/week			CORE /IDC/DSE/ SEC/OEC/MO OCS	Internal Marks	Extern al Marks	No.
		Lecture	Practical	Tutorial				
22BA401	International Business	3	0	0	Core	30	70	3
<b>DOMAIN SPECIFIC ELECTIVE COURSES (CHOOSE ANY FIVE)</b>								
22BA402	Strategic Marketing	4	1	0	DSE	30	70	4
22BA403	Sales and Distribution Management	4	1	0	DSE	30	70	4
22BA404	Retail Management	4	1	0	DSE	30	70	4
22BA405	Service Operations Management	4	1	0	DSE	30	70	4
22BA411	Strategic HRM	4	1	0	DSE	30	70	4
22BA412	Industrial Relations and Labour Legislations	4	1	0	DSE	30	70	4
22BA413	Human Resource Analytics	4	1	0	DSE	30	70	4
22BA421	International Financial Management	4	1	0	DSE	30	70	4
22BA422	Strategic Tax Management	4	1	0	DSE	30	70	4
22BA423	Financial Derivatives	4	1	0	DSE	30	70	4
<b>ENTREPRENEURIAL &amp; INNOVATION / IT SKILL RELATED TO DOMAIN SPECIFIC ELECTIVE COURSES (CHOOSE ANY ONE)</b>								
22OE401 (I)	Banking Technology Management	3	1	0	SEC	30	70	3
22OE401 (II)	E-Business	3	1	0	SEC	30	70	3
22OE401 (III)	Knowledge Management	3	1	0	SEC	30	70	3
<b>*CHOOSE MOOCs FROM SWAYAM/NPTEL SOURCES</b>								
22BA4M1	MOOCs							4
22BA4P1	PROJECT WORK EVALUATION AND VIVA-VOCE						100	4
<b>TOTAL FOR FOURTH SEMESTER</b>		<b>26</b>	<b>8</b>	<b>-</b>	<b>-</b>	<b>240</b>	<b>660</b>	<b>34</b>
*Students may be allowed to register and appear for MOOCs from the third semester itself. However, students are to complete the MOOCs successfully and submit pass certificate of the same to the University through the Principal of the College concerned for approval and endorsement of the same on Grade cards and PCs as per the regulations of the University.								

## **INTERNSHIP:**

1. At the end of second semester examination, every student of MBA will undergo on-the-job practical training in any manufacturing, service or financial organization. The training will be minimum of 6 weeks duration. The University will facilitate this compulsory training for students.
2. During the training, the student is expected to learn about the organization and analyze and suggest solutions of a live problem. The objective is to equip the student with the knowledge of actual functioning of the organization and problems faced by them for exploring feasible solutions and suggestions.
3. During the course of training, the organization (where the student is undergoing training) will assign a problem/project to the student.
4. The student, after the completion of training will submit a report to the Department, which will form part of third semester examination. However, the report must be submitted by the end of August during third semester so that it is evaluated well in time and third semester results are not delayed.
5. The report (based on training and the problem/project studied) prepared by the student will be known as Summer Training Project Report. The report should ordinarily be based on primary data. It should reflect in depth study of micro problem, ordinarily assigned by the organization where student under goes training. Relevant tables and bibliography should support it.
6. One comprehensive chapter must be included about the organization where the student has undergone training. This should deal with brief history of the organization, its structure, performance products/services and problems faced. This chapter will form part I of the Report. Part II of the Report will contain the study of micro research problem. The average size of Report ordinarily will be 60 to 80 typed pages in standard font size (12) and double spacing. Three neatly typed and soft bound copies of the report will be submitted to the University. The reports will be typed on A-4 size paper.
7. The Report will have two certificates. One by the Head of the Department and the other by the Reporting Officer of the organization where the student has undergone training. These two certificates should be attached in the beginning of the report.
8. It is mandatory for the student to make presentation of his report in the presence of teachers & students. The student is expected to answer to the queries and questions raised during such presentation.

**PROJECTWORK:**

The Project Work will comprise Report of 50 marks and Presentation of 50 marks. Candidates will have to submit a Project Report on a problem/topic (from the Specialization are as) under the supervision of a core faculty member of the Department of Management. The report will contain the objectives and scope of the study, Research Methodology, use, importance of the study, analysis of data collected, conclusions and recommendations. It will contain relevant charts, diagrams and bibliography. A certificate of the Supervisor and the Head of the MBA program certifying the authenticity of the report shall be attached therewith. The student will submit three copies of the report to the Head of the MBA program. The number of pages in the report will be 60 or more. The report should be typed in A-4 size paper.

The comprehensive viva voce is scheduled at the end of IV Semester in order to judge the understanding as well as application of the knowledge gained by the students by the end of 4thSemester. This is also to see the articulation of what is being learnt by them. The idea is to see that students are able to digest what is being taught in two full year and see their relevance not only in the practical field but also their inter relationship.

**INDUSTRIALVISIT:**

The Department shall also arrange time to time industrial visit of MBA students. However no credit shall be assigned for such visits and it will not be reflected in the transcripts.



**P.B SIDDHARTHA COLLEGE OF ARTS & SCIENCE**  
**Department of Business Administration (M.B.A) Board of Studies 2022 – 23 ODD Semester**  
**RESOLUTIONS**  
**Dt 09-11-2022**

- 1) It is resolved and recommended to introduce the 'NEW PROGRAMME STRUCTURE' for Master of Business Administration Programme under 'Choice Based Credit System' (CBCS) for the batch of students admitted in 2022-2023 and onwards in line with 'KRU R-2022 Regulations' For Syllabus and Model question paper vide page number from 1 to 6.
- 2) It is resolved to recommend the revised Syllabus & Model question paper of MANAGEMENT PROCESS & ORGANIZATIONAL BEHAVIOR with course code 22BA101 in I semester of M.B.A for the batch of students admitted in 2022-23 and onwards in place of MANAGEMENT PROCESS & ORGANIZATIONAL BEHAVIOR with course code 22 BA101. For Syllabus and Model question paper vide page number from 9 to 13.
- 3) It is resolved to recommend the revised Syllabus & Model question paper of MANAGERIAL ECONOMICS with course code 22BA102 in I semester of M.B.A for the batch of students admitted in 2022-23 and onwards in place of MANAGERIAL ECONOMICS with course code 22 BA102. For Syllabus and Model question paper vide page number from 14 to 17.
- 4) It is resolved and recommend to introduce BUSINESS ENVIRONMENT with course code 22BA103 in I semester of M.B.A for the batch of students admitted in 2022-23 and onwards. For the syllabus and model question paper vide page number from 18 to 23.
- 5) It is resolved and recommend to introduce FINANCIAL REPORTING AND ANALYSIS with course code 22BA104 in I semester of M.B.A for the batch of students admitted in 2022-23 and onwards. For the syllabus and model question paper vide page number from 24 to 30.
- 6) It is resolved and recommend to introduce BUSINESS ANALYTICS FOR MANAGERIAL DECISION MAKING with course code 22BA105 in I semester of M.B.A for the batch of students admitted in 2022-23 and onwards. For the syllabus and model question paper vide page number from 31 to 37.
- 7) It is resolved to recommend the revised Syllabus & Model question paper of MANAGERIAL COMMUNICATION with course code 22BA106 in I semester of M.B.A for the batch of students admitted in 2022-23 and onwards in place of MANAGERIAL COMMUNICATION with course code 22BA106. For Syllabus and Model question paper vide page number from 38 to 42.
- 8) It is resolved and recommend to introduce PERSONALITY DEVELOPMENT THROUGH LIFE ENLIGHTENMENT SKILLS with course code 22PG101 in I semester of M.B.A for the batch of students admitted in 2022-23 and onwards. For the syllabus and model question paper vide page number from 43 to 48

- 9) It is resolved and recommend to introduce **SPREAD SHEET& ACCOUNTING PACKAGES** with course code **22BA 1L1** in I semester of M.B.A for the batch of students admitted in 2022-23 and onwards. For the syllabus and model question paper vide page number from 49 to 50.
- 10) It is resolved and recommend to introduce **EXTERNAL EVALUATION'** (Viva-Voce) with course code **20BA361** in III semester of M.B.A for the batch of students admitted in 2021-22 and onwards.
- 11) It is resolved and recommend to introduce **RURAL IMMERSION PROGRAMME** in I semester of M.B.A for the batch of students admitted in 2021-22 and onwards.
- 12) It is resolved and recommend to introduce **SME- GROUP PROJECT** in III semester of M.B.A for the batch of students admitted in 2021-22 and onwards.

## 22BA101: MANAGEMENT PROCESS AND ORGANIZATIONAL BEHAVIOR

Course Code	<b>20BA101</b>	Course Delivery Method	Class Room / Blended Mode
Credits	04	CIA Marks	30
No. of Lecture Hours / Week	05	Semester End Exam Marks	70
Total Number of Lecture Hours	75	Total Marks	100
Year of Introduction :2017	Year of Offering :2017	Year of Revision :2022	Percentage of Revision :10

**Course Objective:** This Course is designed to enable students to have a basic perspective of Management Theories and Practices. This will form foundation to study other functional areas of management and to provide the students with the conceptual framework and the theories underlying Organizational Behavior. It provides a comprehensive analysis of individual and group behavior in organizations. Its purpose is to provide an understanding of how organizations can be managed more effectively.

### Course Outcomes:

- CO-1 To explain the importance & role of management in the business organizations.
- CO-2 To analyze knowledge on the importance of planning and organizing.
- CO-3 To identify various leadership styles and their suitability to the situation.
- CO-4 To apply organizational behaviour theories and concepts to individual work experiences.
- CO-5 To know how to work more effectively in a team environment.

### Course Content

#### UNIT-I

**Introduction to Management:** Concept, Definition and Nature of Management – Evolution of Management thought – Purpose, Functions, Principles, and Levels of Management – Management and Environment– Social and Ethical Responsibilities of Managers – Recent Trends in Management Practices in the wake of Globalization.

**(15 Hours)**

#### UNIT-II

**Planning:** Nature, Purpose, Process of Planning, and Types of Plans –Decision Making: Concept, Process, and Rationality in Decision; - Management By Objectives. Organizing: Process - Formal and Informal Organizations – Departmentation - Span of Control – Delegation Vs Decentralization – Staffing

**(15 Hours)**

#### UNIT-III

Leading – concept, scope, significance - Motivation: Significance, Process -Theories of Maslow, Herzberg, McClelland, Porter and Lawler - Leadership: Trait Approach, Leadership Styles, – Communication. Controlling: Basis -Control Process, Pre-Requisites, and Requirements of adequate

Control - Techniques of control

(15 Hours)

#### **UNIT-IV**

Organizational Behavior – Importance - Historical Background - Fundamental concepts of OB - Different models of OB – Understanding Individual Behavior – Perception- Concept– Process-Learning-Concept – Theories of learning - Personality –Concept-Personality traits.  
(15 Hours)

#### **UNIT-V**

Group dynamics – Concept, importance, types of groups, group formation, group development, group composition, group performance factors; Organizational conflict, Resolution of conflicts; Culture and determinants of Organizational Culture; Organizational Change, Concept, Need for change, resistance to change; Theories of planned change; Organizational Development-Concept of OD. (15 Hours)

#### **Case Study (Not Exceeding 300 words)**

#### **PRACTICAL COMPONENTS:**

- ✓ Studying organizational structures of any five companies and classifying them into different types of organizations and justifying why such structures are chosen by those organizations.
- ✓ Identifying any five organizations and group them into different types of organizations based on Management at work place.
- ✓ Studying organizational group dynamics of any three companies and identify the best method of managing group dynamics.
- ✓ Study any three companies following OD interventions and Identify effective technique.
- ✓ Note: Faculty can either identify the organizations/ leaders/jobs or students can be allowed to choose the same.

#### **REFERENCE TEXT BOOKS:**

1. Heinz Wehrich, Harold Kuntz, Management: A Global Perspective, 10/e TMH
2. Stoner, Freeman and Gilbert, Jr. Management, Pearson Education, New Delhi.
3. Clegg, S., Kornberger, M., and Pitsis, T., Managing and organizations: An introduction to Theory and practice, Sage, London, 2011.
4. Ricky Griffin, Gregory Moorhead, Organizational Behavior: Managing People and Organizations, Cengage Learning, 2009.
5. Graeme Martin, Managing People and Organizations in Changing Contexts, Routledge, 2006.
6. Knights, D. & Willmott, H. Introducing organizational behavior and management, Thompson, London, 2006.
7. Luthans. F. Organizational Behaviour, TMH.
8. Robbins, Management, 7/e, Pearson Education.
9. John F. Wilson, The Making of Modern Management, Oxford University Press.

**MODEL QUESTION PAPER**  
**PARVATHANENI BRAHMAYYA SIDDHARTHA COLLEGE OF ARTS & SCIENCE**  
**M.B.A. (REGULAR) DEGREE EXAMINATION**  
**First Semester**  
**20BA101: MANAGEMENT PROCESS AND ORGANISATIONAL BEHAVIOUR**  
***W.e.f 2022-2023***

**Duration:** 3 hours

**Maximum Marks:** 70

**SECTION - A**

**Answer ALL Questions**

**5×4=20 Marks**

1. (A) Explain the managerial skills. (CO1)(L2)

**(OR)**

(B) Outline the importance of social responsibility (CO1) (L2)

2. (A) What is management by objectives? (CO2)(L1)

**(OR)**

(B) Define span of control. (CO2)(L1)

3. (A) Summarise barriers to communication (CO3) (L2)

**(OR)**

(B) Explain the different techniques of motivation (CO3) (L2)

4. (A) what do you understand by organisational behaviour? (CO4)(L1)

**(OR)**

(B) Which approach explains the concept of learning? (CO4)(L1)

5. (A) How groups are formed (CO5) (L1)

**(OR)**

(B) Define culture and discuss its significance (CO5) (L1)

## SECTION – B

**Answer ALL Questions**

**5×8=40 Marks**

6. (A) Explain in detail different qualities of modern managers. (CO1)(L2)

**(OR)**

(B) Outline the concept and significance of management. Make a distinction between management and administration (CO1) (L2)

7. (A) Distinguish between short term and long term planning and discuss the process of planning (CO2) (L4)

**(OR)**

(B) Examine the concept of centralisation. Do you suggest centralisation or decentralisation in these days. (CO2)(L4)

8. (A) Explain the importance of Herzberg's theory of motivation in an organisation (CO3) (L2)

**(OR)**

(B) Outline the essential steps in control process. Classify the features of an effective system (CO3) (L2)

9. (A) Examine the concept of human behaviour? What are its different factors affecting one's behaviour (CO4) (L4)

**(OR)**

(B) Analyse the determinants of personality. Which of them are more important in shaping? (CO4)(L4)

10. (A) Outline the term conflict. Should conflicts be necessarily eliminated? (CO5)(L2)

**(OR)**

(B) Explain the levels of change? Which level of change is more common in organisations, why? (CO5)(L2)

**Case Study (Compulsory)**

11. You are a senior clerk in a large branch of a prestigious bank in a metropolitan city. Your manager has decided that customer service should be improved and has formed a committee of junior staff to discuss and present suggestions to the management in a month's time. You are appointed as a member of this committee but not the chairperson. A young lady, a grade junior to you is made the chairperson. She was very reluctant to accept the responsibility because as she said, she had never been to any meeting nor chaired any. However, she was offered no choice in the matter. The manager simply appointed her as the chairperson. In fact she could be a good choice. She is an experienced cashier known to the public as efficient and pleasant, and she has often expressed strong views about the importance of good service. She thinks herself as intelligent and logical and sometimes puts people down quite firmly if she finds flaws in their arguments. You were not able to attend the first meeting of the committee, but from what you heard it was not at all successful. In conversation with those present you have gained the impression that progress was slow and difficult. The chairperson tended to be aggressive. Very few ideas emerged and it was not too clear to those present what they were there to achieve. You have also spoken to the chairperson. She thinks that nobody was forthcoming or enthusiastic enough. They all kept going off the subject and asking silly questions. Such ideas as there were turned out to be trivial or irrelevant in her opinion, apart from the ones she had to suggest herself. She contended that she was worried about the next meeting, about the likely success of the committee in general and indeed about her overall relationship with the staff who were committee members. The next meeting is to take place in a week's time.

**Questions:**

A. Analyze the problems in this case. (L4)

B. Justify with your answer to ensure that the committee performs more effectively? When it next meets? (L5).

\*\*\*

## 22BA102: MANAGERIAL ECONOMICS

<b>Course Code</b>	<b>22BA102</b>	<b>Course Delivery Method</b>	<b>Class Room / Blended Mode</b>
Credits	4	CIA Marks	30
No. of Lecture Hours / Week	5	Semester End Exam Marks	70
Total Number of Lecture Hours	75	Total Marks	100
Year of Introduction : 2017	Year of Offering: 2017	Year of Revision: 2022	Percentage of Revision: 05%

### Course Description and Purpose:

Managerial economics is a stream of management studies that emphasizes primarily solving business problems and decision-making by applying the theories and principles of microeconomics and macroeconomics. It is a specialized stream dealing with an organization's internal issues by using various economic theories. This course is aimed to equip students with the necessary theory and techniques and the ability to apply them in order to inform and enhance managerial decision making. This course covers concepts such as goals of the firm, optimization techniques, demand theory and estimation, forecasting and measurement, theory of production and estimation, cost theory and estimation, pricing and output determination under different market structures, game theory, and pricing in practice and business cycles.

### Course Outcomes:

At the end of completion of this course, the learner is able to

- CO-1 Understand various managerial economic concepts related to Demand, Production, Cost, Market, Profit etc.
- CO-2 Understand various macroeconomic concepts related economic fundamentals, Inflation, trade cycles
- CO-3 Estimate the demand, Output, production costs, profit
- CO-4 Analyze price-output decisions in different markets
- CO-5 Apply the knowledge of the phases trade cycle to understand different economies

### Course Content

#### UNIT- I

**Managerial Economics:** Definition, Nature, Scope - Concepts of Managerial economics - Functions and Responsibilities of a Managerial Economist -Market Demand- determinants- Law of Demand and its exceptions –Theory of Demand - Indifference Curves- Elasticity of Demand - Types of Elasticity of Demand and their Managerial Uses - Demand Forecasting - Methods of Forecasting for Existing and New Product.  
**(16 Hours)**

#### UNIT-II



**Firm Theory & Production Analysis:** Economic Theory of Firm –Profit maximization- Managerial theories - Baumol’s Model - Behavioural theories-Production Function -Law of production- Law of Variable Proportions – Iso-quants and Iso-costs - Least Cost Factor Combination – Law of Returns to Scale - Economies and Diseconomies of Scale, Law of supply - determinants.  
**(15 Hours)**

### **UNIT- III**

**Cost, Profit & Market Structures:** Cost Concepts - Short-run and Long-run Cost Curves- Determinants of Short-Term & Long Term Profits, Measurement of Profit Break Even Analysis - *Demand and Supply:* Market Equilibrium - Market Structures - Concept of Price - Pricing and Output Determination under Perfect Competition, Monopolistic Competition and Monopoly.  
**(15 Hours)**

### **UNIT-IV**

**Recent changes in Indian Economy:** Macro Economic Aggregates and Concepts - National Income - GDP, GNP, NNP, WPI, CPI - *Types of Inflation:* Demand Pull and Cost Push Inflation, Philips curve, Stagflation - Measurement of Inflation - Economics of Risk & Finance - Monetary Policy & Fiscal Policy.  
**(16 Hours)**

### **UNIT-V**

**Trade Cycles: Phases, Theories, and Corrective Measures** - Behavioral and Technical Function: Aggregative Demand and Supply, Consumption Function, and Investment Function - Keynesian Theory (overview)  
**(12 Hours)**

**Case Study (Not Exceeding 300words) Or Problem from either Unit-2orUnit-3**

### **PRACTICALCOMPONENTS:**

- ✓ Study of demand elasticity for a product when there is a price increase or price decrease.
- ✓ Demandforecasting–Miniprojectmaybegiventostudentstoassessthedemandforaproduct or a service using any method.
- ✓ An in-depth study of economic indicators on the growth rate.
- ✓ Analysis of recent budget, fiscal discipline and disinvestment proposals of the GOI.

### **REFERENCETEXTBOOKS:**

1. JoelDean, *Managerial Economics*, Prentice Hall.
2. Mote&Paul, *Managerial Economics*, TataMcGrawHill.
3. Gupta, *Managerial Economics*, TataMcGraw Hill.
4. Gupta, *MacroEconomics, Theory & Applications*, Tata Mc GrawHill.
5. MehtaP.L, *Managerial Economics –Text and Cases*, S.Chand&Co.
6. Peterson & Lewin, *Managerial Economics*, Prentice Hall of India.
7. Person H.Craig, LewisW.Ch and Jain Sudhir K, *Managerial Economics*, Pearson Education

**MODEL QUESTION PAPER**  
**PARVATHANENI BRAHMAYYA SIDDHARTHA COLLEGE OF ARTS & SCIENCE**  
**M.B.A. (REGULAR) DEGREE EXAMINATION**  
**First Semester**  
**20BA102: MANAGERIAL ECONOMICS**  
*W.e.f 2022-2023*

**Duration:** 3 hours

**Maximum Marks:** 70

**SECTION - A**

**Answer ALL Questions**

**5×4=20 Marks**

1. (A) Theory of Demand (CO1) (L2)  
(OR)  
(B) Demand forecasting (CO1) (L2)
2. (A) Sales Maximization theory (CO2) (L2)  
(OR)  
(B) ISO Quants (CO2) (L2)
3. (A) Abnormal Profit (CO3) (L2)  
(OR)  
(B) Monopolistic competition (CO3) (L2)
4. (A) Merits of Monetary policy (CO4) (L2)  
(OR)  
(B) Hyper Inflation Examples (CO4) (L2)
5. (A) Keynes theory (CO5) (L2)  
(OR)  
(B) Uses of Investment function (CO5) (L2)

**SECTION - B**

**Answer ALL Questions**

**5×8=40 Marks**

6. (A) Discuss the role of Managerial economist in different situations of an economy (CO1) (L3)  
(OR)  
(B) Explain different methods of forecasting of the demand of a new product. (CO1) (L3)
7. (A) What are the major propositions of Managerial theories of the firm? (CO1) (L2)  
(OR)  
(B) Discuss the economies and diseconomies of "Return to Scale" (CO1) (L3)

8. (A) How price and output is determined under monopoly and monopolistic competition. (CO1) (L4)

(OR)

(B) How different cost concepts are useful in managing business organizations. (CO4) (L2)

9. (A) Briefly discuss the implications of various inflations occurred in emerging economies. (CO 5) (L4)

(OR)

(B) Discuss the reforms undertaken by government of India. (CO4) (L4)

10. (A) Explain various types of trade cycles and their consequences (CO5) (L3)

(OR)

(B) Explain the steps to be taken to increase the aggregate consumption. (CO 4) (L2, L5)

**SECTION - C**

**(1 x 10 =10 marks)**

**Case study (Compulsory)**

11. Allied Surgical Ltd. manufactures surgical instruments. The normal production of an instrument is 2600 units per month at a total cost of Rs.32, 000. At full capacity it can manufacture 3,400 units per month at a total cost of Rs.38, 000. A dealer abroad offers to purchase 500 instruments over a month at a price of Rs.10 per instrument under a different brand name. Do you advise the company to accept the offer? (CO4) (L5)

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## 22BA103: BUSINESS ENVIRONMENT

Course Code	22BA103	Course Delivery Method	Class Room / Blended Mode
Credits	4	CIA Marks	30
No. of Lecture Hours / Week	5	Semester End Exam Marks	70
Total Number of Lecture Hours	75	Total Marks	100
Year of Introduction : 2022	Year of Offering: 2022	Year of Revision: --	Percentage of Revision:---

### Course Description and Purpose:

Business Environment requires a rigorous examination of the external and internal environment affecting the contemporary business scenario. A thriving manager needs to be aware of the dynamic environment, related issues, and sensitivity towards societal needs. Managers, regardless of industry or company size, must approach their operating strategies, from a global perspective. The course also provides an understanding and analysis of business laws and their impact on businesses. This will help the practitioners and budding scholars of management to make the best decisions.

### Course Outcomes:

By the end of the course, students will be able to

- CO-1 Understand the challenges and complexities faced by businesses and their leaders as they endeavour to maximize returns while responsibly managing their duties to all stakeholders of the business.
- CO-2 Understand the rationale for government interventions in market systems and know various public policies and their impact.
- CO-3 Understand the concepts of Liberalization, Privatization and Globalization and their impact on the Indian Business environment and also be aware of the trends concerning economic indicators such as GDP, Exchange Rates, Interest Rates and inflation Rates, etc.,
- CO-4 Understand the changing nature of the Socio-Cultural, Demographic, and Technological Environment and its influence on the corporate sector.
- CO-5 Understand the concepts of Business Ethics, Corporate Governance, and Corporate Social Responsibility and know the models and best practices that are in vogue concerning these in the corporate sector.

## Course Content

### UNIT-1

**Understanding Business Environment:** Meaning, Nature & Scope of Business Environment; Types of Business Environment - Internal & External Environment, Micro & Macro Environment; Types of Business – Private, Public, Micro, Small, Medium and Large Enterprises; Relationship among Business, Government and Society (BGS) – Importance of Business, Government and Society to Managers - Dynamic Forces Impacting Business Environment.

**(16 Hours)**

### UNIT- II

**Business Environment:** Environmental Scanning, PESTEL, SWOT Analysis; Nature & Structure of Indian Economy; Role of Public Policies in Governing Business: Classification and Levels of Public Policy, Economic Policies: Trade Policy, Monetary Policy, Fiscal Policy, and Industrial Policy;

**(14 Hours)**

### Unit III

**Economic Environment of Business:** Liberalization, Privatization, & Globalization – Impact on Business Environment; Economic Conditions of India and World: Trends of Inflation, Interest and Exchange rates; India's Competitiveness in the World Economy: World's Competitiveness Index, India's Performance in Ease of Doing Business.

**(14 Hours)**

### UNIT-IV

**Socio-Cultural, Demographic, and Technological Environment:** Socio-Cultural Factors impacting Business: Culture, Sub-culture, Societal norms, social classes, gender issues, Changing lifestyles, education, religion, beliefs, values, Nature and impact of culture on business, culture and globalization; Demographics: Demographic environment, population size, migration and ethnic aspects, birth rate, death rate and age structure;

Technological Environment: Impact of Technology, Technology and Society, Trends in Technology Management, Issues & Challenges.

**(16 Hours)**

### UNIT-V

**Business Ethics, Corporate Governance and Corporate Social Responsibility:** Business Ethics: Concept and Definition of Business Ethics - Importance of Ethics, Values and Morals for Business Success, Ethical Dilemmas and Decision Making, Building Ethical Organizations; Corporate Governance: Definition and Significance of Corporate Governance, Historical Perspective of Corporate Governance, International Perspective on Corporate Governance, Elements of Governance in Organizations, Obligation to Stakeholders of Business, Major Corporate Governance Failures in India;

Corporate Social Responsibility: Importance of CSR in present day business context -Types and Nature of Social Responsibilities - Arguments for and Against CSR - CSR Principles and Strategies - Models of CSR - Best Practices of CSR.

**(16 Hours)**

## **PRACTICAL COMPONENTS:**

- ✓ Students are expected to report on how the economic environment has affected the performance of any five large Indian Business Houses.
- ✓ Students are expected to analyze the economic and financial indicators such as GDP, Inflation, CPI, BSE-Sensex, NSE-Nifty50, Currency Exchange rates, Gold Prices, Crude Oil Prices etc., for a particular period and submit the report on the same.
- ✓ Students collect, analyze and discuss the Annual Reports of a listed company.
- ✓ Students produce a report on the working of a reputed agency, including its formation, nature of relations with the outside world and other issues of relevance.
- ✓ Students are expected to study any five CSR initiatives by Indian organizations and submit a report.
- ✓ Case studies/Role plays related to ethical issues in business concerning the Indian context.

## **REFERENCE TEXT BOOKS:**

1. Douglas E. Geer, Business, Government and Society, 3rd Edition, Prentice Hall.
2. John Steiner and George Steiner, Business, Government and Society: A Managerial Perspective, TMH.
3. AC Fernando, Business Ethics: An Indian Perspective, Pearson publications, 2009.
4. Boatright, Ethics and the conduct of Business, fifth edition, Pearson publications, 2007
5. M. Friedman, The social responsibility of business is to increase its profits, New York Times Essay, Sept 13, 1970
6. K. Aswathappa, Essentials of Business Environment - Text, Cases and Exercises, Himalya Publishing House, 12<sup>th</sup> Revised Edition 2016.
7. Recent Union Budgets – Government of India
8. Recent Economic Survey Reports - Government of India
9. Mathur, Corporate Governance and Business Ethics, Macmillan India Ltd, 2005
10. Francis Cherunilam, Business Environment, Himalaya Publishing House, Revised Edition 2018.
11. Mathew M.J., Business Environment: A study of socio cultural, economic and legal environment in business, Jaipur RBSA Publishers, 2003.
12. Justin Paul, Business Environment Text and Cases, 3e, Mc Graw Hill Publication, 2010.

**MODEL QUESTION PAPER**  
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**M.B.A. (REGULAR) DEGREE EXAMINATION**  
**First Semester**  
**20BA103: BUSINESS ENVIRONMENT**  
*W.e.f 2022-2023*

**Duration:** 3 hours

**Maximum Marks:** 70

**SECTION - A**

**Answer ALL Questions**

**5×4=20 Marks**

1. (A) Explain the nature of Business Environment. (CO1) (L2)

**(OR)**

(B) Outline the importance of Micro enterprises (CO1) (L2)

2. (A) What are the types of public policies? (CO2) (L1)

**(OR)**

(B) Define 'PESTEL'. (CO2) (L1)

3. (A) Summarise the trends of inflation during past one year. (CO3) (L2)

**(OR)**

(B) Outline the trends of exchange rates (CO3) (L2)

4. (A) What do you understand by societal norms? (CO4) (L1)

**(OR)**

(B) What do you know about migration? (CO4)(L1)

5. (A) List the corporate governance failures in Indian context. (CO5) (L1)

**(OR)**

(B) What are the CSR principles? (CO5) (L1)

## SECTION – B

Answer ALL Questions

5×8=40 Marks

6. (A) Classify the structure of various business organisations with respect to nature, ownership and size. (CO1) (L2).

(OR)

(B) Outline the concept and significance of relationship among business, government and society. (CO1) (L2).

7. (A) Distinguish between various public policies and their objectives (CO2) (L4)

(OR)

(B) Analyse the present Indian business environment by using PESTEL framework. (CO2) (L4)

8. (A) Analyse the magnitude of the impact of globalisation on Indian economy. (CO3) (L4)

(OR)

(B) Examine the trends of India's competitiveness in world economy. (CO3) (L4)

9. (A) Identify the nature and impact of technology on society. (CO4) (L3)

(OR)

(B) Develop a model for business decision makers by using various demographic variables to understand the population trends. (CO4) (L3)

10. (A) Interpret the various ethical dilemmas faced by organisations. (CO5) (L2)

(OR)

(B) Summarize the developments in corporate governance in India and abroad. (CO5)(L2)



**Case Study (Compulsory)**

11. The panel of state finance ministers is likely to recommend a uniform GST levy of 28 per cent on online gaming irrespective of whether it is a game of skill or game of chance, sources said. However, it is likely to suggest a revised formula for calculating the amount on which the Goods and Services Tax (GST) would be levied. Currently, online gaming attracts 18 per cent GST. The tax is levied on gross gaming revenue, which is the fee charged by online gaming portals.

Sources said that the GoM report is almost final and would be submitted to the GST Council soon for consideration. The Group of Ministers (GoM), chaired by Meghalaya Chief Minister Conrad Sangma, had in its earlier report submitted to the Council in June suggested a 28 per cent GST on on the full value of the consideration, including contest entry fee, paid by the player, without making a distinction such as games of skill or chance. However, the Council had asked the GoM to reconsider its report. Following that the GoM took the views of the Attorney General and also met stakeholders from the online gaming industry.

Although the GoM deliberated on separate definitions for 'games of skill' and 'games of chance', it finally decided to tax both as demerit goods attracting a 28 per cent GST. The message has to be clear that online gaming is a demerit good. However, some relaxation in valuation methods could be provided, sources told PTI. The GoM report in June had suggested that the GST should be levied on the entire amount received as consideration from the participant.

Charging 28 per cent GST on the entire amount, which a player deposits for a game for both categories of online game, would reduce the prize money left for distribution and drive away players from legitimate tax deducting portals. This may also encourage online gamers towards unlawful portals that do not deduct tax, sector experts had said. Online gaming witnessed a spurt during the time of Covid lockdown with the number of users in India rising substantially. As per a KPMG report, the online gaming sector would grow to Rs 29,000 crore by 2024-25 from Rs 13,600 crore in 2021.

**Questions:**

- A. Analyze the various challenges in this case with respect to framing suitable tax procedures for the emerging on-line gaming business (L4)
- B. Recommend your suggestions to the committee of GOM to formulate tax policy in this industry. (L5).

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## 22BA104: FINANCIAL REPORTING AND ANALYSIS

Course Code	<b>22BA104</b>	Course Delivery Method	Class Room / Blended Mode
Credits	04	CIA Marks	30
No. of Lecture Hours / Week	05	Semester End Exam Marks	70
Total Number of Lecture Hours	75	Total Marks	100
Year of Introduction :2022	Year of Offering :2022	Year of Revision :---	Percentage of Revision :---

### **Course Description and Purpose:**

Financial reporting and analysis course provides an understanding of financial accounting and reporting fundamentals for prospective consumers of corporate financial information, such as managers, stockholders, financial analysts, and creditors. This course focuses on understanding how economic events like financing transactions and operating activities are recorded in the three main financial statements (i.e., the income statement, balance sheet, and statement of cash flows/funds flow). Along the way, students will develop the technical skills needed to analyze corporate financial statements and disclosures for use in financial analysis, and to interpret how accounting standards and managerial incentives affect the financial reporting process. This course is well recommended for students who want a more in-depth overview of the financial accounting and reporting required for understanding firm performance and potential future risks through analysis of reported financial information, such as students intending to go into financial analysis and Financial Manager, security analyst, etc.

### **Course Outcomes:**

By the end of the course, students will be able:

- CO-1 To provide the students with the basic concepts of financial accounting and preparation of Company Balance sheet
- CO-2 To discuss the various concepts, tools and practices in analysis and interpretation of financial statements.
- CO-3 To familiarize the students with the concepts of funds flow and cash flow for managerial decision making.
- CO-4 To provide the students with the knowledge of financial statement analysis through ratios.
- CO-5 To provide knowledge required for the preparation of reports understanding firm performance and potential future risks through analysis of reported financial information.

## Course Content

### UNIT-I

**Introduction to accounting:** Objectives, Nature and scope - Generally Accepted Accounting Principles: Accounting Concepts and Conventions; financial accounting-Cost Accounting-Management accounting –Single entry and double entry systems of accounting - Trial Balance - Construction of Income Statement and Company Balance Sheet. **(Theory and Problems)**  
**(18 Hours)**

### UNIT-II

**Financial Statement Analysis:** Objectives and users of financial statements – Elements of financial statements – classification of financial statements – Analysis and Interpretation of financial statements-Horizontal Analysis and Vertical Analysis – Construction and Analysis of Common size Statement – Comparative Statement – Trend Analysis -constraints and assumptions in preparing financial statements(Theory and Problems).  
**(15 Hours)**

### UNIT-III

**Funds flow statement and Cash flow statement:** Meaning of Fund, Flow of Fund and No Flow of Fund - Statement of changes in Financial Position - Components of Flow of Funds,- Fund Flow Statement; Cash-Meaning - Purpose of Cash Flow Statement - Limitations - Preparation of Cash Flow Statement - Flow of Cash Under Non-Current Items - Flow of Cash due to Operations - Non-cash Items - Calculation of Cash Received from Operations Difference between Cash Flow Statement and Fund Flow Statement **(Theory and Problems).**  
**(18 Hours)**

### UNIT-IV

**Financial Analysis through Ratios:** Meaning, Definition and Classification of ratios- Analysis and Interpretations of Ratios; Principles of Ratio Selection, Advantages and Limitations of Ratio Analysis Construction of Balance sheet through ratios **(Theory and Problems)(12 Hours)**

### UNIT-V

**Financial Reporting:** Meaning - Objectives - characteristics of a coherent financial reporting framework - components of the financial reporting - financial reporting process – Regulatory Authorities - International Financial Reporting Standards (IFRS) **(Theory)**  
**(12 Hours)**

### PRACTICAL COMPONENTS:

- ✓ Students are asked to identify and summarize the components of given financial statements (Course instructor to collect reports from company websites and distribute to the students for exercise purpose).
- ✓ Students are asked to prepare trial balance, and trading and Profit & loss account and balance sheets to the company reports (Course instructor to collect reports from company websites and distribute to the students for exercise purpose).
- ✓ Students are to form groups (group consists of 4-6 students) to submit a brief report on modern financial reporting practices followed in Indian and Multinational companies.

**REFERENCE TEXT BOOKS:**

1. Jain & Narang: Advanced Accountancy, Kalyani Publications, Ludhiana. Latest Edition
2. Pandey I.M: Financial Management, Vikas Publishing, New Delhi, Latest Edition.
3. Khan M. Y. & Jain P K: Management Accounting, Tata McGraw-Hill, New Delhi, Latest Edition.
4. Sharma & Gupta: Management Accounting, Kalyani Publishers, Ludhiana.
5. Singvi, N.M. & Ruzbeh J. Bodhanwala: Management Accounting Text and Cases.

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**M.B.A. (REGULAR) DEGREE EXAMINATION**  
**First Semester**  
**20BA104: FINANCIAL REPORTING AND ANALYSIS**  
**W.e.f 2022-2023**

**Duration:** 3 hours

**Maximum Marks:** 70

**SECTION – A**

**Answer the following**

**5X4=20Marks**

1. (A)What is Going concern concept?(CO1)(L1)  
**(OR)**  
(B)Define Single entry system. (CO1) (L1)
2. (A)Explain the objectives of financial statements? (CO2) (L2)  
**(OR)**  
(B)Classify the users of financial statements? (CO2) (L2)
3. (A)What is No flow of fund? (CO3) (L1)  
**(OR)**  
(B)What are Non-current Items? (CO3) (L1)
4. (A)Illustrate the Absolute liquid Ratio. (CO4) (L2)  
**(OR)**  
(B)Outline the Stock turnover Ratio. (CO4) (L2)
5. (A)What is financial reporting? (CO5) (L1)  
**(OR)**  
(B) List out any four characteristics of financial reporting. (CO5)(L1)

**SECTION – B**

**Answer ALL the following**

**5X8=40Marks**

6. (A) Define Financial Accounting. Distinguish between Cost Accounting and Financial Accounting.?(CO1)(L4)

**(OR)**

(B) The following is Trial Balance of M/s Deepak Traders as on 31-3-2021.Analyze the profitability by preparing Balance sheet on 31-3-2021. (CO1)(L4)

Particulars	Debit Balance(Rs.)	Credit Balance(Rs.)
Capital		1,00,000
Drawings	18,000	
Buildings	15,000	

Furniture	7,500	
Motor van	25,000	
Loan to Harry	15,000	
Interest	450	
Sales		1,00,000
Purchases	75,000	
Stock on 1-4-2013	25,000	
Establishment expenses	15,000	
Freight inward	2,000	
Freight outward	1,050	
Bank overdraft		25,000
Commission received		7,500
Sundry debtors	28,000	
Bank balance	20,500	
Sundry Creditors		15,000
Total	2,47,500	2,47,500

Adjustments:

- Closing Stock valued at Rs. 25,000
- Depreciate building by 10% and furniture by 5%
- Provide a Reserve for Bad debts @ 5%
- Provide for discount on debtors and creditors @ 3%.

7. (A) Define financial statement. Briefly explain the elements of financial statements. (CO2)(L2)

(OR)

(B) Interpret the trend percentages from the following figures of Z Ltd. Taking 2018 as the base. (CO2)(L2)

Year	Sales	Stock	Profit before tax (in lakhs)
2018	1881	709	321
2019	2340	781	435
2020	2655	816	458
2021	3021	944	527
2022	3768	1154	672

8. (A) Distinguish between Funds flow and Cash flow statements. (CO3)(L4)

(OR)

(B) From the following Balance sheet of Vincent & Co Ltd., Construct Funds flow statement and Working capital statement. (CO3)(L4)

Liabilities	2021	2022	Assets	2021	2022
Capital	80,000	85,000	Cash in Hand	4,000	9,000
P&L A/c	14,500	24,500	Sundry Debtors	16,500	19,500
Sundry Creditors	9,000	5,000	Stock	9,000	7,000

Long-term Loans	--	5,000	Machinery	24,000	34,000
			Buildings	50,000	50,000
	<b>1,03,500</b>	<b>1,19,500</b>		<b>1,03,500</b>	<b>1,19,500</b>

9. (A) What is meant by ratio analysis? List out its objectives and limitations. (CO4)(L3)

(OR)

(B) Construct Balance sheet with the information given below for Anil & Co for the year ending March 2022. (CO4)(L3)

Current ratio	2.5
Liquidity Ratio	1.5
Net working capital	Rs. 3, 00,000
Stock Turnover Ratio (Cost of sales / closing stock)	6 times
Gross profit Ratio	20%
Fixed assets turnover ratio	2 times
Average debt collection period	2 months
Fixed Assets: Shareholders net worth	1:1
Reserves: Share capital	0.5: 1

(A) What is financial reporting? Briefly explain the steps in financial reporting process. (CO5)(L2)

(OR)

(B) Demonstrate some essential or qualitative characteristics of financial reporting. (CO5)(L2)

### SECTION – C

#### CASE STUDY (Compulsory)

1X10=10Marks

10. Prepare Cash flow statement from the following Balance sheets of Sheath & Co Ltd and interpret the results. (CO3)(L5)

Liabilities	31.03.21	31.03.22	Assets	31.03.21	31.03.22
Share Capital	1,00,000	4,00,000	Goodwill	--	20,000
8% Debentures	--	2,00,000	Machinery	1,25,000	4,75,000
Retained Earnings	60,000	90,000	Stock	20,000	80,000
Creditors	40,000	1,00,000	Debtors	30,000	1,00,000
Bills Payable	20,000	40,000	Cash at Bank	50,000	1,50,000
Provision for Tax	30,000	40,000	Cash in Hand	25,000	45,000
	<b>2,50,000</b>	<b>8,70,000</b>		<b>2,50,000</b>	<b>8,70,000</b>

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## 22BA105: BUSINESS ANALYTICS FOR MANAGERIAL DECISION MAKING

Course Code	<b>22BA105</b>	Course Delivery Method	Class Room / Blended Mode
Credits	<b>04</b>	CIA Marks	30
No. of Lecture Hours / Week	05	Semester End Exam Marks	70
Total Number of Lecture Hours	75	Total Marks	100
Year of Introduction :1987	Year of Offering :1987	Year of Revision :--	Percentage of Revision :--

### Course Description and Purpose:

The role of business analytics in assisting decision-making has now become essential for all organizations in today's data-driven world where data and the insights that it can inspire are a source of competitive advantage. While business analytics is now being used at various levels within the organization. This course gives an introduction to the area of business analytics. Business Analytics (BA) is generally understood as the extensive use of data, mathematical and statistical models using exploratory, descriptive, predictive and causal models under the framework of evidence and fact-based management to drive decisions and actions.

### Course Outcomes:

By the end of the course, students will be able:

- CO-1 To gain an understanding of how managers use business analytics to formulate and solve business problems and to support managerial decision making.
- CO-2 To provide students with knowledge of mathematical models for quantitative analysis of managerial problems in Industry and to improve skills in the use of descriptive statistics for business decisions.
- CO-3 To enable the students understanding probability concepts, probability distributions and its applications in business.
- CO-4 To develop the ability to evaluate the predictive analytics models like correlation, Regression and Time Series analysis.
- CO-5 To understand the significance of Business analytics in managerial decision-making



## Course Content

### UNIT -I

**Introduction:** Meaning, Definition and Importance of Business Analytics – Analytics v/s Analysis – Business Analytics v/s Business Intelligence and Data Mining – Applications of Analytics – Different Kinds of Analytics – Types of Analytical Tools – Identifying Problems & Opportunities through Data Analytics – Framing a Business Problem as an Analytical Problem – Analytical Approaches for Decision Making (**Theory**) **(15 Hours)**

### UNIT -II

**Mathematics and Statistics for Business Analytics:** Application of Differentiation, Maxima and Minima, Matrices and Matrix Operations using Cramer's Rule and Inverse Method (Problems) – Statistics for Business Analytics: Diagrammatic and Graphical Representation of the data Measures of Central Tendency, Measures of Dispersion, Skewness (**Theory and Problems**). **(15 Hours)**

### UNIT-III

**Probability and Probability distributions:** Concept of Probability, Definitions of Probability, Addition Theorem of Probability, Conditional Probability and Multiplication theorems of Probability, Baye's Theorem of Probability and its Applications. Theoretical distributions: Binomial Distribution, Poisson distribution and Normal distribution – their Properties and Applications (**Theory and Problems**). **(15 Hours)**

### UNIT-IV

**Predictive Analytics:** Correlation, Regression and Time Series: Correlation: Types of Correlation - Simple and Rank Correlation coefficient in the case of two variables- Regression: Meaning and importance of Regression Analysis. Estimation of Lines of Regression in the case of two variables Time Series – Components of Time Series – Measurement of Trend (Linear Equation)(**Theory and Problems**). **(15 Hours)**

### UNIT-V

**Business Analytics for Decision making:** – Introduction to Hypothesis – Procedure for Testing of Hypothesis – Large and Small Sampling Tests – Z-Test, Single Proportion – Two Proportions – Single Mean – Two Means – t-Test – Single Mean – Difference of Means – Paired t- test – Chi-square test – Goodness of Fit – Independence of Attributes (**Problems**). **(15 Hours)**

### PRACTICAL COMPONENTS:

- ✓ Students should identify any three companies using data analytics, and analyze how companies are using analytics to prosper.
- ✓ Should form groups (A group consists of 4-6 students) and download 'R' the most popular software (free and open source) for data management and statistical analysis of data.
- ✓ Students should conduct a team based project, which is a unified and practical case on a topic of their choice, with approximately 4-6 students per group.

- ✓ Assess the strengths and limitations of analytics and predictive modeling techniques for different business applications and varying data conditions using free and open source software's like 'R'.
- ✓ Students are asked to conduct Market survey to know the consumer perception towards any FMCG.

**REFERENCE TEXT BOOKS:**

1. S.C. Gupta.-, Fundamentals of Statistics, 7th Revised Edition (2013) Himalaya Publishing House, New Delhi.
2. Sharma, J.K.-, Fundamentals of Business Statistics, 2nd Edition (2000) Pearson Education, New Delhi.
3. Sancheti, Dc & V.K Kapoor, Business Mathematics, 3<sup>rd</sup> Edition (2014) Sultan Chand & Sons, New Delhi..
4. Sharma, J.K., Quantitative Methods- Theory & Applications, 3<sup>rd</sup> Edition (2010) Macmillan New Delhi.
5. Shmueli, Patel and Bruce, *Data Mining for Business Intelligence, Concepts, Techniques and Applications*, Wiley.
6. Powell and Baker, *Management Science: The Art of Modeling with Spreadsheets*, Wiley.
7. Ledolter, *Data Mining and Business Analytics with R*, Wiley.

**MODEL QUESTION PAPER**  
**PARVATHANENI BRAHMAYYA SIDDHARTHA COLLEGE OF ARTS & SCIENCE**  
**M.B.A. (REGULAR) DEGREE EXAMINATION**  
**First Semester**  
**20BA105: BUSINESS ANALYTICS FOR MANAGERIAL DECISION MAKING**  
*W.e.f 2022-2023*

**Duration:** 3 hours

**Maximum Marks:** 70

**SECTION - A**

**Answer ALL Questions**

**5×4=20 Marks**

1. (A) plain the Importance of Business Analytics. (CO1)(L2)

**(OR)**

- (B) Describe the Data Mining. (CO1)(L2)

2. (A) What are the Measures of Central Tenancy. (CO2)(L2)

**(OR)**

- (B) Explain Co-efficient of skewness. (CO2)(L2)

3. (A) State Addition theorem of probability. (CO3)(L1)

**(OR)**

- (B) Define Binomial Distribution. (CO3) (L1)

4. (A) Illustrate Scatter Diagram Method. (CO4)(L3)

**(OR)**

- (B) Uses of Time Series Analysis. (CO4)(L3)

5. (A) Explain Procedure for testing of hypothesis. (CO5) (L2)

**(OR)**

- b) Distinguish between large and small sample tests with examples. (CO5) (L2)

**SECTION- B**

6. a) Discuss the types of analytical tools available in the market to serve the needs of the organization. (CO1 (L2)

(OR)

- b) Explain the applications of analytics. Framing a business problem as an analytical problem. (CO1)(L2)

- 7.a) Solve the following system of equations by matrix method (CO2) (L3)

$$\begin{aligned} 2x - 3y - 5z &= 11 \\ 3x + 2y - 4z &= -5 \\ x + y - 2z &= -3 \end{aligned}$$

(OR)

- b) Calculate the coefficient of variation from the following: (CO2) (L3)

Age (in years) :	10 – 19	20 – 29	30 – 39	40 – 49	50 – 59	60 – 69
Frequency .	360	700	903	503	270	1200

8. a) What is Normal Distribution? Explain characteristics and importance of the normal distribution (CO3)(L2)

(OR)

- b) The contents of urns I, II and III are as follows:

1 white, 2 black and 3 red balls,

2 white, 1 black and 1 red balls, and

4 white, 5 black and 3 red balls

One urn is chosen at random and two balls drawn. They happen to be white and red. What is the probability that they came from urns I, II or III? (CO3)

(L2)

- 9.a) : a straight-line trend for the following series. Estimate the value for 2018.

(CO4)(L3)

Year	2011	2012	2013	2014	2015	2016	2017
Production of steel (in tonnes)	60	72	75	65	80	85	95

OR

b) Two regression equations between  $x$  and  $y$  are :  $10x - 20y - 14 = 0$  and  $5x - 6y = 47$

The standard deviation of  $x$  is 9. Find i) the mean values of  $x$  and  $y$ ; ii) the variance of  $y$ ; and iii) the coefficient of correlation between  $x$  and  $y$ .  
(CO4)(L3)

10. a) The sales data of an item in six shops before and after a special promotional campaign are as under (CO5)(L4)

Shop	A	B	C	D	E	F
Before campaign	48	23	26	43	45	37
After campaign	53	24	25	50	51	40

Is the campaign judged to be a success?

OR

b) Two types of batteries are tested for their length of life and the following data are obtained: (CO5) (L4)

	No. of Samples	Mean life in Hours	Variance
Type A:		10	1
Type B:		10	4

Is there a significant difference in the two means? (Table value=2.131)

### SECTION C - (1 x 10 =10 marks)

#### Case study (Compulsory)

11. A Movie producer is bringing out a new movie. In order to map out his advertising he wants to determine whether the movie will appeal most to a particular age group or whether it will appeal equally to all age groups. The producer takes a random sample from persons attending a pre-reviewing showing of the new movie and obtains the following result. Use  $X^2$ -test to derive the conclusion.(CO4) (L4)

### AGE GROUPS

Persons	Under- 20	20-39	40-59	60 and ever	Total
Like the movie	320	80	110	200	710
Disliked the movie	50	15	70	60	195
Indifferent	30	5	20	40	95
Total	400	100	200	300	1000

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## 22BA106: MANAGERIAL COMMUNICATION

Course Code	<b>22BA106</b>	Course Delivery Method	Class Room / Blended Mode
Credits	04	CIA Marks	30
No. of Lecture Hours / Week	04	Semester End Exam Marks	70
Total Number of Lecture Hours	60	Total Marks	100
Year of Introduction :2017	Year of Offering :2017	Year of Revision :2022	Percentage of Revision :20%

### **Course Description and Purpose:**

This course explores the important roles that communication plays in managers/leaders being effective in their tasks as they exchange meaning with supervisees, peers, supervisors, the larger organization, and the community. Both formal and informal communication will be addressed. The course also explores the relationship between management and communication, providing students with the skills to improve their management communication skills.

### **Course Outcomes:**

By the end of the course, students will be able:

- CO-1 To understand the fundamentals and importance of communication- how communication is going to be a game changer at workplace
- CO-2 To explain the importance of written communication and the value of expression and its impact
- CO-3 To highlight the importance of body language and the role played by receptive behavior in communication
- CO-4 To understand the various modes of communication in organizational functioning with the help of technology
- CO-5 To explain the importance of interpersonal communication in organizational functioning and to help them to prepare for employment communication

## Course Content

### UNIT-I

**Fundamentals of Communication:** Introduction, Understanding Communication, the communication process, Barriers to communication, the Importance of Communication in the Workplace. (12 Hours)

### UNIT-II

**Expressive Communication:** Written Communication, Business Letters. E-mail, Memo, Reports and Proposals, Oral Communication, Presentation Skills, Meetings, Group Discussion, Managerial Speeches, Interviews, Non-verbal Communication, Kinesics, Proxemics, Voice (12 Hours)

### UNIT-III

**Receptive Communication Skills:** Listening, Importance, Types, Barriers, Improving Listening, Reading Body Language. (12 Hours)

### UNIT-IV

**Organizational Communication:** Internal, Types, Channels, Diversity and Intercultural Communication, External Communication, Types, Channels, Use of Technology. (12 Hours)

### UNIT-V

**Interpersonal Communication:** Interpersonal needs, Reducing Misunderstandings, Rapport Building, Negotiation Skills, Johari Window, Transactional Analysis; **Employment Communication** – Resumes and Cover Letters, Introduction, Writing a Resume, Writing Job Application Letters, Group Discussion and Interviews (12 Hours)

### Case Study (Not Exceeding 300 words)

### PRACTICAL COMPONENTS:

- ✓ Demonstrate the effect of noise as a barrier to communication.
- ✓ Make students enact and analyze the non-verbal cues.
- ✓ Give exercises for clarity and conciseness in written communication.
- ✓ Demonstrate the effect of noise as a barrier to communication.
- ✓ Make students enact and analyze the non-verbal cues.
- ✓ Give exercises for clarity and conciseness in written communication.
- ✓ A suitable case is to be selected and administered in the class sticking to all the guidelines of case administering and analysis.
- ✓ Demonstrating Video conferencing & teleconferencing in the class.
- ✓ Conduct a mock meeting of students in the class identifying an issue of their concern. The students should prepare notice, agenda and minutes of the meeting.

### REFERENCE TEXT BOOKS:

1. Bovee and Thill: *Business Communication Today*, McGraw-Hill, Second Edition



2. Guffey M. E.: *Business Communication Process & Product*, Thompson, South-Western
3. Level D.A: *Managerial Communications*, Business Publications, Plano, Texas
4. Pradhan and Pradhan: *Business Communication*, Himalayan Publishing House
5. Seely J, *Oxford Writing and Speaking*, Oxford
6. Raman and Singh: *Business Communication*, Oxford University Press, New Delhi
7. Courtland L Bovee, John V. Thill, & Mukesh Chaturvedi, *Business Communication Today*. Ninth Edition. New Delhi: Pearson.
8. Lesikar & Flatley., *Basic Business Communication – Skills for Empowering the Internet Generation*. 9th Edition, McGraw-Hill.
9. Monippally, M M., *Business Communication Strategies*, Mc Graw-Hill.
10. K.K. Ramachandran Lakshmi, Kartik, M. Krishna Kumar, *Business Communication*, MacMillan India Ltd., 2007.

**MODEL QUESTION PAPER**  
**PARVATHANENI BRAHMAYYA SIDDHARTHA COLLEGE OF ARTS & SCIENCE**  
**M.B.A. (REGULAR) DEGREE EXAMINATION**  
**First Semester**  
**22BA106: MANAGERIAL COMMUNICATION**

*W.e.f 2022-2023*

**Duration:** 3 hours

**Maximum Marks:** 70

**SECTION - A**

**Answer ALL Questions**

**5×4=20 Marks**

1. (A) What are the barriers to effective communication? (CO1)( L1)  
**(OR)**  
(B) Define the importance of communication at work place. (CO1)(L1)
2. (A) What do you understand by kinesics and proxemics? (CO2)( L2)  
**(OR)**  
(B) How is verbal communication different from non-verbal communication? (CO2)(L2)
3. (A) What are the types of receptive communication skills? (CO3)( L3)  
**(OR)**  
(B) Explain the importance of body language. (CO3)(L3)
4. (A) Demonstrate the importance of intercultural communication in organizational communication. (CO4)( L3)  
**(OR)**  
(B) Explain the different communication channels. (CO4)(L3)
5. (A) What are negotiation skills? (CO5)( L1)  
**(OR)**  
(B) What do you mean by rapport building skills? (CO5)(L1)

**SECTION-B**

**5x8=40Marks**

**Answer ALL Questions**

6. (A) Explain the steps in communication process. (CO1)(L1)

**(OR)**

(B) Explain role played by communication in organizational success. (CO1)( L1)

7. (A) Illustrate the relevance of presentation skills in expressive communication (CO2)( L2)

**(OR)**

(B) Examine the importance of business letters in organization communication. (CO2) (L2)

8. (A) Illustrate the importance listening skills.(CO3)(L3)

**(OR)**

(B) Explain the importance of receptive communication skills. (CO3)(L3)

9. (A) Use of technology will reduce the misunderstanding in communication Do you agree? (CO4)  
(L4)

**(OR)**

(B) What do you mean by external communication? (CO4)(L4)

10. (A) Illustrate the importance of a cover letter in a resume. (CO5)( L5)

**(OR)**

(B) Explain the significance of group discussions while conducting interviews. (CO5)(L5)

**SECTION – C**

**1x10=10Marks**

**CASE STUDY (Compulsory)**

11. Prepare a resume along with a cover letter convincing your employee that you are a suitable candidate for the post (CO5)( L5)

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## 22PG101: PERSONALITY DEVELOPMENT THROUGH LIFE ENLIGHTENMENT SKILLS

<b>Course Code</b>	<b>22PG101</b>	<b>Course Delivery Method</b>	Class Room / Blended Mode
<b>Credits</b>	04	<b>CIA Marks</b>	30
<b>No. of Lecture Hours / Week</b>	04	<b>Semester End Exam Marks</b>	70
<b>Total Number of Lecture Hours</b>	60	<b>Total Marks</b>	100
<b>Year of Introduction :2022</b>	Year of Offering :2022	Year of Revision :--	Percentage of Revision :--

### Course Description and Purpose:

Personality development is the development of your behavior patterns and attitude. It is the result of where we are born, the circle we interact with and our personal temperament. Every person is different. There are some characteristics traits that make you unique. Personality development through life enlightenment course aims to help students identify negative behaviors which maybe stopping them from reaching their desired goals. This course will help students both in their personal and desired professional life. The other purposes of personality development through life enlightenment course are to enable you lead stress-free and healthier life, ethical decision making ability, enhanced confidence level, and building a more pleasing personality.

### Course Outcomes:

At the end of this course the students should be able to:

- CO-1 : Understand their Personality and achieve their highest Goals of Life.
- CO-2 : Learn to build Positive Attitude, Self-Motivation, enhancing Self-Esteem and Emotional Intelligence
- CO-3 : Analyze and Develop Time management, Team management, Work ethics, Good manners and personal and professional Etiquettes.
- CO-4 : Lead the nation and mankind to peace , prosperity and practice emotional self-regulation
- CO-5 : Learn to develop coping mechanism to manage Stress through Yoga and Meditation Techniques and develop a versatile personality

## Course Content

### UNIT-I

**Introduction to Personality Development:** The concept of personality - Dimensions of Personality – Theories of Personality development (Freud & Erickson) – The concept of Success and Failure – Factors responsible for Success – Hurdles in achieving Success and Overcoming Hurdles — Causes of failure – Conducting SWOT (Strengths, Weaknesses, Opportunities and Threats) analysis. **(15 Hours)**

### UNIT - II

**Attitude, Motivation and Self-esteem:** Conceptual overview of Attitude – Types of Attitudes – Attitude Formation – Advantages/Disadvantages of Positive/Negative Attitude - Ways to Develop Positive Attitude Concept of motivation: Definition and Nature of Motivation/Motive – Internal and external motives – Theories of Motivation – Importance of self- motivation- Factors leading to demotivation. Self-esteem - Definition and Nature of self-esteem – Do's and Don'ts to develop positive self- esteem – Low self-esteem - Personality having low self-esteem - Positive and negative self-esteem. **(15 Hours)**

### UNIT - III

**Other Aspects of Personality Development:** Body language - Problem-solving - Conflict Management and Negotiation- Decision-making skills - Leadership and qualities of a successful leader – Character building -Team-work – Time management - Work ethics – Good manners and etiquette – Emotional Ability/Intelligence – Dimensions of Emotional Intelligence – Building Emotional Intelligence. **(15 Hours)**

### UNIT – IV

**Neetisatakam-Holistic Development of personality:** Verses- 19,20,21,22 (wisdom) – Verses- 29,31,32 (pride and heroism) – Verses- 26,28,63,65 (virtue)Personality of Role Model – Shrimad BhagwadgitaChapter2-Verses 17 – Chapter 3-Verses 36,37,42 – Chapter 4-Verses 18, 38,39 – Chapter18 – Verses 37,38,63 **(15 Hours)**

### UNIT - V

**Yoga & Stress Management:** Meaning and definition of Yoga - Historical Perspective of Yoga - Principles of Astanga Yoga by Patanjali – Meaning and Definition of Stress - Types of Stress - Eustress and Distress –Stress Management – Pranayama- Pranayama: Anulom and Vilom Pranayama - Nadishudhi Pranayama Kapalabhati-Pranayama - Bhramari Pranayama - Nadasusandhana Pranayama – Meditation techniques: Om Meditation - Cyclic meditation : Instant Relaxation technique (QRT), Quick Relaxation Technique (QRT), Deep Relaxation Technique (DRT) **(Theory & Practical). (15 Hours)**

### **PRACTICAL COMPONENTS:**

- ✓ Students should identify different types of personality to know their own personality. Students are to describe the characteristics of their personalities and submit the same for assessment.
- ✓ Students are to form in groups (a group consists of 4-6 students) to identify and write a brief note on famous personalities of India and World.
- ✓ Students are required to identify different types of attitudes and give any five ~~examp~~ of each.
- ✓ Students are expected to check their attitudes and develop ways to improve their attitudes at work place and home.
- ✓ Students are required to identify keys to self-motivation to achieve their goals.
- ✓ Students are expected to identify at least seven types of body language and conduct activities

### **REFERENCE TEXT BOOKS:**

- 1) Hurlock, E.B. Personality Development, 28th Reprint. New Delhi: Tata McGrawHill, 2006.
- 2) Gopinath, Rashtriya Sanskrit Sansthanam P, Bhartrihari's Three Satakam, Niti- sringar- vairagya, New Delhi, 2010
- 3) Swami Swarupananda, Srimad Bhagavad Gita, Advaita Ashram, Publication Department, Kolkata, 2016.
- 4) Lucas, Stephen. Art of Public Speaking. New Delhi. Tata - Mc-Graw Hill. 2001
- 5) Mile, D.J Power of positive thinking. Delhi. Rohan Book Company, (2004).
- 6) Pravesh Kumar. All about Self- Motivation. New Delhi. Goodwill Publishing House. 2005.
- 7) Smith, B. Body Language. Delhi: Rohan Book Company. 2004
- 8) Yogic Asanas for Group Training - Part-I: Janardhan Swami Yogabhyasi Mandal, Nagpur.
- 9) Rajayoga or Conquering the Internal Nature by Swami Vivekananda, Advaita Ashrama (Publication Department), Kolkata.
- 10) Nagendra H.R nad Nagaratna R, Yoga Perspective in Stress Management, Bangalore, Swami Vivekananda Yoga Prakashan.

### ✓ **Online Resources:**

- [https://onlinecourses.nptel.ac.in/noc16\\_ge04/preview](https://onlinecourses.nptel.ac.in/noc16_ge04/preview)
- <https://freevidelectures.com/course/3539/indian-philosophy/11>

➤ **Course Focus:** Foundation / Employability / Entrepreneurship / Skill Development.

**MODEL QUESTION PAPER**  
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**M.B.A. (REGULAR) DEGREE EXAMINATION**  
**First Semester**  
**22PG101: PERSONALITY DEVELOPMENT THROUGH LIFE ENLIGHTENMENT SKILLS**  
**W.e.f 2022-2023**

**Duration:** 3 hours

**Maximum Marks:** 70

**SECTION - A**

**Answer ALL Questions**

**5×4=20 Marks**

1. (A) Define the term personality (CO1) (L1)  
(OR)  
(B) Find Dimensions of Personality in brief (CO1) (L1)
2. (A) Explain the term Attitude (CO2)(L2)  
(OR)  
(B) Outline the Importance of self- motivation (CO2) (L2)
3. (A) Why Work Ethics are important in any organizations? (CO3)(L1)  
(OR)  
(B) What is meant by the term Emotional Intelligence? (CO3)(L1)
4. (A) Show the wisdom(Verse22) of personality (CO4,L2)  
(OR)  
(B) Interpret the terms pride and heroism (Verse-29) in the context of personality (CO4)(L2)  
(OR)
5. (A) What do you understand by the term Yoga? (CO5)(L1)  
(OR)  
(B) List out the Meditation techniques (CO5) (L1)

## SECTION – B

Answer ALL Questions

5×8=40 Marks

6. (A) Summarize the Theories of Personality development. (Freud & Erickson) (CO1)(L2)  
(OR)  
(B) Explain the SWOT analysis of any MNC. (CO1)(L2)
7. (A) Can you write a brief outline of Attitude and Types of Attitudes? (CO2)(L2)  
(OR)  
(B) Compare the Theories of Motivation explained by Maslow and Herzberg (CO2) (L2)
8. (A) Identify the qualities of a successful leader. (CO3)(L3)  
(OR)  
(B) Apply Good manners and etiquette at work place (CO3) (L3)
9. (A) Analyse the aspects of Holistic Development of personality. (CO4)(L4)  
(OR)  
(B) Examine Personality of Role Model as said in Bhagavad Gita. (CO4)(L4)
10. (A) Explain the Historical Perspective of Yoga in brief. (CO5,L2)  
(OR)  
(B) How would you like to classify the Types of Stress and Relaxation Techniques? (CO5)(L2)

## SECTION - C

(1 x 10 =10 Marks)

### CASE STUDY (Compulsory)

11. Read the case carefully and answer the questions given at the end of the case.

Mr. Afroz an organizational consultant. He found personalities nametags are important in the work place and we must interact with one another But, sometimes interactions can lead to conflict because of the clashes between traits dimensions for example, outspoken and reserved, impulsive and methodical, along with skeptical and accepting. Besides, impulsive types usually foster more conflict than the others. This also being supported by some research because personality characteristics seem to affect whether the interpersonal conflict helps or hurts team performance It can be determine by the openness to experience and emotional stability of the employees. Conflict can affect team performance if there is low on some personality qualities. Plus, relationship between employees and supervisors can be weak if they have different personality on the big five modal except extraversion.



## Questions

- a. Analyze the summary of the case. (L4)
- b. How would you like to examine the personality Traits which really influence the team's performance? (L4)
- c. Justify with your answer and list out the personality traits which help in strengthening the relationships between the employees and the supervisor. (L5)

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## 22BA1L1: SPREAD SHEET & ACCOUNTING PACKAGES

<b>Course Code</b>	<b>22BA1L1</b>	<b>Course Delivery Method</b>	Class Room / Blended Mode
<b>Credits</b>	04	<b>CIA Marks</b>	30
<b>No. of Lecture Hours / Week</b>	04	<b>Semester End Exam Marks</b>	70
<b>Total Number of Lecture Hours</b>	60	<b>Total Marks</b>	100
<b>Year of Introduction :2017</b>	<b>Year of Offering :2017</b>	<b>Year of Revision :--</b>	<b>Percentage of Revision :--</b>

### Course Description:

Tally, or Transactions Allowed in a Linear Line Yards, is a famous program developed by Goenkas in 1986. Its principal goal, as used by a huge number of small and medium-sized businesses, is to execute accounting activities in a highly precise and methodical manner. This course will make students familiar with various aspects of the program, how it works, and comprehend basic concepts like bookkeeping, profit, and loss analysis, stock maintenance, and so on. The most recent version is tally ERP 9.

### Course Objectives:

- CO-1 To familiarize Students with basic to intermediate skills for using Excel in the classroom vis-à-vis Business Applications,
- CO-2 To provide students hands on experience on MS Excel in different versions of MicrosoftOS,
- CO-3 To gain proficiency in creating solutions for Data Management and Reporting, and
- CO-4 To learn about Tally Software and gain proficiency in creating and exporting data and reports obtained in Tally Software.
- CO-5 To impart knowledge in Tally and to provide practical application for using tally in organization.

## Course Content

### Course Content:

#### UNIT-I

Introduction: Understanding Excel's Files, Ribbon and Shortcut – Create a workbook – Enter data in a Worksheet – Format a Worksheet, Format Numbers in a Worksheet – Create an Excel Table – Filter Data by Using an AutoFilter, Sort Data by using an AutoFilter – Essential Worksheet Operations: Using Help (F1), Key Board Shortcuts – Working with Cells and Ranges: Formatting Cells, Name Manager – Visualizing Data Using Conditional Formatting: Apply Conditional Formatting – Printing Your Work: Print a Worksheet , Using Print Preview & Other Utilities. (12Hours)

#### UNIT-II

Lab based Evaluation-1: Working with Dates and Times & Text: Working with Dates & Time, Creating Formulas that Manipulate Text – Upper, Proper, Lower, Concatenate, Text to Column– Creating Formulas (12Hours)

### UNIT-III

Lab based Evaluation-2: Creating Formulas for Financial Applications: Introduction to Formulas e.g. PV, PMT, NPER, RATE, Creating Balance Sheet, Investment Calculations, Depreciation Calculations – Creating Charts and Graphics: Chart Your Data, Creating Sparkline Graphics, Using Insert Tab Utilities – Using Custom Number Formats: Right Click, Format Cells Window– Using Data Tab and Data Validation: Getting external Data, Remove Duplicates, Apply Data Validation & using Utilities from Data Tab – Analyzing Data with the Analysis Tool Pak: Correlation, Covariance, Descriptive Statistics, Histogram, Rank and Percentile, Regression, t-Test, Z Test. (12Hours)

### UNIT-IV

Computers and Accounting: Fundamentals of Computerized Accounting – Computerized Accounting Vs Manual Accounting – Features of Tally – Procedure for Creating a New Company – Directory Name / Mailing Name / Address / Groups Creation – Editing and Deleting Groups – Display of Predefined Vouchers – Voucher Creations and Alteration of Vouchers while or after Entering Transaction – Types of Vouchers – Payment Voucher – Receipt Voucher –Sales Voucher– Purchase Vouchers. (12Hours)

### UNIT-V

Accounting Tally: Ledger – Groups in Tally – Primary Groups, Sub-groups, Creation of Ledger - process of Creation of Ledger – Balance Sheet at the Gateway of Tally – Method of Showing Trading, Profit and Loss account and Balance Sheet Creation of Inventory Reports – Creation of Stock Categories – Stock Items – Stock Groups

#### REFERENCE TEXT BOOKS:

1. Tally – Accounting software S. Palanivel – Marghan Publications
2. Computer Applications in Business – Dr. Raj Kumar
3. **Learning Resources:**
4. Text Books Excel 2010 Bible [With CDROM]by John Walkenbach, John Wiley & Sons, 2010 Edition
5. Reference Books Excel 2007 for Dummies by Greg HarveyNew Perspectives on Microsoft Office Excel 2007
6. Supplementary Reading Material [www.hr diap.gov.in/Downloads/04.MS%20Excel.pdf](http://www.hr diap.gov.in/Downloads/04.MS%20Excel.pdf)  
[www.stern.nyu.edu/~jsimonof/classes/1305/pdf/excelreg.pdf](http://www.stern.nyu.edu/~jsimonof/classes/1305/pdf/excelreg.pdf)  
[www.goodwin.edu/computer\\_resources/pdfs/excel\\_2010\\_tutorial.pdf](http://www.goodwin.edu/computer_resources/pdfs/excel_2010_tutorial.pdf)  
[www.microagecs.com/apps/training/courseware/excel.pdf](http://www.microagecs.com/apps/training/courseware/excel.pdf)  
[www.lfpl.org/jobshop/docs/Intermediate-Excel.pdf](http://www.lfpl.org/jobshop/docs/Intermediate-Excel.pdf)
7. Websites <http://office.microsoft.com/en-us/>

<http://office.microsoft.com/en-us/excel-help/excel-help-and-how-to-FX102693827.aspx>

<http://office.microsoft.com/en-us/excel/>

<http://office.microsoft.com/en-us/excel-help/excel-functions-by-category-HP005204211.aspx>

<http://www.baycongroup.com/e10.html> [http://spreadsheets.about.com/od/tipsandfaqs/f/excel\\_use.html](http://spreadsheets.about.com/od/tipsandfaqs/f/excel_use.html)

<http://www.computerhope.com/shortcut/excel.html>

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**PARVATHANENI BRAHMAYYA SIDDHARTHA COLLEGE OF ARTS & SCIENCE**  
**M.B.A. (REGULAR) DEGREE EXAMINATION**  
**First Semester**  
**20BA1L1: SPREAD SHEET & ACCOUNTING PACKAGES**  
*W.e.f 2022-2023*

**Duration:** 3 hours

**Maximum Marks:** 70

<b>S.No.</b>	<b>LIST OF EXPERIMENTS</b>
1.	Creation and Analysis of data (CO1) (L4)
2.	Graphical presentation of data (CO1) (L4)
3.	Creation of pivot table and analysis(CO2) (L4)
4.	Investment Calculations(CO3) (L4)
5.	Calculating Measures of Central tendency and Dispersion(CO3) (L4)
6.	Correlation calculation in MS Excel(CO3) (L4)
7.	Regression calculation in MS Excel(CO3) (L4)
8.	Large sample Tests Z-Test(CO3) (L4)
9.	Small sample T – test(CO3) (L4)
10.	Tally-Company Creation(CO4) (L4)
11.	Tally-Voucher Creation(CO5) (L4)
12.	Tally – Display of Balance Sheet(CO5) (L4)

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## BOARD OF STUDIES IN COMMERCE (ODD SEMESTERS 2022-23)

DATE: 25-08-2022

### AGENDA

1. To discuss and recommend the syllabi, model question papers for the programme B.Com BFSI for the 3<sup>rd</sup> semester as per the guidelines and instruction under CBCS prescribed by APSHE from the academic year 2022-2023
2. To discuss and recommend the syllabi, model question papers for all streams in B.Com programme for the 5<sup>th</sup>/6<sup>th</sup> semester as per the guidelines and instruction under CBCS prescribed by APSHE from the academic year 2022-2023

Minutes of the meeting of Board of Studies in Commerce held on 25-08-22 at 11.00 o clock.

### Members present:

1. Prof. Rajesh.C.Jampala	Chairperson	Sd/-
2. Dr. M Sravani	University Nominee	Sd/-
3. Dr N V R Jyothi Kumar	Academic Expert	Sd/-
4. Dr K S Arun Kumar	Academic Expert	Sd/-
5. CA B Deena Dayal Kumar	Industry Expert	Sd/-
6. Dr. Dokku Srinivasa Rao	Alumni	Sd/-
7. Sri K. Narayana Rao	Member	Sd/-
8. Sri P. Subhakar	Member	Sd/-
9. Sri Ch. Prasanna Kumar	Member	Sd/-
10.Sri V.V.K. Dharmendra	Member	Sd/-
11.Smt E Suvarnanjali	Member	Sd/-
12.Smt. M Sivaranjani	Member	Sd/-
13.Smt. V Kanaka Durga	Member	Sd/-
14.Dr. ANV Durga Anupama	Member	Sd/-
15.Smt. O.padmaja	Member	Sd/-
16.Sri. B. Venkateswara Rao	Member	Sd/-
17.Sri B.Phani Krishna	Member	Sd/-
18.Sri K Rajasekhar	Member	Sd/-
19.Sri T Srinivas	Member	Sd/-
20.Dr V Srinivas	Member	Sd/-
21.Dr. B Sankar Babu	Member	Sd/-

The following resolutions are made in Board of Studies in Commerce for UG Programmes of ODD Semesters to recommend to the 44<sup>th</sup> Academic Council for its approval. The chairperson prof. Rajesh. C. Jampala welcomed all members to the meeting and in his introduction remarks he presented the agenda of the meeting.

## Department of Commerce (UG)

### LIST OF THE COURSES REVISED/ INTRODUCED IN III, V & VI SEMESTERS -2022-23

S.NO	Title of the Course	Course Code	Offered in	Type of the Paper	Year of Introd.	Revision /Introduce	OBE with BTL	Offered to
1	Advanced Accounting	COMT31A	III	CORE	2022-23	No Revision	YES	B.Com Gen (BFSI) CA
2	Business Statistics	COMT32	III	CORE	2022-23	No Revision	YES	B.Com Gen (BFSI) CA
3	Business Laws	COMT37	III	CORE	2022-23	No Revision	YES	B.Com Gen (BFSI) CA
4	Principals and practice of Insurance	COMT39	III	CORE	2022-23	Introduced	YES	B.Com (BFSI)
5	Accounting for Corporate Restructuring	COHSET01	V	Series-A Pair 01	2022-23	Introduced	YES	B.Com TPP,A&F,BPM
6	Management Accounting	COHSET02	V		2022-23	Introduced	YES	B.Com TPP,A&F,BPM
7	E Commerce	COHSET03	V	Series-A Pair 02	2022-23	Introduced	YES	B.Com TPP,A&F,BPM
8	E filing	COHSET04	V		2022-23	Introduced	YES	B.Com TPP,A&F,BPM
9	Stock Markets	COHSET05	V	Series-A Pair 03	2022-23	Introduced	YES	B.Com TPP,A&F,BPM
10	Stock Market Analysis	COHSET06	V		2022-23	Introduced	YES	B.Com TPP,A&F,BPM
11	Tax planning and management	COHSET07	V	Series-B Pair 01	2022-23	Introduced	YES	B.Com TPP,A&F,BPM
12	Accounting Packages (Tally)	COHSET08	V		2022-23	Introduced	YES	B.Com TPP,A&F,BPM
13	Portfolio Management	COHSET09	V	Series-B Pair 02	2022-23	Introduced	YES	B.Com TPP,A&F,BPM
14	Accounting Packages (Tally)	COHSET10	V		2022-23	Introduced	YES	B.Com TPP,A&F,BPM
15	Capital Markets for BPS	COHSET11	V	Series-B Pair 03	2022-23	Introduced	YES	B.Com TPP,A&F,BPM
16	Supply chain Managements	COHSET12	V		2022-23	Introduced	YES	B.Com TPP,A&F,BPM
17	Income Tax-III	COHSET13	V	Series-C Pair 01	2022-23	Introduced	YES	B.Com TPP,A&F,BPM
18	Customs	COHSET14	V		2022-23	Introduced	YES	B.Com TPP,A&F,BPM
19	Managing Business Process-II	COHSET16	V	Series-C Pair 02	2022-23	Introduced	YES	B.Com TPP,A&F,BPM
20	Campus to Corporate Transition	ENGSET01	V		2022-23	Introduced	YES	B.Com TPP,A&F,BPM
21	Financial Services	COHSET17	V	Series-C Pair 03	2022-23	Introduced	YES	B.Com TPP,A&F,BPM
22	Indian Financial System	COHSET18	V		2022-23	Introduced	YES	B.Com TPP,A&F,BPM
23	Advanced Corporate Accounting	COMSET01	VI	Series-A Pair 01	2022-23	Introduced	YES	B.Com Gen, CA,
24	Software Solutions to Accounting	COMSET02	VI		2022-23	Introduced	YES	B.Com Gen, CA,
25	Management Accounting	COMSET03	VI	Series-A Pair 02	2022-23	Introduced	YES	B.Com Gen, CA,
26	Cost Control Techniques	COMSET04	VI		2022-23	Introduced	YES	B.Com Gen, CA,
27	Stock Markets	COMSET05	VI	Series-A Pair 03	2022-23	Introduced	YES	B.Com Gen, CA,
28	Stock Market Analysis	COMSET06	VI		2022-23	Introduced	YES	B.Com Gen,
29	Life Insurance with Practice with practice	COMSET07	VI	Series-B Pair 01	2022-23	Introduced	YES	B.Com Gen, CA,
30	General Insurance	COMSET08	VI		2022-23	Introduced	YES	B.Com Gen, CA,
31	Logistics Services and Practice	COMSET09	VI	Series-B Pair 02	2022-23	Introduced	YES	B.Com Gen, CA
32	EXPORT Procedure and practice	COMSET10	VI		2022-23	Introduced	YES	B.Com Gen, CA,
33	Advertising and Media Planning	COMSET11	VI	Series-B Pair 03	2022-23	Introduced	YES	B.Com Gen, CA,
34	Sales Promotion and Practice	COMSET12	VI		2022-23	Introduced	YES	B.Com Gen,
35	Income Tax Assessment Procedures and Practice	COMSET13	VI	Series-C Pair 01	2022-23	Introduced	YES	B.Com Gen,
36	GST Procedure &Practice	COMSET14	VI		2022-23	Introduced	YES	B.Com Gen,
37	Digital Marketing	COMSET15	VI	Series-C Pair 02	2022-23	Introduced	YES	B.Com Gen
38	Service Marketing	COMSET16	VI		2022-23	Introduced	YES	B.Com Gen,
39	E Commerce	COMSET17	VI	Series-C Pair 03	2022-23	Introduced	YES	B.Com Gen
40	E filing	COMSET18	VI		2022-23	Introduced	YES	B.Com Gen
41	Third internship / Project Work / On the Job Training / Apprenticeship	COMCIAP5	V/VI	Core Project	2022-23	Introduced	YES	B.Com (GEN, CA, TPP,A&F, BPM)

**The following resolutions are made in Board of Studies in Commerce of ODD Semesters to recommend to the 44<sup>th</sup> Academic Council for its approval.**

1. It is resolved to implement the syllabus & model paper of **Advanced Accounting** with course code **COMT31A** to **B.Com (BFSI)** in semester III for the students admitted in the academic year 2021-22 and onwards. Model paper prepared with levels of Bloom's Taxonomy is appended at the end of the syllabus pg. No 9-13
2. It is resolved to implement the syllabus & model paper of **Business Statistics** with course code **COMT32** to **B.Com (BFSI)** in semester III for the students admitted in the academic year 2021-22 onwards. Model paper prepared with levels of Bloom's Taxonomy is appended at the end of the syllabus pg. No14-16
3. It is resolved to implement the syllabus & model paper of **Business Laws** with course code **COMT37** to **B.Com (BFSI)** in semester III for the students admitted in the academic year 2021-22 onwards. Model paper prepared with levels of Bloom's Taxonomy is appended at the end of the syllabus pg. No 17-19
4. It is resolved to implement the syllabus & model paper of **Principals and practice of Insurance** with course code **COMT39** to **B.Com (BFSI)** in semester III (Theory) for the students admitted in the academic year 2021-22 onwards. Model paper prepared with levels of Bloom's Taxonomy is appended at the end of the syllabus pg. No 20-23
5. It is resolved and recommend to introduce **Accounting for Corporate Restructuring** with course code **COHSET01** in V semester of **B. Com (Accounts & Finance) (Tax Procedures and Practice) (Business Process Management)** for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number 25-29
6. It is resolved and recommend to introduce **Management Accounting** with course code **COHSET02** in V semester of **B. Com (Accounts & Finance) (Tax Procedures and Practice) (Business Process Management)** for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number 30-34
7. It is resolved and recommend to introduce **Accounting Packages (Tally)** with course code **COHSET08** in V semester of **B. Com (Accounts & Finance) (Tax Procedures and Practice) (Business Process Management)** for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number 35
8. It is resolved and recommend to introduce **Accounting Packages (Tally)** with course code **COHSET10** in V semester of **B. Com (Accounts & Finance) (Tax Procedures and Practice) (Business Process Management)** for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number 35
9. It is resolved and recommend to introduce **Portfolio Management** with course code **COHSET09** in V semester of **B. Com (Accounts & Finance) (Tax Procedures and Practice) (Business Process Management)** for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number 36-38

10. It is resolved and recommend to introduce **Financial Services** with course code **COHSET17** in V semester of **B. Com (Accounts & Finance) (Tax Procedures and Practice) (Business Process Management)** for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number 39-40
11. It is resolved and recommend to introduce **Indian Financial System** with course code **COHSET18** in V semester of **B. Com (Accounts & Finance) (Tax Procedures and Practice) (Business Process Management)** for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number 41-43
12. It is resolved and recommend to introduce **Tax planning and management** with course code **COHSET07** in V semester of **B. Com (Accounts & Finance) (Tax Procedures and Practice) (Business Process Management)** for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number 44-46
13. It is resolved and recommend to introduce **Income Tax-III** with course code **COHSET13** in V semester of **B. Com (Accounts & Finance) (Tax Procedures and Practice) (Business Process Management)** for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number 47-50
14. It is resolved and recommend to introduce **Customs** with course code **COHSET14** in V semester of **B. Com (Accounts & Finance) (Tax Procedures and Practice) (Business Process Management)** for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number 51-52
15. It is resolved and recommend to introduce **Managing Business Process-II** with course code **COHSET16** in V semester of **B. Com (Accounts & Finance) (Tax Procedures and Practice) (Business Process Management)** for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number 53-55
16. It is resolved and recommend to introduce **Capital Markets for BPS** with course code **COHSET11** in V semester of **B. Com (Accounts & Finance) (Tax Procedures and Practice) (Business Process Management)** for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number 56-58
17. It is resolved and recommend to introduce **Supply Chain Managements** with course code **COHSET12** in V semester of **B. Com (Accounts & Finance) (Tax Procedures and Practice) (Business Process Management)** for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number 59-61
18. It is resolved and recommend to introduce **E Commerce** with course code **COHSET03** in V semester of **B. Com (Accounts & Finance) (Tax Procedures and Practice) (Business Process Management)** for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number 62-64



19. It is resolved and recommend to introduce **E filing** with course code **COHSET04** in V semester of **B. Com (Accounts & Finance) (Tax Procedures and Practice) (Business Process Management)** for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number 65-66

20. It is resolved and recommend to introduce **Stock Markets** with course code **COHSET05** in V semester of **B. Com (Accounts & Finance) (Tax Procedures and Practice) (Business Process Management)** for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number 67-69

21. It is resolved and recommend to introduce **Stock Market Analysis** with course code **COHSET06** in V semester of **B. Com (Accounts & Finance) (Tax Procedures and Practice) (Business Process Management)** for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number 70-72

It is resolved to opt three pairs subject to selecting at least one from given series as well as implement the syllabus & model papers with allotted course codes to B.Com (Hons A&F)/TPP/BPM for the students admitted in the academic year 2020 – 21 onwards.

### **Skill Enhancement Courses (SECs) for Semester V, from the AY 2022-23**

#### **Structure of SECs for Semester– V**

(To choose Three pairs from the Nine alternate pairs of SECs)

Pairs of Skill Enhancement Courses (SEC) under each series in Commerce for Semester-V.

#### **B. Com (Accounts & Finance) (Tax Procedures and Practice) (Business Process Management)**

<b>CourseNo.</b>	<b>Series-A</b>	<b>CourseNo.</b>	<b>Series-B</b>	<b>CourseNo.</b>	<b>Series-C</b>
COHSET01	<b>Accounting for Corporate Restructuring</b>	COHSET07	Tax planning and management	COHSET13	Income Tax-III
COHSET02	<b>Management Accounting</b>	COHSET08	Accounting Packages (Tally)	COHSET14	Customs
COHSET03	E Commerce	COHSET09	<b>Portfolio Management</b>	<b>ENGSET01</b>	Campus to Corporate Transition
COHSET04	E filing	COHSET10	<b>Accounting Packages (Tally)</b>	COHSET16	Managing Business Process-II
COHSET05	Stock Markets	COHSET11	Capital Markets for BPS	COHSET17	<b>Financial Services</b>
COHSET06	Stock Market Analysis	COHSET12	<b>Supply chain Managements</b>	COHSET18	<b>Indian Financial System</b>

22. It is resolved and recommend to introduce **Advanced Corporate Accounting** with course code **COMSET01** in VI semester of **B. Com (General) and (Computer Applications)** for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number 74-78
23. It is resolved and recommend to introduce **Software Solutions to Accounting** with course code **COMSEP02** in VI semester of **B. Com (General) and (Computer Applications)** for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number 79-80
24. It is resolved and recommend to introduce **Advertising and Media Planning** with course code **COMSET11** in VI semester of **B. Com (General) and (Computer Applications)** for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number 81-83
25. It is resolved and recommend to introduce **Sales Promotion and Practice** with course code **COMSET12** in VI semester of **B. Com (General) and (Computer Applications)** for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number 84-85
26. It is resolved and recommend to introduce **Digital Marketing** with course code **COMSET15** in VI semester of **B. Com (General) for** the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number 86-87
27. It is resolved and recommend to introduce **Service Marketing** with course code **COMSET16** in VI semester of **B. Com (General)** for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number 88-90
28. It is resolved and recommend to introduce **Management Accounting** with course code **COMSET03** in VI semester of **B. Com (General) and (Computer Applications)** for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number 91-94
29. It is resolved and recommend to introduce **Cost Control Techniques** with course code **COMSET04** in VI semester of **B. Com (General) and (Computer Applications)** for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number 95-98
30. It is resolved and recommend to introduce **Life Insurance with Practice** with course code **COMSET07** in VI semester of **B. Com (General) and (Computer Applications)** for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number 99-100

31. It is resolved and recommend to introduce **General Insurance with practice** with course code **COMSET08** in VI semester of **B. Com (General) and (Computer Applications)** for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number101-102
32. It is resolved and recommend to introduce **E Commerce** with course code **COMSET17** in VI semester of **B. Com (General)** for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number103-104
33. It is resolved and recommend to introduce **E filing** with course code **COMSET18** in VI semester of **B. Com (General)** for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number105-106
34. It is resolved and recommend to introduce **Stock Markets** with course code **COMSET05** in VI semester of **B. Com (General) and (Computer Applications)** for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number107-109
35. It is resolved and recommend to introduce **Stock Market Analysis** with course code **COMSET06** in VI semester of **B. Com (General) and (Computer Applications)** for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number110-112
36. It is resolved and recommend to introduce **Logistics Services and Practice** with course code **COMSET09** in VI semester of **B. Com (General) and (Computer Applications)** for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number113-115
37. It is resolved and recommend to introduce **EXPORT Procedure and practice** with course code **COMSET10** in VI semester of **B. Com (General) and (Computer Applications)** for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number 116-118
38. It is resolved and recommend to introduce **Income Tax Procedure & Practice** with course code **COMSET13** in VI semester of **B. Com (General) and (Computer Applications)** for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number119-121
39. It is resolved and recommend to introduce **GST Procedure &Practice** with course code **COMSET14**in VI semester of **B. Com (General) and (Computer Applications)** for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number 122-125

**It is resolved to opt three pairs subject to selecting at least one from given series as well as implement the syllabus & model papers with allotted course codes to B.Com**

(GEN) for the students admitted in the academic year 2020 – 21 onwards. Model paper prepared with levels of Bloom’s Taxonomy is appended at the end of the syllabus.

It is resolved to opt two pairs subject to selecting at least one from given series A&B as well as implement the syllabus & model papers with allotted course codes to B.Com (CA) for the students admitted in the academic year 2020 – 21 onwards. Model paper prepared with levels of Bloom’s Taxonomy is appended at the end of the syllabus

**Skill Enhancement Courses (SECs) for Semester VI, from the AY 2022-23  
Structure of SECs for Semester– VI**

(To choose Three pairs from the Nine alternate pairs of SECs)

Pairs of Skill Enhancement Courses (SEC) under each series in Commerce for Semester-VI.

Course No.	Series-A: Accountancy	Course No.	Series-B: Services	Course No.	Series-C: E commerce
	Course Name		Course Name		Course Name
COMSET01	<b>Advanced Corporate Accounting</b>	COMSET07	Life Insurance with Practice	COMSET13	Income Tax Procedure & Practice
COMSEP02	<b>Software Solutions to Accounting</b>	COMSET08	General Insurance with practice	COMSET14	GST Procedure & Practice
COMSET03	Management Accounting	COMSET09	Logistics Services and Practice	<b>COMSET15</b>	<b>Digital Marketing</b>
COMSET04	Cost Control Techniques	COMSET10	EXPORT Procedure and practice	<b>COMSET16</b>	<b>Service Marketing</b>
COMSET05	Stock Markets	<b>COMSET11</b>	<b>Advertising and Media Planning</b>	COMSET17	E Commerce
COMSET06	Stock Market Analysis	<b>COMSET12</b>	<b>Sales Promotion and Practice</b>	COMSET18	E filing



## P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

Siddhartha Nagar, Vijayawada – 520 010

Autonomous - ISO 9001 – 2015 Certified

### Advanced Accounting

Offered to: B.Com General/CA/BFSI

Course Code: COMT31A

Course Type: Core (Theory)

Year of Introduction: 2021-22

Year of Revision:

Percentage of Revision:

Semester: III

Credits: 4

Hours Taught: 75 hrs. Per Semester

Max. Time: 3 Hours

Course Prerequisites (if any): Intermediate level

#### Course Description:

#### Course Objectives:

1. Learn the criteria for identifying Revenue Expenditure and distinguishing from Capital Expenditure and understand the linkage of such distinction with the preparation of Final Accounts.
2. Understand the special features of Instalment system and also analyses the distinction between the Hire Purchase System and Instalment System.
3. Understand the features of Partnership firm and the need for valuation of goodwill as well as revaluation of Assets and Liabilities.

**Course Outcomes:** At the end of this course, students should be able to:

**CO1:** Student will be able to understand different situations to calculate interest on various installments and understand need for re-possession and the procedure in case of default.-**PO5**

**CO2:** Student will be able to understand Profit & Non-profit concern and to ascertain the surplus/deficit relating to various non-trading concerns –**PO6**

**CO3:** Student will get the knowledge of partnership business, its accounts and modes of settlement in case of partnership restructuring.- **PO7**

**CO4:** Student will acquire the capacity to settle the accounts in case of dissolution by realization of various assets.-**PO5**

**CO5:** Student will obtain the knowledge of branch accounting procedure and the process of conversion of foreign branch transactions into Indian currency.-**PO7**

### Syllabus

#### Course Details

Unit	Learning Units	Lecture Hours
I	<b>Accounting for Non Profit Organizations:</b> Non Profit Entities- Meaning - Features of Non-Profit Entities –Provisions as per Sec 8 - Accounting Process- Preparation of Accounting Records - Receipts and Payments Account- Income and Expenditure Account - Preparation of Balance Sheet (including problems).	15
II	<b>Single Entry System:</b> Features – Differences between Single Entry and Double Entry – Disadvantages of Single Entry- Ascertainment of Profit and Preparation of Statement of Affairs (including Problems)- Conversion of Single entry to Double entry system (Simple Problems).	15

III	<b>Hire Purchase System:</b> Features –Difference between Hire Purchase and Instalment Purchase Systems - Accounting Treatment in the Books of Hire Purchaser and Hire Vendor - Default and Repossession (including Problems).	15
IV	<b>Partnership Accounts-I:</b> Meaning – Partnership Deed - Fixed and Fluctuating Capitals-Accounting Treatment of Goodwill - Admission and Retirement of a Partner (including problems).	15
V	<b>Partnership Accounts-II:</b> Dissolution of a Partnership Firm – Application of Garner v/s Murray Rule in India – Insolvency of one or more Partners (including problems).	15

**Textbook:**

1. S.P JAIN AND K.L NARANG, ADVANCED ACCOUNTANCY, KALYANI PUBLISHERS

**Recommended Reference book:**

1. SN Maheswari & SK Maheswari, Financial Accounting, Vikas Publications.
2. R.L. Gupta & V.K. Gupta, Principles and Practice of Accounting, Sultan Chand & Sons.
3. S.N.Maheshwari & V.L.Maheshwari, Advanced Accountancy (Vol-II), Vikas publishers.
4. S.P. Jain & K.L Narang, Accountancy–III, Kalyani Publishers.

**Course Delivery method:** Face-to-face / Blended

**Course has focus on:** Employability

**Websites of Interest:**

**Co-curricular Activities:**

1. Quiz Programs
2. Co-operative learning
3. Seminar
4. Visit a single-entry firm, collect data and Creation of Trial Balance of the firm
5. Visit Non-profit organization and collect financial statements
6. Critical analysis of rate of interest on hire purchase schemes
7. Visit a partnership firm and collect partnership deed
8. Debate on Garner v/s Murray rule in India and outside India
9. Group Discussions on problems relating to topics covered by syllabus
10. Examinations (Scheduled and surprise tests) on all units

**Model Question Paper  
Advanced Accounting**

Commerce	II B.Com (Gen, CA,BFSI)	Semester-III	COMT31A
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**Max.Marks:75 Marks**

**Min. Pass: 30 Marks**

**Section - A**

**Answer any Five of the following**

**5 X 5 = 25 Marks**

1. Explain Donations. (CO1, L1)
2. Write about Legacies. (CO1, L1)
3. Briefly explain about Accounting from Incomplete Records. (CO2, L1)
4. What is meant by Repossession of Goods? (CO3, L1)
5. Define Installment Purchase System. (CO3, L1)
6. What are Fixed and Fluctuating Capital Methods. (CO4, L1)
7. Explain the Goodwill treatment in case of Admission of a new partner. (CO4, L1)
8. What is Insolvency of partner. (CO5, L1)

**Section - B**

**Answer the following questions**

**(5 X 10 = 50 Marks)**

**Unit I**

9. (a) What are the differences between Receipts and Payments Account and Income and Expenditure Account? (CO1, L2)

(Or)

- (b) The following is the Receipts and Payments account of a Hospital for the year ended 31st December, 2015, prepare Income and Expenditure account and a Balance sheet as at the date: (CO1, L3)

**Receipts and Payments Account for the year ended 31st December 2015**

Receipts	Amount	Payments	Amount
To Cash in hand	3,565	By Medicines	15,295
To Subscriptions	23,998	By Doctors honorarium	4,500
To Donations	7,250	By Salaries	13,750
To Interest on investments @7%	3,500	By Petty expenses	230
To Proceeds from charity	5,225	By Equipment	7,500
		By Expenses on charity show	375
		By Cash in hand	1,888
	<b>43,538</b>		<b>43,538</b>

**Additional information:**

	1.1.2015	31.12.2015
a. Subscriptions due	120	140
b. Subscriptions received in advance	32	55
c. Stock of medicines	4,405	4,870
d. Estimated value of equipment	10,600	15,800
e. Buildings (Cost less depreciation)	20,000	19,000

**Unit II**

10. (a) What is Single Entry System? What are the features of Single Entry System? (CO1, L1)

(Or)

- (b) From the following details, prepare Trading, Profit and Loss Account and Balance Sheet.

Particulars	On 31.3.2019	On 31.3.2020
Stock	25,000	12,500
Debtors	62,500	87,500
Cash	6,250	10,000
Furniture	2,500	2,500
Creditors	37,500	43,750

Bad debts Rs.1,250; Discount received Rs.3,750; Discount allowed Rs.2,500; Sundry expenses Rs.7,500; Payments to creditors Rs.1,12,500; Received from Debtors Rs.1,33,750; Drawings Rs.10,000; Sales returns Rs.3,750; Purchases returns Rs.1,250. Charge depreciation on furniture @ 5% p.a. (CO2, L3)

### Unit III

11. (a) What is Hire Purchase System? Explain the features of Hire Purchase System. (CO3, L1)

(Or)

(b) The Madras Transport Company purchased motor car from the Bombay Motor Co. on hire purchase agreement on 1st January 2013, paying cash Rs.10,000 as down payment and agreeing to pay further three instalments of Rs.10,000 each on 31st December each year. The cash price of the car is Rs.37,250 and the Bombay Motor Company charges interest as depreciation on the reducing instalment system. Prepare necessary accounts in the books of Madras Transport Company. (CO3, L2)

### Unit IV

12. (a) What is a Partnership Deed? What are the contents in Partnership Deed? (CO4, L1)

(Or)

(b) The following is the Balance Sheet of Harshitha and Sindhu who had been sharing profit and losses in the ratio of 3:2. (CO4, L3)

Liabilities	Amount	Assets	Amount
Creditors	20,000	Cash	3,000
General Reserve	15,000	Bank	7,000
Bills Payable	5,000	Debtors	10,000
Capital Accounts		Furniture	20,000
Harshitha	40,000	Machinery	25,000
Sindhu	20,000	Buildings	35,000
	<b>1,00,000</b>		<b>1,00,000</b>

They agreed to take Sravani as a partner on the following conditions:

- Sravani pay Rs.10,000 as her capital for 1/4th share in the future profits.
- Provision for doubtful debts to be created on debtors 10%.
- Deprecation on furniture 5%, on machinery 10%.
- Increase value of building by 20%.
- Goodwill to be valued Rs.75,000.

Prepare necessary ledger accounts and balance sheet after entry of new partner.

### Unit V

13. (a) Briefly explain the rule in **Garner v/s Murray** case. (CO5, L2)

(Or)

(b) The following is the Balance Sheet of P Q and R on 31st December 2020, the partners sharing profits in the ratio of 5 : 3 : 2. (CO5, L4)

#### Balance Sheet of P,Q & R as at 31st December 2005

Liabilities	Rs.	Assets	Rs.
Creditors	30,000	Cash at Bank	6,000
Bills Payable	7,000	Sundry Debtors	20,000
Loan from P	30,000	Less Provision for	



General Reserve	15,000	doubtful debts	1,000	19,000
Capital Accounts:		Stock		30,000
P	30,000	Investments		10,000
Q	25,000	Fixtures		2,000
R	15,000	Plant		35,000
		Freehold Property		50,000
	<b>1,52,000</b>			<b>1,52,000</b>

The Partnership was dissolved, and the assets realised the following amounts:

Stock and investments realised 10 percent less than the book values. Debtors realised Rs.17,500 and Plant Rs.30,000. Freehold property was sold for Rs.85,000. Fixtures were taken over by P at an agreed value of Rs.1,200. Creditors were paid off at a discount of 5 percent. Q agreed to pay the bills payable. Expenses of realisation amounted to Rs.1,000.

Pass Journal entries to give effect to the above and show the necessary ledger accounts.



## P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

Siddhartha Nagar, Vijayawada – 520 010

Autonomous - ISO 9001 – 2015 Certified

### Business Statistics

**Offered to:** B.Com General/CA/BFSI

**Course Code:** COMT32

**Course Type:** Core (Theory)

**Year of Introduction:** 2021-22

**Year of Revision:**

**Percentage of Revision:**

**Semester:** III

**Credits :** 4

**Hours Taught:** 75 hrs. Per Semester

**Max. Time :** 3 Hours

**Course Prerequisites (if any):** Intermediate level

After completing this programme the students will be able to –

**Objective:** 1. The objective of this course is to impart knowledge on the application of statistical tool and techniques in business decision making.

2. Students will be able to understand basic theoretical and applied principles of statistics.

3. Students will gain proficiency in using statistical for data analysis.

**CO-1** Students will be able to understand the basic knowledge and characteristics of business statistics. **PO5, PO7**

**CO-2** Determine the value of the mean, the median, and the mode of ungrouped data. **PO5, PO7**

**CO-3** Explains the disparity of data from one another delivering a precise view of the distribution of data. **PO5, PO7**

**CO-4** Design, Evaluate and apply regression analysis. **PO5, PO7**

**CO-5** Students will be able to understand interpret indexes to identify trends in a data set. And what the trend, seasonality, cyclical irregularity in time series. **PO5, PO7**

Unit	Learning Units	Lecture Hours
I	<b>Introduction to Statistics:</b> Definition, Importance and limitation of statistics, Collection of data, Schedule and questionnaire, Frequency distribution, Tabulation	12
II	<b>Measures of Central Tendency:</b> Characteristics of measures of central tendency, Types of Averages, Arithmetic Mean, Geometric Mean, Harmonic Mean, Median, Mode	18
III	<b>Measures of dispersion and Skewness:</b> Properties of dispersion, Range, Quartile Deviation, Mean deviation, Standard deviation, Coefficient of Variation, Skewness Definition, Karl Pearson's and Bowley's Measures Of skewness	15
IV	<b>Measures of Relation:</b> Meaning and use of correlation, Types of correlation, Karl Pearson's correlation coefficient, Probable Error, Spearman's Rank	15

	correlation, Regression analysis comparison between correlation and Regression, Regression Equations	
V	<b>Analysis of Time Series &amp; Index Numbers</b> Meaning and utility of time series, Components of Time series, Measurement of trend and Seasonal Variations, Techniques of Time series analysis, Methods of averages(Semi , Moving averages), Least square method, Index Numbers, Methods of Construction of Index numbers, Price index numbers, Limitations of index numbers.	15

### **Text Book**

- 1) Business Statistics –S.Chand

### **Reference Books:**

- 1) Business Statistics – S. L Agarwal , S. L Bhrdwaj, K. Raghuvver – Kalyani publishers
- 2) Business Statistics And Operations Research – Dr. S.P .Gupta, P.K. Gupta, Dr.Manmohan – S. Chand

### **Suggested Co-Curricular Activities:**

1. Power point presentations
  2. Role play
  3. Seminar
  4. Problem Solving Exercises
  5. Quiz using Google forms
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# MODEL QUESTION PAPER

Commerce	II B.Com (Gen, CA,BFSI)	Semester-III		COMT32
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## Business Statistics

Time: 3Hrs

Max.Marks:75

### Section – A

Answer any **FIVE** of the following

5 X 5 = 25 Marks

1. Mention four important functions of statistics. **CO1,L1**
2. What are different kinds of classifications? **CO1,L1**
3. What are different types of averages? **CO2,L1**
4. Define standard deviation and its coefficient. **CO3,L1**
5. Explain different types of correlation. **CO4,L2**
6. State seasonal variations and explain any three uses? **CO5,L3**
7. What are the different types of price index numbers? **CO5,L1**
8. What are the methods of construction of index numbers? **CO5,L1**

### Section – B

Answer **All** the questions

5 x 10 = 50 Marks

9. (a) Contrast between primary and secondary data. **CO1,L2**

OR

(b) What is a questionnaire? Discuss the precautions to be taken while preparing a questionnaire. **CO1,L1**

10. (a) What is an average? What are characteristics of a good average? **CO2, L1**

OR

(b) Calculate a Mean and Mode from the data given below: **CO2,L3**

Wages	10 – 15	15 – 20	20 – 25	25 – 30	30 – 35	35 – 40	40 – 45	45 – 50
No. of Workers	22	45	67	73	85	90	64	55

11. (a) What are the objects or uses of Dispersion? **CO3,L1**

OR

(b) Compute, S.D and Co – efficient of variation for given data **CO3,L3**

X	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50
F	5	15	30	65	80

12. (a) Distinguish between correlation and regression analysis. **CO4,L4**

OR

(b) The following are the ranks assigned by 2 judges A & B to 12 contestants in cooking competition.

Find out what agreement the judges had in judgment. **CO4,L4**

S. No	A	B	C	D	E	F	G	H	I	J	K	L
A	1	9	2	10	3	11	8	4	12	9	5	6
B	2	9	1	7	4	10	8	3	12	6	5	11

13. (a) What do you mean by an index numbers? Explain its uses and limitations. **CO5,L1**

OR

(b) Following are the data of production of computers in a factory. Fit a straight line trend. **CO5,L4**

Year	2000	2001	2002	2003	2004
Production (in Lakhs)	4	6	9	10	11



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### Business Law

**Offered to: B.Com (General) /CA/BFS1**

**Course Type: Core (TH)**

**Course Code: COMT37**

**Year of Introduction:2021-22**

**Year of Revision:**

**Percentage of Revision:**

**Semester: III**

**Credits: 4**

**Hours Taught: 75 hrs. Per Semester**

**Prerequisites:** The students opting for this course should have some basic knowledge of law relating to the economic laws. The student is expected to adopt business customs and traditions with the existing laws and the amendments.

#### **Course Objectives:**

1. The objective of this course is to acquaint the students with basic laws to be followed at the time of undertaking the business activities
2. The objective of this course is to acquaint the students with different forms of business organisations in the business field and the law relating to their incorporation and operations.
3. The objective of this course is to acquaint the students with the technical implications with reference to parties and technicalities with reference to any contracts to be followed at the time of undertaking the business activities

**Course Outcomes :** At the end of this course, students should be able to:

**CO1:** Impacts the students in acquiring the basic knowledge regarding contracts in business **(PO 7)**

**CO2:** Students acquires knowledge in the role of parties to the contract and impact of it to “QUID- PRO- QUO” for the enforceability of the contract **(PO 5)**

**CO3:** Students will have clarity on competency of persons, modes of discharge of contract, analysing and approaching to remedies in times of breach of contract. **(PO7)**

**CO4:** Students get knowledge in law and procedure relating to sale of goods in Indian context. **(PO 6)**

**CO5:** Students get knowledge in new dimensions in business Organisation to overcome constrains with reference to liability, capital and management of business. **(PO7)**

## Syllabus

### Course Details

Unit	Learning Units	Lecture Hours
I	<b>Indian Contract Act – 1872</b> Meaning and Definition Agreement and contract, Classification of Contracts – Valid, Void and Voidable Contracts, Essential elements of Valid Contracts	10
II	<b>Offer and Acceptance</b> Definition of Valid Offer, Acceptance, Consideration, Essential elements of a Valid offer, Essentials of valid Acceptance, Legal rules for lawful Consideration, No consideration, no contract – exceptions.	15
III	<b>Capacity of the Parties and Contingent Contract</b> Rules regarding to Minor Contracts, Rules relating to Contingent Contracts, Rules relating to Quasi Contracts, Different modes of Discharge of Contracts, Rules relating to remedies of Breach of contract.	15
IV	<b>Sale of Goods Act – 1930</b> Contract of Sale meaning and Definition, Types of Goods, Sale and Agreement to Sell, Implied conditions and warranties, Rights of Unpaid Seller, Sale of goods by non-owners.	20
V	<b>Limited Liability Partnership Act, 2008</b> Meaning and Features of LLP, Partner- Designated partner- Maximum and Minimum number of partners- Qualification of partners, Procedure to incorporate a LLP, difference between Company, Limited Liability Partnership and Partnership.	15

#### Textbook:

Author: K C Garg ,Vk Sareen,Mukesh Sharma RC Chawala. Book Title : Business Law. Publishing company: Kalyani publishers,

#### Recommended Reference book:

Author: 1. N. D. Kapoor, Book Title : Mercantile Law, Publishing company: Sultan Chand

2. SN Maheswari, SK Maheswari Business Laws, Himalaya Publications House Mumbai,

**Course Delivery method :** Face-to-face

**Course has focus on :**

Foundation / Entrepreneurship

#### Co-curricular Activities:

1. Power point presentations
  2. Role play
  3. Seminar
  4. Quiz
  5. Field trips
-

**Model Question Paper  
Business Law**

<b>Commerce</b>	<b>Semester III</b>	<b>COMT37</b>	<b>B.Com(General )/CA/BFSI</b>
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**Max.: 75 Marks**

**Min. Pass : 30 Marks**

**Max. Time : 3 Hours**

**Section-A**

**Answer any Five of the following**

**(5 x 5M = 25Marks)**

1. Distinguish void and voidable contracts. (CO 1, L2)
2. What is novation? (CO3 ,L1)
3. Features of valid acceptance. (CO2, L2)
4. Can minor be a party to a contract? Discuss. (CO3, L4)
5. Quasi contracts. (CO3, L2)
6. Differences between sale and agreement to sell. (CO4, L4)
7. Who is unpaid seller? What are his rights? (CO4, L1)
8. Designated partner. (CO5, L2)

**Section-B**

**Answer the following questions**

**(5 x 10M = 50Marks)**

**Unit-I**

9. (a) “All agreements are not contracts ,but all contracts are agreements”. Discuss. (CO1, L2)

**(OR)**

- (b) Discuss in detail the kinds of contracts. (CO1, L2)

**Unit-II**

10. (a) Discuss in details the essentials of a valid acceptance. (CO2, L2)

**(OR)**

- (b) “No consideration, no contracts”. Discuss the statement with exceptions. (CO2, L2)

**Unit-III**

11. (a) What are quasi contracts? Explain the quasi contracts under Indian contract Act. (CO3, L1)

**(OR)**

- (b) What are the remedies for breach of contract? (CO3, L2)

**Unit-IV**

12. (a) Define a ‘condition’ and a ‘warranty’. Explain the implied conditions and warranties. (CO4, L1)

**(OR)**

- (b) State the rules relating to the passing right of property from seller to buyer in a contract for sale of goods. (CO4, L1)

**Unit-V**

13. (a) What is the procedure to incorporate a limited liability partnership? (CO5, L1)

**(OR)**

- (b) Distinguish between partnership and limited liability partnership. (CO5, L4)

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Commerce	COMT39	2021-22	B.Com (BFSI)
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**SEMESTER: III**

**No of Credits: 4**

**Principles and Practice of Insurance**

**Objectives:**

1. To understand the principles and significance of insurance.
2. To familiarize the students about various services offered under life and non-life insurance products.
3. To impart thorough knowledge about various insurance acts and regulatory framework.

**Course Outcomes:**

**CO1:** To create awareness about the concepts and introduction to insurance. **(PO1, PO6)**

**CO2:** To enlighten the students about various life Insurance products and documentation process. **(PO6)**

**CO3:** To create thorough knowledge about insurance claim settlement procedure and underwriting process.**(PO1, PO6)**

**CO4:** To create awareness about various non-life insurance products and services.**(PO1, PO6)**

**CO5:** To articulate about the regulating framework for Insurance sector in India. **(PO1, PO6)**

**UNIT – I INTRODUCTION TO INSURANCE:**

15P

Meaning of Insurance - History and Evolution - Concepts and Principles -Need and significance of Insurance - Insurance as a tool for managing Risk -Essentials of Insurance Contract – Role of Insurance in economic development.

**UNIT – II: LIFE INSURANCE PRODUCTS AND DOCUMENTATION:**

15P

Overview of Life Insurance Products - **Traditional Life Insurance Products:**Whole life, Money back policies, Endowment plans; **Life Insurance Documentation:**Proposal Stage:Prospectus - Proposal Form - Agents Report – Medical Examiner’sreport - Know Your Customer; **Policy Stage:**First Premium Receipt - Policy Document - Policy Conditions and Privileges – Issue of duplicate policy, nomination, surrender value, policy loans, assignment.

**UNIT – III: UNDERWRITING AND PAYMENTS UNDER A LIFE INSURANCE POLICY:15P**

Basic Concepts - Non-Medical Underwriting – Medical Underwriting; **Payments under a life Insurance policy:** Types of Claims and Claims Settlement Procedure.

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## **UNIT – IV: NON-LIFE INSURANCE:**

15P

Types of products and scope of Fire Insurance, Marine Insurance, Health Insurance; **PMFBY Crop Insurance (Pradhan Mantri FasalBima Yojana Crop Insurance):** Objectives, Procedure.

## **UNIT – V: LEGAL PROVISIONS OF INSURANCE:**

15P

Insurance Act 1938 – IRDA Amendment Act2002 – Insurance Amendment Act 2002 – General Insurance Business Amendment Act, 2002 - Customer Grievances and grievance redressal Mechanism

### **Text Books:**

1. Practice of General Insurance: Dr.Aanchal Aggarwal, Dr. Nupur Aroro
2. Life Insurance Risk Management Essentials: Michael Koller
3. The Fundamentals of Insurance: Govind Dayal
4. Life and General Insurance: P.K. Gupta, Anil Kumar Meena, Himalaya Publishing House.
5. Business Statistics :Pragatiprakashan publications

### **Suggested Readings:**

1. Statistical Methods: Gupta S.P.Sultan Chand &Sons.
2. Business Statistics, LS Agarwal, KalyaniPublications.
3. Fundamentals of Statistics: Gupta S.C. Sultan Chand&Sons.

### **Suggested Co-Curricular Activities:**

1. Seminars on life insurance products and services.
  2. Seminars on non-life insurance products and services.
  3. Quiz
  4. Group discussions
  5. Power Point Presentations on types of Insurance.
  6. Examinations (Scheduled and surprise tests)
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**Model Question Paper**  
**Principles and Practice of Insurance**

Commerce	Semester III	COMT39	B.Com(BFSI)
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**Max.: 75 Marks**

**Min. Pass : 30 Marks**

**Max. Time : 3 Hours**

**Section – A**

**Answer any five of the following:**

**5 X 5M = 25M**

1. What is the importance of Insurance? AA (CO1) L1
2. Explain about Insurance as a tool for managing risk. (CO1) L2
3. Write a short note on Nomination. (CO2) L1
4. What is meant by Duplicate Policy? (CO2) L2
5. What do you mean by Under writing. (CO3) L2
6. Write a short note on Health Insurance. (CO4) L1
7. Write a short note on PMFBY (Pradhan Mantri Fasal Bima Yojana) Crop Insurance. (CO4) L2
8. Explain briefly about Insurance Act 1938. (CO5) L2

**Section – B**

**Answer the following:**

**5 X 10M = 50M**

9. a. Explain in detail about the essential elements of Insurance Contract. (CO1) L2  
(or)  
b. Explain briefly about the role of Insurance in economic development. (CO1)L2
  10. a. Explain briefly about various types of Life Insurance Policies. (CO2) L1  
(or)  
b. What is meant by Documentation? Explain briefly about various documents required at proposal tage. (CO2) L2
  11. a. What is Insurance Claim? Explain about various types of Insurance Claims. (CO3) L2  
(or)  
b. Explain in detail the procedure for settlement of maturity and death claims.  
(CO3) L1
-

12. a. What is meant by Fire Insurance? Explain about various types of Fire Insurance Policies. (CO4) L1

(or)

b. Define Marine Insurance. Explain briefly about scope and the types of Marine Insurance Policies. (CO4) L1

13. a. What are the functions and objectives of IRDA? (CO5) L2

(or)

b. Write about the grievance redressal mechanism by Insurance Companies.  
(CO5) L2

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**B. Com (Accounts & Finance) (Tax Procedures and Practice) (Business Process Management)****Skill Enhancement Courses (SECs) for Semester V, from the AY 2022-23****Structure of SECs for Semester– V**

(To choose Three pairs from the Nine alternate pairs of SECs)

(For each SEC: Hours/Week: 05, Credits: 4, Max Marks: 100)

Pairs of Skill Enhancement Courses (SEC) under each series in Commerce for Semester-V.

**B. Com (Accounts & Finance) (Tax Procedures and Practice) (Business Process Management)**

<b>CourseNo.</b>	<b>Series-A</b>	<b>CourseNo.</b>	<b>Series-B</b>	<b>CourseNo.</b>	<b>Series-C</b>
COHSET01	<b>Accounting for Corporate Restructuring</b>	COHSET07	Tax planning and management	COHSET13	Income Tax-III
COHSET02	<b>Management Accounting</b>	COHSET13	Accounting Packages (Tally)	COHSET14	Customs
COHSET03	E Commerce	COHSET09	<b>Portfolio Management</b>	<b>ENGSET01</b>	Campus to Corporate Transition
COHSET04	E filing	COHSET10	<b>Accounting Packages (Tally)</b>	COHSET16	Managing Business Process-II
COHSET05	Stock Markets	COHSET11	Capital Markets for BPS	COHSET17	<b>Financial Services</b>
COHSET06	Stock Market Analysis	COHSET12	<b>Supply chain Managements</b>	COHSET18	<b>Indian Financial System</b>

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(An Autonomous college in the jurisdiction of Krishna University, Machilipatnam)

**Accounting for Corporate Restructuring**

<b>Semester:</b>	V	<b>Credits :</b>	<b>4</b>
Offered to	<b>B.Com(Honours) A&amp;F/TPP/BPM</b>	<b>Course Code</b>	COHSET01
Course Type	<b>Core (Theory)</b>	<b>Year of Introduction</b>	<b>2022-23</b>
<b>Year of Revision:</b>		<b>Percentage of Revision:</b>	
<b>Hours Taught</b>	75 hrs. Per Semester		
<b>Course Prerequisites (if any):</b>			

**CO1:** The student will be able to determine the value of goodwill by using different methods and the students will have a good command on ascertainment of value of share by using Asset backing method and Yield method. (PO.1) **PSO1**

**CO 2:** The students will be able to prepare financial statements of banking companies. (PO.4) **PSO1**

**CO 3:** The students will acquire the knowledge of preparing Amalgamated Balance Sheet (PO.7) **PSO1**

**CO 4:** The students will acquire the knowledge of preparing Re-constructed balance sheet. (PO.7) **PSO1**

**CO 5:** The students will get the capacity to prepare consolidated balance sheet of Holding and Subsidiary companies. (PO.4) **PSO1**

**Unit - I: Valuation of Goodwill:**

**23 Hours**

Introduction - Need for valuation-Different methods of valuation of goodwill-Average profit method, Super profit method, Capitalization of profit method and annuity method. (Problems)

**Valuation of shares:**

Need for valuation -Valuation under Asset backing method, yield method and Fair value method. (Problems).

**Unit – II : Bank accounts(Final Accounts)**

**22 Hours**

What is a banking company-Preparation of Profit and Loss a/c-Balance Sheet and Schedules attached to them.(Problems)

**Unit – III. : Amalgamation of Companies:**

**25 Hours**

General introduction-Amalgamation in the nature of merger -Amalgamation in the nature of purchase- Calculation of purchase consideration –Accounting entries in the books of vendor company and purchasing company. (Excluding inter-company Owings and inter-company holdings) (Problems).

**Unit – IV Alternation of share capital & Internal reconstruction:**

Internal reconstruction-Reorganisation through surrender of shares-Scheme of capital reduction.

**Unit – V: Holding Companies –**

**20 Hours**

Capital profits and Revenue profits-Cost of Control/Capital Reserve-Minorities interest Preparation of consolidated Balance Sheet. (Problems)

**Text Books:**

## 1. Corporate Accounting by Sehgal Ashok & Sehgal Deepak

### **Reference Books:**

1. Goyal, Bhushan Kumar. Corporate Accounting. Taxmann, New Delhi
2. Kumar, Alok. Corporate Accounting. Kitab Mahal
3. Monga, J. R. Fundamentals of Corporate Accounting. Mayur Paper Backs, New Delhi
4. . Advanced Accountancy By :S.P.Jain&K.L.Narang. Kalyani Publishers, New Delhi.

### **Suggested Co-Curricular Activities**

1. Assignments including technical assignments like Working with Audit Company for Observation of Purchase Consideration and Observation of recent Amalgamations in Banking Sector and Corporate Sector
2. Seminars, Conferences, discussions by inviting concerned institutions
3. Field Visit
4. Invited Lectures and presentations on related topics.

### **Web Links:**

- <https://thebookee.net/ad/advanced-corporate-accounting-and-accounting-standards>  
<https://www.svtuition.org/2011/08/accounting-for-corporate-restructuring.html>
-

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Commerce	III B.Com (Hons) A&F/TPP/BPM	Semester-V	2021-22	Max. Marks : 75	Course Code: COHSET01
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**Accounting for Corporate Restructure**  
**MODEL PAPER**

**SECTION - A**

Answer any **SIX** of the following.

**6x2=12**

1. Explain the features of Goodwill. (CO1, L1)
2. Write any two factors affecting valuation of Shares. (CO1, L1)
3. Money at call and Short Notice. (CO2, L2)
4. Rebate on Bills discounted. (CO2, L2)
5. Purchase Consideration. (CO3, L3)
6. What is Amalgamation? (CO3, L2)
7. Surrender of Shares (CO4, L3)
8. Reduction of Capital. (CO4, L3)
9. Minorities Interest. (CO5, L2)
10. Capital Profits. (CO5, L3)

**SECTION – B**

Answer any **FOUR** of the following.

**4 x 12 = 48**

11. What are the differences between Amalgamation in the nature of merger and Amalgamation in the nature of purchase? (CO1, L3)
12. Calculate value of goodwill with the following information. (CO1, L3)  
Last three years profits were:  
2009 Rs.46,500  
2010 Rs.51,500  
2011 Rs.53,500  
Remuneration from alternative employment Rs.60,000  
Insurance premium payable in future but not provided earlier Rs.5,500  
Capital employed Rs.2,00,000  
Normal rate of return is 10%  
Goodwill is 2 years super profit based on average profits of last three years.

13. The summarized balance Sheet of BK Ltd. as at 31st March, 2007 is as follows :

<b>Liabilities</b>	<b>Rs.</b>	<b>Assets</b>	<b>Rs.</b>
30,000 Equity Shares of Rs. 10 each fully paid up	3,00,000	Good will	70,000
10,000 Equity Shares of Rs. 10 each Rs. 8 paid up	80,000	Other Fixed Assets	4,50,000
Reserves	1,80,000	Current Assets	2,20,000
11% Debentures	1,00,000	Preliminary Expenses	10,000
Current Liabilities	90,000		
	<b>7,50,000</b>		<b>7,50,000</b>

The goodwill is independently valued at Rs.50,000 and other fixed assets at Rs.4,20,000. There was a contingent liability of Rs.20,000 which has become payable. Determine the value of both the shares under net asset method. (CO1, L3)

14. The following figures have been obtained from the books of the Rana Bank Ltd., for the year ending 31st March, 2015:

	<b>Rs. (in '000)</b>		<b>Rs. (in'000)</b>
Issued and subscribed capital	1,000	Postage and telegrams	61
Interest and discount earned	3,800	Profit on sale of investments	240
Commission and exchange earned	195	Loss on sale of investments	38
Interest paid	2,000	Rent received	62
Salaries and Wages	210	Depreciation	31
Director's fees	35	Stationery	60
Rent and taxes	70	Auditors fees	8

**Additional information:**

1. The profit and loss account had a balance of Rs. 10,00,000 on 1st April, 2014.
2. An advance of Rs. 12,00,000 has become doubtful and it is expected that only 50% of the amount due can be recovered from the security.
3. The provision of tax be made at 50%.
4. A dividend of 10% is proposed.

Prepare Profit and Loss Account of the Rana Bank Ltd. for the year ending 31st March, 2015. (CO2, L3)

15. Blue Bird Ltd. was incorporated for taking over the business of Mr. Ganapati as from 1<sup>st</sup> April, 2016. Following is the Balance Sheet of Mr. Ganapati as on 31<sup>st</sup> March, 2016.

<b>Liabilities</b>	<b>Rs.</b>	<b>Assets</b>	<b>Rs.</b>
Capital Account	1,00,800	Land and Buildings	1,20,000
Loan Creditors	1,20,000	Plant and Machinery	68,000
Trade Creditors	71,200	Furniture	20,000
		Sundry Debtors	84,000
	<b>2,92,000</b>		<b>2,92,000</b>

The company takes over the business along with the Fixed Assets and Loan Creditors on the following basis.

- a) The value of the Goodwill is estimated at Rs.80,000.
- b) The Fixed Assets should be depreciated by 10%.

The company realized Rs.80,000 from the Sundry Debtors as the agent of the vendors in full settlement and discharged all the Trade Creditors by paying Rs.68,000 for a commission of 3% on the amount collected and 2% on the amount paid.

The Loan Creditors accepted 8% preference shares of Rs.100 each in discharge of the loans.

After realization of the debts and discharge of the liabilities, the total amount due to the vendor was settled by payment of Rs.5,440 in cash and the balance in the shape of fully paid equity shares of Rs.10 each. Pass the necessary journal entries in the books of the company. (CO3, L4)



16. The following is the Balance Sheet of ABC Company Ltd. as on 31-3-2013.

<b>Liabilities</b>	<b>Amount Rs.</b>	<b>Assets</b>	<b>Amount Rs.</b>
Share Capital:		Patents	1,70,900
25,000 pref. shares of Rs.10 each	2,50,000	Stock	1,34,000
25,000 Equity shares of Rs.10 each	2,50,000	Debtors	56,000
Current Liabilities	76,000	Cash in hand	100
		Profit & Loss a/c	2,15,000
	<b>5,76,000</b>		<b>5,76,000</b>

The following scheme of reconstruction was resolved and implemented.

- (i) That both the Preference shares and Equity shares be reduced to an equal number of fully paid shares of Rs.5 each.
- (ii) That the amount so available be utilized to write off Profit and Loss Account to depreciate the value of stock by 10%, to provide for Bad debts on debtors at 10% and to reduce the value of patents by the balance amount.

Write the Journal entries for the above transactions and show reconstructed balance sheet (CO4, L4)

**SECTION -C**

Answer the following

1x15=15

17. On 31st March, 2016 the Balance Sheets of H Ltd. and its subsidiary S Ltd. stood as follows:

<b>Liabilities</b>	<b>H. Ltd Rs.</b>	<b>S. Ltd Rs.</b>	<b>Assets</b>	<b>H. Ltd Rs.</b>	<b>S. Ltd Rs.</b>
Equity Share Capital	8,00,000	2,00,000	Fixed Assets	5,50,000	1,00,000
General Reserve	1,50,000	70,000	75% Shares in S.Ltd		
Profit & Loss A/c	90,000	55,000	(at cost)	2,80,000	-----
Creditors	1,20,000	80,000	Stock	1,05,000	1,77,000
			Other Current Assets	2,25,000	1,28,000
	<b>11,60,000</b>	<b>4,05,000</b>		<b>11,60,000</b>	<b>4,05,000</b>

Draw a Consolidated Balance Sheet as at 31st March, 2016 after taking into consideration the following information:

1. H. Ltd. acquired the shares on 31st July, 2016.
2. S. Ltd. earned a profit of Rs. 45,000 for the year ended 31st March, 2016. (CO5, L4)

**P.B.SIDDHARTHA COLLEGE OF ARTS &SCIENCE :: VIJAYAWADA-10.**

(An Autonomous college in the jurisdiction of Krishna University, Machilipatnam)

**Management Accounting**

<b>Semester:</b>	V	<b>Credits :</b>	<b>4</b>
Offered to	<b>B.Com(Honours) A&amp;F/TPP/BPM</b>	<b>Course Code</b>	COHSET02
Course Type	<b>Core (Theory)</b>	<b>Year of Introduction</b>	<b>2022-23</b>
<b>Year of Revision:</b>		<b>Percentage of Revision:</b>	
<b>Hours Taught</b>	75 hrs. Per Semester		
<b>Course Prerequisites (if any):</b>			

**CO1** – Students will critically understanding the financial and management accounting importance in understanding the business operations using different tools (PO 1) **PSO1**

**CO2** – Students will understanding the importance of changes of working capital for any Organisation and analyzing the flow of fund (PO 1, 6 ) **PSO1**

**CO3** – Students will critically understanding the cash and fund flow concept and impact of cash flow on business operations (PO 1, 7) **PSO1**

**CO4** - Students will have the ability of assessing the solvency and profitability of any Organisation (PO 2, 4) **PSO1**

**CO5**- Students will understand the profit making decisions in complex situations of any business Organisation (PO 4, 6 ) **PSO1**

**Unit - I:**

**20 Hours**

**Financial Statement analysis :**

Meaning - nature of financial statements - Formats of income statements -Formats of balance sheet  
Types of Analysis –Horizontal analysis- Vertical analysis-Interpretation of financial statements- Comparative statement analysis- Common-size statement - Common size balance sheet - Common-size income statement- Trend analysis (Problems.)

**Unit - II: Funds flow Analysis:**

**20 Hours**

Introduction - meaning and concept of funds and flow of funds-Meaning of funds flow statement  
Funds flow statement-Income statement-Balance sheet -Uses and importance of funds flow statement - Procedure for preparing a funds flow statement -Statement or schedule of changes in working capital- Statement of sources and application of funds (Problems).

**Unit – III Cash flow Analysis:**

**15 Hours**

Introduction and meaning -Accounting standard 3- Comparison between funds and cash flow statements - Uses and significance of cash flow statement -Limitations of cash flow statement- Procedure for preparing a cash flow statement - Sources of cash inflows - Application of cash or cash out flows.(Problems).

**Unit -IV: Ratio Analysis:**

**20 Hours**

Introduction -Meaning and nature of ratio analysis -Interpretation of ratios -Use and significance of Ratio Analysis - Limitations of ratio analysis - Analysis of short-term financial position or test of solvency - Analysis of profitability or profitability ratios .

**Unit – CVP Analysis :**

**15 Hours**

Marginal costing - Break – even analysis-Concept of marginal costing -Benefits and limitations of Marginal costing (Problems) -Break-even analysis - Break-even point - Assumptions- Limitations- Preparation of Break-even analysis – Charts.

**Text Books:**

Management Accounting - Principles & Practice By: R.K.Sharma&S.K.Gupta.  
Kalyani Publishers, New Delhi.

**Reference Books:**

1. Principles of Management Accounting By: Dr.S.N.Maheswari, Sultan Chand & Sons  
New Delhi.
2. Cost and Management Accounting By Jain and Narang, Kalyani Publishers, New Delhi.

**Curricular Activities:**

Face to face interactions in the class,  
conventional chalk duster method of teaching,  
teaching by using suitable platform,  
spot tests, listing assignments,  
organizing group discussions,  
preparing question banks.

**Suggested Co- Curricular Activities :**

Book Reading  
Student Seminars  
Quiz Programmes  
Assignments  
Talk on Current Affairs about Business, Industry etc.

**Web links**

1. <https://youtu.be/3tTFnHKS4eA>
  2. <https://youtu.be/fPAwVSLEtx0>
  3. <https://youtu.be/rCmuB4-XGWI>
  4. <https://youtu.be/CnhU3duai-c>
  5. <https://youtu.be/rn2KV9DkQ2g>
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(An Autonomous college in the jurisdiction of Krishna University, Machilipatnam)

<b>Commerce</b>	<b>III B.Com (Hons) A&amp;F/TPP/BPM</b>	<b>Semester-V</b>	<b>2021-22</b>	<b>Max. Marks : 75</b>	<b>Course Code: COHSET02</b>
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**Management Accounting  
Model Paper  
Section A**

**Answer any six of the following Questions**

**6x2=12**

1. Write any four analysis statements. CO1,L1
2. What is 'Fund' in funds flow statement? CO2,L1
3. What is BEP? CO5,L1
4. Operating Profit. CO4,L1
5. State 'Contribution' in marginal costing. CO5,L1
6. Write short term solvency ratios. CO4,L1
7. Funds Flow Vs Cash Flow. CO3,L1
8. Interim Dividend. CO3,L1
9. What is Trend Analysis? CO1,L1
10. Capital reserve Vs General reserve. CO2,L1

**Section B**

**Answer any Four of the following Questions**

**4x12=48**

11. What are the different methods used for the analysis and interpretations of financial statements. CO1,L1
12. Prepare Comparative income statement and write the comments. CO1,L3

	2010 (Rs)	2011 (Rs)		2010 (Rs)	2011 (Rs)
To Cost of sales	4,63,250	4,83,899	By Sale	7,21,456	8,34,250
To Administration expenses	91,823	1,15,632	Less: returns	11,588	13,903
To Selling expenses	46,531	54,137	By Other Income:	7,09,868	8,20,347
To Interest paid	4,275	3,500	Interest & Dividend	3,795	2,620
To Loss on sale of plant	1,254	350	Discount	4,250	3,792
To Income Tax	43,038	80,390	By Profit on sale of land	3,000	---
To Net Profit	<u>70,742</u>	<u>88,851</u>			
	<u>7,20,913</u>	<u>8,26,759</u>		<u>7,20,913</u>	<u>8,26,759</u>

13. From the following two years Balance Sheet of ABC. Co Ltd prepare funds flow statement CO2,L3

Capital & liabilities	2010	2011	Assets	2010	2011
12% Pref. Share capital	4,00,000	40,0,000	Plant & Machinery	4,00,000	6,00,000
Equity Share Capital	8,80,000	11,00,000	Furniture	80,000	1,20,000
General Reserve	2,00,000	3,00,000	Building	6,00,000	6,00,000
14% Debentures	2,00,000	2,00,000	Freehold Premises	1,20,000	80,000
Creditors	1,20,000	1,00,000	Cash & Bank	1,00,000	1,60,000
Debts payable	2,00,000	3,00,000	Finished Goods	4,00,000	4,80,000
			Debtors	2,95,000	3,55,000
			Preliminary Expenses	5,000	5,000
	<u>20,00,000</u>	<u>24,00,000</u>		<u>20,00,000</u>	<u>24,00,000</u>

Additional information: Machinery & Furniture to be depreciated by 15% .

14. From the following Balance Sheet as on 31-3-2005 and 31-3-2006 you are required to prepare cash flow statement. CO3,L3

Capital & liabilities	31-3-2005	31-3-2006	Assets	31-3-2005	31-3-2006
Equity Share Capital	1,00,000	1,50,000	Fixed Assets	1,00,000	1,50,000
P&L A/c	50,000	80,000	Goodwill	50,000	40,000
General Reserve	30,000	40,000	Inventories	50,000	80,000
6% Bonds	50,000	60,000	Debtors	50,000	80,000
Sundry Creditors	30,000	40,000	B/R	10,000	20,000
Out Standing Expenses	10,000	15,000	Bank	10,000	15,000
	<u>2,70,000</u>	<u>3,85,000</u>		<u>2,70,000</u>	<u>3,85,000</u>

15. From the Balance Sheet given below calculate the following ratios:

- (a) Debt equity ratio (b) Liquidity ratio (c) Fixed assets to current assets ratio  
(d) Fixed assets turnover ratio (e) Fixed assets to net worth ratio CO4,L3

Liabilities	Rs	Assets	Rs
Equity Shares of Rs 10 each	1,00,000	Goodwill	60,000
Reserve	20,000	Fixed Assets at cost	1,40,000
P&L A/c	30,000	Stock	30,000
Secured loans	80,000	Advances	10,000
Creditors	50,000	Bank balance	30,000
Provision for taxation	20,000		30,000
	<u>3,00,000</u>		<u>3,00,000</u>

Sales for the year Rs. 3,60,000.

16. The results of a company for the last two years are as follows. CO5,L3

Year	Sales(Rs)	Profit(Rs)
2010	1,50,000	20,000
2011	1,70,000	25,000

You are required to calculate:

- (a) P/V ratio.  
(b) BEP in rupees.

- (c) The sales required to earn a profit of Rs. 40,000.  
 (d) Profit when sales are Rs. 50,000.  
 (e) Margin of safety at a profit of Rs. 50,000.

**Section C (Unit II)**

**Answer the following Question**

1X15=15

17. From the following Balance Sheet ABC Co Ltd prepare funds flow statement CO2,L3

Capital & liabilities	2012	2013	Assets	2012	2013
Equity Share Capital	1,50,000	1,75,000	Plant & Machinery	90,000	1,00,000
General Reserve	1,55,000	1,96,000	Furniture	25,000	25,000
Debentures	70,000	85,000	Building	45,000	75,000
Creditors	20,000	20,000	Freehold Premises	80,000	80,000
B/P	25,000	10,000	Cash & Bank	35,000	30,000
Bank OD	20,000	12,000	Finished Goods	20,000	60,000
Out Standing Expenses	15,000	6,000	Debtors	65,000	75,000
Provision for tax	5,000	10,000	B/R	50,000	45,000
Proposed Dividend	20,000	22,000	Work in Progress	35,000	30,000
Provision for depreciation on plant	15,000	19,000	Preliminary Expenses	50,000	35,000
	<u>4,95,000</u>	<u>5,55,000</u>		<u>4,95,000</u>	<u>5,55,000</u>

Additional information:

- (a) Furniture to be depreciated by 15%  
 (b) At the end of 2013 plant costing Rs15000 was sold for Rs13000(accumulated dep 1000)  
 (c)Tax paid during the year Rs. 15,000.

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**COMPUTERISED ACCOUNTING (TALLY)**

<b>Semester:</b>	V	<b>Credits :</b>	<b>4</b>
Offered to	<b>B.Com(Honours) A&amp;F/TPP/BPM</b>	<b>Course Code</b>	COHSET08/ COHSET10
Course Type	<b>Core (Practical)</b>	<b>Year of Introduction</b>	<b>2022-23</b>
<b>Year of Revision:</b>		<b>Percentage of Revision:</b>	
<b>Hours Taught</b>	75 hrs. Per Semester		
<b>Course Prerequisites (if any):</b>			

**CO1:** Enables to understand the origin and features of accounting software Tally. **(PO1, Po2)**

**CO2:** Demonstrate an understanding about the basics of accounts and the usage of Tally for accounting purpose. **(Po2, Po3)**

**CO3:** Able to create ledgers and group allocation for accounting entries in Tally. **(Po2, Po6, Po7)**

**Co4:** Develop an idea to generate accounting and inventory masters, vouchers in Tally. **(Po6, Po7)**

**CO5:** Impart knowledge regarding finalization of accounts using Tally. **(Po7)**

**Unit – I:**

**6Hrs**

Introduction – Accounting Principles & Concepts - Book Keeping –Types of Accounts – Golden Rules of Accounts -Mode of Accounts – Financial statements -Recording o transaction of sample data.

**Unit – II:**

**6Hrs**

Working with Tally-Creating Company – Loading/Selecting a company – Shutting a company  
Modifying an existing company – Deleting a Company-Setting User level of the Company  
Company Features – Company Configurations.

**Unit – III:**

**6Hrs**

Groups – Creating new group – Concept of Default Groups (28) -Creating a sub group – Altering a group – Deleting a group - Multiple groups (Problems)-Ledgers – Creating a ledger – Altering a ledger – Deleting a ledger.

**Unit – IV:**

**6Hrs**

Vouchers in Tally – Configuring vouchers – Predefined vouchers -Creating vouchers -Displaying and altering vouchers (Problems).

**Unit – V:**

SGST ,CGST,IGST ledger Creation, Intrastate and interstate GST Voucher Creation (Problems) **6Hrs**

Generating Basic Reports -Financial Statements - Accounting Books & Registers – Practice Exercise.

**Text Book prefer:**

1. Tally prime with GST – Gaurav Agarwal

**Text Book Reference:**

1. Tally prime with GST – Gaurav Agarwal
2. GST practice manual – Taxmann

**Curricular Activities:**

- 1.Face to face Interaction in the class
- 2.listing assignments
- 3.Conduct Quiz
- 4.Conduct Seminars
- 5.synchronous,asynchronous and hybrid method online

**Co-Curricular Activities:**

- 1.Books reading
- 2.Student seminars, debate
- 3.QUIZ program
- 4.Assignment

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**Portfolio Management**

<b>Semester:</b>	V	<b>Credits :</b>	<b>4</b>
Offered to	<b>B.Com(Honours) A&amp;F/TPP/BPM</b>	<b>Course Code</b>	COHSET09
Course Type	<b>Core (Theory)</b>	<b>Year of Introduction</b>	<b>2022-23</b>
<b>Year of Revision:</b>		<b>Percentage of Revision:</b>	
<b>Hours Taught</b>	75 hrs. Per Semester		
<b>Course Prerequisites (if any):</b>			

**CO1:** To enlighten the evolution and phases of portfolio management.(**PO1**) **PSO2**

**CO2:** Able to measure and manage risk exposure of a portfolio.(**Po1**) **PSO2**

**CO3:** Demonstrate familiarity with professionally managed portfolios through different models.(**Po7**) **PSO2**

**CO4:** Able to identify the need and revision strategies for portfolios.(**Po5**) **PSO2**

**CO5:**Develop and demonstrate ability to evaluate the portfolio performance.(**Po6, Po7**) **PSO2**

**Unit-I Introduction:**

**10Hrs**

Meaning of Portfolio Management – Phases of Portfolio Management – Evolution of Portfolio Management – Role of Portfolio Manager

**Unit-II Portfolio analysis:**

**15Hrs**

Risk and Return of Portfolio – diversification-Portfolios with more than two securities – Risk Return Calculations of Portfolios with More Than Two Securities.

**Unit-III Portfolio selection:**

**20Hrs**

Selection of optimal Portfolio – Markowitz Model-Its limitations – Single index and multi index models – capital Asset Pricing Model(CAPM)-Assumptions – The Capital Market Line(CML) and Securities Market Line(SML) – pricing of securities with CAPM.

**Unit-IV Portfolio Revision:**

**15Hrs**

Need for Revision – Meaning of portfolio Revision – Portfolio Revision strategies – Formula Plans – constant rupee plan – Constant Ratio Plan – Dollar cost averaging.

**Unit-V: Portfolio Evaluation:**

**15Hrs**

Need for Evaluation – Evaluation perspective – meaning of Portfolio Evaluation – Measuring portfolio Return – Risk Adjusted Returns – Differential Return – Sharpe's, Treynor's and Jensen's Measure for Portfolios Performance – FAMA's Decomposition.

**Text Book :**

1. Security Analysis and Portfolio Management – S. Kevin , PHI learning private Ltd.

**Text Book Reference:**

1. Security Analysis and Portfolio Management -J.singh, J.kaur, V. Kaushal, R. Bhatia- Kalayani publishers.

2. Security Analysis and Portfolio Management- Fischer, Jordan 6 th edition -Pearson

3. Security Analysis and Portfolio Management – Punithavathy pandian- Vikas Publishing House Pvt.Ltd

4. Investment Analysis And Portfolio Management- Prasanna Chandra- Tata MC.Graw Hill.

**Curricular Activities:**

Class room Activities: 1. Face to face Interaction in the class

3. Conduct Quiz



**Co-Curricular Activities:**

1. Books reading
2. Student seminars,
4. Assignments
5. stock market analysis

**Web links:**

1. <https://www.yourarticlelibrary.com/financial-management/concept-of-risk-return-in-portfolio-context-with-formulas/71259>
  2. <https://efinancemanagement.com/investment-decisions/portfolio-revision>
  3. <https://www.investopedia.com/articles/08/performance-measure.asp>
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**P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE:: VIJAYAWADA-10.**  
(An Autonomous college in the jurisdiction of Krishna University, Machilipatnam)

<b>Commerce</b>	<b>III B.Com (Hons) A&amp;F</b>	<b>Semester-V</b>	<b>2021-22</b>	<b>Max. Marks : 75</b>	<b>Course Code: COHSET09</b>
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**PORTFOLIO MANAGEMENT**

**Model Paper  
Section – A**

**Answer any six of the following**

**6 x 2=12**

1. Portfolio (CO1)L1
2. Portfolio risk (CO2)L1
3. Portfolio return. (CO2)L1
4. Diversification (CO2)L1
5. Optimal portfolio (CO3)L1
6. Capital market line (CO2)L1
7. Portfolio revision (CO4)L1
8. Dollar cost averaging (CO5)L1
9. Portfolio evaluation (CO5)L1
10. Differential returns (CO5)L1

**Section –B**

**Answer any four of the following**

**4 x 12=48**

11. Explain the different phases of portfolio management. (CO1)L2
12. What are formula plans? Explain the constant rupee plan with examples. (CO4)L2
13. The following data are available to you as portfolio manager: (CO3)L3

<b>Security</b>	<b>Estimated return (percent)</b>	<b>Beta</b>	<b>Standard deviation (percent)</b>
A	30	2.0	50
B	25	1.5	40
C	20	1.0	30
D	11.5	0.8	25
E	10.0	0.5	20
Market Index	15	1.0	18
Government security	7	0	0

- a. In terms of the security market line, which of the securities listed above are under-priced?
- b. Assuming that a portfolio is constructed using equal proportions of the five securities listed above, calculate the expected return and risk of such a portfolio.
14. The historical rates of return of two securities over the past ten years are given. Calculate the covariance and the correlation of the two securities. (CO2)L3

<b>Years</b>	1	2	3	4	5	6	7	8	9	10
<b>Security 1 (return percent)</b>	12	8	7	14	16	15	18	20	16	22
<b>Security 2 (return percent)</b>	20	22	24	18	15	20	24	25	22	20

15. Explain the fama's net selectivity measure. (CO5)L2
16. What are the risk adjusted return measures? Give examples. (CO5)L2

**Section –C**

Answer the following

1 x 15=15

17. Describe the Sharpe's index model. How do you interpret alpha and beta parameters in the model? (CO3)L2

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**Financial services**

<b>Semester:</b>	V	<b>Credits :</b>	<b>4</b>
Offered to	<b>B.Com(Honours) A&amp;F</b>	<b>Course Code</b>	COHSET17
Course Type	<b>Core (Theory)</b>	<b>Year of Introduction</b>	<b>2022-23</b>
<b>Year of Revision:</b>		<b>Percentage of Revision:</b>	
<b>Hours Taught</b>	75 hrs. Per Semester		
<b>Course Prerequisites (if any):</b>			

**CO1:** To create awareness about the concepts and basics of various financial services which are in a nascent and developing stage. **(PO1)PSO2**

**CO2:** Students will understand the inter-corporate loan structure and debt securitization process. **(Po4) PSO2**

**CO3:** TO Familiarize the students regarding the assistance given by merchant banking for success of any corporate business. **(Po4, Po5) PSO2**

**CO4:** Understands the stock exchange operations and the role of portfolio managers in dealing with mutual funds. **(Po4, Po5) PSO2**

**CO5:** Understands complete package of financial services well equipped with the functional aspects of financial products and services available. **(Po1, Po7) PSO2**

**Unit I: Financial services**

**15Hrs**

Financial system and markets – Nature and scope of financial services – Financial intermediation – Regulatory framework for financial services

**Unit II: Asset financing services**

**15Hrs**

Leasing – Hire-purchase – Debt securitization – Housing finance – Inter-corporate loans

**Unit III: Merchant banking services**

**15Hrs**

Issue market and other services – Corporate advisory services – Market making process – SEBI guidelines on Merchant Banking

**Unit IV: Financial market operations**

**15Hrs**

Stock exchange operations – Stock broking services – Role of portfolio managers and registrars Mutual funds – Regulations of SEBI on mutual fund operations

**Unit V: Allied financial services**

**15Hrs**

Venture capital – Insurance services – Factoring – Forfeiting – Discounting – Depository system – Custodian and custodial services – Credit rating – Credit cards

**Text Book prefer:**

1. Financial Services by Shashi K. Gupta, Nisha Aggarwal, Kalyani Publishers..

**Text Book Reference:**

1. Financial Services by Dr. Radha, Prasanna Publishers.
2. Financial Services (Indian Financial System) by B.Santhanam, Margham Publications
3. Financial Services by Dr. V.Bhuvanewari, Dr. P. Srirenganayaki, Charulatha Publications Private Limited, Edition 2020.
4. Financial Services by Sandeep Goel, PHI Publications.
5. Financial Services by Dr. P.M. Meera Mohiadeen, Nahidha Publishers.

**Curricular Activities:**

1. Face to face Interaction in the class
2. Assignments
3. Conduct Quiz

#### 4. Conduct Seminars

#### **Co-Curricular Activities:**

1. Books reading
2. Student seminars, debate
3. Field studies (individual/group)

#### **Web links:**

1. <http://vskub.ac.in/wp-content/uploads/2020/04/FINANCIAL-SERVICES-6th-Sem.pdf>
  2. [https://oms.bdu.ac.in/ec/admin/contents/86\\_16CCCM15-16CCCBM15-16CCCAC15\\_2020052303175751.pdf](https://oms.bdu.ac.in/ec/admin/contents/86_16CCCM15-16CCCBM15-16CCCAC15_2020052303175751.pdf)
  3. <https://odl.ptu.ac.in/SLM/mba/3RD/Finance/MBA%20922.pdf>
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**P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE:: VIJAYAWADA-10.**

(An Autonomous college in the jurisdiction of Krishna University, Machilipatnam)

<b>Commerce</b>	<b>III B.Com (Hons) A&amp;F</b>	<b>Semester-V</b>	<b>2021-22</b>	<b>Max. Marks : 75</b>	<b>Course Code: COHSET17</b>
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**FINANCIAL SERVICES**

**Modal Paper**

**Section – A**

**Answer any six of the following**

**6 x 2=12**

1. What is the nature of financial services? (CO1)L2
2. What is Forfeiting? (CO5)L1
3. What is meant by Hire Purchase? (CO2)L1
4. Define Financial markets (CO1)L1
5. What is meant by custodian services? (CO5)L1
6. What are the advantages of mutual funds? (CO4)L2
7. What do you mean by Inter Corporate loans (CO2)L2
8. Define Stock Exchange (CO4)L1
9. What are the categories of Merchant Bankers? (CO3)L2
10. What are the objectives of Merchant Bankers (CO3)L2

**Section –B**

**Answer any four of the following**

**4 x 12=48**

11. What is meant by leasing? Explain its various types. (CO2)L2
12. What do you mean by 'Mutual Fund'? Explain briefly the regulations of SEBI on mutual funds. (CO4)L2
13. What are SEBI guidelines on Merchant Banking? (CO3)L2
14. What is meant by debt securitization? Explain briefly the process of debt securitization. (CO2)L2
15. What do you mean by 'Financial Services'? Explain its characteristics. (CO1)L2
16. What is meant by factoring? Explain briefly about various types of factoring. (CO5)L2

**Section –C**

**Answer the following**

**1 x 15=15**

17. Write in brief some of the important pre-issue and post-issue obligations of Merchant Bankers. (CO3)L2

**P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE :: VIJAYAWADA-10.**

(An Autonomous college in the jurisdiction of Krishna University, Machilipatnam)

**Indian Financial Systems**

<b>Semester:</b>	V	<b>Credits :</b>	<b>4</b>
<b>Offered to</b>	<b>B.Com(Honours) A&amp;F</b>	<b>Course Code</b>	<b>COHSET18</b>
<b>Course Type</b>	<b>Core (Theory)</b>	<b>Year of Introduction</b>	<b>2022-23</b>
<b>Year of Revision:</b>		<b>Percentage of Revision:</b>	

<b>Hours Taught</b>	75 hrs. Per Semester		
<b>Course Prerequisites (if any):</b>			

- CO1:** To acquaint students with the structure and components of the Indian financial systems. **(Po1) PSO2**
- CO2:** Impart thorough knowledge about role of the financial markets and financial products in the competitive money market. **(Po1, Po4) PSO2**
- CO3:** Students get exposed to new financial money market implications in the existing regulatory framework. **(Po5) PSO2**
- CO4:** Analyze current trends in primary secondary capital markets and their impact on mobilizing investment capital. **(Po4, Po5) PSO2**
- CO5:** Build an idea about investors have a couple of easily accessed alternatives such as options and futures. **(Po3, Po7) PSO2**

**Unit - I: Introduction**

**15Hrs**

Meaning of financial systems-Characteristics of Indian financial system-Functions of financial system-Financial markets-Distinction between Money market and Capital market-Financial instruments-Financial intermediaries-Financial institutions

**Unit - II: Financial institutions**

**15Hrs**

Introduction -Call money markets-Participants in call money markets-Call rates-Guilt edged securities-Treasury bills-Secondary market activities-Debt Instrument features-Modifying the coupon of a bond-Asset backed securities.

**Unit - III: Money Market Instruments**

**15Hrs**

Market segments-Participants in the debt markets -Secondary markets for the debt instruments  
Corporate debt -Credit rating - Rating symbols

**Commercial paper and certificate of deposits**-Guidelines for Commercial Paper issue- Rating notches for Commercial Papers-Growth in Commercial Paper market-Stamp duty -Certificates of deposit-Repo rate-Advantages of Repo- Regulatory and Procedural aspects-Government securities act 2006 -SEBI (guidelines for disclosure and investor protection act 2000)-SEBI (issue and listing of debt securities) regulations 2008.

**Unit - IV: Capital Market**

**15Hrs**

Characteristics of capital market- Structure of capital market- Players of capital market- Primary market and secondary market- Functions of stock exchanges- Listing of Securities- Trading system in stock exchange - NSE, BSE, ISE, OTC - Share brokers- Other intermediaries -Regulation of stock exchanges-Stock market efficiency

**Unit - V: Capital Market Instruments**

**15Hrs**

Stock futures- Stock options-Index futures-Index options - SEBI guidelines for capital markets

**Text Book:**

1. Dr. S. Gurusamy, Indian Financial System, Tata McGraw Hill, 2009, 2nd Edition, New Delhi

**Reference Books:**

1. M. Y. Khan, Indian Financial Systems, Tata McGraw Hill, 2010, 6th Edition, New Delhi.
2. H.R. Machiraju, Indian Financial Systems, Vikas Publishing House, 2003, 2nd Edition, New Delhi.
3. Dr. S. Gurusamy, Indian Financial System, Tata McGraw Hill, 2009, 2nd Edition, New Delhi
4. M. Vohra, Indian Financial Systems, Vedham, 2006, 8th Edition, New Delhi..
6. Varshney and Mittal, "Indian financial System", Sultan Chand, 2008, 5th Edition, New Delhi.

### **Curricular Activities**

- ✓ Summary of an article relating to financial system taken from business line or journal
- ✓ Question and answer session
- ✓ Making files from news paper cuttings
- ✓ List of private banks and analysis of balance sheet

### **Co-curricular Activities**

- ✓ Debate and discussion
- ✓ Essay writing competition
- ✓ Quiz
- ✓ Activity club
- ✓ Video presentation

### **Websites**

<https://indianpdf.com/the-indian-financial-system-book-pdf/>

[https://books.google.co.in/books/about/The\\_Indian\\_Financial\\_System\\_Markets\\_Inst.html?id=18iJsAxmK0gC](https://books.google.co.in/books/about/The_Indian_Financial_System_Markets_Inst.html?id=18iJsAxmK0gC)

<https://india.oup.com/product/indian-financial-system-9780199479351>

<https://www.ebooknetworking.net/ebooks/indian-financial-system-my-khan.html>

<https://www.pdfdrive.com/indian-financial-system-and-management-of-financial-institutions-e42675152.html>

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<b>Commerce</b>	<b>III B.Com (Hons) A&amp;F</b>	<b>Semester-V</b>	<b>2021-22</b>	<b>Max. Marks : 75</b>	<b>Course Code: COHSET18</b>
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**Indian Financial Systems  
Model Paper**

**SECTION- A**

**Answer any SIX of the following:**

**6 X 2=12M**

1. Define Financial System. (CO1)L1
2. Financial Markets. (CO2)L2
3. Call Money Market. (CO2)L2
4. Asset backed securities. (CO2)L2
5. Corporate debt. (CO3)L1
6. Repo rate. (CO3)L1
7. NSE (CO4)L1
8. Bull (CO4)L1
9. Write any two differences between futures and options. (CO5)L2
10. What is meant call and put options? (CO5)L1

**SECTION – B**

**Answer any FOUR of the following:**

**4 X 12=48M**

11. Explain in detail about the importance of Financial System. (CO1)L2
12. What is meant by debt instruments? Explain in detail about the features of debt instruments. (CO2)L2
13. What is meant by Commercial Paper? Explain its advantages and disadvantages. (CO3)L2
14. What is meant by primary and secondary market? Explain its differences. (CO4)L2
15. Define Capital Market. Explain briefly about the characteristics of capital market. (CO4)L2
16. Discuss about the SEBI guidelines for capital markets. (CO5)L1

**SECTION -C**

**Answer the following:**

**1 X 15=15M**

17. Explain in detail about the structure of Indian Financial System. (CO1)L1
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**P.B.SIDDHARTHA COLLEGE OF ARTS &SCIENCE :: VIJAYAWADA-10.**

(An Autonomous college in the jurisdiction of Krishna University, Machilipatnam)

**Tax Planning and Management**

<b>Semester:</b>	V	<b>Credits :</b>	<b>4</b>
Offered to	<b>B.Com(Honours) TPP</b>	<b>Course Code</b>	COHSET07
Course Type	<b>Core (Practical)</b>	<b>Year of Introduction</b>	<b>2022-23</b>
<b>Year of Revision:</b>		<b>Percentage of Revision:</b>	
<b>Hours Taught</b>	75 hrs. Per Semester		
<b>Course Prerequisites (if any):</b>			

**CO1:** To build an idea about Tax evasion and tax management. (PO3) **PSO2**

**CO2:** To impart knowledge on the Tax planning of Financial decisions. (PO2,PO4) **PSO2**

**CO3:** identify the determinants of tax planning in managerial decisions. (PO2,PO4) **PSO2**

**CO4:** comprehend the knowledge about tax planning on foreign collaborations. (PO2,PO4) **PSO2**

**CO5:** build an idea about provisions for double taxation. (PO6) **PSO2**

**Unit-I: Tax Planning:**

**15hrs**

Difference between tax planning and tax avoidance – tax evasion and tax management – Tax planning with reference to setting up a New Business Form and Size – Tax Holiday, etc.

**Unit-II: Tax Planning of Financial Decisions:**

**20hrs**

Absorption, Mergers, De-mergers and Takeovers – Reorganization or Restructuring of Capital -Decisions such as Borrowing or Investment Decisions

**Unit-III: Tax Planning on Managerial decisions:**

**10hrs**

Own or lease – Make or buy decisions – Repair, replace, renewal or renovation of assets – Shut down or Continue decision.

**Unit-IV: Tax planning on foreign income:**

**15hrs**

Selling in domestic or foreign market – Avoidance of double taxation agreement – Foreign collaborations and joint ventures.

**Unit-V: Foreign Collaborations:**

**15hrs**

Incidence of tax on Domestic companies – Provisions for relief in respect of Double taxation – Double Taxation Avoidance Agreements.

**Text Book:**

1.Income Tax Law and practice by V.P. Gaur, D.B.Narang, Puja gaur,Rajeev puri

**Text Book Reference:**

1. Corporate Tax by V.P. Gaur, D.B.Narang, Puja gaur,Rajeev puri

2. Income Tax – Taxmann

3. Income Tax – Himalaya Publications

**Curricular Activities:**

1.Face to face Interaction in the class

2.listing assignments

3.Conduct Quiz

4.Conduct Seminars

5.Synchronous,asynchronous and hybrid method online

**Co-Curricular Activities:**

1. Books reading
2. Student seminars, debate
3. QUIZ program
4. Assignments
5. Field studies (individual/group)

**Web links:**

1. <https://cleartax.in/g/terms/tax-planning>
  2. <https://taxguru.in/income-tax/tax-planning-vs-tax-avoidance-vs-tax-evasion.html>
  3. <https://www.incometax.gov.in/iec/foportal/help/company/return-applicable>
  4. <https://taxguru.in/income-tax/double-tax-avoidance-agreements-taxation.html>
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**P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE:: VIJAYAWADA-10.**

(An Autonomous college in the jurisdiction of Krishna University, Machilipatnam)

Commerce	III B.Com (Hons) TPP	Semester- V	2021-22	Max. Marks : 75	Course Code: COHSET07
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**TAX PLANNING AND MANAGEMENT  
MODEL PAPER**

**Section-A**

**Answer any SIX of the following:**

**6x2=12m**

1. Tax evasion (CO1)L1
2. Tax holiday (CO1)L1
3. Amalgamation (CO2)L1
4. Take over (CO2)L1
5. Own/lease decision (CO3)L1
6. Deduction u/s 80IAC (CO3)L2
7. DTAA rates (CO4)L2
8. Meaning of joint venture (CO4)L1
9. Foreign collaboration (CO5)L1
10. Merger (CO5)L1

**Section-B**

**6x12=48M**

**Answer any FOUR of the following:**

11. What do you mean by tax planning in India? Explain features of tax planning? (CO1)L2
12. Write about tax planning with reference to setting up new business firm and size? (CO1)L2
13. Explain in detailed the tax concessions available to amalgamation company in case of amalgamation as per IT act 1961? (CO2)L2
14. What do you mean by make (or) buy decisions? What are the various Tax considerations involved in make (or) buy decisions? (CO3)L1
15. Write about tax planning on foreign market? (CO4)L1
16. What is DTAA? Explain provisions for relief in respect of DTAA? (CO5)L1

**Section-C (UNIT 3 ONLY)**

**Answer the following:**

**1x15=15m**

17. Silver ltd wants to acquire an industrial equipment costing Rs:2000000 there are two alternatives available
- i. To buy the equipment by taking a loan of Rs:2000000 repayable in five equal year and instalments together interest @14% per annum
  - ii. To take it on lease for a period of five years at annual lease rent Rs:500000 payable each year end ( take equipment at lease)

**Other information:**

- a. The tax rate applicable to company is 30% ( ignore surcharge and EC+SHE cess)
- b. The normal rate of depreciation is applicable to 15% additional depreciation at 20% on actual year equipment is also available in the first year
- c. The company has a policy of educating capital budgeting proposals at 13% discount rate
- d. Present value factor for Rs:1 @13%

Year	1	2	3	4	5
Present Values	0.885	0.783	0.693	0.613	0.543

- e. The life of asset is 5 years at end of life their will be scrap realisation (CO3)L3

**P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE :: VIJAYAWADA-10.**

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**INCOME TAX – III**

<b>Semester:</b>	V	<b>Credits :</b>	<b>4</b>
Offered to	<b>B.Com(Honours) TPP</b>	<b>Course Code</b>	COHSET13
Course Type	<b>Core (Theory)</b>	<b>Year of Introduction</b>	<b>2022-23</b>
<b>Year of Revision:</b>		<b>Percentage of Revision:</b>	
<b>Hours Taught</b>	75 hrs. Per Semester		
<b>Course Prerequisites (if any):</b>			

**CO1:** Impart knowledge on the provisions of total income of HUF (PO4) **PSO2**

**CO2:** The students may be go through the provisions of firm (PO4) **PSO2**

**CO3:** Comprehend knowledge about tax provisions of companies (PO4, PO6) **PSO2**

**CO4:** The students will be able to understand the advance tax and TDS (PO4) **PSO2**

**CO5:** Familiarize the students with powers and functions of tax authorities (PO3) **PSO2**

**UNIT –I Assessment of Individual** **20Hrs**

Computation of gross total income and deductions- Assessment of Individual (Problems)

**UNIT – II Hindu Undivided Family (HUF)** **15Hrs**

Residence of HUF-Basic conditions for assessment of HUF -Computation of total income-Tax liability (Problems).

**UNIT-III Partnership firm (Including LLP)** **20Hrs**

Features of LLP-Assessment of firm/LLP u/s184 (Problems)-Assessment of firm/LLP u/s185 (Problems)

**UNIT – IV Assessment of Association of Persons** **15 Hrs**

Rates of TAX for AOP -Scheme of AMT- Computation of Total Income of AOP -Computation of AOP Tax liability

**UNIT – V Assessment of Company.** **20Hrs**

Residential status of company-Minimum alternate tax -Computation of GTI -Computation of Total income and Tax liability

**Text Books :**

1.Income Tax Law and practice by V.P. Gaur, D.B.Narang, Puja gaur,Rajeev puri

**Text Book Reference:**

- 1.Corporate Tax by V.P. Gaur, D.B.Narang, Puja gaur,Rajeev puri
2. Income Tax – Taxmann
3. Income Tax – Himalaya Publications

**Curricular Activities:**

- 1.Face to face Interaction in the class
- 2.listing assignments
- 3.Conduct Quiz
- 4.Conduct Seminars
- 5.synchronous,asynchronous and hybrid method online

**Co-Curricular Activities:**

- 1.Books reading

2. Student seminars, debate
3. QUIZ program
4. Assignments
5. Field studies (individual/group)

**Web links:**

1. <https://incometaxmanagement.com/Direct-Taxes/AY-2021-22/assessment/1-assessment-of-an-individual.html>
  2. <https://incometaxmanagement.com/Pages/Tax-Ready-Reckoner/Assessment/Firm/What-Is-Partnership.html>
  3. <https://taxguru.in/income-tax/assessment-association-persons-body-individuals.html>
  4. <https://incometaxmanagement.com/Pages/Tax-Ready-Reckoner/Assessment/Company/Assessments-of-Company-Under-ITax-Contents.html>
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**P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE:: VIJAYAWADA-10.**

(An Autonomous college in the jurisdiction of Krishna University, Machilipatnam)

<b>Commerce</b>	<b>III B.Com (Hons) TPP</b>	<b>Semester-V</b>	<b>2021-22</b>	<b>Max. Marks : 75</b>	<b>Course Code: COHSET13</b>
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**INCOME TAX-III**

**MODEL PAPER**

**SECTION – A**

**Answer any six of the following:**

**6x2=12**

1. Assessee(CO1,L1)
2. Scheme of AMT (sec 115 JC(1)) (CO1,L1)
3. Rebate u/s 87 A (CO1,L1)
4. Meaning of HUF (CO2,L2)
5. Meaning of Partnership Firm (CO3,L1)
6. LLP (CO3,L1)
7. Book Profit (CO3,L2)
8. AOP (CO4,L2)
9. Domestic company (CO5,L1)
10. Corporate Tax(CO5,L1)

**SECTION – B**

**Answer any FOUR of the following**

**4x12=48**

**11.** Mr. I.M.Verma is the Manager of Punjab Cotton Mills Ltd. He draws a salary of Rs. 33,000 p.m. His other items of income are

- a) Interest on fixed deposit from Andhra bank Rs. 14,800 and interest credited in the savings account in the bank Rs. 12,000.
- b) Winning from lottery Rs. 60,000.
- c) Dividends from an Indian company Rs. 3,600.
- d) Long-term capital loss from Gold brought forward from the assessment year 2017-18 Rs.20, 000. The following deductions are claimed:
  - i. Life insurance premium (Policy for Rs. 1, 00,000 taken in 2005) Rs. 14,500.
  - ii. Donation for Punjabi University Rs. 5,000.
  - iii. Donation to Clean Ganga Fund set up by Central Government Rs. 5,000.
  - iv. Education of his children, Rs. 4,500.
- e) Short term capital loss Rs. 10,000.
- f) Long term capital Gain Rs. 20,000.

Compute his total income and tax payable for the assessment year 2020-21. (CO1,L4)

**12.** The following particulars have been submitted by Mr. Ram Lal in the capacity of Karta of a Hindu undivided family for assessment purposes: (CO2,L4)

- a) Profit from family's business Rs.2,50,000 after charging an amount of Rs. 60,000 given as salary to Karta's brother who has been actively participating in it.
- b) Salary income of Karta's another brother who is a manager in a Cooperative Bank, Rs. 11,000p.m.
- c) Director's fees received by Karta, Rs. 5,000. (H.U.F. holds 20% shares in this company)
- d) Bank Interest on fixed deposits Rs. 24,000.
- e) Long-term capital gain from the transfer of building, Rs. 28,000.
- f) Long-term capital gain from the transfer of investments RS. 40,000.
- g) Donation to a college which is an approved institution, Rs. 40,000.

- h) Rental value of the property let, Rs. 36,000, municipal tax paid in respect of the house, Rs.4,500.  
Interest on loan taken for repair of house is Rs. 12,000.

You are required to calculate total income and tax liability of the family for the assessment year 2020-21

13. Write about computation of Firms Business Income. ((CO3,L2)

14. From the information give below find out the Amount of Remuneration which can be Debited to P&L A/C of the firm and how much income of partners shall be chargeable to Tax under the Head profits and gains :(CO3,L4)

Salary and interest to partners has been paid as per deed.

Book profit (After debiting the following ) 40,000

Following payments have been made as per partnership deed ,  
which had been submitted along with return per the Assessment year 2012-2013

Salary to X (Working partner) 84,000

Salary to Y(Non-Working partner) 20,000

Commission to Z(Working partner) 60,000

Interest on capital to partners @ 16%

To X 12,000 To Y 9,000 To Z 6,000

15. Arun and Barun were members of AOP whose accounting year ends on 31<sup>st</sup> March every year. On 1<sup>st</sup> April 2018 Shanti (Barun's wife) joined the firm as a partner and thereafter all the three partners are entitled to share profits and losses equally. Shanti invested a sum of Rs. 2,00,000 as her capital in the firm, the sources of such investment being the gift received from her father. The other two partners have no capital in the firm. Shanti is actively engaged in the business.

Particulars	Arun	Barun	Shanti
Salary	15,000	10,000	10,000
Interest on capital	-	-	28000
Brokerage	12,000	-	12,000
Rent (for the office premises owned by him)	-	9,000	-

Arun won a prize of Rs. 10,000 in West Bengal State Lottery and a sum of Rs. 3,000 was deducted at source out of the same. Shanti holds 10,000 equity shares of a company on which a dividend of 95 paise per share was declared by the company in its Annual General Meeting held on 28<sup>th</sup> March 2019. Apart from the above, no partner has any other income whatsoever. Compute the total income of each of the partners and indicate the amounts on which they would be liable to tax respectively. (CO4,L4)

16. Write about the types of Companies under Income Tax Act. (CO5,L2)

**SECTION – C (UNIT- V)**

Answer the following

1x15=15

17. Ashwani Pvt. Ltd., Company Furnish the following information:

Particulars	Amount
Interest on securities (computed)	10,000
Income from House Property (computed)	20,000
(a) Textile manufacturing:	
Profit as per Statement of profit and loss before depreciation	
Depreciation	2,00,000
(b) Hosiery manufacturing:	
Profit as per Statement of Profit and Loss before depreciation	
Depreciation	75,000
Agency business Loss brought forward from 2017-18	18,000
Income from other sources	15,000
Book Profits u/s 115JB= Rs. 7,00,000	25,000

Compute the total income and tax liability under MAT for the assessment year 20120-21. (CO5,L4)

**P.B.SIDDHARTHA COLLEGE OF ARTS &SCIENCE :: VIJAYAWADA-10.**

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**CUSTOMS**

<b>Semester:</b>	V	<b>Credits :</b>	<b>4</b>
Offered to	<b>B.Com(Honours) TPP</b>	<b>Course Code</b>	COHSET14
Course Type	<b>Core (Practical)</b>	<b>Year of Introduction</b>	<b>2022-23</b>
<b>Year of Revision:</b>		<b>Percentage of Revision:</b>	
<b>Hours Taught</b>	75 hrs. Per Semester		
<b>Course Prerequisites (if any):</b>			

**CO1:** To impart the knowledge and best practices in corresponding to trade appliance at customs (PO6)**PSO2**

**CO2:** Acquaint how to know the valuation of customs (PO1) **PSO2**

**CO3:** Students will be able to understand the import and export documentation (PO3) **PSO2**

**CO4:** Impart knowledge on the provisions for assessment of customs (PO1) **PSO2**

**CO5:** Familiarize the students with regard to authorities of customs (PO5) **PSO2**

**Unit –I: Customs Act**

**15 Hours**

Salient features of Customs Act 1962 – Definitions: Adjudicating authority – Assessment Bill of entry , Bill of Export - customs area, Customs port - customs airport, Dutiable goods - export Exporter, Import – Importer – India – Types of Duties - Basic customs duty Surcharge on Basic customs duty, Special Additional duty o of customs, Additional or countervailing duty.

**Unit –II: Valuation of Goods**

**10 Hours**

Value for the purpose of Customs Act – Tariff Value – Customs value as per section 14(1) Major requirements of Customs value – Customs value Inclusions and Exclusions.

**Unit –III: Export &Import of Goods**

**15 Hours**

Prohibition of Export and Import of goods – provisions regarding notified and specified goods – Import Procedures – Export Procedures – Clearance of goods for exportation - Clearance of goods for home consumption - Clearance of goods for ware housing - Ex bond clearance.

**Unit –IV: Assessment**

**10 Hours**

Assessment -Provisional assessment – Date for determination of rate of duty and Tariff valuation of imported and exported goods –Demand of Customs duty -Refund of duty.

**Unit –V: Administration**

**6 Hours**

Customs authorities Administrative set up – Power to grant exemption from duty -Remission of duty – Powers of customs Officers to inspect -Power to stop and inspect conveyance - Power of search -Seizure - Confiscation.

**BOOKS RECOMMENDED:**

1. Indirect Taxes By : V.S.Datey Taxmann Publication (P) Ltd., New Delhi.
2. Indirect Taxation :V.BalaChandran Sultan Chand & sons -New Delhi.



**P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE:: VIJAYAWADA-10.**

(An Autonomous college in the jurisdiction of Krishna University, Machilipatnam)

Commerce	III B.Com (Hons) TPP	Semester-V	2021-22	Max. Marks : 75	Course Code: COHSET14
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**CUSTOMS**

**MODEL PAPER**

**SECTION - A**

**Answer any SIX of the following.**

**6 x 2 = 12 Marks**

1. Dutiable goods (CO1, L1)
2. Customs port (CO1, L1)
3. Tariff value (CO2, L1)
4. Customs value (CO2, L1)
5. Prohibition of export goods (CO3,L1)
6. Ex bond clearance (CO3, L1)
7. Provisional assessment (CO4, L1)
8. Refund of duty (CO4, L1)
9. Remission of duty (CO5, L1)
10. Confiscation (CO5, L1)

**SECTION - B**

**Answer any FOUR of the following.**

**4 x 12 = 48 Marks**

11. Explain various types of duties under Customs Act. (CO1, L1)
12. What are the inclusions and exclusions in Customs Value? (CO2, L2)
13. Explain the procedure for export under Customs Act. (CO3, L1)
14. Explain various types of Assessments. (CO4, L1)
15. Discuss the Procedures and provisions relating to claim of refund of Customs duty paid in excess under Customs Act 1962 (CO4, L2)
16. Explain power to grant exemption from duty. (CO5, L1)

**SECTION - C**

**Answer the following.**

**1 X15 = 15 Marks**

17. Explain the powers of Customs Officers. (CO5, L1)
-

**P.B.SIDDHARTHA COLLEGE OF ARTS &SCIENCE :: VIJAYAWADA-10.**  
(An Autonomous college in the jurisdiction of Krishna University, Machilipatnam)

**MANAGING BUSINESS PROCESSES – II**

<b>Semester:</b>	V	<b>Credits :</b>	<b>4</b>
Offered to	<b>B.Com-BPM</b>	<b>Course Code</b>	COHSET16
Course Type	<b>Core (Theory)</b>	<b>Year of Introduction</b>	<b>2022-23</b>
<b>Year of Revision:</b>		<b>Percentage of Revision:</b>	
<b>Hours Taught</b>	75 hrs. Per Semester		
<b>Course Prerequisites (if any):</b>			

**COURSE OUTCOMES:**

After completion of the course the students will be able to

**CO1:** Illustrate the process solving steps by using 5 whys technique.

**CO2:** Compare and contrast the utility of each of the 7 Quality control tools with other

**CO3:** Justify the adoption of Six sigma project methodology as quality control

**CO4:** Evaluate the applicability and implication of Lean tools in pull and push system for process improvements

**CO5:** Devise a plan for risk management of Business process and Business continuity plan.

**Module 1: Problem Solving Techniques 10 Hrs**

Process solving steps –Why analysis – Benefits – Significance -Steps to complete the 5 whys – Failure mode and effects analysis.

**Module 2: Tools for Problem Solving 10 Hrs**

7QC Tools for simple problem solving – Histograms- Cause and Effect diagram - Check sheets - Pareto diagrams – Graphs- Control charts– Scatter diagram.

**Module 3: Process Improvements – Six Sigma 15 Hrs**

Six sigma methodology overview – Six sigma organization - Six sigma project methodology. **Module 4:**

**Process Improvements – Lean 15 Hrs**

Introduction to lean – Lean evolution – Principles – 8 Types of waste (TIMWOODS) – Kaizen - Lean tools – Value stream mapping – Poke yoke – Difference between pull system and push system – 5S principles.

**Module 5: Risk Management 10 Hrs**

Introduction to quality management – Risk factors – Information security awareness – Fraud management – Password and identity management – Business continuity plan.

**Text books**

- ✓ Business Process Management A Concise Study by KELKAR, S. A., PHI Learning
- ✓ Managing Business Process Flows, by **Anupindi**, published by Pearson education
- ✓ Hand book on Operations Management - Part II for Business Process Services

**Books for Reference:**

- ❖ Craig Gygi, Bruce Williams, “Six Sigma for Dummies”, John Wley and Sons, NewDelhi.
- ❖ Khanna R.B, “Production and Operation Management”, PHI Learning PvtLtd, NewDelhi.

- ❖ Mahadevan.B, “Operation Management Theory and Practice”, Pearson Education, NewDelhi.
- ❖ Mukherjee P.N and KachwalaT.T, “Operation Management and Production Techniques”, PHI Learning PvtLTd, NewDelhi
- ❖ Business Process Management by Mathias Weske, published by Springer
- ❖ Business Process Management and Decision Support Systems by **Quazi Khabeer**
- ❖ Business Process Management: Practical Guidelines to Successful Implementations **4th Edition, by John Jeston, Amazon**
- ❖ The Ultimate Guide to Business Process Management: Everything you need to know and how to apply it to your organization Paperback – by Theodore Panagacos

### Curricular Activities

- ✓ Paper presentation
- ✓ Latest processes in software and logistics and supply chain organizations
- ✓ Collect latest data from websites
- ✓ Discussions on latest trends in processing

### Co-curricular Activities

- ✓ Debate and discussion
- ✓ Essay writing competition
- ✓ Quiz
- ✓ Activity club
- ✓ Video presentation

### Weblinks

- <https://www.process.st/wp-content/uploads/2017/03/The-Complete-Guide-to-Business-Process-Management.pdf>
  - <https://cwiki.apache.org/confluence/display/OFBIZ/Business+Process+Reference+Book>
  - <https://www.techtarget.com/searchcio/definition/business-process-management>
  - <https://www.routledge.com/Business-Process-Management/Kumar/p/book/9781138181854>
-

**P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE:: VIJAYAWADA-10.**

(An Autonomous college in the jurisdiction of Krishna University, Machilipatnam)

<b>Commerce</b>	<b>III B.Com (Hons) BPM</b>	<b>Semester-V</b>	<b>2021-22</b>	<b>Max. Marks : 75</b>	<b>Course Code: COHSET16</b>
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**MANAGING BUSINESS PROCESSES – II**  
**Modal Paper**

**Section – A**

**Answer any six of the following**

**6 x 2=12**

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.
- 9.
- 10.

**Section –B**

**Answer any four of the following**

**4 x 12=48**

- 11.
- 12.
- 13.
- 14.
- 15.
- 16.

**Section –C**

**Answer the following**

**1 x 15=15**

- 17.
-

**P.B.SIDDHARTHA COLLEGE OF ARTS &SCIENCE :: VIJAYAWADA-10.**

(An Autonomous college in the jurisdiction of Krishna University, Machilipatnam)

**CAPITAL MARKETS FOR BUSINESS PROCESS SERVICES**

<b>Semester:</b>	V	<b>Credits :</b>	<b>4</b>
Offered to	<b>B.Com-BPM</b>	<b>Course Code</b>	COHSET11
Course Type	<b>Core (Theory)</b>	<b>Year of Introduction</b>	<b>2022-23</b>
<b>Year of Revision:</b>		<b>Percentage of Revision:</b>	
<b>Hours Taught</b>	75 hrs. Per Semester		
<b>Course Prerequisites (if any):</b>			

**COURSE OUTCOME: After completion of the course the students will be able to**

**CO1:** Illustrate the functioning of capital market in India and its requirements of Business process services. T4

**CO2:** Select a set of capital market instruments on the basis of merit of case. T4

**CO3:** Design a hedging strategy for managing risk of stocks of Capital market by using Derivatives. T6

**CO4:** Illustrate the stages of Trade cycle and process involved in mutual Funds

**CO5:** Explain the stages of Trade cycle and process involved in Investment banking

**Module 1: Financial Markets and Trade**

**8 Hrs**

Meaning of capital market – Importance of capital market-Capital market in India- Market types – Primary and secondary market – OTC vs Exchange markets- Participants in a trade - Trade life cycle - Business process in TLC - Parties involved in TLC - Role of the process - Master agreement - Order management - Trade execution - Overview of regulators and important regulations.

**Module 2: Capital Market Instruments**

**10 Hrs**

Meaning of securities – Types of securities - Equities - Types of equity - Preference stock - Warrants - Leaps and Lepo - Types of capital - debt / equity - Cost of capital – Fixed income and govt. securities - Introduction and features - Classification - Cash flow pattern - Interbank money market - Repo and types - Security borrowing. Types of securities and markets - Bankers acceptance - US treasuries - Bond types and interest types - Inverse and super floater - Euro currency market - Types of ratings – Concept of interest calculation - Simple vs compounding - Day count basis - Risk free rate.

**Module 3: Derivatives and Risk Management in Capital Markets**

**12 Hrs**

Meaning of derivatives – Basics on derivatives -Growth of derivatives market - Accounting definition - Leverage - Asset classes - General types - Market risk - speculation - Pricing principles – Hedging and speculation - Forward - Hedging - Speculation - Performance caselet – Futures strategies - Future - Quotations and terminologies - Trade guarantee - Margining - Span mechanism – EFRP – Swaps - CFD - Swap Vs Other Derivatives - Application of IRS - Currency swaps– Options - Option styles, Exposures, Pay offs - Non Linear and Linear - FX Option. Introduction – Types of risk - Settlement and clearing - Counterparty credit risk management – Assessment of credit risk - Market risk management – Sovereign and counterpart risk.

**Module 4: Mutual Funds****15 Hrs**

Mutual fund objectives and industry players - Responsibilities of fund accountant - Fund expenses - NAV and components - Benefits of mutual funds – Transfer agency - Overview of transfer agency - TA activities ,processing and systems – Workflow – Meaning of hedge funds - Overview and structure - Types and classification - Understanding hedge funds - Hedge fund strategies - Hedge funds vs Mutual funds. Meaning of private equity - Understanding private equity operations - Fund accounting and NAV calculations - Direct private equity funds - Role of private equity - Fund of fund and structure - Realization and investors in private equity - Private equity vs hedge funds - Performance reporting - reconciliations in asset management.

**Module 5: Basics of Investment Banking****15 Hrs**

Meaning of investment banking - Trade life cycle - Trade capture and booking - trade enrichment - Confirm / affirm / match - Allocation and reporting - Position reconciliation - Mark to market and margining – Clearing and settlement - Clearing - Novation in clearing - Netting - Settlement - Physical and cash settlement - Early termination and post settlement - Statics data - Security identifier – Securities lending - Legalities in security lending – Stockloan fees - Prime brokerage - Global custody services - Risk management , advisory services and consulting services - Collateral management – Need for collateral management - Multiple complex and interrelated functions – Corporate actions - Mandatory - Dividends - Stock splits - Spin offs - Mergers and acquisitions - Return of capital - Voluntary - Rights exercise - Tender offer - Corporate actions : How they affect securities Text Book Hand Book on Capital Markets for Business Process Services

**Text Books:**

1. Hand Book on Capital Markets for Business Process Services
2. S Kevin, PHI Learning Pvt Ltd

**Reference books:**

- ✓ Bharathi V. Pathak, “The Indian Financial System”, Dorling Kindersley (India) Pvt. Ltd, South Asia.
- ✓ Gurusamy S, “Capital Markets”, Margham McGraw-Hill Education (India) Pvt. Ltd, Uttar Pradesh.
- ✓ Maheshwari. S. N, “Elements of Financial Management”, Sultan Chand and Sons, New Delhi.

**Curricular Activities:**

1. Visit to Companies
2. Workshops on Online Trading

**Co-Curricular Activities:**

1. Quiz Programs
  2. Seminars
  3. Group Discussions on problems relating to topics covered by syllabus
  4. Examinations (Scheduled and surprise test)
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**P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE:: VIJAYAWADA-10.**

(An Autonomous college in the jurisdiction of Krishna University, Machilipatnam)

<b>Commerce</b>	<b>III B.Com (Hons) BPM</b>	<b>Semester-V</b>	<b>2021-22</b>	<b>Max. Marks : 75</b>	<b>Course Code: COMSET11</b>
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**CAPITAL MARKETS FOR BUSINESS PROCESS SERVICES**

**Modal Paper**

**Section – A**

**Answer any six of the following**

**6 x 2=12**

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.
- 9.
- 10.

**Section –B**

**Answer any four of the following**

**4 x 12=48**

- 11.
- 12.
- 13.
- 14.
- 15.
- 16.

**Section –C**

**Answer the following**

**1 x 15=15**

- 17.
-

**P.B.SIDDHARTHA COLLEGE OF ARTS &SCIENCE :: VIJAYAWADA-10.**

(An Autonomous college in the jurisdiction of Krishna University, Machilipatnam)

**Supply Chain Management**

<b>Semester:</b>	V	<b>Credits :</b>	<b>4</b>
Offered to	<b>B.Com-BPM</b>	<b>Course Code</b>	COHSET12
Course Type	<b>Core (Theory)</b>	<b>Year of Introduction</b>	<b>2022-23</b>
<b>Year of Revision:</b>		<b>Percentage of Revision:</b>	
<b>Hours Taught</b>	75 hrs. Per Semester		
<b>Course Prerequisites (if any):</b>			

**Course Outcomes**

After completion of the course, the students will be able to:

**CO1:** Compare and contrast the forms of business organization, types of Outsourcing and its consistency with the Supply Chain and Lean Supply Chain in BPS.

**CO2:** Evaluate the role of each component of Supply Chain Management, Life Cycle and Technology in Supply Chain and Contract Management.

**CO3:** Relate the impact of Sales order management & its operational nature on after sales market services.

**CO4:** Develop a Master Data Management in consistent with Technology and its Operational Nature.

**CO5:** Select the type of Logistics, Fleet and Warehouse Management in alignment with SCM objectives on par with recent Technology

**Unit 1: Introduction to Supply Chain Management**

**15 Hrs**

Basics of Business, Outsourcing: Concept of Business. Types of Business Organizations (Brief). Business Partnerships. Types of BPS's. Classification & Domain of BPS. Future Scope & Challenges. Concept of Lean Supply Chain Management. SCM in BPS. Merits & Demerits of on various BPS Options. Evolving of Outsourcing. Need for Outsourcing Horizontal Services. Current trend in SCM Outsourcing. Overview to SCM: Features of SCM. Supply Chain Structure. Importance of supply chain in business. Supply Chain Elements & Phases. Process Views of Supply Chain. Technology Intervention in Supply Chain. Upstream & downstream concepts. Supply Chain Functions. SCM offerings.

**Unit 2: Sourcing, Procurement & Contract Management**

**15 Hrs**

Supply Chain Sourcing & Procurement: Sourcing & Types of Sourcing. Components of Sourcing (Spend Analysis, RFX, and Auction Contract). Sourcing Requirement. Procurement practice & Lifecycle. Purchasing Cycle. Receiving & Analysing Purchase requirements. Establishing Specifications. Technology Intervention in Sourcing & procurement. Contract Management: Legal binding. Creation of contract. Negotiation, Approval, Execution, Amendments, Technology Interventions in contract management.

**Unit 3: Sales Order Management & Operations**

**15 Hrs**

Supply Chain Market Sales Services: Concept of After-sales market service requirement. Incident management. Warranty eligibility. Annual maintenance contract. Return material authorization. Parts management. Logistics Involvement. Sales Order Management: Concept. Objectives. Order quotation, acceptance, entry, administration, & order fulfilment. Major Operational Challenges in SOM. Application of Tools & best practices in SOM. Logistics.

**Unit 4: Master Data Management**

**15 Hrs**

Concept, Purpose & benefits of Master Data. Types of Data Management (Item, Customer, Vendor & Supplier). Data On-boarding. Data Cleansing with maintenance. Technology Interventions in MDM. Challenges in Master Data. Responsibilities & Automated Maintenance. Data Stewardship. Data Governance. Key elements.



**Unit 5: Logistics & Warehouse Management****10 Hrs**

Concept of Logistics Fleet. Types of fleet in goods transportation. Warehouse Management: Concept, Functions & Importance of efficient WRM. Operational Challenges in Logistics fleet & WRM. Technology Intervention in Logistics Fleet and Warehouse Management (Application of Information systems like Warehouse management system (WMS), Transport Management System (TMS), Distribution Management system (DMS) etc). Application of Block Chain Technology.

**Books for Reference:**

- TCS reference Material
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**P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE:: VIJAYAWADA-10.**

(An Autonomous college in the jurisdiction of Krishna University, Machilipatnam)

<b>Commerce</b>	<b>III B.Com (Hons) BPM</b>	<b>Semester-V</b>	<b>2021-22</b>	<b>Max. Marks :</b> <b>75</b>	<b>Course Code:</b> <b>COHSET12</b>
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**SUPPLY CHAIN MANAGEMENT**

**Modal Paper**

**Section – A**

**Answer any six of the following**

**6 x 2=12**

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.
- 9.
- 10.

**Section –B**

**Answer any four of the following**

**4 x 12=48**

- 11.
- 12.
- 13.
- 14.
- 15.
- 16.

**Section –C**

**Answer the following**

**1 x 15=15**

- 17.
-

**P.B.SIDDHARTHA COLLEGE OF ARTS &SCIENCE :: VIJAYAWADA-10..**

(An Autonomous college in the jurisdiction of Krishna University, Machilipatnam)

**E COMMERCE**

<b>Semester:</b>	VI	<b>Credits :</b>	<b>4</b>
Offered to	<b>B.Com(General )</b>	<b>Course Code</b>	COHSET03
Course Type	<b>Core (Theory)</b>	<b>Year of Introduction</b>	<b>2022-23</b>
<b>Year of Revision:</b>		<b>Percentage of Revision:</b>	
<b>Hours Taught</b>	75 hrs. Per Semester		
<b>Course Prerequisites (if any):</b>			

**CO1:** Students understand the mechanism of E- commerce (PO5) (PSO1)

**CO2:** Students themselves equip specialization in website designing for E-Commerce (PO5) (PSO1)

**CO3:** Students are able to enhance their skills in operational services of E-Commerce (PO5) (PSO1)

**CO4:** Students are able to involve in activities of E-Commerce (PO5) (PSO1)

**CO5:** Students are able to create awareness among the public one commerce activities (PO5) (PSO1)

**UNIT 1: Introduction, Nature and Scope**

Introduction- Definition –importance- Nature and scope of e commerce-Advantages and limitations-Types of ecommerce – B2B,B2C,C2B,C2C,B2A,C2A- Framework e commerce

**UNIT 2:- Environmental and Technical support Aspects**

Technical Components- Internet and its component structure-Internet Vs Intranet, Vs Extranet and their differences-Website design- its structure-designing, developing and deploying the system-

**UNIT 3. –Security and Legal Aspects**

Security environment –its preliminaries and precautions-protecting Web server with Firewalls-Importance of Digital Signature –its components – Cyber Law-Relevant Provisions of IT Act 2000.

**UNIT 4. - Operational Services of e Commerce**

E retailing –features- E Services-Banking, Insurance, Travel, Auctions, Learning, Publication and Entertainment-Payment of utilities (Gas, Current Bill, Petrol Products)- On Line Shopping (Amazon, Flip kart, Snap deal etc.)

**UNIT 5.–E Payment System**

Types of e payment system- its features-Digital payments (Debit Card/Credit Cards, Internet Banking, Mobile wallets- Digital Apps (unified Payment Services-Phone Pay, Google Pay, BHIM Etc.) Unstructured Supplementary Services Data (Bank Prepaid Card, Mobile banking)-

**Text Books:**

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1. Bharat Bhaskar , Electronic Commerce Framework, Technology and Application.  
McGraw Hill Education

**References:**

1. Bajaj,D.Nag,E Commerce, Tata McGraw Hill Publication
2. Whitely David , E-Commerce, McGraw Hill
3. TN Chhabra ,E Commerce, Dhanapat Rai & Co
4. Dave Chaffey, E Business and E Commerce Management, Pearson Publication
- 5.Dr.Pratikumar Prajapati, Dr.M.Patel, E Commerce , Redshine Publication

**Suggested Co-Curricular Activities**

- 1 Assignments (including technical assignments like volume of business operated through e commerce, Case Studies of problems raised at the time of e commerce
  2. Seminars, Conferences, discussions by inviting concerned institutions
  3. Conduct surveys on pros and cons of ecommerce
  4. Invited lectures and presentations on related topics by field experts.
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**P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE:: VIJAYAWADA-10.**  
(An Autonomous college in the jurisdiction of Krishna University, Machilipatnam)

<b>Commerce</b>	<b>III B.Com (Hons)</b>	<b>Semester-V</b>	<b>2021-22</b>	<b>Max. Marks : 75</b>	<b>Course Code: COHSET03</b>
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**E COMMERCE**  
**Modal Paper**

**Section – A**

**Answer any six of the following**

**6 x 2=12**

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.
- 9.
- 10.

**Section –B**

**Answer any four of the following**

**4 x 12=48**

- 11.
- 12.
- 13.
- 14.
- 15.
- 16.

**Section –C**

**Answer the following**

**1 x 15=15**

- 17.
-

**P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE :: VIJAYAWADA-10..**

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**E FILING**

<b>Semester:</b>	V	<b>Credits :</b>	<b>4</b>
Offered to	<b>B.Com(Hons )</b>	<b>Course Code</b>	COHSET04
Course Type	<b>Core (Theory)</b>	<b>Year of Introduction</b>	<b>2022-23</b>
<b>Year of Revision:</b>		<b>Percentage of Revision:</b>	
<b>Hours Taught</b>	75 hrs. Per Semester		
<b>Course Prerequisites (if any):</b>			

**CO1:** Students are able to understand and apply basic knowledge of Indian Tax System (PO5) (PSO1)

**CO2:** Students will equip themselves in specialization in taxation system (PO5) (PSO1)

**CO3:** Students will enhance their skills in presenting returns (PO5) (PSO1)

**CO4:** Students are able to involve in activities of chartered accountants for filing returns (PO5) (PSO1)

**CO5:** Students will get awareness on how to file returns of Income Tax and GST (PO5) (PSO1)

**UNIT 1: Introduction, Nature and Scope**

Introduction- Definition –importance and scope of returns--Types of Assesses –under Income Tax and Goods and Service Tax-Sources of income-

**UNIT 2:- Returns filing under Income Tax**

Types of Returns- Mode of filing-Manual-Electronic Bureau of Internal Revenue Form (eBIR) Electronic Filing and Electronic and Payment System (eFPS)-for Individuals- ITR1, ITR2, ITR3, ITR4, For Firms and Companies ITR5, ITR6, ITR7.

**UNIT 3: –Penalties and Prosecution under Income Tax**

Nonpayment, failure to comply,-Concealment-, Book Audit, Loans-International transactions, TDS

**UNIT 4:-Returns filing under Goods Service Tax**

GSTR1, GSTR2, GSTR2A, GSTR3B, GSTR4, GSTR5, GSTR6

**UNIT 5.–Penalties and Prosecution under GST**

Differences between fees and penalty-Types of penalties under section 122 to 138

**Text Books:**

1. Varun Panwar ,Jyothi Mahajan Introduction to efilig returns MKM Publishers

**References:**

1. Hemachandjain and H.N.Tiwari Computer Application in Business Taxman’s Publication

2. SusheelaMadan Computer Application in Business MKM Publishers

Co-Curricular Activities

- Training of students by a related field expert.

- Assignments (including technical assignments like collection of submitted returns of various organizations, Case Studies of problems raised at the time of submission of returns.
- Seminars, Conferences ,discussions by inviting concerned institutions
- Visits to local chartered Accountants to expose the practical filing procedure
- Invited lectures and presentations on related topics by field experts.

**P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE:: VIJAYAWADA-10.**

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<b>Commerce</b>	<b>III B.Com (Hons)</b>	<b>Semester-V</b>	<b>2021-22</b>	<b>Max. Marks : 75</b>	<b>Course Code: COHSET04</b>
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**E FILING**  
**Section – A**

**Answer any six of the following**

**6 x 2=12**

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.
- 9.
- 10.

**Section –B**

**Answer any four of the following**

**4 x 12=48**

- 11.
- 12.
- 13.
- 14.
- 15.
- 16.

**Section –C**

**Answer the following**

**1 x 15=15**

- 17.
-

**P.B.SIDDHARTHA COLLEGE OF ARTS &SCIENCE :: VIJAYAWADA-10..**

(An Autonomous college in the jurisdiction of Krishna University, Machilipatnam)

**STOCK MARKETS**

<b>Semester:</b>	V	<b>Credits :</b>	<b>4</b>
Offered to	<b>B.Com(Hons )</b>	<b>Course Code</b>	COHSET05
Course Type	<b>Core (Theory)</b>	<b>Year of Introduction</b>	<b>2022-23</b>
<b>Year of Revision:</b>		<b>Percentage of Revision:</b>	
<b>Hours Taught</b>	75 hrs. Per Semester		
<b>Course Prerequisites (if any):</b>			

By the completion of the course, the students will be able to

**CO1:** Expose to theory and functions of the Share Market in Financial Sector as job careers

**CO2 :**Study the functioning of capital markets and create awareness among the public

**CO3:**Acquire knowledge on operations of Share Market and Research skills

**CO4 :**Involvement in activities of Mutual Funds and stock market firms

**CO5 :**Enhance their skills by practicing in preparation of accounting statements

**UNIT 1: Introduction, Nature, Scope and basics of stock market**

Introduction of Investments-Need of Investment-Short and Long Term investment- Money market Vs Capital Market-Primary Market-Secondary Market-Depositories-Buy Back Shares- Forward Contract and Future Contract- Types of Investors- Speculators, Hedgers, Arbitrators.

**UNIT 2: Capital Markets**

Definition-Participants of Capital Market Participants-Primary Market issues of Equity Shares and Preference Shares and Debentures its types Mutual Funds –Secondary Market-/Stock Exchange-National Stock Exchange of India-Over the Counter Exchange of India –Qualified Individual/Institutional Buyers -Under writers.

**UNIT 3. - Financial Intermediaries**

Depositories- -Buy Back of Shares-- Forward Contract and Future Contract- differences –Participants in Future Contract- Clearing of Mechanism.

**UNIT 4. Stock Indices**

Index and its types-SENSEX- Calculation Methodology-Types of Clearing Members.

**UNIT 5. –Regulatory Mechanism**

Security and Exchange Board of India (SEBI)-Powers, functions,-Over The Counter Exchange (OTCE) of India-Functions and Mechanism.

Text Book

1. I.M.Pandey. ,Financial Management, Vikas Publishing House

**References:**

1. Prasanna Chandra, Fincial Management TaTa Mc GrawL



2. Bhole.L.M. Financial Markets and Institutions, Tata McGraw Hill Publishing House

3. Khan MY, Jain PK, Financial Management, Tata McGraw Hill

### **Co-Curricular Activities:**

**A. Mandatory** (student training by teacher in real time field skills: 10 hours):

- 1. For Teachers: Training** of students by the teacher (using actual field material) in classroom and field for not less than 10 hours on techniques in valuation of shares of selected companies, preparation of documents, identification of local individuals / institutions who are involved in share markets. Listing out Local Money Market institutions, Identifying the investors and their experience in operational activities  
Analysis of various companies Financial Statements and interpretations
- 2. For Students:** Students shall individually study the work of stock market professionals and agencies and make observations. Their observations shall be written as the Fieldwork/Project work Report in the given format not exceeding 10 pages and submit to the teacher.
- 3.** Max marks for Fieldwork/Project work Report: 05.
- 4.** Suggested Format for Fieldwork/Project work (not more than 10 pages): Titlepage, student details, contents, objectives, step-wise work done, findings, conclusions and acknowledgements.
- 5.** Unit tests (IE).

### **B. Suggested Co-Curricular Activities**

1. Training of students by a related field expert.
  2. Assignments (including technical assignments like identifying the investors and their activities in share markets)
  3. Seminars, Conferences, discussions by inviting concerned institutions
  4. Visits to local Investment Institutions, offices,
  5. Invited lectures and presentations on related topics by field experts.
-

**P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE:: VIJAYAWADA-10.**

(An Autonomous college in the jurisdiction of Krishna University, Machilipatnam)

<b>Commerce</b>	<b>III B.Com (Hons)</b>	<b>Semester-V</b>	<b>2021-22</b>	<b>Max. Marks : 75</b>	<b>Course Code: COHSET05</b>
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**Stock Markets**

**Time: 3Hrs**

**Max Marls: 75**

**Section – A**

**Answer any six of the following**

**6 x 2=12**

- 1.
- 2.
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- 4.
- 5.
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- 9.
- 10.

**Section –B**

**Answer any four of the following**

**4 x 12=48**

- 11.
- 12.
- 13.
- 14.
- 15.
- 16.

**Section –C**

**Answer the following**

**1 x 15=15**

- 17.
-

**P.B.SIDDHARTHA COLLEGE OF ARTS &SCIENCE :: VIJAYAWADA-10..**

(An Autonomous college in the jurisdiction of Krishna University, Machilipatnam)

**STOCK MARKETS ANALYSIS**

<b>Semester:</b>	V	<b>Credits :</b>	<b>4</b>
Offered to	<b>B.Com(Hons)</b>	<b>Course Code</b>	COHSET06
Course Type	<b>Core (Theory)</b>	<b>Year of Introduction</b>	<b>2022-23</b>
<b>Year of Revision:</b>		<b>Percentage of Revision:</b>	
<b>Hours Taught</b>	75 hrs. Per Semester		
<b>Course Prerequisites (if any):</b>			

By the completion of the course, the students are able to

CO1:Expose to theory and functions of the monetary and Financial Sector as job careers

CO2:Study the functioning of local Capital markets and

CO3:Create awareness among the public by giving reporting after analysis

CO4:Acquire knowledge on operations of Share Market and Research skills

CO5:Enhance their skills by involving activities of Share Market analysis

**UNIT 1: Introduction, Nature, Scope and basics of stock market analysis** Introduction of Investments- Need of Security Analysis-Types of analysis-Fundamental Analysis, Technical Analysis, Quantity Analysis.

**UNIT 2:Fundamental Analysis**-Based on Company's Records and Performance-EPS Ratio-Price to Sales Ration-P/Earnings Ratio, P/Equity Ratio, ROI,D/P Ratio- Intrinsic Value-

**UNIT 3. –Technical Analysis**- Based on Share Price Movement and Market Trends-Bullish Pattern-Bearish pattern

**UNIT 4-Quantity Analysis:** Based on data for special Research purpose (Descriptive, Correlation, Comparative and Experimental) by preparing questionnaire, observation, focus groups and interviews – Dow Theory

**UNIT 5. –Mutual Funds**

Importance and the role of Mutual Fund –Types of Mutual Funds-Variou schemes in India- Growth Fund, Income Fund, Growth and Income Fund, Tax planning schemes ,other categories,Asset Management Mutual Funds-its method of analysis's

Text Book

1. Khan.M.Y. Financial Management, Vikas Publishing House

### III. References:

1. Bhole.L.M. Financial Markets and Institutions, Tata McGraw Hill Publishing House
2. Prasanna Chandra, Investment Analysis and Portfolio Management, Tata McGraw Hill
3. Damodharan Aswath, Valuation: Security Analysis for Investment and corporate Finance., John Wiley, New York
4. Francis.J.C., Investment Analysis and Management, Tata McGraw Hill
- 6 Web resources suggested by the Teacher concerned and the College Librarian including reading material

### Co-Curricular Activities:

**B. Mandatory:** (student training by teacher in real time field skills: 10 hours)

1. **For Teachers:** Training of students by the teacher (using actual field material) in classroom and field for not less than 10 hours on Security Markets analysis, preparation of documents and Analysis of Shares and debentures, Fundamental Analysis of various companies Financial Statements and interpretations, Technical Analysis of Various Financial Statements, Quantity Analysis of various companies Financial statements and interpretations, Analysis of Mutual fund operations and their performances  
Case Studies of various companies' performances based on analysis of their securities and the success stories of investors.
2. **For Students:** Students shall individually study the data of selected institutions and their performance by analyzing the statements learning from practical experiences from Chartered Accountants and Cost Accountants. They shall record their observations in a hand written Fieldwork/Project work report not exceeding 10 pages in the given format and submit to the teacher.
3. Max marks for Fieldwork/Project work Report: 05.
4. Suggested Format for Fieldwork/Project work Report (not more than 10 pages): Title page, student details, contents, objective, step-wise work done, findings, conclusions and acknowledgements.
5. Unit tests (IE).

### B. Suggested Co-Curricular Activities

1. Training of students by a related field expert.
  2. Assignments (including technical assignments like identifying sources of local financial institutions,
  3. Seminars, Conferences, discussions by inviting concerned institutions
  4. Visits to local Financial Institutions like HDFC securities, ICICI Direct Securities Reliance Securities etc.
  5. Invited lectures and presentations on related topics by field experts.
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**P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE:: VIJAYAWADA-10.**

(An Autonomous college in the jurisdiction of Krishna University, Machilipatnam)

<b>Commerce</b>	<b>III B.Com (Hons)</b>	<b>Semester-V</b>	<b>2021-22</b>	<b>Max. Marks :</b> <b>75</b>	<b>Course Code:</b> <b>COHSET06</b>
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**STOCK MARKETS ANALYSIS**

**Section – A**

**Answer any six of the following**

**6 x 2=12**

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.
- 9.
- 10.

**Section –B**

**Answer any four of the following**

**4 x 12=48**

- 11.
- 12.
- 13.
- 14.
- 15.
- 16.

**Section –C**

**Answer the following**

**1 x 15=15**

- 17.
-

**Commerce-B.Com (General)(Computer Applications)**  
**Skill Enhancement Courses (SECs) for Semester IV, from the AY 2022-23**  
**Structure of SECs for Semester– IV**

(To choose Three pairs from the Nine alternate pairs of SECs)

(For each SEC: Hours/Week: 05, Credits: 4, Max Marks: 100)

Pairs of Skill Enhancement Courses (SEC) under each series in Commerce for Semester-VI.

Course No.	Series-A: Accountancy	Course No.	Series-B: Services	Course No.	Series-C: E commerce
	Course Name		Course Name		Course Name
COMSET01	<b>Advanced Corporate Accounting</b>	COMSET07	Life Insurance with Practice	COMSET13	Income Tax Assessment Procedures and Practice
COMSET02	<b>Software Solutions to Accounting</b>	COMSET08	General Insurance with practice	COMSET14	GST Procedure &Practice

COMSET03	Management Accounting	COMSET09	Logistics Services and Practice	COMSET15	<b>Digital Marketing</b>
COMSET04	Cost Control Techniques	COMSET10	EXPORT Procedure and practice	COMSET16	<b>Service Marketing</b>

COMSET05	Stock Markets	COMSET11	<b>Advertising and Media Planning</b>	COMSET17	E Commerce
COMSET06	Stock Market Analysis	COMSET12	<b>Sales Promotion and Practice</b>	COMSET18	E filing

**P.B.SIDDHARTHA COLLEGE OF ARTS &SCIENCE :: VIJAYAWADA-10.**  
**(An Autonomous college in the jurisdiction of Krishna University, Machilipatnam)**  
**ADVANCED CORPORATE ACCOUNTING**

<b>Semester:</b>	<b>VI</b>	<b>Credits :</b>	<b>4</b>
<b>Offered to</b>	<b>B.Com(General, Computers )</b>	<b>Course Code</b>	<b>COMSET01</b>
<b>Course Type</b>	<b>Core (Theory)</b>	<b>Year of Introduction</b>	<b>2022-23</b>
<b>Year of Revision:</b>		<b>Percentage of Revision:</b>	
<b>Hours Taught</b>	<b>75 hrs. Per Semester</b>		
<b>Course Prerequisites (if any):</b>			

CO1: The students are able to calculate purchase consideration and different methods of determining purchase consideration and its accounting treatment. (PO1) (PSO1)

CO2: students will acquire the knowledge on provisions for amalgamation of company as per accounting standard 14 and its treatment. (PO4) (PSO1)

CO3: The students will get the knowledge on forms of internal reconstruction and alteration and reduction of share capital and its accounting treatment. (PO4) (PSO1)

CO4: The students will be able to prepare consolidated financial statements and calculate minority interest and its accounting treatment. (PO4) (PSO1)

CO5: students will be able to prepare liquidators final statement of accounts at the time of winding up of a company. and are able to calculate liquidators remuneration and acquire the capacity for preparation of statement of affairs and deficiency account and its accounting treatment. (PO8) (PSO1)

**Unit-I: Purchase of Business**

Meaning - Purchase Consideration - Methods for determining Purchase Consideration-Discharge of Purchase Consideration-Accounting Treatment.

**Unit-II: Amalgamation of Companies**

Meaning and Objectives - Provisions for Amalgamation of Companies as per Accounting Standard 14 - Accounting Treatment.

**Unit-III: Internal Reconstruction of Companies**

Meaning - Forms of Internal Reconstruction - Alteration of Share Capital and Reduction of Share Capital- Accounting Treatment.

**Unit-IV: Accounts of Holding Companies**

Meaning of Holding Companies and Subsidiary companies- Consolidated Financial Statements- Legal requirements on Consolidation-Calculation of Minority Interest- Accounting Treatment.

**Unit-V: Liquidation**

Meaning - Modes of Winding up of a Company- - Liquidator's Final Statement of Account - Calculation of Liquidator's Remuneration - Preparation of Statement of Affairs and Deficiency Account- Accounting Treatment

**Text Books:**

1. Corporate Accounting by Sehgal Ashok & Sehgal Deepak

**Reference Books:**

5. Goyal, Bhushan Kumar. Corporate Accounting. Taxmann, New Delhi
6. Kumar, Alok. Corporate Accounting. Kitab Mahal
7. Monga, J. R. Fundamentals of Corporate Accounting. Mayur Paper Backs, New Delhi

**Web Links:**

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#### Suggested Co-Curricular Activities

5. Assignments including technical assignments like Working with Audit Company for Observation of Purchase Consideration and Observation of recent Amalgamations in Banking Sector and Corporate Sector
  6. Seminars, Conferences, discussions by inviting concerned institutions
  7. Field Visit
  8. Invited Lectures and presentations on related topics.
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**Section –A**

**Answer any Five of the following**

**5X5=25M**

1. Define Purchase consideration (CO1)
2. What is Amalgamation? (CO2)
3. Explain Alteration of share capital (CO3)
4. What is a Holding Company (CO4)
5. How do you calculate Minority interest (CO4)
6. Explain Liquidation (CO5)
7. What is meant by Reduction of share capital (CO3)
8. Calculations of liquidators remuneration (CO5)

**Section –B**

**Answer the following**

**5X10=50M**

9. a) Explain the methods for determining the purchase consideration (CO1)

Or

- b) Balance sheet of A Ltd (CO1)

Liabilities	Amount (Rs)	Assets	Amount (Rs)
Share Capital 50,000 equity shares of Rs 10/- each fully paid	5,00,000	Fixed Assets	5,00,000
5% Debentures	1,50,000	Investments	1,00,000
General Reserve	30,000	Current Assets	1,80,000
Profit & Loss a/c	20,000	Priliminary Expenses	20,000
Current Liabilities	1,00,000		
<b>Total</b>	<b>8,00,000</b>		<b>8,00,000</b>

On the date of Balance sheet the company was taken over by B Ltd on the following terms

- i) Fixed assets are revalued at Rs 6, 00,000
  - ii) Investments have only a market value of Rs 80,000
  - iii) Current assets are agreed at Rs 2,00,000
  - iv) All liabilities are taken over by B Ltd
- you are required to compute purchase consideration

10. a) Explain the provisions for amalgamation of companies (CO2)

Or

b) Charlee limited and Piyush limited were amalgamated on 1<sup>st</sup> Arpil 2019 a new company was formed with the name of Chaplin Limited to take over the business of existing companies The balance sheets of both the companies as on 31-03-2019 are given below (CO2)

Liabilities	Charlee Ltd Rs	Piyush Ltd Rs	Assets	Charlee Ltd Rs	Piyush Ltd Rs

Share capital Equity shares of Rs 10 each	800	600	Fixed Assets Less Depreciation	1500 200 <hr/> 1300 <hr/>	1000 100 <hr/> 900 <hr/>
12% preference shares of Rs 100 each	400	300	Investments	500	200
Reserves & Surplus: General Reserve Capital Reserve Profit & Loss a/c Secured Loans Trade Creditors Tax provision	300 200 150 400 300 150	150 150 100 200 100 100	Current Assets: Stock Debtors Cash and Bank	300 400 200	200 200 200
Total	2700	1700		2700	1700

Other Information:

i) Preference shareholders of the two companies are suit equivalent number of 75% of preference shares of Chaplin Ltd

ii) Chaplin Ltd will issue one equity of Rs 10 each for every share of Charlee ltd and Piyush Ltd .

Prepare the balance sheet of Chaplin ltd on the assumption that the amalgamation is in the nature of merger

11. a). Explain the accounting treatment of internal reconstruction. (CO3)

Or

b) Following is the Balance sheet of X ltd as on 31-03-2019 (CO3)

Liabilities	Amount(RS)	Assets	Amount(RS)
5000 Equity shares of Rs 100 each	5,00,000	Goodwill	60,000
3000 8% preferences shares of Rs 100 each	3,00,000	Land & Buildings	2,50,000
6% Debentures	1,50,000	Plant & Machinery	1,00,000
Sundry creditors	1,95,000	Patents	60,000
		Stock	90,000
		Debtors	2,40,000
		Cash in hand	5,000
		Preliminary expenses	25,000
		Discount on issue of debenture	15,000
		Profit & Loss a/c	3,00,000
Totals	11,45,000		11,45,000

The following scheme of Reconstruction was duly approved

i) Equity share are to be reduced to an equal number of fully paid shares of Rs 50 each

ii) 8% Preference share are to be reduced by 40% and the rate of dividend increased to 9%

iii) Value of Land & Buildings to be increased by 20%

iv) Debentures are to be reduced by 20%

v) All nominal and fictitious assets are to be eliminated and the balance used to write off patents

vi) Further equity shares are to be issued for Rs 1,00,000 for each

12. a) Explain the legal requirements for consideration (CO4)

Or

b) H Ltd acquired all the share of S Ltd on 1-1-2020 and liabilities and assets of the two companies on 31-03-2020 were as follows (CO4)

	H Ltd	S Ltd
<b>I Equity and Liabilities</b>		
1) Shareholders funds		
a) Share capital:	8,00,000	3,00,000
shares of Rs 10 each		
b) Reserves and Surplus:		
i) Reserve on 1-4-2014	2,10,000	40,000
ii) Surplus a/c	50,000	30,000
2) Current Liabilities		
i) Creditors	3,50,000	1,60,000
ii) Bills Payable	40,000	20,000
	14,50,000	5,50,000
<b>II Assets</b>	4,00,000	2,70,000
1) Non – Current Assets	2,00,000	1,00,000
a) Fixed Assets	50,000	20,000
i) Land & Buildings	5,00,000	
ii) Plant & Machinery		
iii) Furniture & Fixtures	1,50,000	80,000
b) Investment in share of S Ltd	1,00,000	60,000
2) Current Assets	50,000	20,000
a) Stock		
b) Sundry Debtors	14,50,000	14,50,000
c) Bank Balance		

The surplus account of S Ltd had a credit balance of Rs 6000 on 1-04-2014. Prepare a consolidated Balance sheet as on 31-03-2015.

13. a) Explain the modes of winding a company (CO5)

Or

b) A liquidator is entitled to receive remuneration @2% of the assets realized and 3% on the amount distributed among the unsecured creditors. The assets realized RS 70,00,000 against which payment was made as follows:

Liquidation expenses Rs 50,000

Preferential creditors Rs 1, 50,000

Secured Creditors RS 40,00,000

Unsecured Creditors Rs 30,00,000

Calculate the total remuneration payable to the liquidator

(CO5)

**P.B.SIDDHARTHA COLLEGE OF ARTS &SCIENCE: VIJAYAWADA-10.**  
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**Software Solutions to Accounting**

<b>Semester:</b>	VI	<b>Credits :</b>	<b>4</b>
Offered to	<b>B.Com(General, Computers )</b>	<b>Course Code</b>	COMSET02
Course Type	<b>Core (Practical)</b>	<b>Year of Introduction</b>	<b>2022-23</b>
<b>Year of Revision:</b>		<b>Percentage of Revision:</b>	
<b>Hours Taught</b>	75 hrs. Per Semester		
<b>Course Prerequisites (if any):</b>			

**CO1:** Enables to understand the origin and features of accounting software Tally. **(Po1, Po2)**

**CO2:** Demonstrate an understanding about the basics of accounts and the usage of Tally for accounting purpose. **(Po2, Po3)**

**CO3:** Able to create ledgers and group allocation for accounting entries in Tally. **(Po2, Po6, Po7)**

**Co4:** Develop an idea to generate accounting and inventory masters, vouchers in Tally. **(Po6, Po7)**

**CO5:** Impart knowledge regarding finalization of accounts using Tally. **(Po7)**

**Unit – I:** **6Hrs**

Introduction – Accounting Principles & Concepts - Book Keeping –Types of Accounts – Golden Rules of Accounts -Mode of Accounts – Financial statements -Recording o transaction of sample data.

**Unit – II:** **6Hrs**

Working with Tally-Creating Company – Loading/Selecting a company – Shutting a company  
Modifying an existing company – Deleting a Company-Setting User level of the Company  
Company Features – Company Configurations.

**Unit – III:** **6Hrs**

Groups – Creating new group – Concept of Default Groups (28) -Creating a sub group – Altering a group – Deleting a group - Multiple groups (Problems)-Ledgers – Creating a ledger – Altering a ledger – Deleting a ledger.

**Unit – IV:** **6Hrs**

Vouchers in Tally – Configuring vouchers – Predefined vouchers -Creating vouchers -Displaying and altering vouchers (Problems).

**Unit – V:** **6Hrs**

Generating Basic Reports -Financial Statements - Accounting Books & Registers – Practice Exercise.

**Text Book prefer:**

2. Tally prime with GST – Gaurav Agarwal

**Text Book Reference:**

3. Tally prime with GST – Gaurav Agarwal
4. GST practice manual – Taxmann

**Curricular Activities:**

- Class room Activities:**
- 1.Face to face Interaction in the class
  - 2.listing assignments
  - 3.Conduct Quiz
  - 4.Conduct Seminars
  - 5.synchronous,asynchronous and hybrid method online

**Co-Curricular Activities:**

- 1.Books reading
- 2.Student seminars, debate
- 3.QUIZ program
- 4.Assignments
- 5.Field studies (individual/group)

**Web links:**

[https://medium.com/@tally\\_97442/what-are-the-different-versions-of-tally-70eb053564f7](https://medium.com/@tally_97442/what-are-the-different-versions-of-tally-70eb053564f7)

<https://khatabook.com/blog/accounting-vouchers-in-tally-erp-9>

<https://instapdf.in/tally-prime-shortcut-keys-list/>

**Software Solutions to Accounting**

## List of Experiments

1. Creating Company – Loading/Selecting a company – Shutting a company
  2. Modifying an existing company – Deleting a Company
  3. Setting User level of the Company
  4. Company Configurations
  5. Groups – Creating new group – Concept of Default Groups (28)
  6. Creating a sub group – Altering a group – Deleting a group
  7. Multiple groups (Problems)
  8. Ledgers – Creating a ledger – Altering a ledger – Deleting a ledger.
  9. Vouchers in Tally – Configuring vouchers – Predefined vouchers
  10. Creating vouchers
  11. Displaying and altering vouchers (Problems).
  12. Financial Statements
  13. Accounting Books & Registers – Practice Exercise
-

**P.B.SIDDHARTHA COLLEGE OF ARTS &SCIENCE :: VIJAYAWADA-10..**

(An Autonomous college in the jurisdiction of Krishna University, Machilipatnam)

**ADVERTISING AND MEDIA PLANNING**

<b>Semester:</b>	VI	<b>Credits :</b>	<b>4</b>
Offered to	<b>B.Com(General, Computers )</b>	<b>Course Code</b>	COMSET11
Course Type	<b>Core (Theory)</b>	<b>Year of Introduction</b>	<b>2022-23</b>
<b>Year of Revision:</b>		<b>Percentage of Revision:</b>	
<b>Hours Taught</b>	75 hrs. Per Semester		
<b>Course Prerequisites (if any):</b>			

**CO1:** Students are able to understand the role of advertising in business environment and advertising as a marketing tool and process for promotion of business development. (PO1) (PSO1)

**CO2:** students are able to acquire the knowledge on types of advertising agencies and their strategies in creating advertisement. (PO1) (PSO1)

**CO3:** students will acquire skills on creativeness and communication of advertising and elements of design and principles of design (PO5) (PSO1)

**CO4:** students will have command on media planning and selection of media (PO5) (PSO1)

**CO5:** students are able to prepare analysis of market media and its strategies. (PO5) (PSO1)

**UNIT-I: Introduction, Nature and Scope**

Advertising- Nature and Scope- Functions - Impact on Social, Ethical and Economical Aspects - Its Significance – Advertising as a Marketing Tool and Process for Promotion of Business Development - Criticism on advertising

**UNIT-II: Strategies of Advertisements**

Types of Advertising Agencies and their Strategies in Creating Advertisements - Objectives - Approach - Campaigning Process - Role of Advertising Standard Council of India (ASCI) - DAGMAR approach

**UNIT-III: Process of Advertisement**

Creativeness and Communication of Advertising –Creative Thinking – Process – Appeals – Copy Writing - Issues in Creation of Copy Testing –Slogan Elements of Design and Principles of Design

**UNIT-IV: Media Planning**

Advertising Media - Role of Media - Types of Media - Print Media - Electronic Media and other Media - Advantages and Disadvantages – Media Planning - Selection of Media

**UNIT-V: Analysis of Market Media**

Media Strategy – Market Analysis -Media Choices - Influencing Factors - Target, Nature, Timing, Frequency, Languages and Geographical Issues - Case Studies

**Text Books:**

Media Planning and Buying: Principles and Practice in the Indian Context – Arpita Menon

### **III: References:**

1. Bhatia. K.Tej - Advertising and Marketing in Rural India - Mc Millan India
2. Ghosal Subhash - Making of Advertising - Mc Millan India
3. Jeth Waney Jaishri& Jain Shruti - Advertising Management - Oxford university Press
4. Advertising Media Planning, Seventh Edition Paperback – by Roger Baron (Author), Jack Sissors (Author)

### **Suggested Co-Curricular Activities**

Debates, Seminars, Group Discussions, Quiz, etc.

n of paper cuttings, Preparation of related videos, Class exhibitions

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Section –A

Answer any Five of the following

5X5=25M

1. What is advertising? (CO1)
2. DAGMAR approach (CO2)
3. Types of advertising copy (CO3)
4. Media planning (CO4)
5. Advertising strategy (CO5)
6. Objectives of advertising (CO1)
7. Criticism of Advertising (CO1)
8. Market Analysis (CO1)

Section –B

Answer the following

5X10=50M

9. a) Explain the significance of advertising. (CO1)

Or

b) “Advertising sells products” do you agree with this statement? Give reasons for your answer (CO1)

10. a) What are various types of advertising agencies? (CO2)

Or

b) Explain the role of advertising standards council of India (CO2)

11. a) How to decide testing of an advertising copy (CO3)

Or

b) What is an advertising copy? Describe its elements (CO3)

12. a) Define the term media planning. Explain the factors to be considered while selecting media vehicle (CO4)

Or

b) What do you mean by print media of advertising? (CO4)

13. a) Explain the following concepts (CO5)

- i) Target
  - ii) Frequency
  - iii) Timing
-



Or

b) Explain media choices and its influencing factors (CO5)

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**SALES PROMOTION AND PRACTICE**

Semester:	V/VI	Credits :	4
Offered to	B.Com(General, Computers )	Course Code	COMSET12
Course Type	Core (Theory)	Year of Introduction	2022-23
Year of Revision:		Percentage of Revision:	
Hours Taught	75 hrs. Per Semester		
Course Prerequisites (if any):			

CO1: Students are able to learn about sales promotion its nature and scope and different types of sales organizations (PO1) (PSO1)

CO2: students are exposed to new trends in sales promotion and preparation of product life cycle and get knowledge on theories of personal selling and surrogate selling. (PO5) (PSO1)

CO3: students acquire knowledge on various strategies and promotion campaign.  
(PO4) (PSO1)

CO4: students will have command on salesmanship and sales operations (PO2) (PSO1)

CO5: students are able to develop skills of sales force management and designing events for enhancing sales promotion . (PO4) (PSO1)

UNIT-I: Introduction to Sales Promotion: Nature and Scope of Sales Promotion- Influencing Factors - Sales Promotion and Control - Strengths and Limitations of Sales Promotion – Sales Organization - Setting-up of Sales Organization - Types of Sales Organization.

UNIT-II: Sales Promotion and Product Life Cycle: Types of Sales Promotion - Consumer Oriented - Trade Oriented - Sales Oriented - Various Aspects -Sales Promotion methods in different Product Life Cycle – Cross Promotion - Sales Executive Functions- Theories of Personal Selling - Surrogate Selling.

UNIT-III: Strategies and Promotion Campaign: Tools of Sales Promotion - Displays, Demonstration, Fashion Shows, Conventions - Conferences, Competitions –Steps in designing of Sales Promotion Campaign – Involvement of Salesmen and Dealers – Promotional Strategies - Ethical and Legal issues in Sales Promotion.

Unit-IV: Salesmanship and Sales Operations: Types of Salesman - Prospecting - Pre-approach and Approach - Selling Sequence - Sales budget, Sales territories, Sales Quota's - Point of Sale – Sales Contests - Coupons and Discounts - Free Offers - Showrooms and Exhibitions - Sales Manager Qualities and functions.

Unit-V: Sales force Management and Designing: Recruitment and Selection - Training - Induction - Motivation of sales personnel - Compensation and Evaluation of Sales Personnel - Designing of Events for Enhancing Sales Promotion

Text Books:

Successful Sales Promotion – Pran Choudhury

Reference Books

Don.E. Schultz - Sales Promotion Essentials- Mc Graw hill India

S.H.H Kazmi & Satish K Batra, Advertising and Sales Promotion- Excel Books

Jeth Waney Jaishri& Jain Shruti - Advertising Management - Oxford university Press

Dr.ShailaBootwala Dr.M.D. Lawrence and Sanjay R.Mali -Advertising and Sales Promotion- NiraliPrakashan

Web resources:

<https://www.svtuition.org/2011/08/accounting-for-corporate-restructuring.html>

<https://www.moxienp.com/submitted-pitches/ad72a4b0-f08b-4863-8d07-153083544f50>.

Suggested Co-Curricular Activities

- Assignments, Class seminars, Case studies,
- Compilation of paper cuttings, Group discussions,
- Debates, Quiz, Class exhibitions,
- Preparation of related videos, Invited lectures etc.

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**SALES PROMOTION AND PRACTICE**

**COMSET12**

**Time: 3Hrs**

**Max Marls: 75**

**Section –A**

**Answer any Five of the following**

**5X5=25M**

1. What are the factors influencing sales promotion? (CO1)
2. What is surrogate selling? (CO2)
3. Explain the scope of sales promotion (CO1)
4. What are coupons and discounts? (CO4)
5. Explain selling sequence. (CO4)
6. Write briefly about training induction. (CO5)
7. What are the various tools of sales promotion? (CO3)
8. Explain cross promotion (CO2)

**Section –B**

**Answer the following**

**5X10=50M**

9. a).Discuss the strengths and limitations of sales promotion (CO1)  
Or  
b) Explain various types of sales organization (CO1)
  10. a) Describe sales promotion methods in product life cycle (CO2)  
Or  
b) Explain the functions of sales executives (CO2)
  11. a). Discuss the steps in designing sales promotion campaign (CO3)  
Or  
b) Explain various promotional strategies (CO3)
  12. a) What are the functions and qualities of sales manager? (CO4)  
Or  
b) Discuss the various types of salesmen (CO4)
  13. a) Explain the process of recruitment and selection of sales personnel (CO5)  
Or  
b) what are the different events for enhancing sales promotion? (CO5)
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**P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE :: VIJAYAWADA-10..**  
**(An Autonomous college in the jurisdiction of Krishna University, Machilipatnam)**  
**DIGITAL MARKETING**

Semester:	VI	Credits :	4
Offered to	B.Com(General)	Course Code	COMSET15
Course Type	Core (Theory)	Year of Introduction	2022-23
Year of Revision:		Percentage of Revision:	
Hours Taught	75 hrs. Per Semester		
Course Prerequisites (if any):			

CO1: students are able to understand impact of micro and macro environmental factors on digital marketing.

(PO1) (PSO1)

CO2: students are able design website planning and creation of website. (PO5) (PSO1)

CO3: student will have command on search engine optimization (PO5) (PSO1)

CO4: students will acquire knowledge on social media marketing, content creation, blogging and guest blogging (PO5) (PSO1)

CO5: students will get the capacity to create email marketing and mapping industry trends and eliminating spam messages.(PO5) (PSO1)

**Unit 1: Introduction**

Digital marketing: Meaning – importance – traditional online marketing vs digital marketing – online market place analysis Micro Environment – Online Macro Environment - trends in digital marketing – competitive analysis.

**Unit – II: Web site planning and creation**

Web Site: meaning – objectives – components of website - website creation – incorporation of design and– adding content, installing and activating plugins.

**Unit 3: Search Engine Optimization (SEO)**

SEO: Meaning – History and growth of SEO –Importance of Search Engine - On page Optimization – off page optimization – Role of Search Engine Operation- google Ad words – Search Engine Marketing: Campaign Creation – Ad Creation, Approval and Extensions.

**Unit 4: Social Media Marketing:**

Meaning of social media and Social Media Marketing – social Management tools-strategy and planning – social media network – Social Networking – video creation and sharing – use of different social media platforms - Content creation - Blogging – Guest Blogging.

**Unit 5: Email marketing:**

Meaning – Evolution of email – importance of email marketing – Development and Advancements in e mail marketing - email marketing platforms – creating and Tracking emailers–create forms – create opt-in lists – mapping industry trends and eliminating spam messages.

**Text Books:**

New Rules of Marketing and PR byDavid Meerman Scott.Wiley, 2017

**References**

1.Digital Marketing for Dummies by Ryan Deiss & Russ Henneberry, publisher John Wiley first edition 2020.

2. Youtility by JayBaer, Published by Gilda MedialL C Portfolio 2013,

**Suggested Co-Curricular Activities**

1. Seminars/Conference/ Workshops on significant and emerging areas in Digital Marketing

2. Real time work experience with Digital marketing service providers.

3. Arrange for Interaction with Area Specific Experts.

**Web Links:**

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**DIGITAL MARKETING**

**COMSET15**

**Time: 3Hrs**

**Max Marls: 75**

**Section –A**

**Answer any Five of the following**

**5X5=25M**

1. What is Digital Marketing?
2. What are the benefits of Digital Marketing?
3. Explain Website planning.
4. Explain SEO content optimization
5. Search Engine
6. Social Networking
7. Evolution of Email
8. Explain creating and tracking emails.

**Section –B**

**Answer the following**

**5X10=50M**

9. a) Define marketing. Explain the differences between traditional marketing VS digital marketing  
Or  
b) Explain trends in digital marketing.
  10. a) what are the components of website?  
Or  
b) Write about installing and activating plugin?
  11. a) What is Website SEO? Explain importance and advantages of optimizing website.  
Or  
b) Explain the importance off – page SEO
  12. a) what are the goals of social media marketing  
Or  
b) Explain various tools of social media marketing
  13. a) Trends in development and advancements in email marketing Explain  
Or  
b) Write about mapping industry trends and eliminating spam messages?
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**Service Marketing**

<b>Semester:</b>	VI	<b>Credits :</b>	<b>4</b>
Offered to	<b>B.Com(General)</b>	<b>Course Code</b>	COMSET16
Course Type	<b>Core (Theory)</b>	<b>Year of Introduction</b>	<b>2022-23</b>
<b>Year of Revision:</b>		<b>Percentage of Revision:</b>	
<b>Hours Taught</b>	75 hrs. Per Semester		
<b>Course Prerequisites (if any):</b>			

**CO1:** students are able to understand services marketing and its classification, need and importance. (PO1) (PSO1)

**CO2:** students will be able to understand consumer behavior in services marketing, conflict handling and customer responses in services. (PO2) (PSO1)

**CO3:** students will acquire knowledge on customer relationship marketing and services market segmentation strategies. (PO1) (PSO1)

**CO4:** students will get the capacity on customer defined service standards and theories of pattern demand (PO1) (PSO1)

**CO5:** students will have command on service development and quality improvement and service failures and recovery. (PO6) (PSO1)

**Unit 1: Introduction: Nature and Scope of services**

Introduction: Nature and Scope of services characteristics of services, classification of services – need for service marketing - reasons for the growth of services sector, Overview of marketing Different Service Sectors -Marketing of Banking Services -Marketing in Insurance Sector - Marketing of Education Services.

**Unit-2: Consumer Behavior in Services Marketing**

Customer Expectations on Services- Factors influencing customer expectation of services. - Service Costs experienced by Consumer, the Role of customer in Service Delivery, Conflict Handling in Services, Customer Responses in Services, Concept of Customer Delight

**Unit-3: Customer Relationship marketing and Services Market Segmentation.**

Customer Relationship marketing: Meaning -Importance of customer & customer's role in service delivery, Benefits of customer relationship, retention strategies. Services Market Segmentation: - Market segmentation -Basis & Need for segmentation of services, bases of segmentation services, segmentation strategies in service marketing.

**UNIT 4: Customer Defined Service Standards.**

Customer Defined Service Standards - Hard and Soft, Concept of Service Leadership and Service Vision - Meeting Customer Defined Service Standards -Service Flexibility Versus Standards - Strategies to Match Capacity and Demand - managing Demand and Supply of Service –applications of Waiting Line and Queuing Theories to Understand Pattern Demand.

**Unit 5: Service Development and Quality Improvement.**

Service Development – need, importance and Types of New Services - stages in development of new services, service Quality Dimensions - Service Quality Measurement and Service Mapping, Improving Service Quality and Service Delivery, Service Failure and Recovery.

**Text Books:**

- 1) Dr. K. Karunakaran, Service Marketing (Text and Cases in Indian Context), Himalaya Publications.

**References**

1. John E.G. Bateson, K.Douglas Hoffman: Services Marketing, Cengage Learning, 4e, 2015 publication
2. Vinnie Jauhari, Kirti Dutta: Services Marketing: Operations and Management, Oxford University Press, 2014.
3. Valarie A. Zeithaml and Mary Jo-Bitner: Services Marketing – Integrating Customer Focus Across The Firm, Tata McGraw Hill Publishing Company Ltd., 6e, 2013.
4. Nimit Chowdhary, Monika Chowdhary, Textbook of Marketing Of Services: The Indian Experience, Macmillan, 2013.
5. K. Rama Mohana Rao, Services Marketing, Pearson, 2e, 2011.

**Weblinks:****Suggested Co-Curricular Activities**

1. Seminars/Conference/ Workshops on emerging trends in service marketing
  2. Real time work experience with service marketing providers
  3. Arrange for Interaction with Area Specific Experts.
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**Service Marketing**

**COMSET16**

**Time: 3Hrs**

**Max Marls: 75**

**Section –A**

**Answer any Five of the following**

**5X5=25M**

1. Scope of Services (CO1)
2. Discuss the growth of services sector in India (CO1)
3. Briefly explain customer expectations on services(CO2)
4. Concept of customer delight (CO2)
5. Why customer relationship is important? (CO3)
6. Service flexibility Vs. Standards (CO4)
7. Need for service Development (CO5)
8. Reasons for services failure (CO5)

**Section –B**

**Answer the following**

**5X10=50M**

9. a) Define Services Marketing. Explain the classification of services. (CO1)  
Or  
b) What is services marketing? Discuss different service sectors. (CO1)
10. a) what are the factors that influence customer expectation of services? (CO2)  
Or  
b) What is role played by the customer in services delivery? (CO2)
11. a). Define the concept of market segmentation. Discuss need and basis for segmentation services. (CO3)  
Or  
b) What are the segmentation strategies in services marketing? (CO3)
12. a) Define the concept of services standards and service flexibility. Differentiate service flexibility and service standards. (CO4)  
Or  
b) Explain the Queuing theories to understand pattern demand. (CO4)
13. a) Built the stages to develop a new services (CO5)  
Or  
b) Discuss the service quality dimensions (CO5)

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**P.B.SIDDHARTHA COLLEGE OF ARTS &SCIENCE :: VIJAYAWADA-10..**

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**MANAGEMENT ACCOUNTING AND PRACTICE**

<b>Semester:</b>	VI	<b>Credits :</b>	<b>4</b>
Offered to	<b>B.Com(General, Computers )</b>	<b>Course Code</b>	COMSET03
Course Type	<b>Core (Theory)</b>	<b>Year of Introduction</b>	<b>2022-23</b>
<b>Year of Revision:</b>		<b>Percentage of Revision:</b>	
<b>Hours Taught</b>	75 hrs. Per Semester		
<b>Course Prerequisites (if any):</b>			

**CO1:** Students are able to understand the nature and scope of management accounting and differentiate management accounting, financial accounting and cost accounting. (PO1) (PSO1)

**CO2:** Students will acquire knowledge of how to compute ratios and draw inferences. (PO1) (PSO1)

**CO3:** The students will get knowledge of how to analyze the performance of the organization by preparing funds flow statement and cash flow statements (PO4) (PSO4)

**CO4:** students will be able to prepare cash budget, Fixed and flexible budget (PO5) (PSO4)

**CO5:** Students will get the capability of Management reporting. (PO5) (PSO4)

**UNIT I: Introduction**

Nature & Scope of Management Accounting – Management Accounting Principles – Significance of Management Accounting - Difference between management accounting, financial accounting and Cost accounting – Limitations of Management Accounting – Installation of Management Accounting – Tools of Management Accounting.

**UNIT 2: Ratio Analysis**

Meaning - Advantages and Limitation of Ratio Analysis – Types of Ratios –Profitability Ratios- Gross Profit Ratio (GPR) – Net Profit Ratio (NPR) – Operating Ratio –Solvency Ratios- Current Ratio – Liquidity Ratio – Debt-Equity Ratio-Turnover Ratios-Fixed Assets Turnover Ratio – Working Capital Turnover Ratio – Debtors Turnover Ratio – Creditors Turnover Ratio - Stock Turn Over Ratio - Return on Investment (ROI)-Calculation and interpretation.

**UNIT 3: Fund Flow and Cash Flow Analysis as per AS3**

Meaning and Concept of Working Capital (Fund) – Fund Flow Statement –Meaning and Uses of Funds Flow Statement – Preparation of Funds Flow Statement. Cash Flow Statement – Meaning and Uses of Cash Flow Statement – Preparation of Cash Flow Statement – Difference between Cash Flow Statement and Funds flow Statement.

**UNIT 4: Budgeting and Budgetary Control**

Meaning of Budget – Forecast and Budget - Elements of Budget – Features – objectives and budget procedure – Classification of Budgets - Meaning of Control – Meaning of Budgetary control – objectives of Budgetary control system – Advantages and Limitations of Budgetary control system. Prepare cash budget, fixed budget and flexible budget.

**UNIT 5: Management Reporting:**

Reports - Meaning – Modes of Reporting – Requisites of a good report – Kinds of Reports – General formats of Reports - Need for Management Reporting- financial reporting Vs. Management Reporting - Strategies for Writing Effective Reporting.

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**Text Books:**

Management Accounting and financial control S.N. Maheswari, Sultan Chand and Sons

**References**

1. Principles of Management Accounting by Manmohan & Goyal, Publisher: PHI Learning
2. Cost and Management Accounting by SP Jain and KL Narang
3. Cost and Management Accounting by M.N. Arora, Vikas Publishing House PVT Ltd.,
4. Management Accounting: Text, Problems & Cases by Khan & Jain, Tata McGraw Hill (TMH)

**Co-Curricular Activities**

1. Seminars/Conference/ Workshops on management accountant profession, skills required for Management accountant Professional Development, integration of technical and analytical skills for effective job performance, Ethical behavior of management accountant.
  2. On job work with ICMA professional duration of work be decided on the basis of feasibility and opportunity.
  3. Interaction with Area Specific Experts.
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**MANAGEMENT ACCOUNTING AND PRACTICE**  
**Time: 3Hrs**

**COMSET03**  
**Max Marls: 75**

**Section –A**

**Answer any Five of the following**

**5X5=25M**

1. Explain the scope of management accounting
2. What are the limitations of Financial Accounting?
3. Define Funds Flow Statement.
4. Explain Classification of cash flows
5. Explain Liquidity Ratios.
6. Explain Break Even Analysis
7. Define Margin of Safety
8. What are the types of Financial Analysis

**Section –B**

**Answer the following**

**5X10=50M**

9. a) Define Management Accounting. What are the differences between Management Accounting and Financial Accounting
- Or

b) From the following information prepare a comparative Balance Sheet

Particulars	March 31 <sup>st</sup> 2020	March 31 <sup>st</sup> 2021
Equity Share Capital	4,00,000	6,00,000
Debentures	2,00,000	3,25,000
Sundry Creditors	2,55,000	1,17,000
Bank Over Draft	7,000	10,000
<b>Total of the Liabilities</b>	<b>8,62,000</b>	<b>10,52,000</b>
Plant and Machinery	1,00,000	2,00,000
Land and Buildings	3,60,000	5,40,000
Investments	2,70,000	1,70,000
Sundry Debtors	1,00,000	88,000
Cash in Hand	32,000	54,000
<b>Total of Assets</b>	<b>8,62,000</b>	<b>10,52,000</b>

10. a) What is meant by Ratio Analysis and Explain advantages and limitations of Ratio Analysis
- Or

b) From the following data calculate

- i) Gross Profit Ratio                      ii) Net Profit Ratio                      iii) Net Operating Profit Ratio

Net sales	5,00,000
Cost of goods sold	3,50,000
Selling Expenses	12,000
Administrative Expenses	8,000
Interest income	5,000
Loss on the sale of old machine	12,000

11. a Define cash flow and what are the differences between funds flow and cash flow

Or

b) The Balance Sheet of ABC Ltd is as follows

Liabiliteis	2016	2017	Assets	2016	2017
Equity Capital	1,00,000	1,00,000	Cash	10,000	7,200
General Reserve	1,00,000	1,00,000	Debtors	70,000	76,800
Profit & Loss a/c	96,000	98,000	Stock	50,000	44,000
Current Liabilities	72,000	82,000	Land	40,000	60,000
Loan form Associate Company	-----	40,000	Buildings	1,00,000	1,10,000
Loan from Bank	62,000	50,000	Machinery	1,60,000	1,72,000
<b>Totals</b>	<b>4,30,000</b>	<b>4,70,000</b>	<b>Totals</b>	<b>4,30,000</b>	<b>4,70,000</b>

During the year Rs 52,000 was paid as dividends. You are required to prepare the Cash Flow Statement

12. a) What is a Budgetary Control System? State the advantages of Budgetary Control System in an organization?

Or

b) Z Ltd has prepare the budget for the production of 1,00,000 units from a costing period as under

Particulars	Per unit (Rs)
Raw Materials	10
Direct Labor	3
Direct Expenses	0.40
Works overhead(60% Fixed)	10
Administrative overheads (80% Fixed)	2
Sales overhead(50% Fixed)	1

Actual production in the period was only 60,000 units. Prepare Budgets for the original and revised levels of output.

13. a) Define Reports. What are the requisites of a good report?

Or

b) What are different strategies for writing an effective report?

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**P.B.SIDDHARTHA COLLEGE OF ARTS &SCIENCE :: VIJAYAWADA-10..**

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**COST CONTROL TECHNIQUES**

<b>Semester:</b>	VI	<b>Credits :</b>	<b>4</b>
Offered to	<b>B.Com(General, Computers &amp; )</b>	<b>Course Code</b>	COMSET04
Course Type	<b>Core (Theory)</b>	<b>Year of Introduction</b>	<b>2022-23</b>
<b>Year of Revision:</b>		<b>Percentage of Revision:</b>	
<b>Hours Taught</b>	75 hrs. Per Semester		
<b>Course Prerequisites (if any):</b>			

**CO1:** Students are able to differentiate cost control, cost reduction concepts and identify effective techniques (PO1) (PSO1)

**CO2:** Students will acquire knowledge on allocation of overheads and application of overheads. (PO1) (PSO1)

**CO3:** Students are able to do cost volume profit analysis. (PO1) (PSO1)

**CO4:** Students will get knowledge on standard costing and variance analysis and its application. (PO1) (PSO1)

**CO5:** Students will acquire knowledge of modern techniques and its application (PO5) (PSO4)

**Unit 1: Introduction-Nature and Scope**

Introduction: Meaning of Cost Control – Cost Control Techniques – Requisites of effective Cost Control System – Cost Reduction – meaning – essentials for an effective cost Reduction Program – Scope of cost reduction - Difference between Cost Control and Cost Reduction –Meaning of cost audit – Types of Cost Audit – Auditing techniques.

**Unit 2: Activity Based Costing**

Concept of ABC – Characteristics of ABC – Categories of ABC – Allocation of Overheads under ABC – Cost Reduction under ABC – advantages of implementing ABC –Application on overhead allocation on the basis of ABC-

**Unit 3: Cost Volume Profit Analysis (CVP Analysis)**

Applications of Marginal Costing – profit planning – Evaluation of Performance-fixing selling price – Key Factor –Make or Buy decision – Accept or Reject - closing down or suspending activities –

**Unit 4: Standard Costing and Variance Analysis**

Concept of Standard Cost and Standard Costing – Advantages and limitations – analysis of variances-importance of Variance Analysis - computation and application of variances relating to material and labour.

**Unit 5: Application of Modern Techniques**

Kaizen Costing – Introduction – objectives – scope –Principles – 5 S (Sort, Set in Order, Shine, Standardize, and Sustain) in Kaizen Costing– Advantages and Disadvantages of Kaizen Costing. Learning Curve Analysis-concept and Application.

**Text books:**

1. Cost and Management Accounting by SP Jain and KL Narang.

**References**

1. Cost Accounting by M.C. Shukla, T. S. Grewal & Dr M. P. Gupta, S. Chand and Company Private Limited, New Delhi
2. Cost Accounting: Principles & Practice Book by M. N. Arora, Vikas Publishing House Private Limited.
3. Advanced Cost Accounting: JK Mitra, New Age International
4. Advanced Cost Accounting: SN Maheswari, S. Chand and Company Private Limited, New Delhi.

**Co-Curricular Activities**

1. Seminars/Conference/ Workshops on Cost accountant profession, skills required for cost accountant Professional Development, integration of technical and analytical skills for effective job performance, Ethical behaviour of management accountant.
  2. Real time work experience with ICMA professional duration of work be decided on the basis of feasibility and opportunity.
  3. Arrange for Interaction with Area Specific Experts.
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**COST CONTROL TECHNIQUES**

**Time: 3Hrs**

COMSET04

**Max Marls: 75**

**Section –A**

**Answer any Five of the following**

**5X5=25M**

1. Explain cost Reduction
2. Explain briefly concept of ABC analysis
3. EOQ
4. Define Standard Costing.
5. What is meant Kaizen Costing?
6. What is Make or Buy Decision?
7. What is meant by Cost Audit?
8. What are the principles- 5S

**Section –B**

**Answer the following**

**5X10=50M**

9. a) Explain various cost control techniques and what are the requisites of effective cost control system?

Or

- b) What are the different types of cost audit? Explain auditing techniques.

10. a) What are the characteristics of ABC analysis and explain advantages of implementing ABC analysis

Or

- b) What is Allocation of Overheads under ABC? How overheads are allocated on the basis of ABC

11. a).Define Marginal cost and Marginal costing. How are variable cost and fixed cost treated in marginal costing

Or

- b) Present the following information to show

i) The marginal cost and contribution per unit

ii) The total contribution and profit resulting from each of the following sales mixture

Particulars	Product	Rs( Per unit)
Direct Material	A	10Rs
Direct Material	B	9Rs
Direct Wages	A	3Rs
Direct Wages	B	2 Rs
Sale price	A	20Rs
Sale price	B	15Rs

Fixed expenses Rs 300/-

Sales Mixtures:

- a) 100 units of Product A and 200 Units of Product B
- b) 150 units of Product A and 150 units of Product B
- c) 200 units of Product A and 100 units of Product B

12. a) What is the significance of the term variance in standard costing? Define and explain various types of variances

Or

b) The standard cost of a chemical mixture is as under

8 Tons of material A at Rs 40/- per ton

12 tons of Material B at 60/- per ton

Standard yield is 90% of input

Actual cost for a period is as under

10 Tons of Material A at Rs 30/- per Ton

20 Tons of Material B at Rs 68/- per Ton

Actual yield is 26.5 tons

Compute all material variances.

13. a) What are the advantages and disadvantages of Kaizen costing?

Or

b) Explain Learning Curve Analysis and its application

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**P.B.SIDDHARTHA COLLEGE OF ARTS &SCIENCE :: VIJAYAWADA-10..**  
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**LIFE INSURANCE WITH PRACTICE**

<b>Semester:</b>	VI	<b>Credits :</b>	<b>4</b>
Offered to	<b>B.Com(General, Computers &amp; )</b>	<b>Course Code</b>	COMSET07
Course Type	<b>Core (Theory)</b>	<b>Year of Introduction</b>	<b>2022-23</b>
<b>Year of Revision:</b>		<b>Percentage of Revision:</b>	
<b>Hours Taught</b>	75 hrs. Per Semester		
<b>Course Prerequisites (if any):</b>			

CO1: Students will understand the Features of Life Insurance, schemes and policies and insurance companies in India (PO1) (PSO1)

CO2: Students are able to analyze various schemes and policies related to Life Insurance sector (PO1) (PSO1)

CO3: Students will acquire knowledge on Principles of Life Insurance (PO3) (PSO1)

CO4: Students will get the knowledge on consumer protection act relating to Life Insurance and insurance claims. (PO5) (PSO4)

CO5: Students are able to learn about role of IRDAI and other agencies. (PO5) (PSO4)

**Unit-I: Features of Life insurance contract**

Life Insurance- Features- Advantages - Group Insurance – Group Gratuity Schemes - Group Superannuation Schemes, Social Security Schemes- Life Insurance companies in India.

**Unit-II: Plans of Life Insurance**

Types of Plans: Basic - Popular Plans – Term Plans-Whole Life-Endowment-Money Back-Savings-Retirement-Convertible - Joint Life Policies - Children’s Plans - Educational Annuity Plans - Variable Insurance Plans – Riders

**Unit-III: Principles of Life Insurance**

Utmost Good Faith- Insurable Interest- Medical Examination - Age proof, Special reports - Premium payment - Lapse and revival – Premium, Surrender Value, Non-Forfeiture Option - Assignment of Nomination- Loans – Surrenders – Foreclosure.

**Unit-IV: Policy Claims**

Maturity claims, Survival Benefits, Death Claims, Claim concession - Procedures - Problems in claim settlement - Consumer Protection Act relating to life insurance and insurance claims.

**Unit-V: Regulatory Framework and Middlemen**

Role of IRDAI & other Agencies - Regulatory Framework - Mediators in Life Insurance – Agency services – Development Officers and other Officials.

**Text Books:**

G. S. Pande, Insurance – Principles and Practices of Insurance, Himalaya Publishing

**References:**

1. C. Gopalkrishna, Insurance – Principles and Practices, Sterling Publishers Private Ltd.
2. G. R. Desai, Life Insurance in India, MacMillan India.
3. M. N. Mishra, Insurance Principles and Practices, Chand & Co, New Delhi.
4. M.N.Mishra, Modern Concepts of Insurance, S.Chand& Co.

**Co-Curricular Activities**

1. Assignments including technical assignments like Working with any insurance Company for observation of various policies, premiums, claims, loans and other activities.
2. Seminars, Conferences, discussions by inviting concerned institutions
3. Field Visit
4. Invited lectures and presentations on related topics



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LIFE INSURANCE WITH PRACTICE  
**Time: 3Hrs**

COMSET07  
**Max Marls: 75**

**Section –A**

**Answer any Five of the following**

**5X5=25M**

**1. Group Insurance**

2. Joint Life Policy
3. Define Surrender value
4. Write a short note on Death Claim
5. Maturity claims
6. Role of IRDAI
7. Lapse of Policy
8. Utmost Good Faith

**Section –B**

**Answer the following**

**5X10=50M**

9. a) What are the features of Life Insurance?

Or

b) Briefly explain Group Super Annuation Schemes

10. a) Write an essay on plains of life insurance?

Or

b) Explain about Riders

11. a). Explain the principles of Life Insurance

Or

b) What is surrender explain the procedure of surrenders

12. a) Explain the problem in claim settlement

Or

b) Write an essay on Consumer Protection Act relating to LIC and Insurance Claims

13. a) Explain about Mediators of Life Insurance

Or

b) Explain the role of Development officers.

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**P.B.SIDDHARTHA COLLEGE OF ARTS &SCIENCE :: VIJAYAWADA-10..**

(An Autonomous college in the jurisdiction of Krishna University, Machilipatnam)

**GENERAL INSURANCE PROCEDURE AND PRACTICE**

<b>Semester:</b>	VI	<b>Credits :</b>	<b>4</b>
Offered to	<b>B.Com(General, Computers &amp; )</b>	<b>Course Code</b>	COMSET08
Course Type	<b>Core (Theory)</b>	<b>Year of Introduction</b>	<b>2022-23</b>
<b>Year of Revision:</b>		<b>Percentage of Revision:</b>	
<b>Hours Taught</b>	75 hrs. Per Semester		
<b>Course Prerequisites (if any):</b>			

CO1: students are able to understand the Features of General Insurance and Insurance Companies in India (PO1) (PSO1)

CO2: Students will acquire knowledge on motor insurance, Motor Vehicle act 1988 and Compensation structure formula basis (PO1) (PSO1)

CO3: Students are able to get knowledge on fire and marine insurance and payment of claims (PO3) (PSO3)

CO4: Students will acquire General Insurance Agency skills and administrative skills (PO5) (PSO4)

CO5: Students will apply skill for settlement of claims under various circumstances (PO1) (PSO1)

**Unit-I: Introduction**

General Insurance Corporation Act - General Insurance Companies in India - Areas of General Insurance- Regulatory Framework of Insurance- IRDA - Objectives -Powers and Functions - Role of IRDA- Insurance Advisory Committee.

**Unit-II: Motor Insurance**

Motor Vehicles Act 1988 - Requirements for compulsory third party insurance – Policy Documentation & Premium- Certificate of insurance – Liability without fault – Compensation on structure formula basis - Hit and Run Accidents.

**Unit-III: Fire & Marine Insurance**

Kinds of policies – Policy conditions –Documentation- Calculation of premium- Calculation of Loss- Payment of claims.

**Unit-IV: Agriculture Insurance**

Types of agricultural insurances - Crop insurance - Problems of crop insurance - Crop Insurance Vs Agricultural relief - Considerations in Crop insurance - Live Stock Insurance.

**Unit-V: Health & Medical Insurance**

Types of Policies-Calculation of Premium- Riders-Comprehensive Plans-Payment of Claim

**Text Books:**

1. M. N. Mishra, Insurance Principles and Practices, Chand & Co, New Delhi.

**References:**

1. M.N.Mishra, Modern Concepts of Insurance, S.Chand& Co.
2. P.S. Palandi, Insurance in India, Response Books – Sagar Publications.
3. C. Gopalkrishna, Insurance – Principles and Practices, Sterling Publishers Private Ltd.
4. G. R. Desai, Life Insurance in India, MacMillan India.

**Co-Curricular Activities**

1. Assignments including technical assignments like Working with General Insurance companies for observation of policies and claims under certain policies.
2. Seminars, Conferences, discussions by inviting concerned institutions
3. Field Visit
4. Invited lectures and presentations on related topics

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**GENERAL INSURANCE PROCEDURE AND PRACTICE**  
**Time: 3Hrs**

**COMSET08**  
**Max Marls: 75**

**Section –A**

**Answer any Five of the following**

**5X5=25M**

1. Areas of General Insurance
2. Powers of IRDA
3. Certificate of Insurance
4. Kinds of Policies
5. What is Marine Insurance?
6. Agriculture Insurance
7. Livestock Insurance
8. Medical Insurance

**Section –B**

**Answer the following**

**5X10=50M**

9. a) Explain IRDA. What are the functions of IRDA  
Or  
b) Explain the Regulatory frame work of Insurance.
  10. a) Explain the motor vehicles act 1988  
Or  
b) What are the requirements for compulsory third party insurance?
  11. a). How to calculate premium and loss?  
Or  
b) What are the policy conditions?
  12. a) What are the problems of crop insurance  
Or  
b) Distinguish between crop insurance Vs Agricultural Relief
  13. a) What are the comprehensive plans under Health & Medical Insurance?  
Or  
b) Explain the concept of Riders.
-

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**E COMMERCE**

<b>Semester:</b>	VI	<b>Credits :</b>	<b>4</b>
Offered to	<b>B.Com(General )</b>	<b>Course Code</b>	COMSET17
Course Type	<b>Core (Theory)</b>	<b>Year of Introduction</b>	<b>2022-23</b>
<b>Year of Revision:</b>		<b>Percentage of Revision:</b>	
<b>Hours Taught</b>	75 hrs. Per Semester		
<b>Course Prerequisites (if any):</b>			

CO1: Students understand the mechanism of E- commerce (PO5) (PSO1)

CO2: Students themselves equip specialization in website designing for E-Commerce (PO5) (PSO1)

CO3: Students are able to enhance their skills in operational services of E-Commerce (PO5) (PSO1)

CO4: Students are able to involve in activities of E-Commerce (PO5) (PSO1)

CO5: Students are able to create awareness among the public one commerce activities (PO5) (PSO1)

**UNIT 1: Introduction, Nature and Scope**

Introduction- Definition –importance- Nature and scope of e commerce-Advantages and limitations-Types of ecommerce – B2B,B2C,C2B,C2C,B2A,C2A- Framework e commerce

**UNIT 2:- Environmental and Technical support Aspects**

Technical Components- Internet and its component structure-Internet Vs Intranet, Vs Extranet and their differences-Website design- its structure-designing, developing and deploying the system-

**UNIT 3. –Security and Legal Aspects**

Security environment –its preliminaries and precautions-protecting Web server with Firewalls-Importance of Digital Signature –its components – Cyber Law-Relevant Provisions of IT Act 2000.

**UNIT 4. - Operational Services of e Commerce**

E retailing –features- E Services-Banking, Insurance, Travel, Auctions, Learning, Publication and Entertainment-Payment of utilities (Gas, Current Bill, Petrol Products)- On Line Shopping (Amazon, Flip kart, Snap deal etc.)

**UNIT 5.–E Payment System**

Types of e payment system- its features-Digital payments (Debit Card/Credit Cards, Internet Banking, Mobile wallets- Digital Apps (unified Payment Services-Phone Pay, Google Pay, BHIM Etc.) Unstructured Supplementary Services Data (Bank Prepaid Card, Mobile banking)-

**Text Books:**

2. Bharat Bhaskar , Electronic Commerce Framework, Technology and Application.

McGraw Hill Education

**References:**

1. Bajaj,D.Nag,E Commerce, Tata McGraw Hill Publication

2. Whitely David , E-Commerce, McGraw Hill

3. TN Chhabra ,E Commerce, Dhanapat Rai & Co

4. Dave Chaffey, E Business and E Commerce Management, Pearson Publication

5.Dr.Pratikkumar Prajapati, Dr.M.Patel, E Commerce , Redshine Publication

**Suggested Co-Curricular Activities**

1 Assignments (including technical assignments like volume of business operated through e commerce, Case Studies of problems raised at the time of e commerce

2. Seminars, Conferences, discussions by inviting concerned institutions

3. Conduct surveys on pros and cons of ecommerce

4. Invited lectures and presentations on related topics by field experts

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**E COMMERCE**

**COMSET17**

**Time: 3Hrs**

**Max Marls: 75**

**Section –A**

**Answer any Five of the following**

**5X5=25M**

1. Explain the advantages of E-Commerce
2. World Wide Web
3. Cyber Law
4. online shopping
5. Mobile Banking
6. Explain the importance of Digital Signature
7. Components of internet
8. Evolution of E-Commerce

**Section –B**

**Answer the following**

**5X10=50M**

9. a) Define E-Commerce. Discuss the nature and scope of E-Commerce.

Or

b) Discuss about different models of E-Commerce

10. a) Differentiate between Internet Vs Intranet Vs Extranet

Or

b) Explain the structure of website designing.

11. a). Explain the provisions of IT act 2000

Or

b) What is Security Environment? Explain its precautions to secure the environment.

12. a) List out the E-services

Or

b) What is meant by E-Retailing? state its features.

13. a) what is E- Payments? Explain the Modes of E-Payment

Or

b) What is Internet banking? Explain the advantages and disadvantages

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**E FILING**

<b>Semester:</b>	VI	<b>Credits :</b>	<b>4</b>
Offered to	<b>B.Com(General )</b>	<b>Course Code</b>	COMSET18
Course Type	<b>Core (Theory)</b>	<b>Year of Introduction</b>	<b>2022-23</b>
<b>Year of Revision:</b>		<b>Percentage of Revision:</b>	
<b>Hours Taught</b>	75 hrs. Per Semester		
<b>Course Prerequisites (if any):</b>			

CO1: Students are able to understand and apply basic knowledge of Indian Tax System (PO5) (PSO1)

CO2: Students will equip themselves in specialization in taxation system (PO5) (PSO1)

CO3: Students will enhance their skills in presenting returns (PO5) (PSO1)

CO4: Students are able to involve in activities of chartered accountants for filing returns (PO5) (PSO1)

CO5: Students will get awareness on how to file returns of Income Tax and GST (PO5) (PSO1)

**UNIT 1: Introduction, Nature and Scope**

Introduction- Definition –importance and scope of returns--Types of Assesses –under Income Tax and Goods and Service Tax-Sources of income-

**UNIT 2:- Returns filing under Income Tax**

Types of Returns- Mode of filing-Manual-Electronic Bureau of Internal Revenue Form (eBIR) Electronic Filing and Electronic and Payment System (eFPS)-for Individuals- ITR1,ITR2,ITR3,ITR4,For Firms and CompaniesITR5,ITR6,ITR7.

**UNIT 3: –Penalties and Prosecution under Income Tax**

Nonpayment, failure to comply,-Concealment-, Book Audit, Loans-International transactions, TDS

**UNIT 4:-Returns filing under Goods Service Tax**

GSTR1, GSTR2, GSTR2A, GSTR3B, GSTR4, GSTR5, GSTR6

**UNIT 5.–Penalties and Prosecution under GST**

Differences between fees and penalty-Types of penalties under section 122 to 138

**Text Books:**

3. Varun Panwar ,Jyothi Mahajan Introduction to efilng returns MKM Publishers

**References:**

1. Hemachandjain and H.N.Tiwari Computer Application in Business Taxman’s Publication

4. SusheelaMadan Computer Application in Business MKM Publishers

**Co-Curricular Activities**

- Training of students by a related field expert.
- Assignments (including technical assignments like collection of submitted returns of various organizations, Case Studies of problems raised at the time of submission of returns.
- Seminars, Conferences ,discussions by inviting concerned institutions
- Visits to local chartered Accountants to expose the practical filing procedure
- Invited lectures and presentations on related topics by field experts.

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**E FILING**

COMSET18

**Time: 3Hrs**

**Max Marls: 75**

**Section –A**

**Answer any Five of the following**

**5X5=25M**

- 1. Define the term returns**
2. What are the different types of Assesses?
3. Explain the different methods of filing under income tax
4. Explain EFPS
5. Define Penalty
6. Define Concealment
7. How many types of returns are there in GST
8. Write any two differences between fees and penalty?

**Section –B**

**Answer the following**

**5X10=50M**

9. a) Explain the procedure of filing under income tax act and GST  
Or  
b) Explain about sources of income charged under income tax and GST
10. a) Explain various types of return forms for filing income under income tax act for individuals  
Or  
b) Discuss various procedures of E-Filing
11. a). How income tax return is useful for outside bodies to an individual  
Or  
b) What are the different types of penalties under income tax act for non – compliance of filing
12. a) Explain GSTR-1, GSTR-2, GSTR-2A , GSTR-3B and GSTR-4  
Or  
b) How returns are filed under GST
13. a) What are the different types of penalties u/s 122 to 138  
Or  
b) Discuss different types of penalties and prosecutions under GST.

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**STOCK MARKETS**

<b>Semester:</b>	VI	<b>Credits :</b>	<b>4</b>
Offered to	<b>B.Com(General )</b>	<b>Course Code</b>	COMSET05
Course Type	<b>Core (Theory)</b>	<b>Year of Introduction</b>	<b>2022-23</b>
<b>Year of Revision:</b>		<b>Percentage of Revision:</b>	
<b>Hours Taught</b>	75 hrs. Per Semester		
<b>Course Prerequisites (if any):</b>			

By the completion of the course, the students will be able to

- CO1: Expose to theory and functions of the Share Market in Financial Sector as job careers  
 CO2 :Study the functioning of capital markets and create awareness among the public  
 CO3:Acquire knowledge on operations of Share Market and Research skills  
 CO4 :Involve in activities of Mutual Funds and stock market firms  
 CO5 :Enhance their skills by practicing in preparation of accounting statements

**UNIT 1: Introduction, Nature, Scope and basics of stock market**

Introduction of Investments-Need of Investment-Short and Long Term investment- Money market Vs Capital Market-Primary Market-Secondary Market-Depositories-Buy Back Shares- Forward Contract and Future Contract- Types of Investors- Speculators, Hedgers, Arbitragers.

**UNIT 2: Capital Markets**

Definition-Participants of Capital Market Participants-Primary Market issues of Equity Shares and Preference Shares and Debentures its types Mutual Funds –Secondary Market-/Stock Exchange-National Stock Exchange of India-Over the Counter Exchange of India –Qualified Individual/Institutional Buyers -Under writers.

**UNIT 3. - Financial Intermediaries**

Depositories- -Buy Back of Shares-- Forward Contract and Future Contract- differences –Participants in Future Contract- Clearing of Mechanism.

**UNIT 4. Stock Indices**

Index and its types-SENSEX- Calculation Methodology-Types of Clearing Members.

**UNIT 5. –Regulatory Mechanism**

Security and Exchange Board of India (SEBI)-Powers, functions,-Over The Counter Exchange (OTCE) of India-Functions and Mechanism.

Text Book

- I.M.Pandey. ,Financial Management, Vikas Publishing House

**References:**

- Prasanna Chandra, Fincial Management TaTa Mc GrawL
- Bhole.L.M. Financial Markets and Institutions, Tata McGraw Hill Publishing House
- Khan MY,Jain PK, Financial Management, Tata McGraw Hill

**Co-Curricular Activities:**

- C. Mandatory** (student training by teacher in real time field skills: 10 hours):
- For Teachers: Training** of students by the teacher(using actual field material) in classroom and field for not less than 10 hours on techniques in valuation of shares of selected companies, preparation of documents, identification of local individuals / institutions who are involved in share markets. Listing out Local Money Market institutions, Identifying the investors and their experience in operational activities



Analysis of various companies Financial Statements and interpretations

2. **For Students:** Students shall individually study the work of stock market professionals and agencies and make observations. Their observations shall be written as the Fieldwork/Project work Report in the given format not exceeding 10 pages and submit to the teacher. Max marks for Fieldwork/Project work Report: 05.
3. Suggested Format for Fieldwork/Project work (not more than 10 pages): Titlepage, student details, contents, objectives, step-wise work done, findings, conclusions and acknowledgements.

#### **Suggested Co-Curricular Activities**

1. Training of students by a related field expert.
2. Assignments (including technical assignments like identifying the investors and their activities in share markets)
3. Seminars, Conferences, discussions by inviting concerned institutions
4. Visits to local Investment Institutions ,offices,
5. Invited lectures and presentations on related topics by field experts.

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**Time: 3Hrs**

**Stock Markets**

**COMSET05**  
**Max Marls: 75**

**Section –A**

**Answer any Five of the following**

**5X5=25M**

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.

**Section –B**

**Answer the following**

**5X10=50M**

9. a)

Or

b)

10. a)

Or

b)

11. a).

Or

b)

12. a)

Or

b)

13. a)

Or

b)

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**STOCK MARKETS ANALYSIS**

<b>Semester:</b>	VI	<b>Credits :</b>	<b>4</b>
Offered to	<b>B.Com(General )</b>	<b>Course Code</b>	COMSET06
Course Type	<b>Core (Theory)</b>	<b>Year of Introduction</b>	<b>2022-23</b>
<b>Year of Revision:</b>		<b>Percentage of Revision:</b>	
<b>Hours Taught</b>	75 hrs. Per Semester		
<b>Course Prerequisites (if any):</b>			

By the completion of the course, the students are able to

CO1:Expose to theory and functions of the monetary and Financial Sector as job careers

CO2:Study the functioning of local Capital markets and

CO3:Create awareness among the public by giving reporting after analysis

CO4:Acquire knowledge on operations of Share Market and Research skills

CO5:Enhance their skills by involving activities of Share Market analysis

**UNIT 1: Introduction, Nature, Scope and basics of stock market analysis** Introduction of Investments- Need of Security Analysis-Types of analysis-Fundamental Analysis, Technical Analysis, Quantity Analysis.

**UNIT 2:Fundamental Analysis**-Based on Company's Records and Performance-EPS Ratio-Price to Sales Ration-P/Earnings Ratio, P/Equity Ratio, ROI,D/P Ratio- Intrinsic Value-

**UNIT 3. –Technical Analysis**- Based on Share Price Movement and Market Trends-Bullish Pattern-Bearish pattern

**UNIT 4-Quantity Analysis:** Based on data for special Research purpose (Descriptive, Correlation, Comparative and Experimental) by preparing questionnaire, observation, focus groups and interviews – Dow Theory

**UNIT 5. –Mutual Funds**

Importance and the role of Mutual Fund –Types of Mutual Funds-Variou schemes in India- Growth Fund, Income Fund, Growth and Income Fund, Tax planning schemes ,other categories,Asset Management Mutual Funds-its method of analysis's

Text Book

5. Khan.M.Y. Financial Management, Vikas Publishing House

**IV. References:**

1.Bhole.L.M. Financial Markets and Institutions, Tata McGraw Hill Publishing House

2. Prasanna Chandra,Investment Analysis and Portfolio Management, Tata McGraw Hill

3. DamodharanAswath, Valuation: Security Analysis for Investment and corporateFinance.,Johnwiely, Newyork

4. Francis.J.C., Investment Analysis and Management, Tata Mc Graw Hill

6 Web resources suggested by the Teacher concerned and the College Librarian including reading material

**Co-Curricular Activities:**

**B. Mandatory:** (student training by teacher in real time field skills: 10 hours)

6. **For Teachers:** Training of students by the teacher (using actual field material)in

classroom and field for not less than 10 hours on Security Markets analysis, preparation of documents and Analysis of Shares and debentures, Fundamental Analysis of various companies Financial Statements and interpretations, Technical Analysis of Various Financial Statements, Quantity Analysis of various companies Financial statements and interpretations, Analysis of Mutual fund operations and their performances Case Studies of various companies' performances based on analysis of their securities and the success stories of investors.

**7. For Students:** Students shall individually study the data of selected institutions and their performance by analyzing the statements learning from practical experiences from Chartered Accountants and Cost Accountants. They shall record their observations in a hand written Fieldwork/Project work report not exceeding 10 pages in the given format and submit to the teacher.

**8.** Max marks for Fieldwork/Project work Report: 05.

**9.** Suggested Format for Fieldwork/Project work Report (not more than 10 pages): Title page, student details, contents, objective, step-wise work done, findings, conclusions and acknowledgements.

**10.** Unit tests (IE).

### **B. Suggested Co-Curricular Activities**

**6.** Training of students by a related field expert.

**7.** Assignments (including technical assignments like identifying sources of local financial institutions,

**8.** Seminars, Conferences, discussions by inviting concerned institutions

**9.** Visits to local Financial Institutions like HDFC securities, ICICI Direct Securities Reliance Securities etc.

**10.** Invited lectures and presentations on related topics by field experts

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**Stock Market Analysis**

**COMSET06**

**Time: 3Hrs**

**Max Marls: 75**

**Section –A**

**Answer any Five of the following**

**5X5=25M**

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.

**Section –B**

**Answer the following**

**5X10=50M**

9. a)

Or

b)

10. a)

Or

b)

11. a).

Or

b)

12. a)

Or

b)

13. a)

Or

b)

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**LOGISTICS SERVICES & PRACTICE**

<b>Semester:</b>	VI	<b>Credits :</b>	<b>4</b>
Offered to	<b>B.Com(General )</b>	<b>Course Code</b>	COMSET09
Course Type	<b>Core (Theory)</b>	<b>Year of Introduction</b>	<b>2022-23</b>
<b>Year of Revision:</b>		<b>Percentage of Revision:</b>	
<b>Hours Taught</b>	75 hrs. Per Semester		
<b>Course Prerequisites (if any):</b>			

CO1:Upon successful Completion of the course the student will be able to  
 CO2:Appraise the Principles of Logistics and its informatics.  
 CO3:Examine the Financial Issues in Logistics sector performance.  
 CO4:Describe basic EOQ model and ABC analysis.  
 CO5:Determine warehouse safety rules, concepts of Retail Logistics and strategies of SupplyChain Management.

**UNIT I: Introduction**

Logistics - meaning - Principles of Logistics-Technology & Logistics - Informatics.  
 Warehouse-Meaning - Types –Benefits of Warehousing. Transportation-Meaning - Types – Benefits. Courier/Express-Meaning- Courier Guidelines –Pricing in Courier -Express Sector for international and domestic shipping -Reverse logistics in e-commerce sector.

**UNIT 2: Global Logistics**

Global Supply Chain-Organizing for Global Logistics-Strategic Issues in Global Logistics -Forces driving Globalization- Modes of Transportation in Global Logistics Barriers to Global Logistics-Markets and Competition-Financial Issues in Logistics Performance.

**UNIT 3: Inventory**

Need of Inventory-Types of Inventories-Basic EOQ Model-Classification of material - ABC Analysis -VED, HML, - Material Requirement Planning (MRP)- meaning and Advantages Materials handling and storage systems-Principles of Materials Handling.

**UNIT 4: Ware housing & Distribution Operations**

Need for Warehouse – Importance of warehouse- Stages involved receipt of goods- Advanced shipment notice(ASN)-Warehouse Activities-receiving, sorting, loading, unloading ,Picking, Packing and dispatch - safety rules and Procedures to be observed in a Warehouse.

**Unit 5: Retail Logistics and Supply Chain Management**

Concepts of Retail Logistics and supply chain- Supply chain efficiency-Fundamentals of Supply Chain and Importance - SCM concepts and Definitions - Supply chain strategy- Strategic Drivers of Supply Chain Performance – key decision areas – External Drivers of Change.

**Text Books:**

1 Vinod V Sople (2009) Logistic Management (2ndEdn.) Pearson Limited

**IV References**

1. Vinod V Sople (2009) Logistic Management (2ndEdn.) Pearson Limited.
2. Logistics Management for International Business: Text and Cases, Sudalaimuthu & Anthony Raj, PHI Learning, First Edition, 2009.
3. Fundamentals of Logistics Management (The Irwin / McGraw-Hill Series in Marketing), Douglas Lambert, James R Stock, Lisa M. Ellram, McGraw-hill/Irwin, First Edition, 1998.

**IV. Co-Curricular Activities:**

**A. Mandatory:** (Student training by teacher in the related field skills:10 hrs)

1. **For Teachers:** Shall give hands-on training to students (using actual field material)in

classroom and field in operations of (specific unit/s) logistics sector with reference to material handling and storage processes, warehousing design and financial issues confronted in logistics sector.

2. **Students:** Visit any local logistics provider / local mart etc., observe and understand its operations, financial issues, material handling and storage processes, warehouse design and submit a hand written Fieldwork/Project work Report in the given format on the observations made to the teacher

3. Max marks for Fieldwork/Project work Report: 05.

4. Suggested Format for Fieldwork/Project work Report (not more than 10 pages): Title page, student details, contents, objective, step-wise work done, findings, conclusions and acknowledgements.

5. Unit tests (IE).

**B. Suggested Co-Curricular Activities:**

1. Organize short term training on specific technical skills like Zoho, Fresh book, MS Excel....in collaboration with Computer Department or skill training institution (Government or Non-Government Organization).

2. Seminars/Conference/ Workshops on career opportunities in logistics sector, trends in logistics sector, Automation in the sector etc.

3. Real time work experience with logistics sector.

Arrange for Interaction with Area Specific Experts.

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**Logistics Services and Practices**  
**Time: 3Hrs**

**COMSET09**  
**Max Marls: 75**

**Section –A**

**Answer any Five of the following**

**5X5=25M**

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.

**Section –B**

**Answer the following**

**5X10=50M**

9. a)

Or

b)

10. a)

Or

b)

11. a).

Or

b)

12. a)

Or

b)

13. a)

Or

b)

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**EXPORT IMPORT PROCEDURE &PRACTICE**

<b>Semester:</b>	VI	<b>Credits :</b>	<b>4</b>
Offered to	<b>B.Com(General )</b>	<b>Course Code</b>	COMSET10
Course Type	<b>Core (Theory)</b>	<b>Year of Introduction</b>	<b>2022-23</b>
<b>Year of Revision:</b>		<b>Percentage of Revision:</b>	
<b>Hours Taught</b>	75 hrs. Per Semester		
<b>Course Prerequisites (if any):</b>			

CO1:Upon successful completion of the course the student will be able to

CO2:Understand the significance of Export and Import Management and its role in Economy and as job careers

CO3:Acquire knowledge on Procedures of export and import

CO4:Involve in pre and post EXIM activities

CO5:Enhance their skills by practicing in foreign trade

**I. UNIT 1: Introduction of EXIM policies and procedures**

Objectives of EXIM policies- Role of export houses in the development of Economy- State Trading Corporations and SEZs - Flow of Procedure for export and import process.

**UNIT 2: Product planning and for import and export**

Export Promotion Councils in India and Commodities Board of India - Its functions and their role - Registration cum Membership Certificate (RCMC) and registration of Export Credit and Guarantee Corporation of India (ECGC)

**UNIT 3: Documentation at the time of EXIM goods**

Commercial documents- Principal and Auxiliary documents - Regulatory documents (relating to Goods, Shipment, Payment, Inspection, Payment, Excisable and FERA)

**UNIT 4: Payment Procedures in foreign trade**

Factors determines for Payment and methods of Receiving Amount -Payment in advance- Documentary Bills- Documentary credit under Letter of Credit- Different types of Letters of Credit - Open account with periodical settlement.

**UNIT 5: Insurance and Shipment of Goods**

Cargo Insurance (Marine)- Types of Marine insurance policies- Kinds of losses - Shipment of goods - Clearing and forwarding agents- its role and significance-Classification of services Essential and Optional services-clearance procedures for export of goods.

**Text Books**

1. Rama Gopal.C; Export and Import Procedure- New Age International Publishers

**II. References**

1. Neelam Arora, Export and Import Procedure and documentation- Himalaya Publishing House
2. Dr.SwapnaPilai, Export and Import Procedure & documentation- Sahityabhawan Publications
3. Sudhir kochhar, Export and Import Procedure- Aggarwal Book house

**V Co-Curricular Activities:**

**A. Mandatory** (Student training by teacher in the related field skills:10 hrs):

1. **For Teachers:** Training of students by teacher (using actual field material)in classroom and field for not less than 10 hours on techniques of foreign trade by involving students in making observations, preparation of documents, identification of exportable goods and recording experiences of exporters.

2. **For Students:** students shall visit export import houses or related centers and observe processes of identification of exportable goods, registration of RCMC, logistic support and insurance procedures. They shall submit their observations as an individual handwritten Fieldwork/Project work Report in the given format and submit to teacher.
3. Max marks for Fieldwork/Project work Report: 05
4. Suggested Format for Fieldwork/Project work (not more than 10 pages): Title page, student details, contents, objective, step-wise work done, findings, conclusions and acknowledgements.
5. Unit tests (IE).

**B. Suggested Co-Curricular Activities**

1. Training of students by a related field expert.
2. Assignments (including technical assignments like identifying sources of exportable and Excisable goods, Case Studies of export procedures and the success stories and getting practical experiences by exporting Agricultural and local products including DWACRA
3. Seminars, Conferences ,discussions by inviting concerned institutions
4. Visits to exporting units. SEZs and Export houses
5. Invited lectures and presentations on related topics by field experts.

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**EXPOT Procedure and Practice**  
**Time: 3Hrs**

**COMSET10**  
**Max Marls: 75**

**Section –A**

**Answer any Five of the following**

**5X5=25M**

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.

**Section –B**

**Answer the following**

**5X10=50M**

9. a)

Or

b)

10. a)

Or

b)

11. a).

Or

b)

12. a)

Or

b)

13. a)

Or

b)

\*\*\*\*\*

**P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE :: VIJAYAWADA-10..**  
(An Autonomous college in the jurisdiction of Krishna University, Machilipatnam)

**INCOME TAX ASSESSMENT PROCEDURES AND PRACTICE**

<b>Semester:</b>	VI	<b>Credits :</b>	<b>4</b>
Offered to	<b>B.Com(General )</b>	<b>Course Code</b>	COMSET13
Course Type	<b>Core (Theory)</b>	<b>Year of Introduction</b>	<b>2022-23</b>
<b>Year of Revision:</b>		<b>Percentage of Revision:</b>	
<b>Hours Taught</b>	75 hrs. Per Semester		
<b>Course Prerequisites (if any):</b>			

After successfully completing the course, the student shall be able to:

**CO1:** Understand the basic concepts in computation of tax liability under all heads of income of the individuals.

**CO2:** Analyze the clubbing provisions, aggregate income after set-off and carry forward losses under the Income Tax Act.

**CO3:** Compute taxable income and tax liability of individuals and firms.

**CO4:** Acquire the ability to file online returns of income.

**CO5:** Acquire skills of TDS/TCS and online filing of Tax returns.

**Unit-I: Computation of Total Income and Tax Liability**

Computation of Total Income and Tax Liability of Individuals- Firms and Companies - Procedure for Assessment including Problems in calculation of tax for firms & Companies

**Unit-II: Clubbing of Income-Set off of Losses**

Meaning of clubbing of income- Different items come under the provisions of clubbing of income- Meaning of set-off of losses and carry-forward and set-off of losses – Types of set-off - Intra-set off and Inter-set off

**Unit-III: Tax Payment- Penalties**

Advance Payment of Tax - Persons liable to pay Advance Tax – Procedure for Computation of Advance Tax – Due Dates for the Payment of Advance Tax - Consequences of Non-payment of Advance Tax- Refund of tax, interest on refund – Appeals and Revisions

**Unit-IV: Returns Filing**

Procedure for Assessment - Filing of Return – Prescribed Forms for filing of Returns – PAN & TAN - On-line filing of Returns- 26 AS - Traces.

**Unit-V: TDS & TCS and e-Filing**

TDS-TCS- Provisions in brief relating to TDS/TCS- Schedule for deposit & Submission of Returns of TDS- Form-16 generation.

**Text Books:**

- Income Tax, Vinod K. Sinhania & Monica Sinhania, Taxmann Publications Pvt. Ltd, New Delh

**III: References:**

- Systematic Approach to Income Tax, Girish Ahuja & Ravi Gupta, Bharat Law House Pvt. Ltd, New Delhi.
- Income Tax, Vinod K. Sinhania & Monica Sinhania, Taxmann Publications Pvt. Ltd, New Delhi.
- Taxation Law & Practice, Mehtrotra & Goyal, Sahitya Bhavan Publications, Agra.
- E.A. Srinivas, Corporate Tax Planning, Tata McGraw Hill.
- Vinod K. Sinhania, Taxman's Direct Taxes Planning and Management.
- Bhagawati Prasad, Direct Taxes Laws Practice, Vishwa Prakashan.
- <https://incometaxindia.gov.in>
- Web resources suggested by the Teacher concerned and the College Librarian

including reading material

#### **IV. Co-Curricular Activities**

##### **A. Mandatory** (Student training by teacher in field related skills: 10 hrs.):

1. **For Teachers:** Training of students by the teacher (using actual field material) in classroom/field for not less than 10 hours on techniques in tax consultancy, Income Tax calculation and Tax filing. Tax filing in respect to individuals, firms and Corporate. Income Tax Portal for a selected Tax Payer. Each student has to be trained in using forms for filing of returns.
  - a. Tax Calculation and preparation of Annexure w.r.t employees in the institutions and selected organizations (ref. unit-1)
  - b. Working with Clubbing income and set of losses/carry forward losses for a given Company/organization (ref. unit-2)
  - c. Working with CBDT website for Income Tax website for various provisions and Penalties (ref. unit-3)
  - d. Working with Online tax portal for downloading different formats (ref. unit 4)
  - e. Preparation of TDS and TCS reports and generating Form 16 from respective DDO (ref. unit.5)
2. **For Students:** Students shall individually take up a field study and make observations on Tax Assessment and Submission of Tax Return to Income tax department, payment of tax and other formalities. They may also work with an Income Tax Practitioner and participate in the real time submissions of Tax. Each student has to submit his/her observations as a handwritten Fieldwork/Project work Report not exceeding 10 pages in the given format to the teacher.
3. Max marks for Fieldwork/Project work Report: 05
4. Suggested Format for Fieldwork/Project work (not more than 10 pages): Title page, student details, Contents, objective, step-wise work done, findings, conclusions and acknowledgements.
5. Unit tests (IE).

##### **B. Suggested Co-Curricular Activities**

1. Training of students by a related field expert.
2. Assignments including technical assignments like Working with Tax Consultancy for observation of Tax Assessment and Return Filing Procedure.
3. Seminars, Conferences, discussions by inviting concerned institutions
4. Field Visit
5. Invited lectures and presentations on related topics

**P.B.SIDDHARTHA COLLEGE OF ARTS &SCIENCE :: VIJAYAWADA-10..**  
(An Autonomous college in the jurisdiction of Krishna University, Machilipatnam)

**INCOME TAX ASSESSMENT PROCEDURES AND PRACTICE COMSET13**  
**Time: 3Hrs Max Marls: 75**

**Section –A**

**Answer any Five of the following**

**5X5=25M**

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.

**Section –B**

**Answer the following**

**5X10=50M**

9. a) \_\_\_\_\_
- Or
- b) \_\_\_\_\_
10. a) \_\_\_\_\_
- Or
- b) \_\_\_\_\_
11. a) \_\_\_\_\_
- Or
- b) \_\_\_\_\_
12. a) \_\_\_\_\_
- Or
- b) \_\_\_\_\_
13. a) \_\_\_\_\_
- Or
- b) \_\_\_\_\_

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**P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE :: VIJAYAWADA-10..**  
(An Autonomous college in the jurisdiction of Krishna University, Machilipatnam)

**GOODS AND SERVICES TAX WITH TALLY**

<b>Semester:</b>	VI	<b>Credits :</b>	<b>4</b>
Offered to	<b>B.Com(General )</b>	<b>Course Code</b>	COMSET14
Course Type	<b>Core (Theory)</b>	<b>Year of Introduction</b>	<b>2022-23</b>
<b>Year of Revision:</b>		<b>Percentage of Revision:</b>	
<b>Hours Taught</b>	75 hrs. Per Semester		
<b>Course Prerequisites (if any):</b>			

After completing the course, the student shall be able to:

CO1: Understand the concept of Liability and Payment of GST

CO2: Create a new company in Tally with GST components and establish environment for GST Voucher entry.

CO3: Comprehend the utilization of input tax credit, and the reverse charge mechanism in GST

CO4: Acquire Skills of preparation of GST Returns in accordance with GST Law and Tally

CO5: Acquire skill of online payment of GST through GST Portal.

**Unit 1: GST- Liability and Payment**

Output tax liability - Input tax credit utilization-- Schedule for payment of GST- Interest/penalty for late/non-filing of return-Payment of GST- GST Network

**Unit-II: GST – Accounting Masters and Inventory Masters in Tally**

Company Creation- General Ledgers & GST Ledgers Creation - Stock Groups , Stock Items and Unit of Measure - GST Rate Allocation to Stocks

**Unit-III: GST Voucher Entry**

GST Vouchers - Customizing the Existing Voucher types with applicable GST Rates –Mapping of Input Tax Credit on Purchase Vouchers - Output Tax on Sales Vouchers- Purchase and Sales Voucher Entries with Single Rated GST and Multiple Rated GST Goods.

**Unit-IV: GST Returns**

Regular Monthly returns and Annual Return- Returns for Composition Scheme- Generation of Returns - GSTR-1, GSTR-2, GSTR-3, GSTR-4, GSTR-9, GSTR-3B

**Unit-V: Payment of GST online**

Payment of GST- Electronic Filing of GST Returns – Refunds – Penalties- Administrative structure of GST Officers- Powers- Jurisdiction.

**Text Books:**

1. Bansal, K. M., GST & Customs Law, Taxmann Publication.

**References Books**

2. Ahuja, Girish, Gupta Ravi, GST & Customs Law.
3. Babbar, Sonal, Kaur, Rasleen and Khurana, Kritika. Goods and Service Tax (GST) and Customs Law. Scholar Tech Press.
4. Bansal, K. M., GST & Customs Law, Taxmann Publication.
5. Singhanian, Vinod K. and Singhanian Monica. Students' guide to Income Tax. University Edition. Taxmann Publications Pvt Ltd., New Delhi.
6. Sisodia Pushpendra, GST Law, Bharat Law House.
7. **Web resources:** <https://cbic-gst.gov.in>
8. Web resources suggested by the Teacher concerned and the College Librarian including reading material

**IV. Co-Curricular Activities**

**A. Mandatory** (Student training by teacher in field related skills: 10 hrs.):

1. **For Teachers:** Training of students by the teacher (using actual field material) in classroom/

field for not less than 10 hours on techniques in computation of and online submission of GST. On Tally ERP 9 for entering entries of a selected firm.

- a. Calculation of output tax liability and input Tax Credit through voucher entries(ref. unit-1)
- b. Creation of Company and working with Masters in Tally ERP9 (ref. unit-2)
- c. Voucher entry along with Input tax and output taxed entries (ref. unit-3)
- d. Preparation of GST Returns for regular dealer and composite dealer in tally(Ref. unit 4)
- e. Online Payment of GST using Tally (ref. unit.5)

2. **For Students:** Students shall take up individual field study on Entry of GST Voucher, Calculation of Input Tax and Output Tax including single rated /multi rated GST with a selected organizations. Submission of online GST Returns for a selected business firm. Each student has to submit his/her observations as a handwritten Fieldwork/Project work Report not exceeding 10 pages in the given format to the teacher.

3. Max marks for Fieldwork/Project work Report: 05.

4. Suggested Format for Fieldwork/Project work Report (not more than 10 pages): Title page, student details, contents, objective, step-wise work done, findings, conclusions and acknowledgements.

5. Unit tests (IE).

**B. Suggested Co-Curricular Activities**

1. Training of students by a related field expert.
2. Assignments including technical assignments like Working with Tally for Observation of real-time entries for transaction of accounting with inventory
3. Seminars, Conferences, discussions by inviting concerned institutions
4. Field Visit
5. Invited lectures and presentations on related topics.



**P.B.SIDDHARTHA COLLEGE OF ARTS &SCIENCE :: VIJAYAWADA-10..**  
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**GST Procedure & Practice**

COMSET14

**Time: 3Hrs**

**Max Marls: 75**

**Section –A**

**Answer any Five of the following**

**5X5=25M**

- 1.
- 2.
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- 8.

**Section –B**

**Answer the following**

**5X10=50M**

9. a)

Or

b)

10. a)

Or

b)

11. a).

Or

b)

12. a)

Or

b)

13. a)

Or

b)

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**P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE, Vijayawada-10**

(An Autonomous College in the Jurisdiction of Krishna University)

Siddhartha Nagar, Vijayawada – 520 010

*Autonomous - ISO 9001 - 2015 Certified*

**DEPARTMENT OF ECONOMICS**

Minutes of **Board of Studies in Economics** meeting held on **12-08-2022 at 11:00** am in the Department of Economics for **ODD SEMESTER** of 2022-2023 academic year.

**Members Present**

<b>S.No</b>	<b>Name of the Member</b>	<b>Designation</b>	<b>Signature</b>
1.	<b>Dr. Ch. Surya Prakasa Rao</b>	Chairman	
2.	<b>Dr. B. Narayana Rao</b>	University Nominee	
3.	<b>Prof. B. Nageswara Rao</b>	Subject Expert	
4.	<b>Prof. T.Koti Reddy</b>	Subject Expert	
5.	<b>Sri V. Keshava Rao</b>	Industrialist	
6.	<b>Smt. Ch. V. R. Kusuma</b>	Member	

DEPARTMENT OF ECONOMICS							
LIST OF THE COURSES REVISED/ INTRODUCED IN V/VI SEMESTERS -2022-23							
S.NO	TITLE OF THE COURSE	Course Code	Offered in SEM	Type of the Paper	Year of Introduction	OBE with BTL	Offered to
1	Third internship / Project Work / On the Job Training / Apprenticeship	ECOCIAP5	V	CORE PROJECT	2022-23	YES	B.A.(E.M.S)
2	Rural Entrepreneurship	ECOSET01	VI	SEC ELECTIVE A	2022-23	YES	B.A.(E.M.S)
3	Farmer Producer Organizations (FPOs)	ECOSET02					B.A.(E.M.S)
4	Urban Entrepreneurship and MSMEs	ECOSET03	VI	SEC ELECTIVE B	2022-23	YES	B.A.(E.M.S)
5	Retail and Digital Marketing	ECOSET04					B.A.(E.M.S)
6	Insurance Services	ECOSET05	VI	SEC ELECTIVE C	2022-23	YES	B.A.(E.M.S)
7	Banking and Financial Services	ECOSET06					B.A.(E.M.S)
8	Inferential Statistics and Software Packages	ECOSET07	VI	SEC ELECTIVE D	2022-23	YES	B.A.(E.M.S)
9	Project Designing and Report Writing	ECOSET08					B.A.(E.M.S)

## Resolutions

The following resolutions are approved by The Board of studies in Economics, held on 12-8-2022 at 11.00 am in the Department of Economics for Odd Semester of 2022-23 recommend to Academic council for its approval.

1. It is resolved and recommend to introduce Rural Entrepreneurship with course code ECOSET01 in VI semester of B.A(EMS) for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 4 to 8.
2. It is resolved and recommend to introduce Farmer Producer Organizations (FPOs) with course code ECOSET02 in VI semester of B.A(EMS) for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 9 to 13.
3. It is resolved and recommend to introduce Urban Entrepreneurship and MSMEs with course code ECOSET03 in VI semester of B.A(EMS) for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 14 to 18.
4. It is resolved and recommend to introduce Retail and Digital Marketing with course code ECOSET04 in VI semester of B.A(EMS) for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 19 to 23.

5. It is resolved and recommend to introduce **Insurance Services** with course code **ECOSET05** in VI semester of B.A(EMS) for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 24 to 28.
6. It is resolved and recommend to introduce **Banking and Financial Services** with course code **ECOSET06** in VI semester of B.A(EMS) for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 29 to 32.
7. It is resolved and recommend to introduce **Inferential Statistics and Software Packages** with course code **ECOSET07** in VI semester of B.A(EMS) for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 33to 37.
8. It is resolved and recommend to introduce **Project Designing and Report Writing** with course code **ECOSET08** in VI semester of B.A(EMS) for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 38 to 42.
9. It is resolved to permit the III BA students to do **Third internship / Project Work / On the Job Training / Apprenticeship** for 90 days / 720 hrs in V / VI semester.

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**P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE  
VIJAYAWADA – 10.**

**Three-Year B.A (EMS)**

Course Code: **ECOSET01**

Domain Subject: **ECONOMICS**

III Year B.A.-Semester-V

Max Marks: 100

**Course 6A: Rural Entrepreneurship**  
(Skill Enhancement Course (Elective, 4 Credits))

**I. Learning Outcomes:**

Students at the successful completion of the course shall be able to:

1. Explain the basic theories and essentials of entrepreneurship;
2. Identify and analyze the entrepreneurship opportunities available in local rural area;
3. Apply the theories of entrepreneurship to the conditions of local rural area and formulate appropriate business ideas;
4. Demonstrate practical skills that will enable them to start rural entrepreneurship.

**II. Syllabus:** (Hours: Teaching: 60, Training: 10, Others Including Unit

Tests: 05)

**Unit - 1: Entrepreneurship: Concept and Theories**

Concept and Importance of Entrepreneurship - Theories of Entrepreneurship: Innovations, X-Efficiency, Risk Bearing - Qualities and Functions of an Entrepreneur – Women Entrepreneurship – Ecopreneurship.

**Unit - 2: Rural Entrepreneurship, Business Planning and Agribusiness**

Rural Entrepreneurial Ecosystem - Factors affecting Rural Entrepreneurships - Process of Identification of new Entrepreneurship Opportunities in Rural Areas - Formulation of Business Planning for Rural Entrepreneurship - Problems and Challenges to Rural Entrepreneurship - Agribusiness and Value Addition: Procuring, Processing, Storing, and Marketing.

**Unit - 3: New Rural Entrepreneurship Opportunities**

New Entrepreneurship Opportunities in Farm sector: Organic Farm Products, Nutri-Cereals, Horticultural Products, Forest Produce, Medicinal Plant Products - New Entrepreneurship Opportunities in Rural Non-farm sector: Poultry, Aquaculture, Sericulture, Honeybee, Mushrooms Cultivation - New Entrepreneurship Opportunities in Rural Services: Micro Finance, Handicrafts, Custom Hiring Machines, Cold Storages.

#### **Unit - 4: Financing and Marketing for Rural Entrepreneurship**

Financing the Rural Entrepreneurship: Procedures to obtain formal loans from banks and other institutions - Preparation of Detailed Project Report for Loan - New avenues of Finance: Crowd Funding and Venture Capital - Marketing of Rural Products: Market Survey, Demand Forecasting, Marketing Strategies, Branding, Planning and Promotion, Digital and Social Media Marketing.

#### **Unit - 5: Institutional Support and Case Studies of Rural Entrepreneurship**

Intitutional Support for Rural Entrepreneurship - Special Role of NABARD in promoting and supporting the Rural Entrepreneurship - Government Schemes for promotion of Rural Entrepreneurship and their important features – Rules and Procedures to start a Rural Entrepreneurship Firm – Discussion of two different types of Case Studies related to Rural Entrepreneurship with local relevance.

#### **III. References:**

1. Gordona, E and N. Natarajan: *Entrepreneurship Development*, Himalaya Publishing House Pvt Ltd, Mumbai, 2017.
2. Sudhir Sharma, Singh Balraj, SinghalSandeep, *Entrepreneurship Development*, Wisdom Publications, Delhi, 2005.
3. Drucker, P., *Innovation and Entrepreneurship: Practice and Principles*, Harper & Row, New York, 1985; revised edn., Butterworth-Heinemann, Oxford, 1999.
4. National Council of Rural Institute (NCRI): Curriculum for Rural Entrepreneurship, 2019.  
<http://www.mgncre.org/pdf/Rural%20Entrepreneurship%20Material.pdf>
5. NITI Aayog: *Report of Expert Committee on Innovation and Entrepreneurship*, New Delhi, 2015.  
[https://niti.gov.in/writereaddata/files/new\\_initiatives/report-of-the-expert-committee.pdf](https://niti.gov.in/writereaddata/files/new_initiatives/report-of-the-expert-committee.pdf)
6. VardhamanMahavir Open Unversity, *Entrepreneurship Development & Small Scale Business*, Kota. <http://assets.vmou.ac.in/BBA12.pdf>
7. MANAGE: *Agri-Business and Entrepreneurship Development*, Course Material AEM-202, 2013.  
<https://www.manage.gov.in/pgdaem/studymaterial/aem202.pdf>
8. NABARD: *Model Bankable Farming on Hi-Tech Agriculture, Green Farming*, 2015.

[https://www.nabard.org/demo/auth/writereaddata/ModelBankProject/1612162301Precision farming for vegetable cultivation in Kerala \(E\).pdf](https://www.nabard.org/demo/auth/writereaddata/ModelBankProject/1612162301Precision%20farming%20for%20vegetable%20cultivation%20in%20Kerala%20(E).pdf)

9. JohanneHanko:*A Handbook for Training of Disabled on Rural Enterprise Development*, Food and Agricultural Organisation (FAO), 2003. <http://www.fao.org/3/ad453e/ad453e.pdf>
- 10.IGNOU: *Marketing for Managers*, New Delhi. <http://egyankosh.ac.in/handle/123456789/4271>
- 11.[www.nirdpr.org](http://www.nirdpr.org)
- 12.<https://www.nabard.org/>
- 13.<http://sfacindia.com/>
- 14.Other Relevant web resources suggested by the teacher and college librarian

#### **IV. Co-Curricular Activities: (Lecturer Participation: Total 10 Hours)**

##### 1. For Teachers:

- Presentation of audio-video or print material to demonstrate the practical ground level activities of a rural entrepreneur so as to encourage the students to develop their own rural entrepreneurship ideas
- Conducting activities like brainstorming sessions, group discussions, student seminars, role play etc., for generating ideas and plans.
- Organize guest lectures and interactions with successful real rural entrepreneurs in the local area to discuss ideas and plans and preparation of DPRs
- Arranging interaction sessions or workshops with officers of relevant government department and financial institutions to work on specific proposals
- Engage the students in field work to study the successful rural entrepreneurs in the local area and gain working knowledge

##### 2. For Students:

- Students shall actively participate in the above co-curricular activities and gain practical knowledge, understanding, ideas and skills related to the subject.
- Students shall participate in field work, collect data, analyze, and make a report and present it in the class.

##### 3. Suggested Field Work Report Format:

Title Page, Student Details, Acknowledgments, Index of Contents;  
*Objectives, Step-wise process, Findings, Conclusion & References*

##### 4. Max Marks for Field Work Report: 05

##### 5. Unit Tests/Internal Examinations

**Note:** For the latest topics which have no formal material available, the teacher is expected to prepare own material by using multiple latest sources and practical knowledge.

Section - A

Answer any FIVE of the following.

5x5=25M

1. Write about women Entrepreneurship  
మహిళా వ్యవస్థాపకత్వము గూర్చివ్రాయుము.
2. Explain the concept of Processing  
ప్రోసెసింగ్ భావనను వివరింపుము
3. Write about Mushrooms cultivation  
పుట్టగొడుగుల వ్యవసాయమును గూర్చి వ్రాయుము
4. Write about Aquaculture  
అక్వాకల్చర్ గూర్చి వ్రాయుము
5. Explain the concept of Venture capital  
వెంచర్ మూలధనము భావనను వివరింపుము
6. Explain the concept of social media marketing  
సామాజిక మాధ్యమాల మార్కెటింగ్ భావనను వివరింపుము
7. What are the rules to about rural form  
గ్రామీణ సంస్థ ఏర్పాటుకు ఉన్న నియమాలు ఏవి?
8. NABARD  
జాతీయ గ్రామీణ మరియు అభివృద్ధి (నాబార్డ్) విధులు ఏవి?

Section - B

Answer the following.

5x10=50M

9. A) What is entrepreneurship and explain the importance of entrepreneurship  
ఉద్యమిత్వము అనగానేమి? ఉద్యమత్వ ప్రాధాన్యతను వివరింపుము

Or

- B) Explain the qualities and functions of an entrepreneurship  
ఉద్యమిత్వ గుణాలు మరియు విధులను వివరింపుము మరియు సవాళ్ళను వివరింపుము

10. A) Explain the problems and challenges of rural entrepreneurs.  
గ్రామీణ వ్యవస్థాపకత్వములో ఉన్న సమస్యలు మరియు సవాళ్ళను వివరింపుము

Or

- B) Explain the process of identification of new entrepreneurship opportunities in Rural Areas.



గ్రామీణ ప్రాంతాలలో నూతన వ్యవస్థాపకత్వ అవకాశాలను గుర్తించే ప్రక్రియను వివరింపుము.

11. A) Write about the different new entrepreneurs opportunities in Form section.  
వ్యవసాయ రంగంలో వివిధ నూతన వ్యవస్థాపన అవకాశాలను గూర్చి వ్రాయుము

Or

B) Write about the different New entrepreneurs opportunities in Rural Non-farm sectors.

గ్రామీణ వ్యవసాయేతర రంగాలలో నూతన వ్యవస్థాపన అలకాలను గూర్చి వ్రాయుము.

12. A) Explain the procedures to obtain formal loans from banks and other institutions..  
బ్యాంకులు మరియు ఇతర సంస్థల దగ్గర నుండి ఋణము పొందే ప్రక్రియను వివరింపుము.

Or

B) Explain the different steps in marketing of Rural Products.

గ్రామీణ ఉత్పత్తులను మార్కెట్లో వున్న వివిధ దశలను వివరింపుము.

13. A) Explain the role of NABAB in promotes rural entrepreneurs

గ్రామీణ వ్యవస్థాపనను ప్రోత్సహించడంలో నాబార్డ్ పాత్రను వివరింపుము

Or

B) Write about the different government schemes for promotion of Rural entrepreneurs

గ్రామీణ వ్యవస్థాపనలో వివిధ ప్రభుత్వ పథకాలను గూర్చి వ్రాయుము.

**P.B.SIDDHARTHA COLLEGE OF ARTS &SCIENCE  
VIJAYAWADA – 10.**

Course Code: **ECOSET02**

Three-Year B.A

Domain Subject: **ECONOMICS**

III Year B.A.-Semester-V

Max Marks: 100

Course 7A: **Farmer Producer Organizations (FPOs)**  
(Skill Enhancement Course (Elective)), 4 Credits

**I. Learning Outcomes:**

Students at the successful completion of the course shall be able to:

1. Explain the concept and organization of FPO and its economic activities.
2. Identify and analyse the opportunities related to FPO in local rural area.
3. Apply the concepts to the identified FPO related opportunities available in the local area and formulate business ideas.
4. Demonstrate practical skills that will enable them to start a FPO or earn wage employment in it

**II. Syllabus:** (Hours: Teaching: 60, Training: 10, Others Including Unit

Tests: 05)

**Unit 1: Concept of FPO and Importance**

Concept and importance of FPO – Types of FPOs - Organizational structure and Functions of FPO - Ecosystem required for FPO - Role of FPOs in present Indian Agricultural Development – Current Problems and Challenges of FPOs in India.

**Unit 2: Establishing FPO and Collaborations**

Situation Analysis and Mobilizing Farmer Producers for FPO - Rules and Regulation related to FPOs - Procedures to start FPO – Infrastructure required for FPO - Collaboration with Other Organizations – Training and Capacity Building to Persons in FPO – Managing Financial Accounts of FPO.

**Unit 3: Economic Activities and Business Planning of FPO**

Economic Activities and Services undertaken by FPO: Input Purchase, Custom Hiring Machines - Output Business: Procuring, Processing, Storage,

Logistics, Marketing, Exporting etc. - Product Identification and Value Chain Analysis - Business Planning for FPO - Viable Business Models of FPO: Multi-product and Value Added.

#### **Unit 4: Financing and Marketing of FPO**

Financial Planning in FPO - Mobilization of Capital from Members, Banks and other Funding Agencies - Marketing of FPO Products: Market Survey, Demand Forecasting, Marketing Strategies, Branding, Planning and Promotion, Digital and Social Media Marketing.

#### **Unit 5: Institutional Support and Case Studies of FPOs**

Institutional Support and Resource Supporting Agencies for FPOs - Special Roles of NABARD and SFAC – Government Schemes for promotion of FPOs - Discussion of two important Case Studies related to FPOs with different product or process types of local relevance.

### **III. References:**

1. NABARD: *Farmer Producer Organisations*, FAQs. Mumbai, 2015. <https://www.nabard.org/demo/auth/writereaddata/File/FARMER%20PRODUCER%20ORGANISATIONS.pdf>
2. NABARD: *Farmer Producer Organisations: Status, Issues and Suggested Policy Reforms*, Mumbai, 2019-20. <https://www.nabard.org/auth/writereaddata/CareerNotices/2708183505Paper%20on%20FPOs%20-%20Status%20&%20%20Issues.pdf>
3. NABARD: *FPO e-Learning Module*. [https://www.nabard.org/FPO/story\\_html5.html](https://www.nabard.org/FPO/story_html5.html)
4. SFAC: *Formation and Promotion of 10, 000 Farmer Producer Organisations: Operational Guidelines*, New Delhi, 2020. <http://sfacindia.com/UploadFile/Statistics/Formation%20&%20Promotion%20of%2010,000%20FPOs%20Scheme%20Operational%20Guidelines%20in%20English.pdf>
5. FAO: *Course on Agribusiness Management for Producers' Associations*, 2009. <http://www.fao.org/3/i0499e/i0499e00.htm>
6. Richa Govil, Annapurna Neti and Madhushree R. Rao: *Farmer Producer Organisations: Past, Present and Future*, Azim Premji University, Bengaluru, 2020. <http://publications.azimpremjifoundation.org/2268/>
7. IGNOU: *Marketing for Managers*, New Delhi. <http://egyankosh.ac.in/handle/123456789/4271>
8. <https://www.nabard.org/>
9. <http://sfacindia.com/FPOS.aspx>
10. Other Relevant web resources suggested by the teacher and college librarian

### **IV. Co-Curricular Activities: (Lecturer Participation: Total 10 Hours)**

1. For Teachers:

- Presentation of audio-video or print material to demonstrate the practical ground level activities of a FPO, so as to encourage the students to develop their own FPO models
- Conducting activities like brainstorming sessions and group discussion, student seminars, role play etc., to generate ideas
- Organize guest lectures and interactions with successful FPOs in the local area.
- Organize interactive sessions with the officers of the government departments concerned to seek practical guidance in meeting the procedural requirement of starting and running a FPO
- Engage the students in field work to study and gain practical knowledge for successful organization of FPOs in the local area.

2. For Students:

- Students shall actively participate in the above co-curricular activities and gain practical knowledge, understanding, ideas and skills related to the subject.
- Students shall participate in field work, collect data, analyze, and make a report and presentation in the class.

3. Suggested Field Work Format:

Title Page, Student Details, Acknowledgments, Index of Contents;  
*Objectives, Step-wise process, Findings, Conclusion & References*

4. Max Marks for Field Work Report: 05

5. Unit Tests/Internal Examination

**Note:** For the latest topics which have no formal material available, the teacher is expected to prepare own material by using multiple latest sources and practical knowledge.

###

**P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE :: VIJAYAWADA  
- 10**

**Name of Programme : III B.A. (EMS)  
Course 7A : Farmer Producer Organization  
SEMESTER - V / VI**

**Skill Enhancement Course**

**Time: 3 Hours**

**Max. Marks: 75M**

**Course Code : ECOSET02**

**Section - A**

**Answer any FIVE of the following.**

**5x5=25M**

1. Explain the concept of Farmer produce organisation (FPO's)  
వ్యవసాయ ఉత్పత్తిదారుల వ్యవస్థ భావనను వివరింపుము
2. Organizational structure of FPO  
వ్యవసాయ ఉత్పత్తి దారుల వ్యవస్థ నిర్మాణమును వివరింపుము.
3. Managing Financial Accounts of FPO  
వ్యవసాయ ఉత్పత్తిదారుల వ్యవస్థ ఆర్థిక గణాంకల నిర్వహణ
4. Economic activities FPO  
వ్యవసాయ ఉత్పత్తిదారుల వ్యవస్థ ఆర్థిక కార్యకలాపాలు
5. Write about business planning for FPO  
వ్యవసాయ ఉత్పత్తిదారుల వ్యవస్థ వ్యాపార ప్రణాళికను గూర్చి వ్రాయుము
6. Demand Forecasters  
డిమాండ్ అంచనాదారులు
7. Digital and social media  
డిజిటల్ మరియు సామాజిక మాధ్యమాలు
8. NABARD  
నాబార్డ్

**Section - B**

**Answer the following.**

**5x10=50M**

9. A) Explain the organization structure and functions of FPO  
వ్యవసాయ ఉత్పత్తిదారుల వ్యవస్థ నిర్మాణము మరియు విధులను వివరింపుము

Or

B) Explain the Role of FPO's in present Indian agricultural Development  
వ్యవసాయరంగ అభివృద్ధిలో వ్యవసాయ ఉత్పత్తి దారుల వ్యవస్థ పాత్రను వివరింపుము

10. A) Explain the Rules and Regulations related to FPOs

వ్యవసాయ ఉత్పత్తిదారుల వ్యవస్థకు సంబంధించిన నియమ నిబంధనలను వివరింపుము

Or

B) Explain the training and capacity Building to pension in FPO

వ్యవసాయ ఉత్పత్తి దారుల ప్రస్తుత వ్యవస్థ శిక్షణ మరియు శక్తి అభివృద్ధిని వివరింపుము

11. A) Explain the economic activities undertaken by FPO

వ్యవసాయ ఉత్పత్తి దారుల వ్యవస్థ నిర్వహించే ఆర్థిక కార్యకలాపాలను వివరింపుము

Or

B) Write about the visible Business models of FPO

వ్యవసాయ ఉత్పత్తిదారుల వ్యవస్థ బయటికి కనిపించే వ్యాపార నమూనాలను గూర్చి వ్రాయుము

12. A) Explain the financial planning in FPO

వ్యాపార ఉత్పత్తిదారుల వ్యవస్థ ఆర్థిక ప్రణాళికను వివరింపుము

Or

B) Explain the methods of Marketing of FPO products.

వ్యవసాయ ఉత్పత్తిదారుల వ్యవస్థ ఉత్పత్తుల మార్కెటింగ్ పద్ధతులను వివరింపుము

13. A) Explain the special role of NABARD is in supports FPO

వ్యవసాయ ఉత్పత్తిదారుల వ్యవస్థకు నాబార్డ్ యొక్క మద్దతును వివరింపుము.

Or

B) Explain the Government schemes for promotion of FPO

వ్యవసాయ ఉత్పత్తిదారుల వ్యవస్థను ప్రోత్సహించడం ప్రభుత్వ పథకాలను వివరింపుము.

**P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE  
VIJAYAWADA – 10.**

Course Code: **ECOSSET03**

Three-Year B.A

Domain Subject: **ECONOMICS**

III Year B.A.-Semester-V

Max Marks: 100

**Course 6B: Urban Entrepreneurship and MSMEs**  
(Skill Enhancement Course (Elective)), 4 Credits

**I. Learning Outcomes:**

Students at the successful completion of the course shall be able to:

1. Explain the basic theories and essentials of entrepreneurship
2. Identify and analyze the entrepreneurship opportunities available in local urban area.
3. Apply the theories of entrepreneurship to the conditions of local urban area and formulate appropriate business ideas.
4. Demonstrate practical skills that will enable them to start urban entrepreneurship

**II. Syllabus:** (Hours: Teaching: 60, Training: 10, Others Including Unit Tests: 05)

**Unit1: Entrepreneurship: Concept and Theories**

Concept and Importance of Entrepreneurship - Theories of Entrepreneurship: Innovations, X-Efficiency, Risk Bearing - Qualities and Functions of an Entrepreneur – Women Entrepreneurship - Ecopreneurship.

**Unit2: Urban Entrepreneurship and Business Planning**

Urban Entrepreneurial Ecosystem - Factors affecting Urban Entrepreneurships - Process of Identification of new Entrepreneurship Opportunities in Urban Areas - Formulation of Business Planning for Urban Entrepreneurship - Problems and Challenges to Urban Entrepreneurship.

**Unit 3: MSMEs and New Urban Entrepreneurship Opportunities**

Features of Micro Small Medium Enterprises (MSMEs) – Cluster Development Approach and Leveraging Technology for MSMEs – Problems and Challenges of MSMEs - Urban Consumerism and Emerging Trends - New

Entrepreneurial Opportunities in Urban Area: Food and Beverages, Sanitary and Health Products, Solid Waste and Scrap Disposal, Tourism and Hospitality Services, Consultancy Services and Event Management, Logistic services.

#### **Unit 4: Financing and Marketing of Urban Entrepreneurship**

Financing the Urban Entrepreneurship and MSMEs: Procedures to obtain formal loans from Banks and other Institutions, Preparing Detailed Project Report for Loan - New avenues of Finance: Crowd Funding and Venture Capital – Marketing of Urban Entrepreneurship and MSMEs products: Market Survey, Demand Forecasting, Marketing Strategies, Branding, Planning and Promotion, Digital and Social Media Marketing – Public Procurement Policy to purchase MSME Products.

#### **Unit5: Institutional Support and Case Studies of Urban Entrepreneurship**

Institutional support for Urban Entrepreneurship and MSMEs - Government Schemes for promotion of Urban Entrepreneurship and MSMEs and their important features: Startup, Standup, PMKVY, PLI etc. – Rules and Procedures to start a Urban Entrepreneurship Firm and MSME – Discussion of two different types of Case Studies related to Urban Entrepreneurship with local relevance.

### **III. References:**

1. Gordona, E and N. Natarajan: *Entrepreneurship Development*, Himalaya Publishing House Pvt Ltd, Mumbai, 2017.
2. Sharma Sudhir, Singh Balraj, SinghalSandeep, *Entrepreneurship Development*, Wisdom Publications, Delhi, 2005.
3. Drucker, P., *Innovation and Entrepreneurship: Practice and Principles*, Harper & Row, New York, 1985; revised edn, Butterworth-Heinemann, Oxford, 1999.
4. NITI Aayog: *Report of Expert Committee on Innovation and Entrepreneurship*, New Delhi, 2015.  
[https://niti.gov.in/writereaddata/files/new\\_initiatives/report-of-the-expert-committee.pdf](https://niti.gov.in/writereaddata/files/new_initiatives/report-of-the-expert-committee.pdf)
5. VardhamanMahavir Open University, *Entrepreneurship Development & Small Scale Business*, Kota.  
<http://assets.vmou.ac.in/BBA12.pdf>
6. Reserve Bank of India: *Report of Expert Committee on Marginal, Small, Medium Enterprises*, Mumbai, 2019.  
<https://www.rbi.org.in/Scripts/PublicationReportDetails.aspx?UrlPage=&ID=924>



7. IGNOU: Marketing for Managers, New Delhi.  
<http://egyankosh.ac.in/handle/123456789/4271>
8. <https://nimsme.org>
9. Other Relevant web resources suggested by the teacher and college librarian

#### **IV. Co-Curricular Activities: (Lecturer Participation: Total 10 Hours)**

##### 1. For Teachers:

- Presentation of audio-video or print material to demonstrate the practical ground level activities of a urban entrepreneur so as to encourage the students to develop their own urban entrepreneurship ideas
- Conducting activities like brainstorming sessions, group discussions, student seminars, role play etc. for generating ideas and plans.
- Organize guest lectures and interactions with successful real urban entrepreneurs in the local area to discuss ideas and plans and preparation of DPRs
- Arranging interaction sessions or workshops with officers of relevant government department and financial institutions to work on specific proposals
- Engage the students in field work to study the successful urban entrepreneurs in the local area and gain working knowledge

##### 2. For Students:

- Students shall actively participate in the above co-curricular activities and gain practical knowledge, understanding, ideas and skills related to the subject.
- Students shall participate in field work, collect data, analyze, and make a report and presentation in the class.

##### 3. Suggested Field Work Format:

Title Page, Student Details, Acknowledgments, Index of Contents;  
*Objectives, Step-wise process, Findings, Conclusion & References*

4. Max Marks for Field Work Report: 05

5. Unit Tests/Internal Examinations

**Note:** For the latest topics which have no formal material available, the teacher is expected to prepare own material by using multiple latest sources and practical knowledge.

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**P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE :: VIJAYAWADA**  
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**Name of Programme : III B.A. (EMS)**  
**Course 6B : Urban Entrepreneurship and MSMEA**  
**SEMESTER – V / VI**

**Skill Enhancement Course**

**Time: 3 Hours**

**Max. Marks: 75M**

**Course Code : ECOSET03**

**Section – A**

**Answer any FIVE of the following.**  
**5x5=25M**

1. Concept of Entrepreneurship  
వ్యవస్థాపన భావన
2. Concept of Risk Bearing  
నష్ట భయ భావన
3. Business planning for urban entrepreneurship  
పట్టణ ఉద్యమత్వంలో వ్యాపార ప్రణాళిక
4. Features of MSMEs  
ఎమ్.ఎస్.ఎమ్.ఇ.ఎస్. (సూక్ష్మ, చిన్న, మధ్యతరహా సంస్థల లక్షణాలు)
5. Logistic services  
రవాణా సేవలు
6. Food and Beverages  
సామాజిక మద్యాముల ద్వారా మార్కెటింగ్
7. Social Media Marketing  
ఆహారము మరియు బహరేజిస్
8. Write about PMKVY  
పి.యం.కె.వి.వై.ను గూర్చి వ్రాయుము

**Section – B**

**Answer the following.**

**5x10=50M**

9. A) Explain the different theory of entrepreneurship  
వ్యవస్థాపన యొక్క వివిధ సిద్ధాంతాలను వివరింపుము  
Or  
B) Write about the qualities and functions of entrepreneurship  
వ్యవస్థాపన యొక్క గుణాలు మరియు విధులను గూర్చి వ్రాయుము
10. A) Explain the problems and challenges of urban entrepreneurs.  
పట్టణ వ్యవస్థాపనలో ఉన్న సమస్యలు మరియు సవాళ్ళను వివరింపుము  
Or  
B) Write about the process of identification of new entrepreneurship opportunities in urban Areas.  
నూతన వ్యవస్థాపనను పట్టణాలలో ఉన్న గుర్తించబడి ఉన్న ప్రక్రియను గూర్చి వ్రాయుము.

11. A) Explain the problem of MSMES

ఎమ్.ఎస్.ఎమ్.ఇ.సి సమస్యలను వివరింపుము

Or

B) Explain the cluster development approach and leveraging technology for MSMES.

ఎమ్.ఎస్.ఎమ్.ఇ.సి.లలో క్లస్టర్ అభివృద్ధి విధానమును వివరింపుము.

12. A) Explain the New avenues of Financer of urban entrepreneurship

పట్టణ ఆర్థిక వ్యవస్థాపనలో ఉన్న కొత్త అవకాశాలను వివరింపుము

Or

B) Explain the public procurement policy to purchase MSME products.

ఎమ్.ఎస్.ఎమ్.ఇ.సి. ఉత్పత్తుల సేకరణలో ప్రభుత్వ విధానములను వివరింపుము.

13. A) Write about the Government schemes for promotion of urban entrepreneurship and MSMES

పట్టణ వ్యవస్థాపనను ప్రోత్సహించడంలో ప్రభుత్వ పథకాలను వివరింపుము

Or

B) Explain the rules and procedures to start a Urban entrepreneurship firm.

పట్టణ వ్యవస్థాపన సంస్థ స్థాపించుటలో ఉన్న నియమాల మరియు ప్రక్రియను వివరింపుము.

**P.B.SIDDHARTHA COLLEGE OF ARTS &SCIENCE  
VIJAYAWADA – 10.**

Course Code: **ECOSSET04**

Three-Year B.A

Domain Subject: **ECONOMICS**

III Year B.A.-Semester-V

Max Marks: 100

**Course 7B: Retail and Digital Marketing**  
(Skill Enhancement Course (Elective)), 4 Credits

**I. Learning Outcomes:**

Students at the successful completion of the course shall be able to:

1. Explain the concepts and principles about the retail and digital marketing;
2. Identify and analyse the opportunities related to retail and digital marketing available in the local area;
3. Apply the concept to formulate the new strategies related to retail and digital marketing;
4. Demonstrate the practical skills required to get employment in retail and digital marketing or to start own digital marketing.

**II. Syllabus:** (Hours: Teaching: 60, Training: 10, Others Including Unit Tests: 05)

**Unit 1: Concept of Marketing**

Concept of Marketing - Type of Markets - Current Market types in India – Marketing Mix – Marketing Strategies – Marketing Segmentation – Marketing Organization - Marketing Research - Pricing Policies and Practices - Major Players in Retail and Digital Market in India

**Unit 2: Understanding Product and Consumer**

Marketing Product Types – Product Decision and Strategies - Product Life Cycle – Factors determining Consumer Behavior - Consumer Behavior Models – Understanding Indian Consumer - Strategies of persuading the Consumer – Sale Promotion: Advertisement, Branding and Packaging.

### **Unit 3: Retail Marketing**

Concept of Retail Marketing – Types of Retailing – Big and Small Retail Markets - Retail Marketing Mix – Essentials of Successful Retail Marketing - Retail Marketing Strategies – Multichannel Retailing – Store Management – Shopping Market Dynamics.

### **Unit 4: Digital Marketing**

Digital Marketing: Concept and Types – Telemarketing – Online or e-tailing – Essentials of Digital Marketing – Difference between Physical Retail and Digital Marketing – Digital Marketing Channels - Customer Behavior in Digital Marketing – Major players in Digital Marketing and their Marketing Strategies - Tools and Apps of Digital Marketing.

### **Unit 5: Marketing Models and Case Studies**

Marketing Models of Retail and Digital Market Companies/Shops: Global, National and Local levels - Discussion of two different types of Case Studies related to Retail and Digital Marketing.

### **III. References:**

1. VenkateshGanapathy: *Modern Day Retail Marketing Management*, Bookboon Company, 2017.  
<https://mmimert.edu.in/images/books/modern-day-retail-marketing-management.pdf>
2. PrashantChaudary: *Retail Marketing in the Modern Age*, Sage Publication, 2019
3. JermyKagan and SiddarthShekar Singh: *Digital Marketing & Tactics*, Wiely Publishers, 2020.
4. Philip Kotler: *Marketing Management*, 11<sup>th</sup> Edition, Prentice-Hall of India Pvt. Ltd., New Delhi. , 2002
5. S.Neelamegham: *Marketing in India*, 3<sup>rd</sup> edition, Vikas Publications, New Delhi, 2000.
6. IGNOU: *Marketing for Managers*, New Delhi.  
<http://egyankosh.ac.in/handle/123456789/4271>
7. Digitalmarketer: The Ultimate Guide to Digital Marketing.  
<https://www.digitalmarketer.com/digital-marketing/assets/pdf/ultimate-guide-to-digital-marketing.pdf>
8. NITI Aayog: *Connected Commerce: Creating a Roadmap for Digitally Inclusive Bharat, 2021*.  
<https://niti.gov.in/writereaddata/files/Connected-Commerce-Full-Report.pdf>

9. IASRI Course in *Agribusiness Management and Trade Concepts in Marketing* <http://ecoursesonline.iasri.res.in/mod/page/view.php?id=710>
10. World Bank: *Digital Economy in South East Asia: Strengthening the Foundations for Future Growth*, 2019. <https://documents1.worldbank.org/curated/en/328941558708267736/pdf/The-Digital-Economy-in-Southeast-Asia-Strengthening-the-Foundations-for-Future-Growth.pdf>
11. Relevant web resources suggested by the teacher and college librarian

#### **IV. Co-Curricular Activities: (Lecturer Participation: Total 10 Hours)**

##### 1. For Teachers:

- Presentation of audio-video or print material to demonstrate the practical ground level activities of a retail and digital marketing so as to encourage the students to develop their own ideas
- Conducting activities like brainstorming sessions, group discussions, student seminars, role play etc. for generating ideas and plans.
- Organize guest lectures and interactions with successful people in the field of retail and digital marketing in the local area.
- Engage the students in field work to study the successful retail and digital marketing strategies practiced by the firms in the local area and gain working knowledge

##### 2. For Students:

- Students shall actively participate in the above co-curricular activities and gain practical knowledge, understanding, ideas and skills related to the subject.
- Students shall participate in field work, collect data, analyze, and make a report and presentation in the class.

##### 3. Suggested Field Work Format:

Title Page, Student Details, Acknowledgments, Index of Contents; *Objectives, Step-wise process, Findings, Conclusion & References*

4. Max Marks for Field Work Report: 05

5. Unit Tests/Internal Examinations

**Note:** For the latest topics which have no formal material available, the teacher is expected to prepare own material by using multiple latest sources and practical knowledge.

###

Section – A

Answer any FIVE of the following.  
5x5=25M

1. Explain the concept of Marketing  
మార్కెటింగ్ భావనను వివరింపుము
2. What is market segmentation  
మార్కెట్ సెగ్మెంట్ అనగానేమి
3. What is product life cycle  
వస్తువు జీవిత కాల చక్రము అనగానేమి?
4. Write about advertisement  
ప్రకటనలను గూర్చి వ్రాయుము
5. Concept of Retail Marketing  
చిల్లర మార్కెటింగ్ గూర్చి వ్రాయుము
6. Explain the concept of Retail marketing mix  
చిల్లర మార్కెటింగ్ మిశ్రమ భావనను వివరింపుము
7. What is Digital Marketing  
డిజిటల్ మార్కెటింగ్ అనగానేమి?
8. Meaning of Marketing Models  
మార్కెటింగ్ నమూనాలు అర్థము

Section – B

Answer the following.

5x10=50M

9. A) Write about the marketing strategy  
మార్కెటింగ్ వ్యూహమును గూర్చి వ్రాయుము  
Or  
B) Explain the pricing policy and practice  
ధరలి విధానమును మరియు అమలును వివరింపుము
10. A) Explain the different types of Marketing products

వివిధ రకాల మార్కెటింగ్ ఉత్పత్తులను వివరింపుము

Or

B) Explain the strategies of persuasive the consumer  
వినియోగదారుని చోరవ వ్యూహములో ఉన్న వ్యూహాలను వివరింపుము

11. A) Explain the types of Retailing

రిటైలింగ్ రకాలను వివరింపుము

Or

B) Explain the different Retail Marketing strategies  
వివిధ రకాల చిల్లర మార్కెటింగ్ వ్యూహాలను వివరింపుము

12. A) Explain the types of Digital marketing

డిజిటల్ మార్కెటింగ్ రకాలను వివరింపుము

Or

B) Explain the today and apps of Digital marketing  
డిజిటల్ మార్కెటింగ్ ఉన్న వివిధ రాకాల యాప్స్‌ను వివరింపుము

13. A) Explain the marketing models of retail and Digital Marketing company

చిల్లర మరియు డిజిటల్ మార్కెటింగ్ కంపెనీ నమూనాలను వివరింపుము

Or

B) Write a brief discussion about any Retail and Digital marketing  
చిల్లర మరియు డిజిటల్ మార్కెటింగ్‌ను గూర్చి సూక్ష్మంగా వివరింపుము.



**P.B.SIDDHARTHA COLLEGE OF ARTS &SCIENCE :: VIJAYAWADA – 10**

**An autonomous college in the jurisdiction of Krishna university**

**III B.A (EMS), SEMESTER – V**

**COURSE – VI**

**Course Code : **ECOSET05****

**INSURANCE SERVICES**

**No of Hours per week : 5**

**Credits :4**

- Col : Students are able to acquire the knowledge about principles of insurance since and functioning of insurance science ....
- Co2 : Students are about know importance of life insurance and products
- Co3 : Students are able to again the knowledge about general and health insurance
- Co3 : Students are able to acquire the knowledge about practicing as an insurance agent
- Co5 : Students are able to acquire the knowledge about understanding the continuous midst and case studies related to the general or health ....

**UNIT I : INSURANCE CONCEPT AND PRINCIPLES**

Risk Management: Risk and Uncertainty, Risk Classification – Concept, Importance and Types of Insurance– Principles of Insurance – Insurance Regulations in India - Role of IRDA and Insurance Ombudsman –Scope for Insurance Business in India.

**UNIT II : LIFE INSURANCE AND PRODUCTS**

Life Insurance: Nature and Features - Major Life Insurance Companies in India - Important Life Insurance Products/policies and their Features: Conventional, Unit Linked, Annuities, Group Policies – Medical Examiner.

**UNIT III : GENERAL AND HEALTH INSURANCES AND PRODUCTS**

General Insurance: Nature, Features and Types - Major General Insurance Companies in India - Important General Insurance Products/Policies and their Features - Surveyor – Health Insurance: Nature and Features - Health Insurance Companies in India - Major Health Insurance Products/policies and their Features: Individual, Family, Group.

**UNIT IV : PRACTICING AS AN INSURANCE AGENT**

Insurance Contract and Terms of Insurance Policy - Registration of Insurance Agency with the Company - Procedure to issue a Policy: Application and Acceptance – Policy Lapse and Revival – Premium Payment, Assignment,

Nomination and Surrender of Policy – Policy Claim - Important Websites and Apps of Insurance in India.

## **UNIT V : UNDERSTANDING THE CUSTOMER AND CASE STUDIES**

Insurance Customer and Categories – Understanding Customer Mindset and Satisfaction - Addressing the Grievances of the Customer – Ethical Behavior in Insurance – Moral Hazard –Discussion of two different Case Studies related to Life or General or Health Insurance Services.

### **References:**

1. Insurance Institute of India: Principles of Insurance (IC-01), Mumbai, 2011.
2. Insurance Institute of India: Practice of Life Insurance (IC-02), Mumbai, 2011.
3. Insurance Institute of India: Practice of General Insurance (IC-11), Mumbai, 2011
4. IGNOU: Life Insurance  
<https://egyankosh.ac.in/bitstream/123456789/6472/1/Unit-20.pdf>
5. IGNOU: Non-Life Insurance  
<https://egyankosh.ac.in/bitstream/123456789/6470/1/Unit-21.pdf>
6. P. Periyaswamy: Principles and Practice of Insurance, Himalaya Publishers, New Delhi (2nd Edition), 2019.
7. G. Dionne and S.E. Harrington (Eds.): Foundations of Insurance Economics, Kluwer Academic Publishers, Boston, 1997.
8. K. Jr. Black, and H.D. Skipper Jr.:Life and Health Insurance, Prentice Hall, Upper Saddle River, New Jersey, 2000.
9. <https://www.irdai.gov.in>
10. <https://www.insuranceinstituteofindia.com>
11. <https://licindia.in/>
12. Other Relevant web resources suggested by the teacher and college librarian

**Co-Curricular Activities:**

a) Mandatory (Training of students in the related skills by the teacher for a total 10 Hours)

- 1) For Teacher: Training of students by teacher in the classroom and in the field for a total of not less than 10 hours on skills and hands on experience like explaining the details of an insurance policy to a customer – life, health and general policy, filling up application for a policy, calculation of premium and claim, make use of important websites and apps etc. pertaining to insurance and make a field visit to any insurance organization in local area. The expertise of practicing insurance agent or trainer can be utilized for this purposes.

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**III B.A (EMS), SEMESTER – V**  
**COURSE – VI Course Code : ECOSET05**  
**MODEL QUESTION PAPER**  
**INSURANCE SERVICES**

**Time : 3 Hours**

**Max. Marks : 75M**  
**Min. Pass : 30 M**

**Section – A**

**Answer any Five of the following.**

**5 x5=25M**

1. Write about Risk classification  
నష్ట భావవర్గీకరణను గూర్చి వ్రాయుము
2. What are the features of life insurance  
జీవిత భీమా లక్షణాలు ఏవి?
3. What are the benefits of groups insurance policies  
సమూహభీమా ప్రయోజనములు ఏవి
4. Write about General Insurance  
సాధారణ భీమా గూర్చి వ్రాయుము
5. Write about Health Insurance  
ఆరోగ్యభీమా గూర్చి వ్రాయుము
6. What are the Terms of Insurance policy  
భీమా విధానం యొక్క నియములు
7. Write about Grievances  
గ్రేవియన్స్ను గూర్చి వ్రాయుము
8. Explain the customer satisfaction  
కస్టమర్ యొక్క సంతృప్తి గూర్చి వ్రాయుము.

**Section – B**

**Answer the following.**

**5 x10= 50M**

9. A) Explain the different principles of insurance  
వివిధరకాల భీమా సూత్రాలను వివరింపుము  
Or  
B) Explain the scope of insurance business in India  
భారతదేశంలో భీమా పరిధిని వివరింపుము

10. A) Write about the major life Insurance companies in India  
భారతదేశంలో ముఖ్యమైన జీవితభీమా కంపెనీలను గూర్చి వ్రాయుము

Or

B) Explain the importance of life insurance policies  
జీవిత భీమా విధానాల యొక్క ప్రాముఖ్యతను వివరింపుము

11. A) Write about the major general insurance companies in India  
భారతదేశంలో ముఖ్యమైన సాధారణ భీమా కంపెనీలను గూర్చి వ్రాయుము

Or

B) Explain the major Health insurance products.  
ముఖ్యమైన ఆరోగ్య భీమా విధానాలను గూర్చి వ్రాయుము

12. A) Write about the insurance contract and terms of insurance policy  
భీమా ఒప్పందము మరియు నిబంధనలను గూర్చి వ్రాయుము

Or

B) Explain the procedure to issues a policy  
భీమా పాలసీని జారీచేయుటలో ఉన్న ప్రక్రియను వివరింపుము

13. Explain the Ethical Behaximin Insurance  
భీమాలో ఉన్న నైతిక ప్రవర్తనను వివరింపుము

Or

B) Write about understanding customer mindset and satisfaction  
కస్టమర్ మైండ్ సెట్ మరియు సంతృప్తిని గూర్చి వ్రాయుము.

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**III B.A (EMS), SEMESTER – V**  
**SEMESTER – V**

**Max.Marks : 100**

**Number of Credits : 4**

**COURSE – VII Course Code : **ECOSET06****

**BANKING AND FINANCIAL SERVICES**

- Co1 : Students are able to acquit the knowledge about the principles of banking and Indian Banking system.
- Co2 : Students are able to acquit the knowledge about Deposits, Loans and Digital Banking Systems.
- Co3 : Students are able to acquit he knowledge about Banking correspondents and common service centers
- Co4 : Students are able to acquit the knowledge about Financial service of NBFIs.
- Co5 : Students are able to acquit the knowledge about more with Finance service Company (FSC).

**UNIT I : PRINCIPLES OF BANKING AND INDIAN BANKING SYSTEM**

Meaning of Banking – Principles of Banking – Functions of Banking – Structure of Indian Banking System – Regulations of Banking in India – Role of RBI in Banking – Anti-money Laundering - Basics of Financial literacy - Problems and Challenges of Banking in India.

**UNIT II : DEPOSITS, LOANS AND DIGITAL BANKING**

Bank Deposit Account Types – Account Opening and Closing – Banking Customer types – KYC Norms – Negotiable Instruments: Cheque, Bill of Exchange, Promissory Note, Endorsement - Principles of Lending – Different categories of Loans – Mortgaging -Priority Sector Lending – E-Banking facilities: Debit Card, Credit Card, Net Banking, Mobile Banking, Tele-banking, Micro ATMs, Digital Currency – Core Banking Solutions.

**UNIT III : BANKING CORRESPONDENTS AND COMMON SERVICE CENTERS**

Banking Correspondent Model - Activities of Banking Correspondent: Deposit Mobilization.

Identification of Borrowers, Collection and Recovery Loan, Other Banking Services – Common Services Centre (CSC) - Provision of Services by CSC

- Requirement for Registering CSC and Telecentre - Case Study of Banking Correspondents with any Bank or CSC in Local Area.

#### **UNIT IV : FINANCIAL SERVICES OF NBFIS**

Non-Banking Financial Institutions (NBFIs): Types and Major Players of NBFIs in India – Important Financial Services offered by NBFIs and their Features – Concept of EMI - Micro Finance: Concept and Operation - Chit Funds: Concept and Operations– Payment Banks - Regulations of NBFIs in India – Problems and Challenges of NBFIs in India.

#### **UNIT V : WORK WITH FINANCE SERVICE COMPANY (FSC)**

Types of loans by Finance Service Company (FSC) – Customer of FSC: Types and Needs - Marketing of FSC's Loans – Procedures and Requirements in FSC's Loan Sanction - Collection and Recovery of FSC Loans - Case Study of a FSC's services in Local Area.

#### **References:**

1. Indian Institute of Banking and Finance: Principles and Practices of Banking, Macmillan India Limited, 2021.  
<https://drive.google.com/file/d/1VU7aN4s5ikPQ17nX6mTBW-sVLQCNhfvK/view>
2. Indian Institute of Banking and Finance: Retail Banking, Macmillan India Limited, 2015.
3. D.R.Patade Babasaheb Sangale and T.N.Salve : Banking and Finance: Fundamental of Banking, Success Publications, Pune, January 2013.  
<https://app1.unipune.ac.in/external/course-material/Fundamental-of-Banking-English.pdf>
4. N. Mukund Sharma: Banking and Financial Services, Himalaya Publishers, 2015.
5. Akhan Ali Jafor: Non-Banking Financial Companies in India: Functioning and Practice, New Century Publications, New Delhi, 2010.
6. RBI: “Non-Banking Financial Institutions” in Report on Trend and Progress of Banking in India 2019-20.
7. RBI: Discussion Paper on Engaging Business Correspondents.  
[https://www.rbi.org.in/scripts/bs\\_viewcontent.aspx?Id=2234](https://www.rbi.org.in/scripts/bs_viewcontent.aspx?Id=2234)
8. Govt. of India: Ministry of Electronic and Information Technology: Digital Seva-Operational Manual for Common Service Centres.  
<https://csc.gov.in/assets/cscmanual/digitalsevaoperationalmanual.pdf>
9. <http://www.cscentrepneur.in/> for Telecentre Entrepreneurship Course

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**III B.A (EMS), SEMESTER – V**  
**COURSE – VII Course Code : ECOSET06**  
**MODEL QUESTION PAPER**  
**BANKING AND FINANCIAL SERVICES**

**Time : 3 Hours**

**Max. Marks : 75M**

**Min. Pass : 30 M**

**Section – A**

**Answer any Five of the following.**

**5 x5=25M**

1. What are the principals of Banking  
బ్యాంకింగ్ సూత్రాలు ఏవి?
2. Write about the KYC Norms  
KYC నియమాలను గూర్చి వ్రాయుము
3. Writ about priority sector lending  
ప్రాధాన్యత రంగ ఋణాలను గూర్చి వ్రాయుము
4. Write about collection and recovery of loan  
కలెక్షన్ మరియు రకవరి గూర్చి వ్రాయుము
5. Write about micro Finance  
సూక్ష్మ విత్తము గూర్చి వ్రాయుము
6. Explain the payment Banks  
చెల్లింపు బ్యాంకులను వవరింపుము
7. What is a Finance service company  
విత్త సేవా కంపెని అనగానేమి?
8. Types of Finance Service companies  
విత్త సేవా కంపెనీల రకాలు

**Section – B**

**Answer the following.**

**5 x10= 50M**

9. A) Explain the structure of Indian Banking system  
భారత బ్యాంకింగ్ నిర్మాణమును గూర్చి వివరింపుము  
Or  
B) Explain the problem and challenges of Banking in India  
భారతదేశ బ్యాంకింగ్ రంగం ఎదుర్కొంటున్న సమస్య మరియు సవాళ్లను వివరింపుము



10. A) Explain the principles of lending

ఋణ సూత్రాలను వివరింపుము

Or

B) Write about the negotiable instruments act

అన్యాయకాంత చట్టమును గూర్చి వ్రాయుము

11. A) Explain the activities of banking correspondent

బ్యాంకింగ్ కర్పొండింట్ కార్యకలాపాలను వివరింపుము

Or

B) Explain the provision of Services of Common services Centre (CSC)

కామన్ సర్వీస్ కు చేస్తున్న సేవలను వివరింపుము

12. A) Write about the major NBF in India

భారతదేశంలో ముఖ్యమైన ( )ను గూర్చి వ్రాయుము

Or

B) Explain the problems and challenges of NBFIs in India

భారతదేశంలో ( )లు ఎదుర్కొంటున్న సమస్యలు మరియు సవాళ్లను వివరింపుము

13. Explain the procedures and requirement in FSC's loan sanction

ఋణ కేటాయింపు విధానముల ప్రక్రియను వివరింపుము

Or

B) Explain the collection and recovery of FSC loan.

( ) ఋణ సేకరణ మరియు రికవరీని గూర్చి వివరింపుము

**P.B.SIDDHARTHA COLLEGE OF ARTS &SCIENCE  
VIJAYAWADA – 10.**

Course Code: **ECOSET07**

Three-Year B.A

Domain Subject: **ECONOMICS**

III Year B.A.-Semester-V

Max Marks: 100

**Course 6D: Inferential Statistics and Software Packages**  
(Skill Enhancement Course (Elective)), 4 Credits

**1. Learning Outcomes:**

Students at the successful completion of the course shall be able to:

1. Demonstrate the knowledge related to the important concepts and techniques of inferential statistics
2. Calculate correlation, regression coefficients and interpret the results.
3. Use Excel sheets and SPSS package to analyse the data and derive the results.

**II. Syllabus:** (Hours: Teaching: 60, Training: 10, Others Including Unit Tests: 05)

**Unit 1: Concept and Theories of Probability**

Concept of Probability - Definitions of Probability: Classical or Mathematical and Empirical or Statistical – Axiomatic Approach to Probability – Theorems of Probability: Addition and Multiplication (without proofs).

**Unit 2: Theoretical Probability Distributions**

Binomial Distribution: Constants (without proof) and Properties – Poison Distribution: Constants (without proof) and Properties – Normal Distribution: Constants (without proof) and Properties – Standard Normal Distribution and Standard Normal Curve – Economic and Practical Applications of Binomial, Poison and Normal Distributions.

**Unit 3: Test of Significance - Large and Small Sample Tests**

Steps involved in Testing of Hypotheses – Large Sample or Z-Test – Testing the difference between Means and Proportions – Small Sample Tests –

Difference between Large and Small Sample Tests – Applications of Student's t-test,  $\chi^2$  test, F-test – One way and Two way ANOVA.

#### **Unit 4: Linear and Non-linear Multiple Regression Models**

Three Variable Linear Multiple Regression Model – Notation – Assumptions – Estimation of Partial Regression Coefficients – Interpretation of Regression coefficients - Testing the coefficients: t-test, p- value – Coefficient of Determination:  $R^2$  and adjusted  $R^2$  – Estimation of Non-linear Multiple Regression: Cobb-Douglas Production Function and Interpretation of Elasticity Coefficients.

#### **Unit 5: Excel and Software Packages for Data Analysis**

Worksheet – Entering data in Worksheets – Creating Graphs and Charts - Mathematical and Statistical Functions -Data Analysis Pack in Excel - Descriptive Statistics, Testing of Hypotheses, ANOVA, Correlation and Regression, Random Number Generation - Data Handling Using SPSS - Opening Excel files in SPSS - Analysis Tools - Descriptive Statistics - Selection of Variables in Multiple Linear Regression – Estimation of Regression Coefficients using SPSS and their interpretation.

### **III. References:**

1. S. C. Gupta: **Fundamentals of Statistics**, Himalaya Publishing House, Bombay, 1982.
2. S. P. Gupta: **Statistical Methods**, S. Chand & Company, New Delhi, 2000.
3. K. V. S. Sharma :**Statistics Made Simple: Do it yourself on PC, (Second edn.)**Prentice Hall of India, New Delhi, 2010.
4. తెలుగు అకాడమీ ప్రచురణ “పరిమాణాత్మక పద్ధతులు”
5. B. N. Gupta: **Statistics Theory and Practice**, Sahitya Bhavan, Agra, 1992.
6. Goon A.M., M. K. Gupta and B. Dasgupta: **Fundamentals of Statistics**, Vol.1, The World Press, Ltd, Calcutta, 1975.
7. Nagar, A.L. and R. K. Das: **Basic Statistics**, Oxford University Press, New Delhi, 1996.
8. **D N Elhance**, Veena Elhance & B M Aggarwal **Foundation of Statistics**, Kitab Mahal, New Delhi, 2018.
9. Relevant web resources suggested by the teacher and college librarian

#### **IV. Co-Curricular Activities: (Lecturer Participation: Total 10 Hours)**

##### **a) Mandatory:**

##### 1. For Teacher:

- Provide hands on training and skills to the students about the techniques of statistical inferences and software packages with real life example data sets.
- Organise the guest lectures and interactions with the people who are practically applying those techniques and software packages.
- Engage the students in a project work with a model data set to gain the practical knowledge

##### 2. For Student:

- Students shall actively participate in the above co-curricular activities and gain practical knowledge, understanding, ideas and skills related to the subject.
- Students shall demonstrate those skills by using a data set and make a report and presentation in the class.

##### 3. Suggested Project Work Format:

Title Page, Student Details, Acknowledgments, Index of Contents;  
*Objectives, Step-wise process, Findings, Conclusion & References*

##### 4. Max Marks for Project Work Report: 05

##### 5. Unit Tests/Internal Examinations

###

**Section – A**

**Answer any FIVE of the following.**

**5x5=25M**

1. Define Probability  
సంభావ్యతను నిర్వచించుము
2. What is poisson Distributions  
పాయిజన్ పంపిణీ అంటే ఏమిటి
3. What is normal distribution  
సాధారణ పంపిణీ అంటే ఏమిటి
4. ANOVA Test  
అనోవ పరీక్ష
5.  $X^2$  test  
కైస్కేర్ పరీక్ష
6. Cobb-Douglas production function  
కాబ్-డగ్లస్ ఉత్పత్తి ఫంక్షన్
7. Elasticity of Coefficients  
వ్యాకోచత్వ గుణకము
8. Testing of Hypothesis  
పరికల్పన పరీక్ష

**Section – B**

**Answer the following.**

**5x10=50M**

9. A) Explain the Axiomatic Approach to probability  
సంభావ్యత యొక్క అక్షోమెట్ అప్రోచ్‌ను వివరింపుము  
Or  
B) Explain the addition and multiplication theorem of probability  
సంభావ్యత సంకలన మరియు గుణక సిద్ధాంతములను వివరింపుము
10. A) Explain the standard Normal Distribution and standard Normal cause

ప్రామాణిక సామాన్య పంపిణీ మరియు ప్రామాణిక సాధారణ కారణమును వివరింపుము

Or

B) Explain the Economic and practical application of Normal Distributions  
సాధారణ డిస్ట్రిబ్యూటర్ యొక్క ఆర్థిక మరియు అనువర్తితాలను వివరింపుము

11. A) Explain the various steps involved in Testing of Hypothesis  
పరికల్పన పరీక్షలో ఉన్న వివిధ దశలను వివరింపుము

Or

B) Distinguish between large sample test and small sample tests  
పెద్ద నమూన మరియు చిన్న నమూనాల మధ్య విభేదించుము

12. A) Explain the various tests of Coefficients  
గుణకాల యొక్క వివిధ పరీక్షలను వివరింపుము

Or

B) Explain the procedures for estimation of Non-Linear multiple Regressions  
బహుళైచ్చిక ప్రతి గమన వక్రరేఖ అంచనా ప్రక్రియను వివరింపుము

13. A) What is worksheet? Explain the procedure of Entering data in worksheets  
వర్క్ షీట్ అనగానేమి? వర్క్ షీట్ లో దత్తాంశమును వ్రాయటంలో ఉన్న ప్రక్రియను వివరింపుము

Or

B) Explain the estimation of regression of co-efficient using SPSS and their interpretation  
ఎస్.పి.ఎస్.ఎస్. ద్వారా ప్రతి గమన గుణకములను అంచనా లేయడంను వివరింపుము.

**P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE  
VIJAYAWADA – 10.**

Course Code: **ECOSET08**

Three-Year B.A

Domain Subject: **ECONOMICS**

III Year B.A.-Semester-V

Max Marks: 100

Course 7D: **Project Designing and Report Writing**  
(Skill Enhancement Course (Elective)), 4 Credits

**I. Learning Outcomes:**

The Student at the successful completion of the course shall be able to:

1. Demonstrate the knowledge relating to research, its role in enhancement of knowledge in social sciences in general and economics in particular;
2. Formulate a good research design to undertake mini research projects with a view to studying the socio-economic problems of the society;
3. Undertake a field survey by himself/herself to collect relevant data and information relating to his/her project work;
4. Develop capacity to write a simple project report with all relevant components on the research project undertaken by him/her.

**II. Syllabus:** (Hours: Teaching: 60, Training: 10, Others Including Unit Tests: 05)

**Unit 1: Foundations of Research**

Meaning and Importance of Research - Scientific Research – Social Science Research – Methods of ensuring Objectivity in Social Science Research – Limitations of Research in Social Science – Ethics in Research.

**Unit 2: Classification of Research**

Pure and Applied Research – Exploratory and Descriptive Research – Diagnostic Research – Action Research – Analytical Research – Evaluation Research – Experimental Research Design – Concepts of Independent and Dependent Variables – Case Study method.

### **Unit 3: Planning of Research Project**

Selection of a Research Problem – Criteria for Selecting a Research Problem – Review of Theoretical and Related Research Studies - Choice of Secondary and Primary Data for the Study - Choice of Census and Sample Data – Preparation of a Research Proposal – Components of a good Research Proposal.

### **Unit 4: Implementation of a Project Design**

Field Work and Collection of Data – Choice of Schedules and Questionnaire – Pilot Study – Role of Observation and Participation – Documentary Evidences - Projective Techniques: Functions and Types - Editing Data – Graphical and Statistical Analysis of Data using Appropriate Statistical Techniques.

### **Unit 5: Report Writing**

Types of Research Report – Target Audience – Nature of Language to be used in Research Report - Outlines of a good Research Report – Prefatory Items – Body of the Report – Terminal Items: Differences between References and Bibliography – Appendices - Ethical values in Research Report - Plagiarism Test - Components of a good Research Paper.

### **III. References:**

1. C. T. Kurien: *A Guide to Research in Economics*, Sangam Publishers for Madras Institute of Development Studies, Chennai, 1973.
2. O. R. Krishnaswami and M. Ranganatham: *Methodology of Research in Social Sciences*, Himalaya Publishing House, Mumbai, 2018.
3. C. R. Kothari: *Research Methodology: Methods and Techniques*, New Age International (Pvt.) Ltd. Publishers, New Delhi, 2004.
4. K. V. S. Sharma :*Statistics Made Simple: Do it yourself on PC*, (Second edn.) Prentice Hall of India, New Delhi, 2010.
5. John W. Creswell and J. David Creswell :*Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*, Sage Publications, New Delhi, 2018.
6. Shanti Bhushan Mishra and ShashiAlok, *Handbook of Research Methodology*, Educreation, Bilaspur, 2017.
7. Wayne C. Booth, Gregory G. Colomb, and Joseph M. Williams: *The Craft of Research*, University of Chicago Press, Chicago, 2016.
8. Dr. Ranjit Kumar: *Research Methodology: A Step-by-Step Guide for Beginners*, Sage Publications, New Delhi, 2014.
9. Geoffrey Marczyk, David DeMatteo, and David Festinger: *Essentials of Research Design and Methodology*, John Wiley and Sons, New Jersey, 2005.



10. Sharan B. Merriam: *Qualitative Research: A Guide to Design and Implementation* Jossey Boss, San Francisco, 2009.
11. Mark Balnaves & Peter Caputi: *Introduction to Quantitative Research Methods: An Investigative Approach*, Sage Publications, New Delhi, 2001.
12. Relevant web resources suggested by the teacher and college librarian.

#### **IV. Co-Curricular Activities: (Lecturer Participation: Total 10 Hours)**

##### 1. For Teachers:

- Demonstrate the practical ground level activities to undertake a project designing thereby encourage the students to participate in activities like group discussion, student seminars etc.
- Organize guest lectures and interactions with people who engage in the research projects.
- Engage the students in any model research project work and make the students to prepare a report and present.

##### 2. For Student:

- Students shall actively participate in the above co-curricular activities and gain practical knowledge, understanding, ideas and skills related to the subject.
- Students shall demonstrate those skills by using any model research project and make report and presentation in the class.

##### 3. Suggested Project Work Format:

Title Page, Student Details, Acknowledgments, Index of Contents;  
*Objectives, Step-wise process, Findings, Conclusion & References*

##### 4. Max Marks for Field Work Report: 05

##### 5. Unit Tests/Internal Examinations

###

**Section – A**

**Answer any FIVE of the following.**  
**5x5=25M**

1. What is scientific research  
శాస్త్రీయ పరిశోధన అనగానేమి?
2. Limitations of Research in social science  
సామాజిక శాస్త్రములో పరిశోధనకున్న పరిమితులు
3. Write about Evaluation Research  
మూల్యాంకన పరిశోధన గూర్చి వ్రాయుము
4. What are the components of a good Research Proposal  
మంచి పరిశోధనయొక్క భాగాలు ఏవి?
5. What are qualities of good questionance  
మంచి ప్రశ్నావలి యొక్క లక్షణాలు ఏవి?
6. Bibliography  
గ్రంథ పట్టిక
7. Plagiarism Test  
దోపిడి పరీక్ష
8. Write about Editing of data  
దత్తాంశ విజిటింగ్ గూర్చి వ్రాయుము

**Section – B**

**Answer the following.**

**5x10=50M**

9. A) Explain the importance social science research  
సామాజిక శాస్త్రీయ పరిశోధన ప్రాముఖ్యతను వివరింపుము

Or

- B) Write about the methods of ensuring objectivity in social science Research.

సామాజిక శాస్త్రాల లక్ష్యాల నిర్ధారణ పద్ధతులను గూర్చి వ్రాయుము

10. A) Write about pure and Applied Research

శుద్ధ మరియు అను వర్తిత పరిశోధన గూర్చి వ్రాయుము

Or

B) Distinguish between exploratory and descriptive research

వివరణాత్మక మరియు అవివరణాత్మక మధ్య విభేదించుము

11. A) Explain the various methods to collect the primary data

ప్రాథమిక దత్తాంశ సేకరణ వివిధ పద్ధతులను వివరింపుము

Or

B) Explain the criterion for selecting a Research problem.

పరిశోధన సమస్య ఎంపికలలో గల ప్రాముఖ్యతను వివరింపుము

12. A) Explain the importance of graphical presentation of data

రేఖాపటముల ద్వారా దత్తాంశ సమర్పణ ప్రాముఖ్యతను వివరింపుము

Or

B) Explain the importance of statistical Analysis of data

దత్తాంశ విశ్లేషణ ప్రాముఖ్యతను వివరింపుము

13. A) Explain the various types of Research report

పరిశోధన రిపోర్ట్‌లోని వివిధ రకాలను వివరింపుము

Or

B) Write about the outlines of a good Research Report

మంచి పరిశోధన రిపోర్ట్ నమూనాలను గూర్చి వ్రాయుము.

## Department of Botany

### Board of Studies for the academic Year 2022 -2023 (Odd Semesters)

#### Agenda

1. To evaluate the syllabus in relation to its socio-economic relevance.
2. To explore the possibilities of introducing any new subjects as additional optional subjects, or new combinations of subjects.
3. To assess the potential of the courses against the employment prospects, necessary certification courses.
4. To make academic flexibilities like honors with extra credits acquired through either advanced study of same courses or with procuring additional credits from additional courses.

Minutes of meeting of Board of studies in Botany held on 24 -08-2022 at 2.00 p.m.

in the Department of Botany.

#### Members present:

1	Sri.Ch.Venkateswarlu	Chairman	Sd/-
2	Dr.J.Naveena Lavanya Latha	University Nominee	Sd/-
3	Dr.G.Rosaiah	Subject Expert	Sd/-
4	Dr.N.Savithamma	Subject Expert	Sd/-
5	M.Chandrasekhara Reddy	Industrialist	Sd/-
6	A.Amani	Alumnus	Sd/-
7	D.Sravani	Member	Sd/-
8	Dr.P.Srinivasa Rao	Member	Sd/-

BOTANY SEC -2020-21 ONWARDS			
S.NO	TITLE OF THE PAPER	COURSE CODE	P.NAME
1	Plant Tissue Culture	BOTSET01	B.Sc (BZC)
2	Plant Tissue Culture Lab	BOTSEP01	B.Sc (BZC)
3	Mushroom Cultivation	BOTSET02	B.Sc (BZC)

4	Mushroom Cultivation Lab	BOTSEP02	B.Sc (BZC)
5	Plant Propagation	BOTSET03	B.Sc (BZC)
6	Plant Propagation Lab	BOTSEP03	B.Sc (BZC)
7	Seed Technology	BOTSET04	B.Sc (BZC)
8	Seed Technology Lab	BOTSEP04	B.Sc (BZC)
9	Vegetable Crops – Cultivation Practices	BOTSET05	B.Sc (BZC)
10	Vegetable Crops – Cultivation Practices Lab	BOTSEP05	B.Sc (BZC)
11	Vegetable Crops – Post Harvest	BOTSET06	B.Sc (BZC)
12	Vegetable Crops – Post Harvest Lab	BOTSEP06	B.Sc (BZC)

The following resolutions are made in Board of Studies in Botany for ODD Semesters to recommend to the 46<sup>th</sup> Academic Council for its approval.

1. It is resolved and recommend to introduce Plant Tissue Culture with course code BOTSET01 in V semester of B.Sc. (BZC) for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 4 to 7 .
2. It is resolved and recommend to introduce Plant Tissue Culture Lab with course code BOTSEP01 in V semester of B.Sc. (BZC) for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 8 to 9 .
3. It is resolved and recommend to introduce Mushroom Cultivation with course code BOTSET02 in V semester of B.Sc. (BZC) for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 10 to 13 .
4. It is resolved and recommend to introduce Mushroom Cultivation Lab with course code BOTSEP02 in V semester of B.Sc. (BZC) for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 14 to 15 .

5. It is resolved and recommend to introduce Plant Propagation with course code BOTSET03 in V semester of B.Sc. (BZC) for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 16 to 19 .
6. It is resolved and recommend to introduce Plant Propagation Lab with course code BOTSEP03 in V semester of B.Sc. (BZC) for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 20 to 21 .
7. It is resolved and recommend to introduce Seed Technology with course code BOTSET04 in V semester of B.Sc. (BZC) for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 22 to 25 .
8. It is resolved and recommend to introduce Seed Technology Lab with course code BOTSEP04 in V semester of B.Sc. (BZC) for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 26 to 27.
9. It is resolved and recommend to introduce Vegetable Crops – Cultivation Practices with course code BOTSET05 in V semester of B.Sc. (BZC) for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 28 to 31 .
10. It is resolved and recommend to introduce Vegetable Crops – Cultivation Practices Lab with course code BOTSEP05 in V semester of B.Sc. (BZC) for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 32 to 33.
11. It is resolved and recommend to introduce Vegetable Crops – Post Harvest with course code BOTSET06 in V semester of B.Sc. (BZC) for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 34 to 37 .
12. It is resolved and recommend to introduce Vegetable Crops – Post Harvest Lab with course code BOTSEP06 in V semester of B.Sc. (BZC) for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 38 to 39 .

**P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE:: VIJAYAWADA**

**Semester-wise Revised Syllabus under CBCS, 2020-21**

Course Code: <b>BOTSET01</b>	Offered to B.Sc. (BZC)
Domain Subject: BOTANY	Semester – V
Max. Marks: 100 (CCIA: 25+ SEE: 75)	Theory Hrs. /Week: 3

**Course 6C: PLANT TISSUE CULTURE**

Type of the Course: Skill Enhancement Course (Elective: Theory), Credits: 04

**I. Course Outcomes: Students at the successful completion of the course will be able to:**

- CO1: Comprehend the basic knowledge and applications of plant tissue culture.
- CO2: Identify various facilities required to set up a plant tissue culture laboratory.
- CO3: Acquire a critical knowledge on sterilization techniques related to plant tissue culture.
- CO4: Demonstrate skills of callus culture through hands on experience.
- CO5: Understand the biotransformation technique for production of secondary metabolites.

**II. Syllabus: (Total Theory Hours: 45 including Unit tests etc.)**

**UNIT-I Basic concepts of plant tissue culture (9H)**

1. Plant tissue culture: Definition, history, scope and significance.
2. Totipotency, differentiation, dedifferentiation, and redifferentiation; types of cultures.
3. Infrastructure and equipment required to establish a tissue culture laboratory.

**UNIT-II Sterilization techniques and culture media (9H)**

1. Aseptic conditions – Fumigation, wet and dry sterilization, UV sterilization, ultrafiltration.
2. Nutrient media: Types of media
3. Composition and preparation of Murashige and Skoog culture medium.

**UNIT-III Callus culture technique (9H)**

1. Explant: Definition, different explants for tissue culture, surface sterilization, inoculation methods.
2. Callus culture: Definition, various steps in callus culture.
3. Soma clonal variations and their isolation.

**UNIT-IV Micropropagation (9H)**

1. Direct and indirect morphogenesis, organogenesis, role of PGRs; somatic embryogenesis and synthetic seeds.
2. Protoplast Culture.
3. Cybrids.

## UNIT-V Applications of plant tissue culture

(9H)

1. Germplasm conservation: cryopreservation methods, slow growth, applications and limitations; cryoprotectants.
2. r DNA Technology.
3. Transgenic plants- gene transfer methods, BT cotton, Golden Rice.

### III References/ Text Book/ e-books/websites

1. Razdan, M.K. (2005) Introduction to Plant Tissue Culture, Oxford & IBH Publishers, Delhi
2. Bhojwani, S.S. (1990) Plant Tissue Culture: Theory and Practical (a revised edition). Elsevier Science Publishers, New York, USA.

### Reference Materials on the Web/web links:

<https://www.youtube.com/watch?v=dFrX-t5J0PA>  
<https://www.youtube.com/watch?v=A6qEgc6Jt3Q>

### IV Co-Curricular Activities

**(a) Mandatory:(Training of students by teacher in field related skills: (lab:10+field: 05)**

1. **For Teacher:** Training of students by teacher in the laboratory/field for a total of not less than 15 hours on the field techniques/skills of sterilization procedures, preparation of media, establishment of callus culture, growth measurements; morphogenesis and organogenesis; acclimatization and hardening of plantlets.

2. **For Student:** Students shall (individually) visit anyone of plant tissue culture laboratories in universities/research organizations/private facilities, write their observations on tools, techniques, methods and products of plant tissue culture; and submit a hand-written Fieldwork/Project work Report not exceeding 10 pages to the teacher in the given format.

3. Max marks for Fieldwork/Project work Report: 05

4. Suggested Format for Fieldwork/Project work Report: Title page, student details, index page, details of place visited, observations, findings and acknowledgements.

5. Unit tests (IE).



**b) Suggested Co-Curricular Activities:**

1. Training of students by related industrial experts.
2. Assignments (including technical assignments like identifying tools in plant tissue culture and their handling, operational techniques with safety and security, IPR)
3. Seminars, Group discussions, Quiz, Debates etc. (on related topics).
4. Preparation of videos on tools and techniques in plant tissue culture.
5. Collection of material/figures/photos related to products of plant tissue culture, writing and organizing them in a systematic way in a file.
6. Visits to plant tissue culture/biotechnology laboratories in universities, research organizations, private firms, etc.
7. Invited lectures and presentations on related topics by field/industrial experts

## Model Question Paper

**Course Code: BOTSET01** **Offered to B.Sc. (BZC)**

**Title of the Course: PLANT TISSUE CULTURE**

**SECTION – A (Total: 25 Marks)**

**Short Answer Questions (25 Marks: 5 x5)**

**Answer any Five questions. Each answer carries 5 marks. At least 1 question should be given from each Unit**

1. What is totipotency? Explain. **CO1L4.**
2. Describe the method of dry sterilization. **CO2L1.**
3. Enumerate the somaclonal variations. **CO3,L1.**
4. Discuss about the cybrids. **CO4,L2.**
5. Prepare a note on role of auxins. **CO5,L3.**
6. State a note on Bt Cotton. **CO5,L1.**
7. What is morphogenesis? Describe. **CO4,L1.**
8. Describe the synthetic seeds in detail. **CO4,L1.**

**SECTION B (Total: 5 x 10 = 50 Marks)**

**Answer all questions. Each answer carries 10 marks. Two questions should be given from each unit with internal choice.**

9(a) State the concepts differentiation, dedifferentiation, and Redifferentiation. **CO1,L1**

**OR**

9(b) Enumerate an account of Infrastructure and equipment required to establish a tissue culture laboratory. **CO1,L1**

10(a) Explain various methods of sterilization. **CO2,L4**

**OR**

10(b) Discriminate an account of the composition and preparation of MS media. **CO2,L4**

11(a) Paraphrase various ways of surface sterilization of explants. **CO3,L2**

**OR**

11(b) Summarize an account of callus culture. **CO3,L2**

12(a) Illustrate about somatic embryogenesis. **CO4,L3**

**OR**

12(b) Demonstrate the process of Organogenesis in plant tissue culture. **CO4,L3**

13(a) Explain the steps involved in r DNA Technology. **CO5,L2.**

**OR**

13(b) Memorize the Agrobacterium mediated gene transfer method. **CO5,L4**

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**P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE:: VIJAYAWADA**

Semester-wise Revised Syllabus under CBCS, 2020-21

Course Code: **BOTSEP01** Offered to B.Sc. (BZC)  
Domain Subject: BOTANY Semester – V  
Max. Marks: 50(CCIA: 10+ SEE: 40) Practical Hrs./Week : 3

**Course 6C: PLANT TISSUE CULTURE**

Type of the Course: Skill Enhancement Course (Elective: Practical), Credits: 01

**I. Course Outcomes: Students at the successful completion of the course will be able to:**

CO1: Demonstrate the applications of autoclave, laminar airflow, hot air oven.

CO2: Sterilize the glassware and tools used for tissue culturing.

CO3: Prepare different stock solutions, media.

CO4: Measure the growth of callus formed.

CO5: Demonstrate the hardening and acclimatization in green house.

**II: Practical (Laboratory) Syllabus: (30 Periods):** Atleast 8 Practicals ....

1. Principles and applications of- Autoclave, Laminar Airflow, Hot Air Oven.
2. Sterilization techniques for glass ware, tools, explant etc.,
3. MS medium - Preparation of different stock solutions; media preparation
4. Explant preparation, inoculation and initiation of callus from carrot.
5. Callus formation.
6. Induction of somatic embryos, preparation of synthetic seeds.
7. Multiplication of callus and organogenesis.
8. Hardening and acclimatization in green house.

**III. Lab References:**

1. Reinert, J. and M.M. Yeoman, 1982. Plant Cell and Tissue Culture - A Laboratory
2. Manual, Springer-Verlag Berlin Heidelberg
3. Robert N. Trigiano and Dennis J. Gray, 1999. Plant Tissue Culture Concepts and Laboratory Exercises. CRC Press, Florida
4. Ashok Kumar, 2018. Practical Manual for Biotechnology, College of Horticulture & Forestry, Jhalawar, AU, Kota
5. Chawla, H.S., 2003. Plant Biotechnology: A Practical Approach, Nova Science Publishers, New York
6. Web sources suggested by the teacher concerned.

### Model Question Paper : Practicals

**Time Allowed: Three hours**

**Max. Marks: 40**

- |  |     |              |
|--|-----|--------------|
| 1. Demonstration of a sterilization technique                    | 'A' | 7 M          |
| 2. Preparation of MS medium                                      | 'B' | 8 M          |
| 3. Demonstration of callus culture technique/synthetic seeds 'C' |     | 5 M          |
| 4. Scientific observation and data analysis                      |     | 4 x 3 = 12 M |
| D. Tissue culture equipment /photograph                          |     |              |
| E. Morphogenesis or organogenesis - photograph                   |     |              |
| F. Direct gene transfer methods/Secondary metabolite             |     |              |
| G. Transgenic plant/photograph                                   |     |              |
| 5. Record  |     | 5M           |
| 6. Viva voce   |     | 3M           |

Evaluation Scheme	Marks
<b>One Major Experiment (Experiment No : )</b>	<b>15</b>
<b>One Minor Experiment (Experiment No : )</b>	<b>10</b>
<b>Slide Preparation, if any</b>	<b>5</b>
<b>Practical Record + Viva Voce</b>	<b>10</b>
<b>Total</b>	<b>40</b>

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**P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE:: VIJAYAWADA**

Semester-wise Revised Syllabus under CBCS, 2020-21

Course Code: **BOTSET02**

Offered to B.Sc. (BZC)

Domain Subject: BOTANY

Semester – V

Max. Marks: 100 (CCIA: 25+ SEE: 75) Theory Hrs. /Week: 3

**Course 7C: MUSHROOM CULTIVATION**

Type of the Course: Skill Enhancement Course (Elective: Theory),

Credits: 04

**I. Course Outcomes: Students at the successful completion of the course will be able to:**

CO1: Comprehend the value of mushrooms.

CO2: Identify the methods of composting and the materials required.

CO3: Acquire a critical knowledge on spawning and casing.

CO4: Demonstrate skills in cultivation of various mushrooms.

CO5: Understand the Post-harvest technology.

**II. Syllabus: (Total Theory Hours: 45 including Unit tests etc.)**

**UNIT-I Introduction and value of mushrooms (9h)**

1. Mushrooms: Definition, structure of a mushroom and a brief account of life cycle; historical account and scope of mushroom cultivation; difference between edible and poisonous mushrooms.

2. Morphological features of any four edible mushrooms, Button mushroom (*Agaricus bisporus*), Milky mushroom (*Calocybe indica*), Oyster mushroom (*Pleurotus sajor-caju*) and Paddy straw mushroom (*Volvariella volvacea*).

3. Nutraceutical value of mushrooms; medicinal mushrooms in South India - *Ganoderma lucidum*, *Phellinus rimosus*, *Pleurotus florida* and *Pleurotus pulmonaris* – their therapeutic value; Poisonous mushrooms - harmful effects.

**UNIT-II Basic requirements of cultivation system (9h)**

1. Small village unit and larger commercial unit; layout of a mushroom farm - location of building plot, design of farm, bulk chamber, composting, equipment and facilities, pasteurization room and growing rooms.

2. Compost and composting: Definition, machinery required for compost making, materials for compost preparation.

3. Methods of composting- long method of composting and short method of composting.

### **UNIT-III Spawning and casing (9h)**

1. Spawn and spawning: Definition, facilities required for spawn preparation; preparation of spawn substrate.
2. Preparation of pure culture, media used in raising pure culture; culture maintenance, storage of spawn.
3. Casing: Definition, Importance of casing mixture, Quality parameters of casing soil, different types of casing mixtures, commonly used materials.

### **UNIT-IV Mushroom cultivation (9h)**

Raw material, compost, spawning, casing, cropping, and problems in cultivation (diseases, pests and nematodes, weed molds and their management strategies), picking and packing for any Four of the following mushrooms: (a) Button mushroom (b) Oyster mushroom (c) Milky mushroom and (d) Paddy straw mushroom

### **UNIT-V Post harvest technology (9h)**

1. Shelf life of mushrooms; preservation of mushrooms - freezing, dry freezing, drying and canning.
2. Quality assurance and entrepreneurship - economics of different types of mushrooms; value added products of mushrooms.
3. Management of spent substrates and waste disposal of various mushrooms.

### **References/ Text Book/ e-books/websites**

1. Tewari Pankaj Kapoor, S. C. (1988). Mushroom Cultivation. Mittal Publication, New Delhi.
2. Pandey R.K, S. K Ghosh, (1996). A Hand Book on Mushroom Cultivation. Emkey Publications
3. Web resources suggested by the teacher concerned and the college librarian including reading material.

#### **Reference Materials on the Web/web links:**

<https://www.youtube.com/watch?v=DwMCw14khIU>

<https://www.youtube.com/watch?v=vggMIUelsoU>

### **III Co-Curricular Activities**

#### **(a) Mandatory:(Training of students by teacher in field related skills:(lab:10 + field: 05)**

1. **For Teacher:** Training of students by teacher in the laboratory/field for not less than 15 hours on the field techniques/skills of identification of edible and poisonous mushrooms, basic facilities of a mushroom culture unit, preparation of compost and spawn, cultivation practices of edible mushrooms, storage and marketing of produce.

2. **For Student:** Students shall (individually) visit mushroom culture units in universities/research organizations/private sector write their observations on infrastructure, cultivation practices and products of a mushroom culture unit etc., and submit to the teacher a hand-written Fieldwork/Project work Report not exceeding 10 pages in the given format. 3. Max marks for Fieldwork/Project work Report: 05. 6. Suggested Format for Fieldwork/Project work Report: Title page, student details, index page, details of place visited, observations, findings and acknowledgements. 4. Unit tests (IE).

**b) Suggested Co-Curricular Activities:** 1. Training of students by related industrial experts. 2. Assignments (including technical assignments like identifying various mushrooms, tools and techniques for culture, identification and control of diseases etc., 3. Seminars, Group discussions, Quiz, Debates etc. (on related topics). 4. Preparation of videos on tools and techniques in mushroom culture. 5. Collection of material/figures/photos related to edible and poisonous mushrooms, cultivation of mushrooms in cottage industries, writing and organizing them in a systematic way in a file. 6. Visits to mushroom culture units in universities, research organizations, private firms, etc. 7. Invited lectures and presentations on related topics by field/industrial experts.

## **Model Question Paper**

**Course Code: BOTSET02**

**Offered to B.Sc. (BZC)**

**Title of the Course: MUSHROOM CULTIVATION**

### **SECTION – A (Total: 25 Marks)**

#### **Short Answer Questions (25 Marks: 5 x5)**

**Answer any Five questions. Each answer carries 5 marks. At least 1 question should be given from each Unit**

1. Extend the medicinal value of *Ganoderma*.CO2,L2
2. Describe the small village unit.CO2,L1
3. List the facilities required for spawn preparation.CO3,L1
4. Explain weed mold in mushroom cultivation .CO4,L4
5. Illustrate the Novel Value Added Products of Mushrooms .CO5,L3
6. Enumerate the Poisonous mushrooms .CO1,L1
7. Summarize Layout of a mushroom farm .CO2,L2
8. Explain about the Casing oil .CO3,L4

**SECTION B (Total: 5 x 10 = 50 Marks)**

**Answer all questions. Each answer carries 10 marks. Two questions should be given from each unit with internal choice.**

9(a) Describe the life cycle of a mushroom.**CO1,L1**

**OR**

9(b) Describe the morphological features of Paddy straw and oyster mushroom.**CO1,L1**

10(a) Explain various types of composting methods.**CO2,L4**

**OR**

10(b) Point out basic requirements of mushroom cultivation.**CO2,L4**

11(a) What is casing? Explain different types of casing mixture and their Importance.**CO3,L4**

**OR**

11(b) Appraise an account of different types of media used for preparation of pure culture.**CO3,L4**

12(a) Summarize the process of cultivation of Milky mushroom.**CO4,L1**

**OR**

12(b) Extend an account cultivation of Oyster mushroom.**CO4,L1**

13(a) Explain the shelf life of mushrooms? What are the conditions required to improve shelf life of mushrooms?**CO5,L4**

**OR**

13(b) Explain how mushrooms are preserved through Freeze drying method.**CO5,L4**

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**P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE:: VIJAYAWADA**

Semester-wise Revised Syllabus under CBCS, 2020-21

Course Code: **BOTSEP02** Offered to B.Sc. (BZC)  
Domain Subject: BOTANY Semester – V  
Max. Marks: 50(CCIA: 10+ SEE: 40) Practical Hrs./Week : 3

**Course 6C: MUSHROOM CULTIVATION**

Type of the Course: Skill Enhancement Course (Elective: Practical), Credits: 01

**I. Course Outcomes: Students at the successful completion of the course will be able to:**

CO1: Identify different types of mushroom.

CO2: Demonstrate preparation of pure culture of an edible mushroom.

CO3: Prepare compost and casing mixture.

CO4: Crop and harvest mushrooms.

CO5: Prepare value-added products.

**II: Practical (Laboratory) Syllabus: (30 Periods):** Atleast 8 Practicals ....

1. Identification of different types of mushrooms.
2. Preparation of pure culture of an edible mushroom.
3. Preparation of mother spawn.
4. Production of planting spawn and storage.
5. Preparation of compost and casing mixture.
6. Demonstration of spawning and casing.
7. Hands on experience on cropping and harvesting.
8. Demonstration of storage methods.
9. Preparation of value-added products.(Pickle, Chips, Biryani, fritters)

**III. Lab References:**

1. Sushma Sharma Sapna Thakur Ajar Nath Yadav, 2018. Mushroom Cultivation: A Laboratory Manual, Eternal University, Sirmour, H.P.
2. Kadhila-Muandingi, N.P., F. S. Mubiana and K. L. Halueendo, 2012. Mushroom Cultivation: A Beginners Guide, The University of Namibia
3. Gajendra Jagatap and Utpal Dey, 2012. Mushroom Cultivation:Practical Manual, LAMBERT Academic Publishing, Saarbrücken, Germany
4. Deepak Som, 2021. A Practical Manual on Mushroom Cultivation, P.K.Publishers & Distributors, Delhi
5. Web sources suggested by the teacher concerned.

### Model Question Paper : Practicals

**Time Allowed: Three hours Max. Marks: 40**

1. Demonstration of preparing pure culture/mother spawn 'A' 7 M
2. Preparation method for planting spawn and storage/compost and casing material 'B' 8 M
3. Demonstration of spawning and casing/storage and making a value-added product 'C' 5 M
4. Scientific observation and data analysis 4 x 3 = 12 M
- D. Edible/poisonous mushroom specimen/photograph
- E. Infrastructure/tool used in mushroom cultivation
- F. Material for compost/casing
- G. Storage practice/ a value-added product
5. Record 5 M
6. Viva Voce 3 M

Evaluation Scheme	Marks
<b>One Major Experiment (Experiment No : )</b>	<b>15</b>
<b>One Minor Experiment (Experiment No : )</b>	<b>10</b>
<b>Slide Preparation, if any</b>	<b>5</b>
<b>Practical Record + Viva Voce</b>	<b>10</b>
<b>Total</b>	<b>40</b>

**P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE:: VIJAYAWADA**

Semester-wise Revised Syllabus under CBCS, 2020-21

Course Code: **BOTSET03**

Offered to B.Sc. (BZC)

Domain Subject: BOTANY

Semester – V

Max. Marks: 100 (CCIA: 25+ SEE: 75) Theory Hrs. /Week: 3

**Course 6A: PLANT PROPAGATION**

Type of the Course: Skill Enhancement Course (Elective: Theory),

Credits: 04

**I. Course Outcomes: Students at the successful completion of the course will be able to:**

CO1: Comprehend the basic concepts of propagation.

CO2: Identify apomictics in plant propagation.

CO3: Acquire knowledge of propagation by cuttings.

CO4: Demonstrate skills of propagation by layering.

CO5: Understand the propagation by grafting and budding.

**II. Syllabus: (Total Theory Hours: 45 including Unit tests etc.)**

*(Hours: Teaching: 50, Lab: 30, Field training: 05, others incl. unit tests: 05) (Syllabi of theory, practical and lab (skills) training together shall be completed in 80 hours)*

**UNIT-I Basic concepts of propagation (10h)**

1. Propagation: Definition, need and potentialities for plant multiplication; asexual and sexual methods of propagation - advantages and disadvantages.
2. Propagation facilities: Mist chamber, humidifiers, greenhouses, glasshouses, cold frames, hot beds, poly-houses, phytotrons nursery - tools and implements.
3. Identification and propagation by division and separation: Bulbs, pseudobulbs, corms, tubers and rhizomes; runners, stolons, suckers and offsets.

**UNIT-II Apomictics in plant propagation (10h)**

1. Apomixis: Definition, facultative and obligate; types – recurrent, non-recurrent, adventitious and vegetative; advantages and disadvantages.
2. Polyembryony: Definition, classification, horticultural significance; chimera and bud sport.
3. Propagation of mango, Citrus and Allium using apomictic embryos.

**UNIT-III Propagation by cuttings (10h)**

1. Cuttings: Definition, different methods of cuttings; root and leaf cuttings.
2. Stem cuttings: Definition of stem tip and section cuttings; plant propagation by herbaceous, soft wood, semi hard wood, hard wood and coniferous stem cuttings.
3. Physiological and bio chemical basis of rooting; factors influencing rooting of cuttings; Use of plant growth regulators in rooting of cuttings.

#### **UNIT-IV Propagation by layering (10h)**

1. Layering: Definition, principle and factors influencing layering.
2. Plant propagation by layering: Ground layering – tip layering, simple layering, trench layering, mound (stool) layering and compound (serpentine layering).
3. Air layering technique – application in woody trees.

#### **UNIT-V Propagation by grafting and budding (10h)**

1. Grafting: Definition, principle, types, graft incompatibility, collection of scion wood stick, scion-stock relationship, and their influences, bud wood certification; micrografting.
2. Propagation by veneer, whip, cleft, side and bark grafting techniques.
3. Budding: Definition; techniques of ‘T’, inverted ‘T’, patch and chip budding.

#### **References/ Text Book/ e-books/websites**

1. Sharma RR and Manish Srivastav.2004. Plant Propagation and Nursery Management International Book Distributing Co. Lucknow.
2. Hartman, HT and Kester, D.E.1976. Plant Propagation: Principles and Practices, Prentice Hall of India Pvt. Ltd. Bombay.
3. Sadhu, M.K. 1996. Plant Propagation. New Age International Publishers, New Delhi.
4. Web resources suggested by the teacher concerned and college librarian including reading material.

#### **Reference Materials on the Web/web links:**

<https://www.youtube.com/watch?v=WHiv1OvXGcI>

<https://www.youtube.com/watch?v=dYdD2-7pXY0>

### **III Co-Curricular Activities**

#### **(a) Mandatory:(Training of students by teacher in field related skills:(lab:10 + field: 05)**

1. **For Teacher:** Training of students by the teacher in the laboratory/field for a total of not less than 15 hours on the field techniques/skills of different plant propagation structures, containers, preparation of soil, plant propagation through separation and division, apomictics, cuttings, layering,

grafting and budding.

2. **For Student:** Students shall (individually) visit horticulture nurseries in a University/, research institute /private nursery and observe propagation structures, propagation techniques etc., write their observations and submit a hand-written Fieldwork/Project work/Project work Report not exceeding 10 pages in the given format to the teacher.

3. Max marks for Fieldwork/Project work Report: 05.

4. Suggested Format for Fieldwork/Project work Report: Title page, student details, index page, details of place visited, observations, findings and acknowledgements.

5. Unit tests (IE).

**b) Suggested Co-Curricular Activities:**

1. Training of students by experts in plant vegetative propagation methods.

2. Assignments (including technical assignments like identifying propagation structures and their operational techniques for a specific plant species.

3. Seminars, Group discussions, Quiz, Debates etc. (suggested topics):

4. Preparation of videos on plant propagation techniques in relation to different economically useful plants.

5. Collection of material/figures/photos related to plant propagation methods, writing and organizing them in a systematic way in a file.

6. Visits to Horticulture/Agriculture/Forest nurseries, research organizations, universities etc.

7. Invited lectures and presentations on related topics by experts in the specified area.

## **Model Question Paper**

**Course Code: BOTSET03**

**Offered to B.Sc. (BZC)**

**Title of the Course: PLANT PROPOGATION**

**SECTION – A (Total: 25 Marks)**

**Short Answer Questions (25 Marks: 5 x5)**

**Answer any Five questions. Each answer carries 5 marks. At least 1 question should be given from each Unit**

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.

**SECTION B (Total: 5 x 10 = 50 Marks)**

**Answer all questions. Each answer carries 10 marks. Two questions should be given from each unit with internal choice.**

9(a)

**OR**

9(b)

10(a)

**OR**

10(b)

11(a)

**OR**

11(b)

12(a)

**OR**

12(b)

13(a)

**OR**

13(b)

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**P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE:: VIJAYAWADA**

Semester-wise Revised Syllabus under CBCS, 2020-21

Course Code: <b>BOTSEP03</b>	Offered to B.Sc. (BZC)
Domain Subject: BOTANY	Semester – V
Max. Marks: 50(CCIA: 10+ SEE: 40)	Practical Hrs./Week : 3

**Course 6A: PLANT PROPAGATION**

Type of the Course: Skill Enhancement Course (Elective: Practical), Credits: 01

**I. Course Outcomes: Students at the successful completion of the course will be able to:**

- CO1: Comprehend the basic concepts of propagation.
- CO2: Identify apomictics in plant propagation.
- CO3: Acquire knowledge of propagation by cuttings.
- CO4: Demonstrate skills of propagation by layering.
- CO5: Understand the propagation by grafting and budding.

**II: Practical (Laboratory) Syllabus: (30 Periods):** The following experiments/practices shall be conducted by students in the lab. Atleast 8 Practical's ....

1. Preparation of nursery beds – flat, raised and sunken beds.
2. Propagation through apomictic.
3. Propagation by separation and division technique.
4. Propagation by cuttings.
5. Propagation by layering
6. Propagation by grafting.
7. Propagation by budding.
8. Preparation of potting mixture, potting and repotting.

**III. Lab References:**

1. Prasad, V. M. and Balaji Vikram, 2018. Practical Manual on Fundamentals of Horticulture and Plant Propagation, Write & Print Publications, New Delhi
2. Upadhyay S. K. (Ed.) 2013. Practical Manual Basic Horticulture-I, Akashdeep Printers, New Delhi
3. Web sources suggested by the teacher concerned.

### Model Question Paper : Practicals

**Time Allowed: Three hours**

**Max. Marks: 40**

- 1.
- 2.
- 3.
- 4.
- D.
- E.
- F.
- G.
- 5.
- 6.

<b>Evaluation Scheme</b>	<b>Marks</b>
<b>One Major Experiment (Experiment No : )</b>	<b>15</b>
<b>One Minor Experiment (Experiment No : )</b>	<b>10</b>
<b>Slide Preparation, if any</b>	<b>5</b>
<b>Practical Record + Viva Voce</b>	<b>10</b>
<b>Total</b>	<b>40</b>



**P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE:: VIJAYAWADA**

Semester-wise Revised Syllabus under CBCS, 2020-21

Course Code: **BOTSET04**

Offered to B.Sc. (BZC)

Domain Subject: BOTANY

Semester – V

Max. Marks: 100 (CCIA: 25+ SEE: 75) Theory Hrs. /Week: 3

**Course 7A: SEED TECHNOLOGY**

Type of the Course: Skill Enhancement Course (Elective: Theory),

Credits: 04

**I. Course Outcomes: Students at the successful completion of the course will be able to:**

CO1: Comprehend the dormancy of seeds.

CO2: Identify the steps involved in seed processing.

CO3: Acquire the knowledge in seed testing.

CO4: Demonstrate seed health testing methods.

CO5: Understand the seed certification issues.

**II. Syllabus: (Total Theory Hours: 45 including Unit tests etc.)**

**UNIT-I Seed dormancy (10h)**

1. Seed and grain: Definitions, importance of seed; structure of Dicot and Monocot seed.
2. Role and goals of seed technology; characteristics of quality seed material.
3. Dormancy: Definition, causes for seed dormancy; methods to break seed dormancy.

**UNIT-II Seed processing and storage (10h)**

1. Principles of seed processing: seed pre-cleaning, precuring, drying, seed extraction; cleaning, grading, pre-storage treatments; bagging and labelling, safety precautions during processing.
2. Seed storage; orthodox and recalcitrant seeds, natural longevity of seeds.
3. Factors affecting longevity in storage; storage conditions, methods and containers.

**UNIT-III Seed testing (10h)**

1. Definition of seed vigour, viability and longevity; seed sampling and equipment; physical purity analysis.
2. Seed moisture – importance – methods of moisture determination.

3. Seed germination tests using paper, sand or soil – standard germination test; TZ test to determine seed viability; seed health testing.

#### **UNIT-IV Seed borne diseases (10h)**

1. A brief account of different seed borne diseases and their transmission.
2. Different seed health testing methods for detecting microorganisms.
3. Management of seed borne diseases; seed treatment methods: spraying and dusting

#### **UNIT-V Seed certification (10h)**

1. Objectives - Indian seed Act; seed rules and seed order; new seed policy (1988).
2. Seed Inspector: Duties and responsibilities; classes of seeds, phases of certification standards (i.e., Land requirement, isolation distance) etc.
3. Issue of certificates, tags and sealing; pre and post control check: Genetic purity verification, certification, records and reporting.

#### **References/ Text Book/ e-books/websites**

1. Umarani R, Jerlin R, Natarajan N, Masilamani P, Ponnuswamy AS 2006. Experimental Seed Science and Technology, Agrobios, Jodhpur
2. Agrawal, 2005. Seed Technology. Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi
3. Desai B D 2004. Seeds Hand Book: Processing and Storage, CRC Press
4. Agarwal V K and J B Sinclair 1996, Principles of Seed Pathology, CRC Press
5. Tunwar NS and Singh SN. 1988. Indian Minimum Seed Certification Standards. CSCB, Ministry of Agriculture, New Delhi.
6. McDonald, M.B. and L.O. Copland. 1999. Seed Science and Technology Laboratory Manual. Scientific Publishers, Jodhpur
7. Web resources suggested by the teacher concerned and the college librarian including reading material.

#### **Reference Materials on the Web/web links:**

<https://www.youtube.com/watch?v=yY7DOo6N9II>

<https://www.youtube.com/watch?v=F7XTGYZbXwM>

### III Co-Curricular Activities

#### (a) **Mandatory:(Training of students by teacher in field related skills:(lab:10 + field: 05)**

1. **For Teacher:** Training of students by the teacher in the laboratory/field for a total of not less than 15 hours on the field techniques/skills of identifying and drawing seed structure, methods of breaking seed dormancy, seed cleaning, seed storage, identification of seed borne diseases, seed certification procedure.

2. **For Student:** Students shall (individually) visit horticulture/agriculture/ forest nursery/commercial seed production firms/ seed testing laboratories in government or private sector, observe seed production techniques, processing and storage, seed testing and certification procedures etc., write their observations and submit a handwritten Fieldwork/Project work Report not exceeding 10 pages in the given format to the teacher.

3. Max marks for Fieldwork/Project work Report: 05.

4. Suggested Format for Fieldwork/Project work Report: Title page, student details, index page, details of place visited, observations, findings and acknowledgements.

5. Unit tests (IE).

#### **b) Suggested Co-Curricular Activities:**

1. Training of students by experts in seed technology.

2. Assignments (including technical assignments like seed processing and storage techniques, seed testing, seed certification, seed borne diseases- prevention and control).

3. Seminars, Group discussions, Quiz, Debates etc. (suggested topics):

4. Preparation of videos on various aspects related to seed technology.

5. Collection of material/figures/photos related to seed technology, writing and organizing them in a systematic way in a file.

6. Visits to seed production units in Industries/Horticulture/Agriculture/Forest universities/colleges; research organizations, seed testing laboratories etc.

7. Invited lectures and presentations on related topics by experts in the specified area.

## Model Question Paper

Course Code: BOTSET04

Offered to B.Sc. (BZC)

Title of the Course: SEED TECHNOLOGY

### SECTION – A (Total: 25 Marks)

#### Short Answer Questions (25 Marks: 5 x5)

Answer any Five questions. Each answer carries 5 marks. At least 1 question should be given from each Unit

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.

### SECTION B (Total: 5 x 10 = 50 Marks)

Answer all questions. Each answer carries 10 marks. Two questions should be given from each unit with internal choice.

9(a)

OR

9(b)

10(a)

OR

10(b)

11(a)

OR

11(b)

12(a)

OR

12(b)

13(a)

OR

13(b)

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**P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE:: VIJAYAWADA**

Semester-wise Revised Syllabus under CBCS, 2020-21

Course Code: **BOTSEP04**

Offered to B.Sc. (BZC)

Domain Subject: BOTANY

Semester – V

Max. Marks: 50(CCIA: 10+ SEE: 40)

Practical Hrs./Week : 3

**Course 7A: SEED TECHNOLOGY**

Type of the Course: Skill Enhancement Course (Elective: Practical),

Credits: 01

**I. Course Outcomes: Students at the successful completion of the course will be able to:**

CO1: Comprehend the dormancy of seeds.

CO2: Identify the steps involved in seed processing.

CO3: Acquire the knowledge in seed testing.

CO4: Demonstrate seed health testing methods.

CO5: Understand the seed certification issues.

**II: Practical (Laboratory) Syllabus: (30 Periods):** Atleast 8 Practicals ....

1. Determination of physical properties of seeds of 3 select local crops (1 each from cereals, millets, pulses and oil seeds).
2. Breaking seed dormancy in 3 select local crops.
3. Measurement of seed moisture content by O S W A or moisture meter or oven drying method.
4. Seed germination tests and evaluation.
5. Seed vigour - conductivity test. 6. Accelerated ageing tests.
7. Tetrazolium test.
8. Priming and invigoration treatments for improving germination and vigour.
9. Techniques of seed health testing - visual examination of seeds, washing test, incubation methods, embryo count method, seed soak method for the detection of certain seed borne pathogens.
10. Using various types of tools for dusting and spraying pesticides/insecticides.

**III. Lab References:**

1. Sanjeev Kumar, 2019. Practical Manual Seed Technology of Vegetable Crops, M/s Asian Printery, Ahmedabad
2. Divakara Sastry, E.V., Dharendra Singh and S.S.Rajput, 2013. Seed Technology: Practical Manual, Swami Keshwanand Rajasthan Agricultural University, Jobner
3. Web sources suggested by the teacher concerned.

### Model Question Paper : Practicals

**Time Allowed: Three hours**

**Max. Marks: 40**

- 1.
- 2.
- 3.
- 4.
- D.
- E.
- F.
- G.
- 5.
- 6.

<b>Evaluation Scheme</b>	<b>Marks</b>
<b>One Major Experiment (Experiment No : )</b>	<b>15</b>
<b>One Minor Experiment (Experiment No : )</b>	<b>10</b>
<b>Slide Preparation, if any</b>	<b>5</b>
<b>Practical Record + Viva Voce</b>	<b>10</b>
<b>Total</b>	<b>40</b>

**P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE:: VIJAYAWADA**

Semester-wise Revised Syllabus under CBCS, 2020-21

Course Code: **BOTSET05**

Offered to B.Sc. (BZC)

Domain Subject: BOTANY

Semester – V

Max. Marks: 100 (CCIA: 25+ SEE: 75) Theory Hrs. /Week: 3

**Course 6B: VEGETABLE CROPS-CULTIVATION PRACTICES**

Type of the Course: Skill Enhancement Course (Elective: Theory),

Credits: 04

**I. Course Outcomes: Students at the successful completion of the course will be able to:**

CO1: Comprehend the classification of vegetable crops.

CO2: Identify the locally cultivated leafy vegetables.

CO3: Acquire the knowledge in cultivation of fruity vegetables.

CO4: Demonstrate cultivation practices of peas and beans.

CO5: Understand the cultivation of root and tuber crops.

**II. Syllabus: (Total Theory Hours: 45 including Unit tests etc.)**

**UNIT-I Introduction to Olericulture (10h)**

1. Vegetables and Olericulture: Definitions, nutritive value of vegetables and economic significance of vegetable farming.
2. Classification of vegetable crops (Botanical, based on climatic zones and economic parts used).
3. Types of vegetable gardens (kitchen gardening, terrace gardening, market gardening and truck gardening); implements used in vegetable gardening; vegetable forcing – a brief concept.

**UNIT-II Cultivation of leafy vegetables (10h)**

1. Leafy vegetables: Definition and a brief account of locally cultivated crops.
2. Study of the following leafy vegetable crops: (a) Amaranthus (b) Palak (c) Hibiscus cannabinus (d) Fenugreek: systematic position, nutritive value, origin, area, production, improved varieties.
3. General cultivation practices such as sowing, planting distance, fertilizer requirements, irrigation, weed management, harvesting.
4. Crop specific yield, storage, disease and pest control and seed production.

**UNIT-III Cultivation of fruity vegetables (10h)**

1. Fruity vegetables: Definition and a brief account of locally cultivated crops.

2. Study of the fruity vegetable crops: (a) Okra (b) Tomato (c) Chillies (d) Brinjal: systematic position, nutritive value, origin, area, production, improved varieties.
3. General cultivation practices such as sowing, planting distance, fertilizer requirements, irrigation, weed management, harvesting.
4. Crop specific yield- storage, disease and pest control and seed production

#### **UNIT-IV Cultivation of peas and beans (10h)**

1. A brief account of locally cultivated peas and beans.
2. Study of the following crops: (a) Dolichos (b) Cluster bean (c) French bean: Systematic position, nutritive value, origin, area, production, improved Varieties.
3. General cultivation practices such as sowing, planting distance, fertilizer requirements, irrigation, weed management, harvesting.
4. Crop specific yield, storage, disease and pest control and seed production.

#### **UNIT-V Cultivation of root and tuber crops (10h)**

1. A brief account of locally cultivated root and tuber crops.
2. Study of the following crops: (a) Carrot (b) Radish (c) Sweet potato (d) Potato: Systematic position, family, nutritive value, origin, area, production, improved varieties.
3. General cultivation practices such as sowing, planting distance, fertilizer requirements, irrigation, weed management, harvesting.
4. Crop specific yield, storage, disease and pest control and seed production.

#### **References/ Text Book/ e-books/websites**

1. Bose T K et al. (2003) Vegetable crops, Naya Udhyog Publishers, Kolkata.
2. Singh D K (2007) Modern vegetable varieties and production, IBN Publisher Technologies, International Book Distributing Co, Lucknow.
3. Premnath, Sundari Velayudhan and D P Sing (1987) Vegetables for the tropical region, ICAR, New Delhi
4. Shanmugavelu, K. G. 1989. Production Technology of Vegetable Crops. Oxford and IBH Publishing Co. Pvt. Ltd. New Delhi.
5. Rana MK. 2008. Scientific Cultivation of Vegetables. Kalyani Publ., New Delhi



6. Rubatzky VE and Yamaguchi M. (Eds.). 1997. World Vegetables: Principles, Production and Nutritive Values. Chapman & Hall, London.

7. Web resources suggested by the teacher concerned and the college librarian including reading material.

**Reference Materials on the Web/web links:**

<https://www.youtube.com/watch?v=7mbB7EivtH4>

<https://www.youtube.com/watch?v=ZTc8TIK8XoQ>

**III Co-Curricular Activities**

**(a) Mandatory:(Training of students by teacher in field related skills:(lab:10 + field: 05)**

1. **For Teacher:** Training of students by the teacher in the laboratory/field for a total of not less than 15 hours on the field techniques/skills of vegetable plants identification, vegetable gardening, agronomic practices, water, weed and disease management; harvesting and storage of produce. \

2. **For Student:** Students shall (individually) visit a horticulture university/ research station or vegetable crop farm in their locality, observe different vegetable crops/ varieties of a vegetable crop, intercultural operations, pests and diseases, harvesting and storage etc., write their observations and submit to the teacher a hand-written Fieldwork/Project work Report not exceeding 10 pages in the given format.

3. Max marks for Fieldwork/Project work Report: 05.

4. Suggested Format for Fieldwork/Project work Report: Title page, student details, index page, details of place visited, observations, findings and acknowledgements.

5. Unit tests (IE).

**b) Suggested Co-Curricular Activities:**

1. Training of students by related industrial experts or farmers.

2. Assignments (including technical assignments like tools in vegetable gardening and their handling, agronomic practices, modern irrigation methods, organic farming practices etc.)

3. Seminars, Group discussions, Quiz, Debates etc. (on related topics).

4. Preparation of videos on cultivation practices for vegetable crops.

5. Collection of material/figures/photos related to different vegetable crop species, writing and organizing them in a systematic way in a file.

6. Visits to horticulture universities, research organizations, private vegetable farming units etc.

7. Invited lectures and presentations on related topics by field/industrial experts

## Model Question Paper

Course Code: BOTSET05

Offered to B.Sc. (BZC)

Title of the Course: VEGETABLE CROPS-CULTIVATION PRACTICES

### SECTION – A (Total: 25 Marks)

#### Short Answer Questions (25 Marks: 5 x5)

Answer any Five questions. Each answer carries 5 marks. At least 1 question should be given from each Unit

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.

### SECTION B (Total: 5 x 10 = 50 Marks)

Answer all questions. Each answer carries 10 marks. Two questions should be given from each unit with internal choice.

9(a)

OR

9(b)

10(a)

OR

10(b)

11(a)

OR

11(b)

12(a)

OR

12(b)

13(a)

OR

13(b)

\*\*\*

**P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE:: VIJAYAWADA**

Semester-wise Revised Syllabus under CBCS, 2020-21

Course Code: **BOTSEP05** Offered to B.Sc. (BZC)

Domain Subject: BOTANY Semester – V

Max. Marks: 50(CCIA: 10+ SEE: 40) Practical Hrs./Week : 3

**Course 7A: VEGETABLE CROPS – CULTIVATION PRACTICES**

Type of the Course: Skill Enhancement Course (Elective: Practical), Credits: 01

**I. Course Outcomes: Students at the successful completion of the course will be able to:**

CO1: Comprehend the classification of vegetable crops.

CO2: Identify the locally cultivated leafy vegetables.

CO3: Acquire the knowledge in cultivation of fruity vegetables.

CO4: Demonstrate cultivation practices of peas and beans.

CO5: Understand the cultivation of root and tuber crops.

**II: Practical (Laboratory) Syllabus: (30 Periods):** Atleast 8 Practicals ....

1. Identification of seeds of important local vegetable plants and preparation of herbarium.
2. Identification of local vegetable crops and handling of garden tools.
3. Analysis of garden soil for ratios of physical characteristics by sieve separation.
4. Determination of chemical characters of garden soil (pH, EC, Organic Carbon, SAR).
5. Planning and layout of a vegetable crop farm.
6. Preparation of nursery bed (raised, sunken and flat beds) and sowing of seeds.
7. Transplanting and care of vegetable seedlings.
8. Intercultural operations in vegetable plots.
9. Estimation of Total Soluble Solids (TSS) by Refractometer in a fruit and a leafy vegetable.
10. Estimation of Vitamin - C in a fruit and a leafy vegetable by DCIP method.
11. Identification of pests and disease-causing organisms on any two vegetable plants.
12. Seed extraction in tomato and brinjal.

**III. Lab References:**

1. Akhilesh Sharma (Ed.), 2013. Practical Manual Olericulture-I, Sheel Packers, New Delhi
2. Biswajit Saha and Shri Dharampal Singh, 2013. Practical Manual Olericulture-I, Sheel Packers, New Delhi
3. Saini RS, K.D. Sharma, O.P, Dhankhar and R.A. Kaushik (Eds.). 2001. Laboratory Manual of Analytical Techniques in Horticulture. Agrobios, Jodhpur

4. Ranganna S. 1986. Handbook of Analysis and Quality Control for Fruit and Vegetable Products. Tata-McGraw Hill, New Delhi
5. Web sources suggested by the teacher concerned.

**Model Question Paper : Practicals**

**Time Allowed: Three hours**

**Max. Marks: 40**

- 1.
- 2.
- 3.
- 4.
- D.
- E.
- F.
- G.
- 5.
- 6.

<b>Evaluation Scheme</b>	<b>Marks</b>
<b>One Major Experiment (Experiment No : )</b>	<b>15</b>
<b>One Minor Experiment (Experiment No : )</b>	<b>10</b>
<b>Slide Preparation, if any</b>	<b>5</b>
<b>Practical Record + Viva Voce</b>	<b>10</b>
<b>Total</b>	<b>40</b>

## **P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE:: VIJAYAWADA**

Semester-wise Revised Syllabus under CBCS, 2020-21

Course Code: **BOTSET06**

Offered to B.Sc. (BZC)

Domain Subject: BOTANY

Semester – V

Max. Marks: 100 (CCIA: 25+ SEE: 75) Theory Hrs. /Week: 3

### **Course 7B: VEGETABLE CROPS-POST HARVEST TECHNOLOGY**

Type of the Course: Skill Enhancement Course (Elective: Theory),

Credits: 04

#### **I. Course Outcomes: Students at the successful completion of the course will be able to:**

CO1: Comprehend the post-harvest practices.

CO2: Identify the methods of storage.

CO3: Acquire the knowledge in processing of vegetables.

CO4: Demonstrate importance of preservation and value-addition.

CO5: Understand the various operations in marketing.

#### **II. Syllabus: (Total Theory Hours: 45 including Unit tests etc.)**

##### **UNIT-I Introduction to Post Harvest Practices (10h)**

1. Post-harvest technology: Definition; importance, scope and future status of post-harvest management of vegetables.
2. Study of maturity standards of vegetables; harvest techniques of vegetables, methods stages, signs of harvesting; harvesting and its relationship with quality, sorting and grading.
3. Careful handling of harvested vegetables; pre-harvest and post-harvest factors responsible for ripening.

##### **UNIT-II Methods of storage (10h)**

1. Climacteric and non-climacteric types of vegetables.
2. Methods of storage to prolong shelf life of harvested vegetables; on-farm storage, evaporatively cooled stores, ventilated storage, pit storage etc.
3. Refrigerated storage, refrigeration cycle, controlled and modified atmosphere, hypobaric storage.

##### **UNIT-III Processing of vegetables (10h)**

1. Causes for spoilage of vegetables and control measures during storage; post-harvest disease and pest

management.

2. Techniques to prevent deterioration; vegetable processing equipment; minimal processing of vegetables.

3. Safe chemicals and microbial limits; application of growth regulators for quality assurance; grading.

#### **UNIT-IV Preservation and value-addition (10h)**

1. Importance and scope of vegetable preservation in India; principles underlying general methods of preservation.

2. Methods of preservation; food additives and food colours.

3. Fried products, process of frying; dried vegetables; sauces and chutneys, pickles and salted vegetables; by-product and waste utilization.

#### **UNIT-V Marketing (10h)**

1. Packing line operations, packaging of vegetables and their products; transportation; codex norms for export of perishables.

2. Demand supply analysis of important vegetables; market potential of various vegetables products.

3. Important marketing agencies and institutions; importance of cooperative marketing.

#### **References/ Text Book/ e-books/websites**

1. Salunkhe DK and Kadam SS. (Ed.). 1998. Hand Book of Vegetable Science and Technology: Production, Composition, Storage and Processing. Marcel Dekker, New York.

2. Arthey D and Dennis C. 1996. Vegetable Processing. Blackie/Springer-Verlag, New York

3. Verma LR and Joshi VK. 2000. Post-harvest Technology of Fruits and Vegetables: Handling, Processing, Fermentation and Waste Management. Indus Publishing Company, New Delhi

4. Srivastava RP and Kumar S. 2003. Fruit and Vegetable Preservation: Principles and Practices. International Book Distribution Company, Lucknow.

5. Giridharilal GS, Siddappa and Tandon GL. 1986. Preservation of Fruits and Vegetables. ICAR, New Delhi.

6. Web resources suggested by the teacher concerned and the college librarian including reading material.

#### **Reference Materials on the Web/web links:**

<https://www.youtube.com/watch?v=XkFyGbyq6SU>

### III Co-Curricular Activities

#### (a) Mandatory:(Training of students by teacher in field related skills:(lab:10 + field: 05)

1. **For Teacher:** Training of students by teacher in the laboratory/field for a total of not less than 15 hours on the field techniques/skills of harvesting indices of vegetables, storage methods, tools and techniques for processing, causes for spoilage and methods to control, preservation methods, marketing chain and in making value added products.

2. **For Student:** Students shall (individually) visit any one of the places like horticulture university/ research station; vegetable storage units in public and private sector; vegetable processing industries in their locality and observe harvesting practices, storage methods, processing and preservation; grading, value added products and marketing. Write their observations and submit to the teacher a hand-written Fieldwork/Project work Report not exceeding 10 pages in the given format.

3. Max marks for Fieldwork/Project work Report: 05.

4. Suggested Format for Fieldwork/Project work Report: Title page, student details, index page, details of place visited, observations, findings and acknowledgements.

5. Unit tests (IE)

#### b) Suggested Co-Curricular Activities:

1. Training of students by related industrial experts or farmers.

2. Assignments (including technical assignments like tools and techniques for storage, processing and preservation, causes for spoilage and methods to avoid losses, value added products of some vegetables, packaging and marketing etc.)

3. Seminars, Group discussions, Quiz, Debates etc. (on related topics).

4. Preparation of videos on cultivation practices for vegetable crops.

5. Collection of material/figures/photos related to harvesting, storage, processing and preservation of vegetable crop produce, writing and organizing them in a systematic way in a file.

6. Visits to horticulture universities, research organizations; storage, processing industries in public or private sector; industries making value added products of vegetables etc.

7. Invited lectures and presentations on related topics by field/industrial experts.

## Model Question Paper

Course Code: BOTSET06

Offered to B.Sc. (BZC)

Title of the Course: VEGETABLE CROPS-CULTIVATION PRACTICES

SECTION – A (Total: 25 Marks)

Short Answer Questions (25 Marks: 5 x5)

Answer any Five questions. Each answer carries 5 marks. At least 1 question should be given from each Unit

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.

SECTION B (Total: 5 x 10 = 50 Marks)

Answer all questions. Each answer carries 10 marks. Two questions should be given from each unit with internal choice.

9(a)

OR

9(b)

10(a)

OR

10(b)

11(a)

OR

11(b)

12(a)

OR

12(b)

13(a)

OR

13(b)

\*\*\*



**P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE:: VIJAYAWADA**

Semester-wise Revised Syllabus under CBCS, 2020-21

Course Code: **BOTSEP06**

Offered to B.Sc. (BZC)

Domain Subject: BOTANY

Semester – V

Max. Marks: 50(CCIA: 10+ SEE: 40)

Practical Hrs./Week : 3

**Course 7B: VEGETABLE CROPS-POST HARVEST TECHNOLOGY**

Type of the Course: Skill Enhancement Course (Elective: Practical),

Credits: 01

**I. Course Outcomes: Students at the successful completion of the course will be able to:**

CO1: Comprehend the post-harvest practices.

CO2: Identify the methods of storage.

CO3: Acquire the knowledge in processing of vegetables.

CO4: Demonstrate importance of preservation and value-addition.

CO5: Understand the various operations in marketing.

**II: Practical (Laboratory) Syllabus: (30 Periods):** Atleast 8 Practicals ....

1. Maturity selection and harvest, harvesting practices.
2. List and cost of equipment, utensils, and additives required for small scale processing industry.
3. Study of different types of spoilages in fresh as well as processed vegetables.
4. Identification and classification of spoilage organisms.
5. Estimation of total carbohydrates (Anthrone method) in a stored vegetable and unstored vegetable.
6. Estimation of protein (Lowry method) in a stored vegetable and un-stored vegetable.
7. Sensory evaluation of fresh and processed vegetables.
8. Assessment of quality and grading, pre-packaging and protective treatments.
9. Identification of packaging materials, containers for packaging.
10. Preparation of pickle from a vegetable.
11. Preparation of tomato sauce, ketchup and chutney.

### III. Lab References:

1. Swati Barche, Reena Nair and P. K. Jain, 2016. A Practical Manual on Post Harvest Value Addition and Processing of Horticulture Crops. Agrobios (India), Jodhpur
2. Antonio L. Acedo Jr., Md. Atiqur Rahman, Borarin Buntong and Durga Mani Gautam, 2016. Vegetable Postharvest Training Manual, AVRDC - The World Vegetable Center, Taiwan
3. Akhilesh Sharma (Ed.), 2013. Practical Manual Olericulture-I, Sheel Packers, New Delhi
4. Biswajit Saha and Shri Dharampal Singh, 2013. Practical Manual Olericulture-I, Sheel Packers, New Delhi
5. Web sources suggested by the teacher concerned.

### Model Question Paper : Practicals

**Time Allowed: Three hours**

**Max. Marks: 40**

- 1.
- 2.
- 3.
- 4.
- D.
- E.
- F.
- G.
- 5.
- 6.

Evaluation Scheme	Marks
One Major Experiment (Experiment No : )	15
One Minor Experiment (Experiment No : )	10
Slide Preparation, if any	5
Practical Record + Viva Voce	10
<b>Total</b>	<b>40</b>

## Department of Chemistry

Minutes of the meeting of the Board of studies in **Chemistry** held on 24/08/2022 through online at 04:00 PM.

### **BOS Members List**

***Dr.M.Manoranjani***

HOD, Chemistry

P.B.Siddhartha College of Arts & Science

**Chairman**

***Dr D.Ramasekhara Reddy,***

Department of Chemistry,

Krishna University,

Machilipatnam..

**University Nominee**

***Prof.C. Suresh Reddy,***

Department of Chemistry (Organic)

Sri Venkateswara University,

Tirupati.

**Subject Expert**

***Prof.Ch.Subrahmanyam***

Professor & Dean of Academics,

IIT,

Hyderabad.

**Subject Expert**

***Sri Ch.Sekhar***

Director,

CIPET, Vijayawada.

**Industry Expert**

***Dr.M.Sivanadh***

HOD, Department of Chemistry,

ANR College,

Gudivada,

**Alumni**

***Dr.P.T.S.R.K.PrasadRao***

I/C, Dept of Chemistry

P.B.Siddhartha College of Arts & Science

**Member**

***Smt.V.Visalakshamma***

Lecturer, Dept of Chemistry

P.B.Siddhartha College of Arts & Science

**Member**

***E. Nagarjuna Babu***

Lecturer, Dept of Chemistry

P.B.Siddhartha College of Arts & Science

**Member**

DEPARTMENT OF CHEMISTRY							
LIST OF THE COURSES INTRODUCED IN V SEMESTER -2022-23							
S.NO	TITLE OF THE COURSE	Course Code	Offered in SEM	Type of the Paper	Year of Introduction	OBE with BTL	Offered to
1	Analytical Methods in Chemistry-1	CHESET01	V/VI	SEC ELECTIVE A	2022-23	YES	BSC MPC & BZC
2	Analytical Methods in Chemistry-1 Lab	CHESEP01	V/VI		2022-23	YES	BSC MPC & BZC
3	Analytical Methods in Chemistry-2	CHESET02	V/VI	SEC ELECTIVE A	2022-23	YES	BSC MPC
4	Analytical Methods in Chemistry-2 Lab	CHESEP02	V/VI		2022-23	YES	BSC MPC
5	Synthetic Organic Chemistry	CHESET03	V/VI	SEC ELECTIVE B	2022-23	YES	BSC MPC & BZC
6	Synthetic Organic Chemistry Lab	CHESEP03	V/VI		2022-23	YES	BSC MPC & BZC
7	Analysis of Organic Compounds	CHESET04	V/VI	SEC ELECTIVE B	2022-23	YES	BSC MPC & BZC
8	Analysis of Organic Compounds Lab	CHESEP04	V/VI		2022-23	YES	BSC MPC & BZC
9	Industrial Chemistry-1	CHESET05	V/VI	SEC ELECTIVE C	2022-23	YES	BSC MPC & BZC
10	Industrial Chemistry-1 Lab	CHESEP05	V/VI		2022-23	YES	BSC MPC & BZC
11	Industrial Chemistry-2	CHESET06	V/VI	SEC ELECTIVE C	2022-23	YES	BSC MPC & BZC
12	Industrial Chemistry-2 Lab	CHESEP06	V/VI		2022-23	YES	BSC MPC & BZC

### Resolutions of BOS in Chemistry held on

1. It is resolved and recommend to introduce **Analytical methods in Chemistry-1** with course code **CHESET01** in V/VI semester of B.Sc. Chemistry (MPC & BZC) for the batch of students admitted in **2020-21** and onwards. For the syllabus and model question paper vide Page No 4 to 7.
2. It is resolved and recommend to introduce **Analytical methods in Chemistry-1 Lab** with course code **CHESEP01** in V semester of B.Sc. Chemistry (MPC & BZC) for the batch of students admitted in **2020-21** and onwards. For the syllabus and model question paper vide Page No 8.
3. It is resolved and recommend to introduce **Analytical methods in Chemistry-2** with course code **CHESET02** in V/VI semester of B.Sc. Chemistry (MPC & BZC) for the batch of students admitted in **2020-21** and onwards. For the syllabus and model question paper vide Page No 9 to 11.

4. It is resolved and recommend to introduce **Analytical methods in Chemistry-2 Lab** with course code **CHESEP02** in V/VI semester of B.Sc. Chemistry (MPC & BZC) for the batch of students admitted in **2020-21** and onwards.For the syllabus and model question paper vide Page No12.
5. It is resolved and recommend to introduce **Synthetic Organic Chemistry** with course code **CHESET03** in V/VI semester of B.Sc. Chemistry(MPC & BZC) for the batch of students admitted in **2020-21** and onwards.For the syllabus and model question paper vide Page No13 to 16.
6. It is resolved and recommend to introduce **Synthetic Organic Chemistry Lab** with course code **CHESEP03** in V/VI semester of B.Sc. Chemistry(MPC & BZC) for the batch of students admitted in **2020-21** and onwards.For the syllabus and model question paper vide Page No 17.
7. It is resolved and recommend to introduce **Analysis of Organic Compounds**with course code **CHESET04** in V/VI semester of B.Sc. Chemistry(MPC & BZC) for the batch of students admitted in **2020-21**and onwards.For the syllabus and model question paper vide Page No 18 to 21.
8. It is resolved and recommend to introduce **Analysis of Organic Compounds Lab** with course code **CHESEP04** in V/VI semester of B.Sc. Chemistry(MPC & BZC) for the batch of students admitted in **2020-21** and onwards.For the syllabus and model question paper vide Page No22.
9. It is resolved and recommend to introduce **Industrial Chemistry-1** with course code **CHESET05** in V/VI semester of B.Sc. Chemistry(MPC & BZC) for the batch of students admitted in **2020-21** and onwards.For the syllabus and model question paper vide Page No 23 to 25.
10. It is resolved and recommend to introduce **Industrial Chemistry-1 Lab** with course code **CHESEP05** in V/VI semester of B.Sc. Chemistry(MPC & BZC) for the batch of students admitted in **2020-21** and onwards.For the syllabus and model question paper vide Page No 26.
11. It is resolved and recommend to introduce **Industrial Chemistry-2** with course code **CHESET06** in V/VI semester of B.Sc. Chemistry (MPC & BZC) for the batch of students admitted in **2020-21** and onwards.For the syllabus and model question paper vide Page No 27 to 29.
12. It is resolved and recommend to introduce **Industrial Chemistry-2 lab** with course code **CHESEP06** in V/VI semester of B.Sc. Chemistry for the batch of students admitted in **2020-21** and onwards.For the syllabus and model question paper vide Page No30.

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# **P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE:: VIJAYAWADA**

**Semester-wise revised syllabus under CBCS, 2020-21**

## **Analytical Methods in Chemistry-1**

(Skill Enhancement Course (Elective), Credits: 03)

**Course Code:** CHESET01

**Offered to B.Sc (MPC&BZC)**

**Domain Subject:** CHEMISTRY

**Semester:** V

**Max.Marks:** 100 (CCIA 25 + SEE: 75)

**Theory Hrs./Week:** 3

### **I Learning Outcomes: Students after successful completion of the course will be able to:**

**CO1.** Remember the basic concepts of quantitative analysis data treatment, separation techniques and spectrophotometry (PO7)

**CO2.** Acquire knowledge on the concepts quantitative analysis data treatment, separation techniques and spectrophotometry (PO1, PO7)

**CO3.** Apply the conceptual knowledge gained in the areas of quantitative analysis data treatment, separation techniques and spectrophotometry in the chosen job role (PO1)

**CO4.** Analyse that how far the quantitative methods, data treatment methods separation techniques and spectrophotometric methods are use full in accurate analysis (PO1).

### **II Syllabus: (Total Hours: 45 including Unit test setc.)**

#### **Unit-1: Quantitative analysis-1**

**8 hours**

1. A brief introduction to analytical methods in chemistry
2. Principles of volumetric analysis, concentration terms- Molarity, Normality, v/v, w/v, ppm and ppb, preparing solutions- Standard solution, primary standards and secondary standards.
2. Description and use of common laboratory apparatus- volumetric flask, burette, pipette, beakers, measuring cylinders.

#### **Unit-2: Quantitative analysis-2**

**12 hours**

1. Principles of volumetric analysis: Theories of acid-base (including study of acid-base titration curves), redox, complex metric, iodometric and precipitation titrations-choice of indicators for the saturations.
2. Principles of gravimetric analysis: precipitation, coagulation, peptization, coprecipitation, post precipitation, digestion, filtration, and washing of precipitate, drying and ignition.

#### **Unit-3: Treatment of analytical data**

**8 hours**

Types of errors- Relative and absolute, significant figures and its importance, accuracy – methods of expressing accuracy, errors- Determinate and indeterminate and minimization of errors, precision- methods of expressing precision, standard deviation and confidence interval.

#### Unit-4: Separation techniques

5 hours

1.

Solvent Extraction: Introduction, principle, techniques, factors affecting solvent extraction, Batch extraction, continuous extraction and countercurrent extraction. Synergism. Application- Determination of Iron(III).

2. Ion Exchange method: Introduction, action of ion exchange resins, applications.

#### UNIT-5: Spectrophotometry

12 hours

**Principle, Instrumentation: Single beam and double beam spectrometer, Beer-Lambert's law- Derivation and deviations from Beer-Lambert's law, applications of Beer-Lambert's law- Quantitative determination of  $\text{Fe}^{+2}$ ,  $\text{Mn}^{+2}$  and  $\text{Pb}^{+2}$ . Determination of PK value of indicator, determination of Glucose in blood.**

#### III References

1. Analytical Chemistry by Gary D. Christian, Purnendu K. Dasgupta and Kevin A. Schug, Seventh edition, Wiley.

2. Textbook of Vogel's Quantitative Chemical Analysis, Sixth edition, Pearson.

3. Text book of Environmental Chemistry and Pollution Control by S.S. Dara and D.D. Mishra, Revised edition, S Chand & Co Ltd.

#### Text Books:

1. Instrumental methods of chemical analysis by B K Sharma

2. Separation methods MN Sastry

#### Reference materials on the web/weblinks:

1. [https://chem.libretexts.org/Bookshelves/Analytical\\_Chemistry/Supplemental\\_Modules\\_\(Analytical\\_Chemistry\)/Quantifying\\_Nature/Volumetric\\_Chemical\\_Analysis\\_\(Shiundu\)/14.1%3A\\_Sampling\\_and\\_Statistical\\_Analysis\\_of\\_Data](https://chem.libretexts.org/Bookshelves/Analytical_Chemistry/Supplemental_Modules_(Analytical_Chemistry)/Quantifying_Nature/Volumetric_Chemical_Analysis_(Shiundu)/14.1%3A_Sampling_and_Statistical_Analysis_of_Data)

2. <https://vlab.amrita.edu/?sub=2&brch=190&sim=338&cnt=1>

#### IV Co-Curricular Activities:

**a) Mandatory** (Lab/field training of students by teacher (lab: 10+field: 05) :

**1. For Teacher:** Training of students by the teacher in laboratory and field for not less than 15 hours on the field techniques/skills of calibration of pH meter, Strong acid vs strong base titration using pH meter, determination of chloride ion, estimation of water quality parameter and estimation of Iron(II).

Google classroom created during instruction of course by the teacher concerned for sharing relevant material and conducting exams.

**2. For Student:** Students shall visit related industry/chemistry laboratory in universities/research organizations/private sector facility and observe. Write their observations and submit a hand written fieldwork/project work report not exceeding 10 pages in the given format to the teacher.

3. Max marks for Fieldwork/project work Report: 05.

4. Suggested Format for Fieldwork/project work: Title page, student details, index page, details of place visited, observations, findings, and acknowledgements.

5. Unit tests (IE).

#### b) Suggested Co-Curricular Activities

1. Training of students by related industrial experts.

2. Assignments, Seminars and Quiz (on related topics).

3. Visits to facilities, firms, research organizations etc.

4. Invited lectures and presentations on related topics by field/industrial experts.

## Question Paper Pattern

Semester-wise revised syllabus under CBCS, 2020-21

Title of the Course: **Course 6-B: Analytical Methods in Chemistry-1**

Course Code: SECCHET03

Offered to B.S.c MPC & BZC

### SECTION-A

**Short answer questions (25 Marks: 5x5)**

**Answer any Five questions. Each carries 5 marks.**

**At least 1 question should be given from each unit**

1. Explain the preparation of v/v based with suitable examples-L2
2. Discuss the significance of quantitative analysis in Chemistry-L2
3. Explain the need of drying the precipitate in gravimetric analysis-L2
4. Discuss the principle involved in Iodometric titrations-L2
5. Define accuracy and explain the methods of expressing accuracy-L2
6. Discuss the principle and theory involved in solvent extraction-L1
7. Illustrate the importance of significant figures in qualitative analysis-L3
8. Explain the quantitative determination of  $Pb^{+2}$  by spectrophotometric methods-L3

### SECTION-B

**(Total: 5x10=50 Marks)**

9(a) Discuss the detail about the primary and secondary standards with suitable examples-L2

Or

9(b) Describe the role of the following apparatus in analytical chemistry I) Volumetric flask  
II) Burette III) Pipette –L2

10(a) Elaborate the theory involved in complex metric and acid base titrations-L2

Or

10(b) Write a note on the following terms in gravimetric analysis I) Precipitation II) Digestion  
III) Filtration-L2

11(a) Define error, discuss in detail about various types of errors encountered in quantitative analysis-L2

Or

11(b) Elaborate the methods used for minimization of errors-L2

12(a) Discuss the various factors which effect solvent extraction-L2

Or

12(b) Explain in detail about role of Ion exchange resins in separation of compounds-L2

13(a) Explain the role of spectrophotometry in the determination of PK value of an indicator-L2

Or

13(b) Give a detailed account on various factors responsible for deviation from Beer's-Lambert's law-L2



**P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE:: VIJAYAWADA**

**Semester-wise revised syllabus under CBCS, 2020-21**

**Analytical methods in Chemistry-1-PRACTICAL SYLLABUS**

(Skill Enhancement Course (Elective), Credits: 02)

**Course Code:** CHESEP01

**Offered to B.Sc (MPC&BZC)**

**Domain Subject:** CHEMISTRY

**Semester:** V

**Max.Marks :**50(CCIA 10 + SEE: 40)

**Practical Hrs./Week:** 3

**I Learning Outcomes: On successful completion of this practical course, student shall be able to:**

**CO1.** Estimate Iron (II) using standard Potassium dichromate solution (PO1)

**CO2.** Learn the procedure for the estimation of total hardness of water (PO7)

**CO3.** Demonstrate the determination of chloride using Mohr's method (PO1, PO7)

**CO4.** Acquire skills in the operation and calibration of pH meter (PO1)

**II Practical (Laboratory) Syllabus :( 30hrs)**

1. Estimation of Iron(II) using standard Potassium dichromate solution (using DPA indicator)
2. Estimation of total hardness of water using EDTA
3. Determination of chloride ion by Mohr's method
4. Study the effect on pH of addition of HCl/NaOH to solutions of acetic acid, sodium acetate and their mixtures.
5. Preparation of buffer solutions of different pH (i) Sodium acetate-acetic acid, (ii) Ammonium chloride-ammonium hydroxide.
6. pH metric titration of (i) strong acid vs. strong base, (ii) weak acid vs. strong base.
7. Determination of dissociation constant of a weak acid.

**II Lab References:**

1. Text book of Vogel's Quantitative Chemical Analysis, Sixth edition, Pearson.

**Sample suggested question paper pattern: Practical's**

<b>Evaluation scheme</b>	<b>Marks</b>
Experiment performance	30
Practical record	5
Viva	5
Total	40

**P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE:: VIJAYAWADA**

**Semester-wise revised syllabus under CBCS, 2020-21**

**Analytical Methods in Chemistry-2**

(Skill Enhancement Course (Elective), Credits: 03)

**Course Code:** CHESE T02

**Offered to B.Sc (MPC&BZC)**

**Domain Subject:** CHEMISTRY

**Semester:** V

**Max.Marks :**100(CCIA 25 + SEE: 75)

**Theory Hrs./Week:** 3

**I Learning Outcomes: Students after successful completion of the course will be able to:**

**CO1.** Remember the basic concepts of Chromatography like paper, TLC, Column, GC & HPLC (PO7)

**CO2.** Understand the significance of paper, TLC, Column, GC & HPLC in separation and identification of compounds (PO1, PO7) .

**CO3.** Apply the conceptual knowledge gained in the techniques of chromatography in separating and identifying the chemical compounds as and when required (PO1).

**CO4.** Analyse that how far one chromatographic technique is much use full in separation and identification of compounds over the other chromatographic technique (PO1,PO7).

**II Syllabus (Total Hours: 45 including Unit tests etc.)**

**Unit-1: Chromatography-Introduction and classification**

**7 hours**

Principle, Classification of chromatographic methods, Nature of adsorbents, eluents, R<sub>f</sub> values, factors affecting R<sub>f</sub> values.

**UNIT-2: TLC and paper chromatography**

**12 hours**

1. Thin layer chromatography: Principle, Experimental procedure, preparation of plates, adsorbents and solvents, development of chromatogram, detection of spots, applications and advantages.

2. Paper Chromatography: Principle, Experimental procedure, choice of paper and solvents, various modes of development- ascending, descending, radial and two dimensional, applications.

**UNIT-3: Column chromatography**

**10 hours**

1. Column chromatography: Principle, classification, Experimental procedure, stationary and mobile phases, development of the Chromatogram, applications, **factors affecting the column efficiency.**

2. Applications:- Separation of .Methylene Blue and Fluorene by column chromatography.

**UNIT-4: Gas chromatography:**

**8 hours**

**Basic principles. Different types of GC techniques. Selection of columns and carrier gases.**

**Instrumentation. Detectors-Thermal conductivity detector, Flame ionization detector, R<sub>f</sub> values.**

**Applications in the separation of amino acids & estrogens**

**UNIT-5: High Performance liquid chromatography (HPLC):****8 hours**

**Basic principles. Normal and reversed Phases. Selection of column and mobile phase. Instrumentation. Detectors- RID, UV detector Rf values. Applications in the separation, separation of anions, barbiturates, tropane alkaloids.**

**III References**

1. Fundamental so Analytical Chemistry by F. James Holler, Stanley R Crouch, Donald M. West and Douglas A. Skoog, Ninth edition, Cengage.
2. Analytical Chemistry by Gary D. Christian, Purnendu K. Dasgupta and Kevin A. Schug, Seventh edition, Wiley.
3. Quantitative analysis by R. A. Day Jr. and A. L. Underwood, Sixth edition, Pearson.
4. Text book of Vogel's Quantitative Chemical Analysis, Sixth edition/ Pearson.

**Text Books:**

1. Instrumental methods of chemical analysis by B K Sharma
2. Instrumental methods of chemical analysis by Gurudeep & Chatwal Anand

**Reference materials on the web/web links:**

1. [https://chem.libretexts.org/Bookshelves/Analytical\\_Chemistry/Supplemental\\_Modules\\_\(Analytical\\_Chemistry\)/Instrumental\\_Analysis/Chromatography/Gas\\_Chromatography](https://chem.libretexts.org/Bookshelves/Analytical_Chemistry/Supplemental_Modules_(Analytical_Chemistry)/Instrumental_Analysis/Chromatography/Gas_Chromatography)
2. <https://lab-training.com/hplc-high-performance-liquid-chromatography/>

**VI Co-Curricular Activities:**

**a) Mandatory :** ( Lab/field training of students by teacher (lab: 10+ fields: 05):

**1. For Teacher:** Training of students by the teacher in laboratory and field for not less than 15 hours on the field techniques/skills of determination of hardness of water, using the calorimeter and or Spectrophotometer, preparation of TLC plate, identification of spots in TLC and Paper chromatographic techniques, loading of column, selection of solvent system, separation of amino acids and dyes mixture using chromatographic techniques.

Google classroom created during instruction of course by the teacher concerned for sharing relevant material and conducting exams.

**2. For Student:** Student shall visit a related industry/chemistry laboratory in universities/research organizations/private sector facility and observe the chromatographic techniques used for the separation of compounds. Write their observations and submit a hand written fieldwork/project work report not exceeding 10 pages in the given format to the teacher.

**3. Max marks for Fieldwork/project work Report: 05.**

4. Suggested Format for Fieldwork/project work: Title page, student details, index page, details of place visited, observations, findings, and acknowledgements.

5. Unit tests (IE).

**b) Suggested Co-Curricular Activities**

1. Training of students by related industrial experts.

2. Assignments, Seminars and Quiz (on related topics).

3. Visits to facilities, firms, research organizations etc.

4. Invited lectures and presentations on related topics by field/industrial experts.

## **Suggested Question paper pattern**

Semester-wise revised syllabus under CBCS, 2020-21

Title of the Course: **Course7-B: Analytical Methods in Chemistry-2**

Course Code: SECCHET04

Offered to B.S.c MPC & BZC

### **SECTION-A**

**Short answer questions (25 Marks: 5x5)**

**Answer any Five questions. Each carries 5 marks.**

**At least 1 question should be given from each unit**

- 1) What is the basic principle involved in chromatography, explain nature of adsorbents-L1
- 2) How to prepare TLC plates-L3
- 3) Explain Ascending and descending techniques in paper chromatography-L2
- 4) Explain the classification of column chromatography-L2
- 5) Write briefly about experimental procedure for column chromatography-L2
- 6) Explain the schematic diagram of G.C-L2
- 7) Explain schematic diagram of HPLC-L2
- 8) Write experimental procedure of TLC.-L2

### **SECTION-B**

**(Total: 5x10=50 Marks)**

- 9 (a) How do the chromatographic methods are classified? Explain any one-L2  
Or  
(b) Define Rf value, Explain factors effecting the Rf values-L2
- 10 (a) Discuss the applications of TLC.-L3  
Or  
(b) Explain the applications of paper chromatography-L3
- 11(a) Explain the factors effecting the column efficiency in CC-L2  
Or  
(b) Discuss the separation of methylene blue and fluorescein by C C.-L2
- 12 (a) Explain different types detectors used in G.C-L2.  
Or  
(b) Explain the separation of Amino acids by G.C-L2
- 13 (a) Explain the different detectors used in HPLC-L2  
Or  
(b) Explain the separation of Anions and Barbiturates by HPLC-L2

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**Semester-wise revised syllabus under CBCS, 2020-21**

**Analytical Methods in Chemistry-2- PRACTICAL SYLLABUS**

(Skill Enhancement Course (Elective), Credits: 02)

**Course Code:** CHESE P02

**Domain Subject:** CHEMISTRY

**Max.Marks :**50(CCIA 10 + SEE: 40)

**Offered to B.Sc (MPC&BZC)**

**Semester:** V

**Practical Hrs./Week:** 3

**I Learning Outcomes:** On successful completion of this practical course, student shall be able to:

**CO1.** Perform the separation of a given dye mixture using TLC (PO1)

**CO2.** Learn the preparation of TLC plates (PO1, PO7)

**CO3.** Demonstrate the separation of mixture of amino acids using paper chromatography (PO1)

**CO4.** Acquire skills in using column chromatography for the separation of dye mixture (PO7)

**II Practical (Laboratory) Syllabus: (30hrs)**

1. Separation of a given dye mixture (methyl orange and methylene blue) using TLC (using alumina as adsorbent).
2. Separation of different amino acids using paper chromatography.
3. Separation of given mixture of amino acids (glycine and phenyl alanine) using ascending paper chromatography.
4. Estimation of  $\text{Fe}^{+2}$  by using thiocyanate by calorimeter.
5. Separation of sugars using TLC
6. Verification of Beer Lambert's law. (Using potassium permanganate solution) using colorimeter /spectrophotometer.

**III Lab References:**

1. Text book of Vogel's Quantitative Chemical Analysis, Sixth edition, Pearson.
2. Vogel A. I. Practical Organic Chemistry, Longman Group Ltd.
3. Bansal R.K. Laboratory Manual of Organic Chemistry, Wiley- Eastern.
4. Ahluwalia V. K. and Aggarwal R. Comprehensive Practical Organic Chemistry, University press.
5. Mann F.Gand Saunders B.C, Practical Organic Chemistry, Pearson Education.

**Sample suggested question paper pattern: Practical's**

Evaluation scheme	Marks
Experiment performance	30
Practical record	5
Viva	5
Total	40

**P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE:: VIJAYAWADA**

**Semester-wise revised syllabus under CBCS, 2020-21**

**Synthetic Organic Chemistry**

(Skill Enhancement Course (Elective), Credits: 03)

**Course Code:** CHESE T03

**Domain Subject:** CHEMISTRY

**Max. Marks:** 100 (CCIA 25 + SEE: 75)

**Offered to B.Sc (MPC & BZC)**

**Semester:** V

**Theory Hrs./Week:** 3

**I Learning Outcomes: Students after successful completion of the course will be able to:**

**CO1.** Memorize the basic concepts of Pericyclic reactions, Organic photo chemistry, retrosynthesis reactions and reagents in Organic Chemistry-(PO1, PO7)

**CO2.** Understand the concepts of Pericyclic reactions, Organic photo chemistry, retrosynthesis reactions and reagents in Organic Chemistry-(PO1, PO7).

**CO3.** Exercise the conceptual gain in the areas of as and when required (PO1).

**CO4.** Analyze the similarities and differences between various concepts of Pericyclic reactions, Organic photo chemistry, retrosynthesis reactions and reagents in Organic Chemistry-(PO1, PO7).

**II Syllabus:** (Total Hours: 45 including Unit test setc.)

**Unit-1: Pericyclic reactions**

**12 hours**

1. A brief introduction to synthetic organic chemistry

2.

Features and classification of pericyclic reactions: Phases, nodes and symmetry properties of molecular orbital's in ethylene, 1,3-butadiene, 1,3,5-hexatriene, alkylation and allyl radical. Thermal and photochemical reactions.

3. Electro cyclic reactions: Definition and examples, definitions of con and dis rotation, Woodward-Hoffmann selection rules. (Correlation diagrams are not required)

4. Cyclo addition reactions: Definition and examples, definitions of supra facial and antar facial addition, Woodward-Hoffmann selection rules. (Correlation diagrams are not required)

**Unit-2: Organic photochemistry**

**8 hours**

1. Jablonski diagram-singlet and triplet states

2. Photochemistry of Carbonyl compounds- $n-\pi$  and  $\pi-\pi^*$  transitions, Norrish type-1 and type-2 reactions

3. Paterno-Buchi reaction.

**Unit-3:Retrosynthesis****12 hours**

1. Important terms in Retro synthesis with examples-Disconnection, Target molecule,FGI,Synthon,Retrosynthetic analysis, chemoselectivity,region selectivity
2. ImportanceofOrderofevents in organicsynthesis
3. Retrosyntheticanalysis of the compounds: **a.**cyclohexene,**b.**4-Nitro toluene,**c.**Paracetamol

**Unit-4:SyntheticReactions****8hours**

Shapiro reaction, Stork - enamine reaction(only alkylation),Wittig reaction,Robinson annulation, Bailys-Hillman reaction, Heck reaction, Suzuki coupling.Synthesisof aldehydesand ketones using 1, 3-Dithiane.

**Unit-5:ReagentsinOrganicChemistry****10 hours**

Oxidizingagents:PCC,PDC,SeO<sub>2</sub>

(Rileyoxidation),NBS.Reducingagents:LiAlH<sub>4</sub>(withmechanism),LTBA,Metal-solventreduction(Birchreduction), Catalyticreduction.

**III. References**

1. Pericyclireactions byIanFleming,Secondedition,OxfordUniversitypress.
2. Pericyclic2.Reactions-ATextbook:Reactions,ApplicationsandTheorybyS.Sankararaman, WILEY-VCH.
3. Reaction Mechanism in Organic Chemistry by S.M. Mukherji andS.P.Singh,Revised edition, TrinityPress.
4. Pericyclireactions-AMechanisticstudybyS.M.Mukherji, MacmillanIndia.
5. Organicsynthesis:The disconnectionapproach byStuart Warren,John Wiley&Sons.
6. Organic chemistry by Jonathan Clayden, Nick Greeves and Stuart Warren,Secondedition,Oxford universitypress.
7. Reactions, Reagents and Rearrangements by S.N. Sanyal, BharatiBhawanPublishers &Distributors.

**Reference materials on the web/weblinks:**

1. <https://byjus.com/chemistry/pericyclic-reactions/>
2. <https://www.massey.ac.nz/~gjrowlan/chem312/tutorial.pdf>
3. <https://egyankosh.ac.in/bitstream/123456789/15757/1/Unit-13.pdf>



#### IV Co-Curricular Activities

**a) Mandatory: (Lab/field training of students by teacher: (lab: 10 + field: 05):**

**1. For Teacher:** Training of students by the teacher in laboratory and field for not less than 15 hours on the field techniques/skills of detection of N, S and halogens using the green procedure, preparation of TLC plates, detection of organic compounds using R<sub>f</sub> values in TLC/paper chromatography, loading of column, selection of solvent system for column chromatography, separation of amino acids and dye mixture using chromatographic techniques.

Google classroom created during instruction of course by the teacher concerned for sharing relevant material and conducting exams.

**2. For Students:** Students shall visit a related industry/chemistry laboratory in universities/research organizations/private sector facility and observe the synthetic reactions. Write their observations and submit a hand written fieldwork/project work report not exceeding 10 pages in the given format to the teacher.

**3. Max marks for Fieldwork/project work Report: 05.**

**4. Suggested Format for Fieldwork/project work:** *Title page, student details, index page, detail of place visited, observations, findings, and acknowledgements.*

**5. Unit tests (IE).**

**b) Suggested Co-Curricular Activities**

1. Training of students by related industrial experts.
2. Assignments, Seminars and Quiz (on related topics), collection of relevant videos and material.
3. Visits of facilities, firms, research organizations etc.
4. Invited lectures and presentations on related topics by field/industrial experts.

## Suggested Question paper pattern

Semester-wise revised syllabus under CBCS, 2020-21

Title of the Course: **Course 6-A: Synthetic Organic Chemistry**

Course Code: SECCHET01

Offered to B.Sc MPC & BZC

### SECTION-A

**Short answer questions (25 Marks: 5x5)**

**Answer any Five questions. Each carries 5 marks.**

**At least 1 question should be given from each unit**

1. Explain the Phase and nodes and symmetry properties of Ethylene-L2
2. Define the con and disrotation of electrocyclic compounds-L1
3. Explain Norrish type-I reaction with an example-L2
4. Construct the mechanism of Paterno-Buchi reaction-L3
5. Define Synthons, FGI with an example-L1
6. Explain the Heck reaction with mechanism-L2
7. Discuss the catalytic reduction-L2
8. Illustrate the synthesis of aldehydes by using 1,3 di thianes-L2

### SECTION-B

**(Total: 5x10=50 Marks)**

9(a) List Woodward-Hoffmann selection rules for cyclo addition reactions-L4

Or

9(b) List Woodward-Hoffmann selection rules for electrocyclic reactions-L4

10(a) Explain the Jablonski diagram for Singlet and Triplet-L2

Or

10(b) Explain the following I) transition of  $n-\pi$  and  $\pi-\pi^*$  II) Norrish type-II reaction-L2

11(a) Demonstrate chemoselective and regioselective reaction-L3

Or

11(b) Construct the retrosynthesis of paracetamol-L3

12(a) Discuss the following reactions with the mechanism I) Suzuki coupling II) Wittig Reaction-L2

Or

12(b) Discuss the following reactions with the mechanism I) Stork- enamine reaction II) Shapiro reaction-L2

13(a) Describe the following oxidation reagents I)  $\text{SeO}_2$  II) NBS-L2

Or

13(b) Explain the following I) Hydride transfer reaction ( $\text{LiAlH}_4$  only) II) Birch Reduction-L2

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## Semester-wise revised syllabus under CBCS, 2020-21 Synthetic Organic Chemistry-PRACTICAL SYLLABUS (Skill Enhancement Course (Elective), Credits: 02)

Course Code: CHESE P03

Domain Subject: CHEMISTRY

Max. Marks: 50 (CCIA 10 + SEE: 40)

Offered to B.Sc (MPC & BZC)

Semester: V

Practical Hrs. / Week: 3

**I Learning Outcomes:** On successful completion of this practical course, students shall be able to:

**CO1.** Perform the organic qualitative analysis for the detection of N, S and halogens using the green procedure. (PO1)

**CO2.** Learn the procedure for the separation of mixture of amino acids using paper chromatography (PO7).

**CO 3.** Understand the preparation of TLC plates for TLC chromatography (PO1, PO7).

**CO 4.** Acquire skills in conducting column chromatography for the separation of dyes in the given mixture. (PO1)

### II Practical (Laboratory) Syllabus (30 hrs)

1. Green procedure for organic qualitative analysis: Detection of N, S and halogens
2. Separation of given mixture of amino acids (glycine and phenyl alanine) using ascending paper chromatography.
3. Separation of a given dye mixture (methyl orange and methylene blue) using TLC (using alumina as adsorbent).
4. Separation of mixture of methyl orange and methylene blue by column chromatography
5. Separation of food dyes using Column Chromatography
6. Separation of triglycerides using TLC

### III Lab References:

1. Vogel A.I. Practical Organic Chemistry, Longman Group Ltd.
2. Bansal R.K. Laboratory Manual of Organic Chemistry, Wiley-Eastern.
3. Ahluwalia V. K. And Aggarwal R. Comprehensive Practical Organic Chemistry, University Press.
4. Mann F.G. and Saunders B.C., Practical Organic Chemistry, Pearson Education.

### Sample suggested question paper pattern: Practical's

Evaluation scheme	Marks
One Major Experiment	20
One Minor experiment	10
Practical record	5
Viva	5
Total	40

# P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE:: VIJAYAWADA

Semester-wise revised syllabus under CBCS, 2020-21

## Analysis of Organic Compounds

(Skill Enhancement Course (Elective), Credits: 03)

Course Code: CHESE T04

Offered to B.Sc (MPC & BZC)

Domain Subject: CHEMISTRY

Semester: V

Max. Marks: 100 (CCIA 25 + SEE: 75)

Theory Hrs./Week: 3

### I Learning Outcomes: Students after successful completion of the course will be able to:

CO1. Memorize the basic concepts of mass spectrometry, IR & NMR and separation techniques (PO7).

CO2. Demonstrate the knowledge gained in the areas of mass spectrometry, IR & NMR and separation techniques (PO1, PO7).

CO3. Understand the importance of mass spectrometry, IR & NMR and separation techniques in Organic Chemistry (PO1).

CO4. Analyse the role of mass spectrometry, IR & NMR in the structural elucidation of Organic molecules and also separation techniques, Identification and purification of compounds (PO1)

### II Syllabus: (Total Hours: 45 including Unit test setc.)

#### Unit-1: Mass Spectrometry

10 hours

A brief introduction to analysis of organic compounds

Basic principles, Instrumentation - Mass spectrometer, electron Ionization (Electron Impact ionization, EI), Molecular ions, metastable ions, Isotope abundance. Basic fragmentation types. Fragmentation patterns in Toluene, 2-Butanol, But aldehyde, Propionic acid.

#### Unit-2: Structural elucidation of organic compounds using IR, NMR, mass spectral data-

8 hours

2,2,3,3-Tetramethylbutane, Butane-2,3-dione, Propionic acid and methylpropionate.

#### Unit-3: Structural elucidation of organic compounds using IR, NMR, Mass spectral data-

8 hours

Phenylacetylene, acetophenone, nicotinic acid and p-nitroaniline.

#### Unit-4: Separation techniques-1

12 hours

1. Solvent extraction - Principle and theory, Batch extraction technique, application of batch extraction in the separation of organic compounds from mixture - acid & neutral, base & neutral.

2. Chromatography - Principle and theory, classification, types of adsorbents, eluents, R<sub>f</sub> values and factors affecting R<sub>f</sub> values.

3. Thin layer chromatography - principle, experimental procedure, advantages and applications.

#### Unit-5: Separation techniques-2

12 hours

1. Paper chromatography - Principle, experimental procedure, ascending, descending, radial and two dimensional, applications.

2. Column chromatography-Principle, classification, experimental procedure, applications.
3. HPLC-Principle, Instrumentation-block diagram and applications.

### III References

1. Organic Spectroscopy by William Kemp, Third Edition, Palgrave USA.
2. Introduction to Spectroscopy by Pavia, Lampman, Kriz and Vyvyan, Fifth edition, Cengage.
3. Organic Spectroscopy: Principles and Applications by Jag Mohan, Second edition, Alpha Science.
4. Spectator's copy of Organic Compounds by P.S. Kalsi, Seventh edition, New Age International.
5. Spectroscopic Methods in Organic Chemistry by Ian Fleming and Dudley Williams, Seventh edition, Springer.
6. Fundamentals of Analytical Chemistry by F. James Holler, Stanley R. Crouch, Donald M. West and Douglas A. Skoog, Ninth edition, Cengage.

#### Reference materials on the web/weblinks:

1. <https://www.britannica.com/science/mass-spectrometry/Thermal-ionization>
2. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5206469/#:~:text=Various%20chromatography%20methods%20have%20been,and%20affinity%20chromatography%20%5B6%5D.>

### IV. Co-Curricular Activities:

#### a) Mandatory :( Lab/field training of students by teacher :(lab:10+field:05):

**1. For Teacher:** Training of students by teacher in laboratory and field for not less than 15 hours on the field techniques/skills of preparation of acetanilide, preparation of azo dye, use of separating funnel for solvent extraction, separation of organic compounds in a mixture.

Google classroom created during instruction of course by the teacher concerned for sharing relevant material and conducting exams.

**2. For Student:** Students shall visit a related industry/chemistry laboratory in universities/research organizations/private sector facility and observe the techniques used for the separation of organic compounds. Write their observations and submit a handwritten fieldwork/project work report not exceeding 10 pages in the given format to the teacher.

3. Max marks for Fieldwork/project work Report: 05.

4. Suggested Format for Fieldwork/project work: *Title page, student details, index page, detail of place visited, observations, findings, and acknowledgements.*

5. Unit tests (IE).

#### b) Suggested Co-Curricular Activities

1. Training of students by related industrial experts.
2. Assignments, Seminars and Quiz (on related topics), collection of videos and other material.
3. Visit of facilities, firms, research organization etc.
4. Invited lectures and presentations on related topics by field/industrial experts.

## Suggested Question paper pattern

Semester-wise revised syllabus under CBCS, 2020-21

Title of the Course: **Course7-A: Analysis of Organic Compounds**

Course Code: SECCHET02

Offered to B.S.c MPC & BZC

### SECTION-A

**Short answer questions (25 Marks: 5x5)**

**Answer any Five questions. Each carries 5 marks.**

**At least 1 question should be given from each unit**

1. Define molecular ion and metastable ion with an example-L1
2. Explain basic principles of fragmentation in mass spectra-L2
3. Interpret IR and NMR data of Propionic acid-L2
4. Show the fragmentation of Methyl propionate-L3
5. Interpret spectral data (IR & NMR) of P-Nitro amine-L2
6. Discuss batch extraction-L2
7. Describe R<sub>f</sub> values and factors effecting R<sub>f</sub> values-L2
8. Explain principle of paper chromatography-L2

### SECTION-B

**(Total: 5x10=50 Marks)**

- 9(a) Explain the following I) Fragmentation of Butanaldehyde II) Electron Impact ionization-L2  
Or
- 9(b) Explain the following Fragmentation of I) 2-Butanol II) Propionic acid III) Toluene-L2
- 10(a) Illustrate the structure of 2, 2, 3, 3 tetra methyl butane by using NMR, IR & Mass fragmentation-L3  
Or
- 10(b) Illustrate the structure of butane 2, 3 dione by using NMR, IR & Mass fragmentation-L3
- 11(a) Illustrate the structure of Acetophenone by using NMR, IR & Mass fragmentation-L3  
Or
- 11(b) Illustrate the structure of Phenylacetalene by using NMR, IR & Mass fragmentation-L3
- 12(a) Explain the principle, procedure and application of TLC-L2  
Or
- 12(b) Classify different types of chromatography and write the basic principle of chromatography-L2
- 13(a) Demonstrate the principle and instrumentation of HPLC-L3  
Or
- 13(b) Demonstrate the principle and experimental procedure of column chromatography-L3

# P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE:: VIJAYAWADA

## Semester-wise revised syllabus under CBCS, 2020-21 Analysis of Organic Compounds – PRACTICAL SYLLABUS (Skill Enhancement Course (Elective), Credits: 02)

**Course Code:** CHESE P04

**Offered to B.Sc (MPC & BZC)**

**Domain Subject:** CHEMISTRY

**Semester:** V

**Max. Marks:** 50 (CCIA 10 + SEE: 40)

**Practical Hrs./Week:** 3

**I Learning Outcomes:** On successful completion of this practical course, students shall be able to:

**CO1.** Prepare acetanilide using the green synthesis. (PO1)

**CO2.** Demonstrate the preparation of an azo dye. (PO1, PO7)

**CO3.** Acquire skills in the separation of organic compounds in the given mixture using solvent extraction (PO1)

### II Practical (Laboratory) Syllabus (30 hrs)

1. Identification of various equipment in the laboratory.
2. Acetylation of 1<sup>o</sup> amine by green method: Preparation of acetanilide
3. Rearrangement reaction in green conditions: Benzil–Benzilic acid rearrangement
4. Radical coupling reaction: Preparation of 1,1-bis-2-naphthol
5. Green oxidation reaction: Synthesis of adipic acid
6. Preparation and characterization of biodiesel from vegetable oil/waste cooking oil
7. Photoreduction of Benzophenone to Benzopinacol in the presence of sunlight.
8. Separation of organic compounds in a mixture (acidic compound + neutral compound) using solvent extraction.
9. Separation of organic compounds in a mixture (basic compound + neutral compound) using solvent extraction.

### III Lab References:

1. Vogel A.I. Practical Organic Chemistry, Longman Group Ltd.
2. Bansal R.K. Laboratory Manual of Organic Chemistry, Wiley-Eastern.
3. Ahluwalia V. K. and Aggarwal R. Comprehensive Practical Organic Chemistry, University Press.
4. Mann F.G. and Saunders B.C, Practical Organic Chemistry, Pearson Education.

### Sample suggested question paper pattern: Practical's

Evaluation scheme	Marks
One Major Experiment	20
One Minor experiment	10
Practical record	5
Viva	5
Total	40

**P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE:: VIJAYAWADA**

Semester-wise revised syllabus under CBCS, 2020-21

**Industrial Chemistry-1**

(Skill Enhancement Course (Elective), Credits:03)

Course Code: CHESE T05

Offered to B.Sc (MPC&BZC)

Domain Subject: CHEMISTRY

Semester: V

Max.Marks:100(CCIA 25 + SEE: 75)

Theory Hrs./Week: 3

I. Learning Outcomes: Students after successful completion of the course will be able to:

CO1. Memorize the basic concepts related to fertilizers, silicates, surface coatings, sugar chemistry & paper industry (PO1).

CO2. Understand the concepts related to fertilizers, silicates, surface coatings, sugar chemistry & paper industry (PO1, PO7).

CO3. Exercise the conceptual knowledge gain in the areas of fertilizers, silicates, surface coatings, sugar chemistry & paper industry in chosen job roles (PO7).

CO 4. Analyse the similarities and differences between various fertilizers, silicates, surface coatings, as well as concepts related to sugar chemistry and paper industry (PO1, PO7).

.II Syllabus:(Total Hours: 45, Unit test setc.)

Unit-1:Fertilizers

10hours

A brief introduction to industrial Chemistry. Different types of fertilizers. Manufacture of the following fertilizers:

Urea, Ammonium nitrate, Calcium ammonium nitrate, Ammonium phosphates; Polyphosphate, Superphosphate, Compound and mixed fertilizers.

Unit-2:Silicates

10hours

1. Ceramics: Important clays and Feldspar. Ceramics-types, uses and manufacture. High technology ceramics and their applications.

2. Cements: Classification of cement, ingredients and their role, Manufacture of cement and the setting process, quick setting cements.

Unit-3:Surface Coatings

12 hours

Objectives of coating surfaces, preliminary treatment of surface, classification of surface coatings. Paints and pigments-formulation, composition and related properties. Oil paint, modified oils, Pigments, toners and lake pigments, fillers, thinners, enamels, em



ulsifying agents. Special paints (Heat retardant, Fire retardant, Eco-friendly paint, Plastic paint), Water and Oil paints.

Unit-4: Sugar Chemistry

08 hours

Introduction—Manufacture and recovery of cane sugar from molasses, manufacture of sucrose from beet root, testing and estimation of sucrose.

Unit-5: Paper Industry

10 hours

Pulp and Paper—Introduction, Manufacture of pulp, sulphate or Kraft pulp, soda pulp, sulphite pulp, rag pulp, beating, refining, filling, sizing and colouring of pulp, manufacture of paper.

III References:

1. E. Stocchi: *Industrial Chemistry*, Vol-I, Ellis Horwood Ltd. UK
2. J. A. Kent: *Riegel's Hand book of Industrial Chemistry*, CBS Publishers, New Delhi.
3. P. C. Jain, M. Jain: *Engineering Chemistry*, Dhanpat Rai & Sons, Delhi.
4. R. Gopalan, D. Venkappayya, S. Nagarajan: *Engineering Chemistry*, Vikas Publications, New Delhi.
5. B. K. Sharma: *Engineering Chemistry*, Goel Publishing House, Meerut
6. O. P. Vermani, A. K. Narula: *Industrial Chemistry*, Galgotia Publications Pvt. Ltd., New Delhi.

Reference materials on the web/weblinks:

1. <https://byjus.com/biology/fertilizers/>
2. <http://dl.mohandes-iran.com/metalozhy-mavad/book/Coating%20Material%20%20and%20Surface%20Coating.pdf>

VI Co-Curricular Activities:

a) Mandatory (Lab/field training of students by teacher (lab: 10+field: 05):

1. For Teacher: Training of students by the teacher in laboratory and field for not less than 15 hours on field related skills in determination of free acidity, estimation of calcium and phosphoric acid in a fertilizer, use of colorimeter to estimate sucrose.

Google classroom created during instruction of course by the teacher concerned for sharing relevant material and conducting exams.

2. For Student: Students shall visit related industry/chemistry laboratory in universities/research organizations/private sector facility and observe the surface coatings of surfaces used to prevent the corrosion. Write their observations and submit a handwritten fieldwork/project work report not exceeding 10 pages in the given format to the teacher.

3. Max marks for Fieldwork/project work Report: 05.

4. Suggested Format for Fieldwork/project work: Title page, student details, index page, details of place visited, observations, findings, and acknowledgements.

5. Unit tests (IE).

b) Suggested Co-Curricular Activities

1. Training of students by related industrial experts.

2. Assignments, Seminars and Quiz (on related topics).

3. Visits to facilities, firms, research organizations etc.

4. Invited lectures and presentations on related topics by field/industrial experts.

## **Suggested Question paper pattern**

Semester-wise revised syllabus under CBCS, 2020-21

Title of the Course: **Course 6-C:IndustrialChemistry-1**

Course Code: SECCHET05

Offered to B.S.c MPC & BZC

### **SECTION-A**

**Short answer questions (25 Marks: 5x5)**

**Answer any Five questions. Each carries 5 marks.**

**At least 1 question should be given from each unit**

1. Explain different types of fertilizers-L2
2. Demonstrate the preparation of polyphosphate and super phosphate-L3
3. Classify different types of Ceramics-L2
4. Classify different types of Cements-L2
5. Describe emulsifying agents-L2
6. Define water & oil pains-L1
7. Describe the recovery of cane sugar from molasis-L2
8. Describe manufacturing of soda pulp-L2

### **SECTION-B**

**(Total: 5x10=50 Marks)**

- 9(a) Describe manufacturing of following fertilizers I) Urea II) Ammonium Nitrate –L2  
Or  
9(b) Describe manufacturing of following fertilizers I) Ammonium phosphate II) Calcium Ammonium Nitrate –L2
- 10(a) Explain the applications of Ceramics –L2  
Or  
10(b) Explain the procedure for manufacturing of Cement-L2
- 11(a) Explain the following I) Oil paints II) Pigments-l2  
Or  
11(b) Explain the following I) Toners II) Thinners-l2
- 12(a) Demonstrate the estimation of Sucrose- L3  
Or  
12(b) Illustrate manufacturing of Sucrose from beetroot-L3
- 13(a) Illustrate manufacturing of paper -L3  
Or  
13(b) Illustrate manufacturing of Pulp-L3

**P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE:: VIJAYAWADA**

**Semester-wise revised syllabus under CBCS, 2020-21**

**Industrial Chemistry-1- PRACTICAL SYLLABUS**

(Skill Enhancement Course (Elective), Credits: 02)

**Course Code:** CHESE P05

**Domain Subject:** CHEMISTRY

**Max.Marks:** 50 (CCIA 10 + SEE: 40)

**Offered to B.Sc (MPC & BZC)**

**Semester:** V

**Practical Hrs./Week:** 3

**I Labwork-Skills Outcomes:** On successful completion of this practical course, students shall be able to:

**CO1.** Determine free acidity in ammonium sulphate fertilizer. (PO1)

**CO2.** Learn the procedure for the estimation of Calcium in Calcium ammonium nitrate fertilizer (PO7).

**CO3.** Demonstrate skills on estimation of phosphoric acid in superphosphate fertilizer (PO7).

**CO4.** Acquire skills in using colorimetry for the estimation of sucrose. (PO1)

**II Practical (Laboratory) Syllabus : ( 30hrs)**

1. Determination of free acidity in ammonium sulphate fertilizer.

2. Estimation of Calcium in Calcium ammonium nitrate fertilizer.

3. Estimation of phosphoric acid in superphosphate fertilizer.

4. Estimation of sucrose by colorimetry.

**III Lab References**

1. Textbook of Vogel's Quantitative Chemical Analysis, Sixth edition, Pearson.

2. Textbook on Experiments and Calculations in Engineering Chemistry, S.S.Dara, S.Chand.

3. R.Gopalan, D.Venkappayya, S.Nagarajan: Engineering Chemistry, Vikas Publications.

4. B.K.Sharma: Engineering Chemistry, Goel Publishing House, Meerut

**Sample suggested question paper pattern: Practical's**

Evaluation scheme	Marks
One Major Experiment	20
One Minor experiment	10
Practical record	5
Viva	5
Total	40

**P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE:: VIJAYAWADA**

**Semester-wise revised syllabus under CBCS, 2020-21**

**Industrial Chemistry-2**

(Skill Enhancement Course (Elective), Credits: 03)

**Course Code:** CHESE T06

**Offered to B.Sc (MPC&BZC)**

**Domain Subject:** CHEMISTRY

**Semester:** V

**Max.Marks :**100(CCIA 25 + SEE: 75)

**Theory Hrs./Week:** 3

**I Learning Outcomes: Students after successful completion of the course will be able to:**

**CO1.** Remember the basic concepts of Organic polymers air pollution, water analysis and Industrial waste management (PO1).

**CO2.** Understand the significance of the concepts related to Organic polymers, prevention of air pollution water analysis methods and industrial management techniques (PO1, PO7)

**CO3.** Apply to conceptual knowledge gain in the areas of Organic polymers air pollution, water analysis and Industrial waste management as when required (PO1).

**CO4.** Analyse that how far that methods adopted for the synthesis of organic polymers techniques ,for controlling air pollution , for the analysis of water and techniques of industrial waste management with useful in day to day life.(PO1, PO7)

**II Syllabus :( Total Hours: 45, Unit tests etc.)**

**Unit-1: Organic Polymers-1**

**10 hours**

Basic definitions, degree of polymerization, classification of polymers- Natural and Synthetic polymers, Organic and In organic polymers, Thermoplastic and Thermo setting polymers, Plastics, Elastomers, Fibers and Resins, Linear, Branched and Cross- Linked polymers.

**Unit-2: Organic Polymers-2**

**10 hours**

Addition polymers and Condensation polymers, mechanism of polymerization- Free radical, ionic and Zeigler-Natta polymerization. Industrial manufacturing and applications of following polymers, Polystyrene, Poly acrylonitrile, Poly methacrylate, Poly methyl-methacrylate.

**Unit-3: Air Pollution**

**8 hours**

Sources of air pollution, acid rain, photochemical smog, Greenhouse effect, Formation and depletion of ozone, sources and effects of various gaseous pollutants: NO<sub>x</sub>, SO<sub>x</sub>, SPM, CO, hydrocarbons, controlling methods of air pollution.

**Unit-4: Analysis of water**

**10hours**

Determination of total hardness of water, Dissolved oxygen, BOD, COD, total dissolved solids, turbidity, alkalinity, determination of chloride using Mohr's method.

## Unit-5: Industrial Waste Management

12hours

Waste water treatment - primary, secondary & tertiary treatment. (All treatment methods in detail). Characteristics of solid wastes, methods of solid waste treatment and disposal, microbiology involved in solid waste disposal, methods of solid waste disposal- composting, sanitary land filling- economic, aesthetic and environmental problems.

### III References:

1. E.Stocchi: *Industrial Chemistry*, Vol-I, Ellis Horwood Ltd. UK
2. J.A.Kent: Riegel's *Handbook of Industrial Chemistry*, CBS Publishers, New Delhi.
3. P.C.Jain, M.Jain: *Engineering Chemistry*, Dhanpat Rai & Sons, Delhi.
4. R. Gopalan, D. Venkappayya, S. Nagarajan: *Engineering Chemistry*, Vikas Publications, New Delhi.
5. B.K.Sharma: *Engineering Chemistry*, Goel Publishing House, Meerut
6. O. P. Vermani, A. K. Narula: *Industrial Chemistry*, Galgotia Publications Pvt. Ltd., New Delhi. edition, S.C.Hand & Co Ltd.

### Reference materials on the web/web links:

1. <http://colapret.cm.utexas.edu/courses/Chap29.pdf>
2. <https://www.era-environmental.com/blog/industrial-waste-management-pollution-prevention>

### IV Co-Curricular Activities

**a) Mandatory** (*Student training by teacher in field related skills: inlab: 15, infield: 05 hours*):

**1. For Teacher:** Training of students by the teacher in laboratory and field for not less than 15 hours on the field related skills in determination of hardness of water, estimation of COD and BOD in water sample, determination chloride ion in water sample.

Google classroom created during instruction of course by the teacher concerned for sharing relevant material and conducting exams.

**2. For Student:** Student shall visit a related industry/chemistry laboratory in universities/research organizations/private sector facility and observe the measurement of water quality parameters. Write their observations and submit a hand written fieldwork/project work report not exceeding 10 pages in the given format to the teacher.

**3. Max marks for Fieldwork/project work Report:** 05.

**4. Suggested Format for Fieldwork/project work:** *Title page, student details, index page, details of place visited, observations, findings, and acknowledgements.*

**5. Unit tests (IE).**

### b) Suggested Co-Curricular Activities

1. Training of students by related industrial experts.
2. Assignments, Seminars and Quiz (on related topics).
3. Visits to facilities, firms, research organizations etc.
4. Invited lectures and presentations on related topics by field/industrial experts.

## Suggested Question paper pattern

Semester-wise revised syllabus under CBCS, 2020-21

Title of the Course: **Course7-C: Industrial Chemistry-2**

Course Code: SECCHET06

Offered to B.S.c MPC & BZC

### SECTION-A

**Short answer questions (25 Marks: 5x5)**

**Answer any Five questions. Each carries 5 marks.**

**At least 1 question should be given from each unit**

1. Explain the degrees of polymerization-L2
2. Define the addition and condensation of polymers with examples-L1
3. Discuss green house effect-L2
4. Define the hardness of water and determine the total hardness of water-L1
5. Summarize the characteristics of solid waste-L2
6. Discuss the mechanism of cationic polymerisation-L2
7. Define photochemical smog and explain it-L1
8. Discuss the alkalinity of water-L2

### SECTION-B

**(Total: 5x10=50 Marks)**

9(a) Classify the following polymers I) natural & synthetic II) Organic & Inorganic III) based on structure-L2

Or

9(b) Classify the following polymers I) thermoplastic & Thermosetting II) Elastomers III) Fibers & resins-L2

10(a) Describe the following mechanism I) Free Radical II) Zeigler-Natta –L1

Or

10(b) Describe the preparation and applications of following polymers I) Polystyrene II) Polyacrylonitrile III) Poly methyl-methacrylate-L1

11(a) Explain the following I) Acid rains II) Depletion of Ozone-L2

Or

11(b) Interpret the causes, effects and controlling methods of air pollution-L2

12(a) Describe the following I) BOD II) COD III) Dissolved Oxygen-L1

Or

12(b) Identify the total dissolved solids and turbidity in a water sample  
Describe the determination of chloride using Mohr's method-L1

13(a) Describe waste water treatment-L2

Or

13(b) Explain method of solid waste treatment and disposal-L2

# P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE:: VIJAYAWADA

Semester-wise revised syllabus under CBCS, 2020-21

## Industrial Chemistry-2-PRACTICAL SYLLABUS

(Skill Enhancement Course (Elective), Credits: 02)

**Course Code:** CHESE P06

**Domain Subject:** CHEMISTRY

**Max.Marks:**50(CCIA 10 + SEE: 40)

**Offered to B.Sc (MPC&BZC)**

**Semester:** V

**Practical Hrs./Week:** 3

**I Lab work-Skills Outcomes:** On successful completion of this practical course, student shall be able to:

**CO1.** Learn the procedures for the determination of BOD and COD (PO1).

**CO2.** Demonstrate skills in the determination of chloride in the given water sample.(PO7)

**CO3.** Acquire skills in determining the hardness of water (PO1, PO7).

### II Practical (Laboratory) Syllabus:(30hrs)

1. Determination of Hardness of water by EDTA titration.
2. Determination of Chemical Oxygen Demand (COD)
3. Determination of Biological Oxygen Demand (BOD)
4. Determination of chloride using Mohr's method.
5. Determination of pH, turbidity and total solids in water sample.
6. Determination of  $\text{Ca}^{+2}$  and  $\text{Mg}^{+2}$  in soil sample by flame photometry.
7. Determination of Ph in soil samples using pH metry.

### III Lab References:

1. Textbook of Vogel's Quantitative Chemical Analysis, Sixth edition, Pearson.
2. Textbook on Experiments and Calculations in Engineering Chemistry, S.S.Dara, S.Chand.

### Sample suggested question paper pattern: Practical's

Evaluation scheme	Marks
One Major Experiment	20
One Minor experiment	10
Practical record	5
Viva	5
Total	40



## DEPARTMENT OF COMPUTER SCIENCE

Minutes of the meeting of Board of Studies in Computer Science for PG Programs held on 11<sup>th</sup> November 2022 (Friday) at 11 A.M. in the Department of Computer Science.

Name of the Member	Role
Dr.T.S.Ravi Kiran, HOD, Dept of CS, P.B. Siddhartha College of Arts & Science. Mobile: 9441176980, Email: tsravikiran@pbsiddhartha.ac.in, kirantsr1@gmail.com	Chairman
Dr.R. Vijaya Kumari, Krishna University, Machilipatnam. Email: vijayakumari28@gmail.com, Mobile : 9948593964	University Nominee
Dr.M. Babu Reddy, Principal, Krishna University College of Engineering and Technology, Krishna University, Machilipatnam. Mobile: 9963436460, Email: m_babureddy@yahoo.com	Subject Expert
Dr.P.Deepalakshmi, ME, Ph.D. Professor and Dean, School of Computing Kalasalingam Academy of Research and Education Krishnankoil - 626126. Viridhunagar (Dist), Tamil Nadu, India. Email: deepa.kumar@klu.ac.in, deansoc@klu.ac.in Mobile: 9865061291, 8838010443.	Subject Expert
Bharat Kumar Reddy Gujavarti (M.C.A, PGDHRM), Hyderabad Founder & CEO, Pragmatiq Systems Inc Director, Sunblue Technologies; Co-founder, Edify Email: bharat@pragmatiq.in, Mobile: 8978191977	Industrialist
Shankar Lakkaraju, M.C.A: 1999-2002 Product Director, Blue Yonder India Email: shankar.lakkaraju@gmail.com Mobile: 98851 65651	Alumnus
Ms.K.Priya, Asst Prof, P.B.Siddhartha College of Arts & Science. Mobile:7989782245	Member
Mrs. A.Kavitha, Asst Prof, P.B.Siddhartha College of Arts & Science. Mobile: 9493486272	Member
Mr. G.Samrat Krishna, Asst Prof, P.B.Siddhartha College of Arts & Science. Mobile: 9177937461	Member
Ms.R.Jayamma, Asst Prof, P.B.Siddhartha College of Arts & Science. Mobile: 9989895732	Member
Mrs. K.Sirisha, Asst Prof, P P.B.Siddhartha College of Arts & Science. Mobile: 7032617871	Member
Mrs.K.Raja Sree, Asst Prof, P P.B.Siddhartha College of Arts & Science. Mobile: 9492712745	Member
Mr.S.Tulasi Prasad, Asst Prof, P P.B.Siddhartha College of Arts & Science. Mobile: 9985762476	Member
Mr.V.V.Ramana, Systems Analyst, P.B.Siddhartha College of Arts & Science. Mobile: 7989415546	Member

## AGENDA

1. To discuss and approve the *Programme Structure and Syllabi of First Semester of M.Sc.(Computer Science), M.C.A and M.Sc.(Computational Data Science) Programmes* for the batch of students admitted from the Academic Year 2022-2023(R22) and onwards.
2. To recommend the policy to complete *MOOCS Certification*.
3. To discuss the Structure, Syllabi and Model Question Papers of Third Semester of *M.Sc.(Computer Science), M.C.A and M.Sc.(Computational Data Science) Programmes* for the batch of students admitted from the academic year 2021-2022(R20) and onwards.
4. To discuss and approve the *Structure, Syllabi and Model Question Papers* of Open Electives titled “**Data Visualization**”, “**Visual Analytics for Executives**”, and “**Web Programming**”.

## RECOMMENDATIONS FOR M.Sc.(COMPUTR SCIENCE) PROGRAMME

Percentage of change of syllabus between the Regulation 2021-2022 (R20) & 2022-2023 (R22) for M.Sc.(Computer Science) Programme								
SEMESTER I								
Academic Year: 2021-2022				Academic Year: 2022-2023				
S.No	Course Code	Title of Course	Credits	S.No	Course Code	Title of Course	Credits	Percentage of Change
1	20CS1T1	Problem Solving Using Python Programming	4	1	22CS1T1	Programming and Problem Solving Using Python	4	10%
2	20CS1T2	Computer Organization	4	2	22CS1T4	Operating Systems	4	100%
3	20CS1T3	Software Engineering	4	3	22CS1T5	Personality Development through Life Enlightenment Skills	3	100%
4	20CS1T4	Database Management Systems	4	4	22CS1T2	Database Management Systems	4	10%
5	20CS1T5	Theory of Computation	4	5	22CS1T3	Formal Languages and Automata Theory	4	20%
6	20CS1L1	Problem Solving Using Python Programming Lab	4	6	22CS1L1	Programming and Problem solving using Python Lab	3	Nil
7	20CS1L2	DBMS Lab	4	7	22CS1L2	Database Management Systems Lab	3	Nil
8	20CS1S1	Seminar	1					
			29				25	
Percentage of change in First Semester: 34.28%								

- As per the new regulations recommended by the Krishna University with effect from 2022-2023(R22), new structure is formulated for *M.Sc.(Computer Science) Programme*. The *Program Structure and Syllabi of First Semester* may be approved for the batch of students admitted in the academic year 2022-2023.

1. It is resolved and recommend to revise the syllabus & model question paper of the course “Programming and Problem-Solving using Python” with course code “20CS1T1” as “Programming and Problem-Solving using Python” with course code “22CS1T1” in I semester of M.Sc.(Computer Science) programme from the batch of students admitted in 2022-23 and onwards. For the syllabus and model question paper vide page number from 12 to 14.
2. It is resolved and recommend to revise the syllabus & model question paper of the course “Database Management Systems” with course code “20CS1T4” as “Database Management Systems” with course code “22CS1T2” in I semester of M.Sc.(Computer Science) programme from the batch of students admitted in 2022-23 and onwards. For the syllabus and model question paper vide page number from 15 to 18.
3. It is resolved and recommend to introduce the syllabus & model question paper of the course “Formal Languages and Automata Theory” with course code “22CS1T3” in place of “Theory of Computation” with course code “20CS1T5” in I semester of M.Sc.(Computer Science) programme from the batch of students admitted in 2022-23 and onwards. For the syllabus and model question paper vide page number from 19 to 22.
4. It is resolved and recommend to introduce the syllabus & model question paper of the course “Operating Systems” with course code “22CS1T4” in place of “Computer Organization” with course code “20CS1T2” in I semester of M.Sc.(Computer Science) programme from the batch of students admitted in 2022-23 and onwards. For the syllabus and model question paper vide page number from 23 to 26.
5. It is resolved and recommend to introduce the syllabus & model question paper of the course “Personality Development through Life Enlightenment Skills” with course code “22CS1T5” in place of “Software Engineering” with course code “20CS1T3” in I semester of M.Sc.(Computer Science) programme from the batch of students admitted in 2022-23 and onwards.
6. It is resolved and recommend to revise the syllabus & model question paper of the course “Programming and Problem solving using Python Lab” with course code “20CS1L1” as “Programming and Problem solving using Python Lab” with course code “22CS1L1” in I semester of M.Sc.(Computer Science) programme from the batch of students admitted in 2022-23 and onwards. For the syllabus and model question paper vide page number from 27 to 31.
7. It is resolved and recommend to adopt the syllabus & model question paper of the course “Database Management Systems Lab” with course code “20CS1L2” as “Database Management Systems Lab” with course code “22CS1L2” in I semester of M.Sc.(Computer Science) programme from the batch of students admitted in 2022-23 and onwards. For the syllabus and model question paper vide page number from 32 to 37.

## RECOMMENDATIONS FOR M.C.A PROGRAMME

Percentage of change of syllabus between the Regulation 2021-2022 (R20) & 2022-2023 (R22) for M.C.A Programme								
SEMESTER I								
Academic Year: 2021-2022				Academic Year: 2022-2023				
S.No	Course Code	Title of Course	Credits	S.No	Course Code	Title of Course	Credits	Percentage of Change
1	20CA1T1	Problem Solving Using Python Programming	4	1	22CS1T1	Programming and Problem Solving Using Python	4	10%
2	20CA1T2	Computer Organization	4	2	22CA1T5	Personality Development through Life Enlightenment Skills	3	100%
3	20CA1T3	Software Engineering	4	3	22CA1T4	Operating Systems	4	100%
4	20CA1T4	Database Management Systems	4	4	22CA1T2	Database Management Systems	4	10%
5	20CA1T5	Discrete Mathematical Structures	4	5	22CA1T3	Mathematical and Statistical Foundations	4	100%
6	20CAIT6	Probability and Statistics	4	6	22CA1L1	Programming and Problem solving using Python Lab	3	Nil
7	20CA1L1	Problem Solving Using Python Programming Lab	4	7	22CA1L2	Database Management Systems Lab	3	Nil
8	20CA1L2	DBMS Lab	4					
9	20CA1S1	Seminar	1					
			33				25	
Percentage of change in First Semester: 45.71%								

- As per the new regulations recommended by the Krishna University with effect from 2022-2023(R22), new structure is formulated for *M.C.A.* Programme. The *Program Structure* and *Syllabi of First Semester* may be approved for the batch of students admitted in the academic year 2022-2023.

1. It is resolved and recommend to revise the syllabus & model question paper of the course “Programming and Problem-Solving using Python” with course code “20CA1T1” as “Programming and Problem-Solving using Python” with course code “22CA1T1” in I semester of M.C.A. programme from the batch of students admitted in 2022-23 and onwards. For the syllabus and model question paper vide page number from 40 to 42.
2. It is resolved and recommend to revise the syllabus & model question paper of the course “Database Management Systems” with course code “20CA1T4” as “Database Management Systems” with course code “22CA1T2” in I semester of M.C.A. programme from the batch of students admitted in 2022-23 and onwards. For the syllabus and model question paper vide page number from 43 to 46.
3. It is resolved and recommend to introduce the syllabus & model question paper of the course “Mathematical and Statistical Foundations” with course code “22CA1T3” in place of “Discrete Mathematical Structures” with course code “20CA1T5” in I semester of M.C.A programme from the batch of students admitted in 2022-23 and onwards. For the syllabus and model question paper vide page number from 47 to 49.
4. It is resolved and recommend to introduce the syllabus & model question paper of the course “Operating Systems” with course code “22CA1T4” in place of “Software Engineering” with course code “20CA1T3” in I semester of M.C.A. programme from the batch of students admitted in 2022-23 and onwards. For the syllabus and model question paper vide page number from 50 to 53.

5. It is resolved and recommend to introduce the syllabus & model question paper of the course “Personality Development through Life Enlightenment Skills” with course code “22CA1T5” in place of “Computer Organization” with course code “20CA1T2” in I semester of M.C.A. programme from the batch of students admitted in 2022-23 and onwards.
6. It is resolved and recommend to revise the syllabus & model question paper of the course “Programming and Problem solving using Python Lab” with course code “20CA1L1” as “Programming and Problem solving using Python Lab” with course code “22CA1L1” in I semester of M.C.A. programme from the batch of students admitted in 2022-23 and onwards. For the syllabus and model question paper vide page number from 54 to 58.
7. It is resolved and recommend to adopt the syllabus & model question paper of the course “Database Management Systems Lab” with course code “20CA1L2” as “Database Management Systems Lab” with course code “22CA1L2” in I semester of M.C.A. programme from the batch of students admitted in 2022-23 and onwards. For the syllabus and model question paper vide page number from 59 to 64.

**RECOMMENDATIONS FOR M.Sc.(COMPUTATIONAL DATA SCIENCE)  
PROGRAMME**

Percentage of change of syllabus between the Regulation 2021-2022 (R20) & 2022-2023 (R22) for M.Sc.(Computational Data Science) Programme								
<b>SEMESTER I</b>								
Academic Year: 2021-2022				Academic Year: 2022-2023				
S.No	Course Code	Title of Course	Credits	S.No	Course Code	Title of Course	Credits	Percentage of Change
1	21DS1T1	Mathematical Essentials for Data Science	4	1	22DS1T5	Personality Development through Life Enlightenment Skills	3	100%
2	21DS1T2	Data Structures	4	2	22DS1T1	Data Structures	4	Nil
3	21DS1T3	Object Oriented Programming	4	3	22DS1T2	Object Oriented Programming	4	Nil
4	21DS1T4	Advanced Database Management Systems	4	4	22DS1T3	Advanced Database Management Systems	4	Nil
5	21DS1T5	Data Mining	4	5	22DS1T4	Data Mining Techniques	4	Nil
6	21DS1L1	Data Structures Lab	3	6	22DS1L1	Data Structures Lab	3	Nil
7	21DS1L2	Object Oriented Programming Lab	3	7	22DS1L2	Object Oriented Programming Lab	3	Nil
8	21DS1S1	Seminar	1					
			27				25	
Percentage of change in First Semester: 14.28%								

- As per the new regulations recommended by the Krishna University with effect from 2022-2023(R22), new structure is formulated for *M.Sc.(Computational Data Science)* Programme. The *Program Structure* and *Syllabi of First Semester* may be approved for the batch of students admitted in the academic year 2022-2023.
1. It is resolved and recommend to adopt the syllabus & model question paper of the course “Data Structures” with course code “21DS1T2” as “Data Structures” with course code “22DS1T1” in I semester of M.Sc.(Computational Data Science) programme from the batch of students admitted in 2022-23 and onwards. For the syllabus and model question paper vide page number from 67 to 69.

2. It is resolved and recommend to adopt the syllabus & model question paper of the course “Object Oriented Programming” with course code “21DS1T3” as “Object Oriented Programming” with course code “22DS1T2” in I semester of M.Sc.( Computational Data Science) programme from the batch of students admitted in 2022-23 and onwards. For the syllabus and model question paper vide page number from 70 to 72.
3. It is resolved and recommend to adopt the syllabus & model question paper of the course “Advanced Database Management Systems” with course code “21DS1T4” as “Advanced Database Management Systems” with course code “22DS1T3” in I semester of M.Sc.(Computational Data Science) programme from the batch of students admitted in 2022-23 and onwards. For the syllabus and model question paper vide page number from 73 to 76.
4. It is resolved and recommend to introduce the syllabus & model question paper of the course “Data Mining Techniques” with course code “22DS1T4” in place of “Data Mining” with course code “21DS1T5” in I semester of M.Sc.( Computational Data Science) programme from the batch of students admitted in 2022-23 and onwards. For the syllabus and model question paper vide page number from 77 to 79.
5. It is resolved and recommend to introduce the syllabus & model question paper of the course “Personality Development through Life Enlightenment Skills” with course code “22DS1T5” in place of “Mathematical Essentials for Data Science” with course code “20DS1T1” in I semester of M.Sc.( Computational Data Science) programme from the batch of students admitted in 2022-23 and onwards.
6. It is resolved and recommend to adopt the syllabus & model question paper of the course “Data Structures Lab” with course code “21DS1L1” as “Data Structures Lab” with course code “22DS1L1” in I semester of M.Sc.( Computational Data Science) programme from the batch of students admitted in 2022-23 and onwards. For the syllabus and model question paper vide page number from 80 to 81.
7. It is resolved and recommend to adopt the syllabus & model question paper of the course “Object Oriented Programming Lab” with course code “21DS1L2” as “Object Oriented Programming Lab” with course code “22DS1L2” in I semester of M.Sc.(Computational Data Science) programme from the batch of students admitted in 2022-23 and onwards. For the syllabus and model question paper vide page number from 82 to 86.

#### **RECOMMENDATIONS FOR OPEN ELECTIVES**

1. It is resolved and recommend to adopt the syllabus & model question paper of the course “Visual Analytics for Executives” with course code “20OE06” from the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 158 to 161.
2. It is resolved and recommend to adopt the syllabus of the course “Data Visualization” with course code “21OE04” from the batch of students admitted in 2021-22 and onwards. For the syllabus and model question paper vide page number from 162 to 163.
3. It is resolved and recommend to adopt the syllabus & model question paper of the course “Web Programming” with course code “21OE03” from the batch of students admitted in 2021-22 and onwards. For the syllabus and model question paper vide page number from 164 to 166.

## PROGRAMME OUCOMES & PRORAMME SPECIFIC OUTCOMES

### PROGRAMME OUTCOMES FOR M.Sc.(COMPUTER SCIENCE) PROGRAMME

**PO1. Technical Expertise and Knowledge in Multiple Domains:** Ability to develop an understanding of modern computing concepts and architectures from a design and performance perspective of various domains.

**PO2. Assessment from System Level Perspective:** Able to analyze and appreciate the structure of computer systems and the processes involved in their construction at various levels of detail and abstraction.

**PO3. Critical Thinking, Business Analytics & Problem Solving and Innovation:** An ability to apply knowledge of mathematics and computer science practices to build Innovative Public & Private Sector Applications involving complex computing problem solving and in research.

**PO4. Professional Ethics & Social Responsibility:** Ability to apply and commit to professional ethics following cyber regulations in a global economic environment. Create and design innovative applications to solve complex problems using established practices for the betterment of the society.

**PO5. Apposite to Industry:** Gain exposure to multiple programming languages, tools, paradigms, and technologies as well as the fundamental underlying principles throughout their education there by making them the right choice for industry positions.

**PO6. Effective Communication & Leadership:** Ability to communicate effectively and present technical & project management information using audio visual tools as well as in oral and written reports. Rise up to the need and be able to lead teams of individuals.

**PO7. Life-long Learning and Research:** Understand the importance of, and possess pre-requisite skill set to undertake life-long independent learning and research in the context of contemporary technological advancements.

### PROGRAMME SPECIFIC OUTCOMES FOR M.SC.(COMPUTER SCIENCE) PROGRAMME

**PSO1.** To make the students industry ready as far as possible to enhance their employability in the industries.

**PSO2.** Create an ambience of education through *faculty training, self learning, sound academic practices* and *research endeavors*.

## PROGRAMME OUTCOMES FOR M.C.A PROGRAMME

**PO1. Technical Expertise and Knowledge in Multiple Domains:** Ability to develop an understanding of modern computing concepts and architectures from a design and performance perspective of various domains.

**PO2. Assessment from System level perspective:** Able to analyze and appreciate the structure of computer systems and the processes involved in their construction at various levels of detail and abstraction.

**PO3. Critical Thinking, Business Analytics & Problem Solving and Innovation:** An ability to apply knowledge of mathematics and computer science practices to build Innovative Public & Private Sector Applications involving complex computing problem solving and in research.

**PO4. Professional Ethics & Social Responsibility:** Ability to apply and commit to professional ethics following cyber regulations in a global economic environment. Create and design innovative applications to solve complex problems using established practices for the betterment of the society.

**PO5. Apposite to Industry:** Gain exposure to multiple programming languages, tools, paradigms, and technologies as well as the fundamental underlying principles throughout their education there by making them the right choice for industry positions.

**PO6. Effective Communication & Leadership:** Ability to communicate effectively and present technical & project management information using audio visual tools as well as in oral and written reports. Rise up to the need and be able to lead teams of individuals.

**PO7. Life-long Learning:** Understand the importance of, and possess pre-requisite skill set to undertake life-long independent learning in the context of contemporary technological advancements.

## PROGRAMME SPECIFIC OUTCOMES FOR M.C.A PROGRAMME

**PSO1.** To make the students industry ready as far as possible to enhance their employability in the industries.

**PSO2.** Create an ambience of education through *faculty training, self learning, sound academic practices and research endeavors.*

## PROGRAMME OUTCOMES FOR M.SC.(COMPUTATIONAL DATA SCIENCE) PROGRAMME

**PO1. Technical Expertise and Knowledge in Multiple Domains:** Ability to develop an understanding of modern computing concepts and architectures from a design and performance perspective of various domains.

**PO2. Assessment from System level perspective:** Able to analyze and appreciate the structure of computer systems and the processes involved in their construction at various levels of detail and abstraction.

**PO3. Critical Thinking, Business Analytics & Problem Solving and Innovation:** An ability to apply knowledge of mathematics and computer science practices to build Innovative Public & Private Sector Applications involving complex computing problem solving and in research.

**PO4. Professional Ethics & Social Responsibility:** Ability to apply and commit to professional ethics following cyber regulations in a global economic environment. Create and design innovative applications to solve complex problems using established practices for the betterment of the society.



**PO5. Apposite to Industry:** Gain exposure to multiple programming languages, tools, paradigms, and technologies as well as the fundamental underlying principles throughout their education there by making them the right choice for industry positions.

**PO6. Effective Communication & Leadership:** Ability to communicate effectively and present technical & project management information using audio visual tools as well as in oral and written reports. Rise up to the need and be able to lead teams of individuals.

**PO7. Life-long Learning:** Understand the importance of, and possess pre-requisite skill set to undertake life-long independent learning in the context of contemporary technological advancements.

#### **PROGRAM SPECIFIC OUTCOMES FOR M.SC.(COMPUTATIONAL DATA SCIENCE)**

**PSO1:** Take leading roles in *Industry, Academia, and Entrepreneurship* to develop robust application that solve real world problems and contributing to research with a professional context pertaining to ethics, social, cultural and cyber regulations.

**PSO2:** Implement the concepts of *Statistics, Optimization Techniques, Data Repository, Data Analytics* on real world problems, and to take a decision on the problem and Handle the projects related to *Electronic Commerce, Software Development* related to online applications and can achieve *Organizational Goals and Objectives*.

**APPENDIX-I**  
**PROGRAM STRUCTURE & SYLLABI FOR M.Sc.(COMPUTER SCIENCE) PROGRAMME**



**P.B.Siddhartha College of Arts & Science, Vijayawada**  
**Programme Structure for M.Sc.(Computer Science)**  
**Under Choice Based Credit System (CBCS)**  
**W.E.F 2022-23 (R22 Regulations)**

I SEMESTER (For the batch of students admitted during 2022-2023)					M.Sc.(Computer Science)			
Course Code	Course Name	Teaching Hours / Week			CORE/IDC/DSE/SEC/OEC/MOOCs	CIA	SEE	No. of Credits
		Lecture	Practical	Tutorial				
22CS1T1	Programming and Problem Solving Using Python	4	0	0	Core	30	70	4
22CS1T2	Database Management Systems	4	0	0	Core	30	70	4
22CS1T3	Formal Languages and Automata Theory	4	0	0	Core	30	70	4
22CS1T4	Operating Systems	4	0	0	Core	30	70	4
22CS1T5	Personality Development through Life Enlightenment Skills	3	1	0	Core	30	70	3
22CS1L1	Programming and Problem solving using Python Lab	0	6	0	Core	30	70	3
22CS1L2	Database Management Systems Lab	0	6	0	Core	30	70	3
<b>TOTAL FOR FIRST SEMESTER</b>						<b>210</b>	<b>490</b>	<b>25</b>

II SEMESTER (For the batch of students admitted during 2022-2023)					M.Sc.(Computer Science)			
Course Code	Course Name	Teaching Hours/ Week			CORE/IDC/DSE/SEC/OEC/MOOCs	CIA	SEE	No. of Credits
		Lecture	Practical	Tutorial				
22CS2T1	Computer Networks	4	0	0	Core	30	70	4
22CS2T2	Data Structures	4	0	0	Core	30	70	4
22CS2T3	Web Technologies	4	0	0	Core	30	70	4
22PG201	Research Methodology & IPR	3	1	0	SEC	30	70	3
<b>DOMAIN SPECIFIC ELECTIVE COURSES (CHOOSE ANY ONE)</b>								
22CS2E1	Software Engineering	4	0	0	DSE	30	70	4
22CS2E2	Mobile Applications	4	0	0	DSE	30	70	4
22CS2E3	Unix Programming	4	0	0	DSE	30	70	4
<b>LAB PRACTICALS</b>								
22CS2L1	Data Structures Lab	0	6	0	Core	30	70	3
22CS2L2	Web Technologies Lab	0	6	0	Core	30	70	3
<b>TOTAL FOR SECOND SEMESTER</b>						<b>210</b>	<b>490</b>	<b>25</b>

At the end of 2<sup>nd</sup> semester, every student must undergo *Summer Internship/Apprenticeship/Project Work/Industrial Training/Research based Project Work* for **Six Weeks** and must prepare a report concerned as per approved project guidelines, and submit the same to the University 14 days before the commencement of third semester end examinations.

**Note: Students may be allowed to register and appear for MOOCs from the third semester itself. However, students are to complete the MOOCs successfully and submit pass certificate of the same to the University through the Principal of the College concerned for approval and endorsement of the same on grade cards and PCs and ODs as per the regulations of the University.**

III SEMESTER (For the batch of students admitted during 2022-2023)						M.Sc.(Computer Science)		
Course Code	Course Name	Teaching Hours/ Week			CORE/IDC/DSE/ SEC/OEC/MOOCs	CIA	SEE	No. of Credits
		Lecture	Practical	Tutorial				
22CS3T1	Data Science	4	0	0	Core	30	70	4
<b>DOMAIN SPECIFIC ELECTIVE COURSES (CHOOSE ANY THREE)</b>								
22CS3E1	Design & Analysis of Algorithms	4	0	0	DSE	30	70	4
22CS3E2	Data Mining Techniques	4	0	0	DSE	30	70	4
22CS3E3	Cryptography & Network Security	4	0	0	DSE	30	70	4
22CS3E4	Artificial Intelligence	4	0	0	DSE	30	70	4
22CS3E5	Internet of Things	4	0	0	DSE	30	70	4
22CS3E6	Block Chain Technologies	4	0	0	DSE	30	70	4
<b>LAB PRACTICALS</b>								
22CS3L1	Data Science Lab	0	6	0	Core	30	70	3
22CS3L2	Cryptography & Network Security Lab	0	6	0	Core	30	70	3
<b>OPEN ELECTIVE (INTERDISCIPLINARY/MULTIDISCIPLINARY) COURSES (CHOOSE ANY ONE)</b>								
22OE301	Python Programming	3	0	0	OEC	30	70	3
22OE302	Office Tools	3	0	0	OEC	30	70	3
22OE303	Mobile Computing	3	0	0	OEC	30	70	3
22OE304	R Programming	3	0	0	OEC	30	70	3
22OE305	Web Development	3	0	0	OEC	30	70	3
						<b>210</b>	<b>490</b>	<b>25</b>

IV SEMESTER (For the batch of students admitted during 2022-2023)						M.Sc.(Computer Science)		
Course Code	Course Name	Teaching Hours/ Week			CORE/IDC/DSE/ SEC/OEC/MOOCs	CIA	SEE	No. of Credits
		Lecture	Practical	Tutorial				
22CS4T1	Machine Learning	4	0	0	Core	30	70	4
<b>DOMAIN SPECIFIC ELECTIVE COURSES (CHOOSE ANY THREE)</b>								
22CS4E1	Cloud Computing	4	0	0	DSE	30	70	4
22CS4E2	Cyber Security	4	0	0	DSE	30	70	4
22CS4E3	Big Data Analytics	4	0	0	DSE	30	70	4
22CS4E4	Applied Data Analysis	4	0	0	DSE	30	70	4
22CS4E5	Deep Learning	4	0	0	DSE	30	70	4
22CS4E6	Information Security	4	0	0	DSE	30	70	4
<b>LAB PRACTICALS</b>								
22CS4L1	Machine Learning Lab	0	6	0	Core	30	70	3
<b>ENTREPRENEURIAL &amp; INNOVATION/IT SKILL RELATED TO DOMAIN SPECIFIC ELECTIVE COURSES (CHOOSE ANY ONE)</b>								
22CS4E7	Social Media Analytics	3	0	0	SEC	30	70	3
22CS4E8	Dynamic Web Programming using Python	3	0	0	SEC	30	70	3
22CS4E9	Software Testing and Project Management	3	0	0	SEC	30	70	3
<b>* CHOOSE MOOCs FROM SWAYAM/NPTEL SOURCES</b>								
<b>MOOCs</b>								4
<b>PROJECT WORK EVALUATION AND VIVA-VOCE</b>						Nil	100	4

## 22CS1T1: PROGRAMMING AND PROBLEM SOLVING USING PYTHON

<b>Course Name</b>	Programming and Problem Solving Using Python	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>CIA</b>	<b>SEE</b>	<b>TM</b>
<b>Course Code</b>	22CS1T1	4	0	0	4	30	70	100
<b>Year of Introduction:</b> 2020	<b>Year of Offering:</b> 2022	<b>Year of Revision:</b> 2022		<b>Percentage of Revision:</b> 10				
<b>L-Lecture, T-Tutorial, P-Practical, C-Credits, CIA-Internal Marks, SEE-External Marks, TM-Total Marks</b>								

**Course Description and Purpose:** Python Programming is a course that illustrates basic concepts of Python programming, Decision Control Statements, Functions and Modules, Python Strings Revisited, Data Structures, Classes and Objects, Inheritance, Operator Overloading, Pandas, Error and Exception Handling, File Handling, Numpy, Matplotlib.

### Course Objectives:

This course will help enable the students to understand, learn and develop a various Decision Control Statements, Functions & Modules, Strings, Data Structures, Classes and Objects, Inheritance, Operator Overloading, Pandas, Error and Exception Handling, Handling Files, Databases.

### Specific objectives include:

- ✓ To understand basics of *Python Programming*.
- ✓ To gain knowledge on *Decision Control Statements* and *Functions & Modules and Python Strings* and *Data Structures*.
- ✓ To gain knowledge on *Classes & Objects, Inheritance*.
- ✓ To apply *Operator Overloading, Error and Exception Handling* and Pandas.
- ✓ To gain knowledge on File Handling, Database Connection, basics of Numpy and matplotlib.

### Course Learning Outcomes:

Upon successful completion of the course, the student will be able to:

**CO1:** Understand basics of Python Programming.

**CO2:** Gain knowledge on *Decision Control Statements* and *Functions & Modules and Python Strings* and *Data Structures*.

**CO3:** Gain knowledge on *Classes & Objects & Inheritance*.

**CO4:** Apply Operator Overloading, Error and Exception Handling and Pandas.

**CO5:** Gain Knowledge on File Handling, Database Connection and basics of Numpy and matplotlib

### UNIT I (12 Hours)

**Basics of Python Programming:** Features of Python, History of Python, The Future of Python, Writing and Executing First Python Program, Literal Constants, Variables and Identifiers, Data Types, Input Operation, Comments, Reserved Words, Indentation, Operators and Expressions, Expressions in Python, Operations on Strings, Other Data Types, Type Conversion.

**Decision Control Statements:** Conditional Branching Statements, Basic Loop Structures, Nested Loops, The Break Statement, The Continue Statement, The Pass Statement, The Else Statement used with Loops.

### UNIT II (12 Hours)

**Functions and Modules:** Function Definition, Function Call, Variable Scope and Lifetime, The Return Statement, More on Defining Functions, Recursive Functions, Modules, Packages in Python, Standard Library Modules.

**Python Strings Revisited:** Concatenating, Appending and Multiplying Strings, String Formatting Operator, Built in String Methods and Functions, Comparing Strings, Regular Expressions.

**Data Structures:** Sequence, Lists, Functional Programming, Tuple, Sets, Dictionaries.

### UNIT III (12 Hours)

**Classes and Objects:** Classes and Objects, Class Method and self Argument, Class Variables and Object Variables, Public and Private Data Members, Private Methods, Calling a Class Method from Another Class Method, Built in Class Attributes, Class Methods, Static Methods.

**Inheritance:** Inheriting Classes in Python, Types of Inheritance, Abstract Classes and Interfaces.

### UNIT IV (12 Hours)

**Operator Overloading:** Concept of Operator Overloading, Advantage of Operator Overloading, Implementing Operator Overloading.

**Pandas:** Introduction, Getting Started, Series, Data Frame, Read CSV, Read JSON -Analyzing Data Frames, Cleaning Data, Cleaning Empty Cell, Cleaning Wrong Format, Cleaning Wrong Data, Removing Duplicates, Correlations, Plotting.

**Error and Exception Handling:** Introduction to Errors and Exceptions, Handling Exceptions, Raising Exceptions, Built in and User defined Exceptions.

### UNIT V (12 Hours)

**File Handling:** File Path, Types of Files, Opening and Closing Files, Reading and Writing Files.

**Databases:** Database Table Creation, Select Operation, Insert Operation, Delete Operation, Update Operation, Drop Table.

**Numpy:** Basic Functions of Numpy.

**Matplotlib:** Basic Functions of Matplotlib.

#### Reference Text Books:

1. Reema Thareja, Python Programming Using Problem Solving Approach, Oxford University Press, June 2017.
2. Vamsi Kurama, Python Programming, A Modern Approach, Pearson, 2017.
3. Wesley Chun, Core Python Programming, Prentice Hall, December 2000.

**e-resources:** <https://www.w3schools.com/python/pandas/>

**PARVATHANENI BRAHMAYYA SIDDHARTHA COLLEGE OF ARTS & SCIENCE**

(An Autonomous College in the jurisdiction of Krishna University)

M.Sc.(Computer Science), First Semester

**Course Name: PROBLEM SOLVING USING PYTHON PROGRAMMING**

**Course Code: 22CS1T1**

**(w.e.f admitted batch 2022-23)**

**Time: 3 Hours**

**Max Marks: 70**

**SECTION-A**

**Answer ALL questions**

**(5×4 = 20 Marks)**

1. a) Explain *Future of Python* (CO1,L2)  
(or)  
b) Explain different *Data Types* in *Python* (CO1,L2)
2. a) What is *Recursive Function*? Explain with *example*.(CO2,L1)  
(or)  
b) List out and explain any 4 *Built in String Method*?(CO2,L1)
- 3.a) What is the *Differences between Class Variable and Object Variable*?(CO3,L1)  
(or)  
b) List out *Built in Class Attributes*? (CO3,L1)
- 4.a) Explain *Advantages of Operator Overloading*? (CO4,L2)  
(or)  
b) Explain *Exception Hierarchy*? (CO4,L2)
- 5.a) Explain *Types of Plots in Matplotlib*? (CO5,L2)  
(or)  
b) Explain different *ways of creating Arrays* using *Numpy*. (CO5,L2)

**SECTION-B**

**Answer Five Questions Choosing One Question from Each Unit.**

**All Questions Carry Equal Marks.**

**(5×10 = 50 Marks)**

6. a) Explain the *features of Python Programming Language*.(CO1,L2)  
(or)  
b) Explain *Different Loops* in *Python* with *example*. (CO1,L2)
7. a) Apply *Modules Concept* in *Python* with *examples*. (CO2,L3)  
(or)  
b) Build the *List Data Structure and their built in functions* with *examples*. (CO2, L3)
8. a) What are *Classes and Objects*? Write a *program in Python* to illustrate an *instance variable*.(CO3,L1)  
(or)  
b)What is *Inheritance*? Explain *different types of Inheritance*. (CO3,L1)
9. a) Explain how to *Implement Operator Overloading* in *Python*. (CO4,L2)  
(or)  
b) Explain *process of Analyzing Data Frames*. (CO4,L2)
10. a) Explain *process of Writing and Reading data from file with example*. (CO5,L5)  
(or)  
b) Explain *process of Update Data into Database with relevant examples*. (CO5,L5)

## 22CS1T2: DATABASE MANAGEMENT SYSTEMS

<b>Course Name</b>	Database Management Systems	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>CIA</b>	<b>SEE</b>	<b>TM</b>
<b>Course Code</b>	22CS1T2	4	0	0	4	30	70	100
<b>Year of Introduction:</b> 1991	<b>Year of Offering:</b> 2022	<b>Year of Revision:</b> 2022		<b>Percentage of Revision:</b> 10				
L-Lecture, T-Tutorial, P-Practical, C-Credits, CIA-Internal Marks, SEE-External Marks, TM-Total Marks								

### Course Description and Purpose:

Database Management Systems is a course that illustrates basic concepts of *Databases and Database Users*, *Database System Architecture*, *ER & EER Relationship Modeling*, *Structured Query Language*, *Relational Algebra and Relational Calculus*, *Functional Dependencies and Normalization for Relational Databases*, *Transaction Processing Concepts*, *Concurrency Control Techniques* and *Emerging Database Technologies and Applications*.

### Course Objectives:

This course will help enable the students to understand, learn and develop a various *Relational Data Models*, *Querying*, *ER & EER Modeling*, *Relational Algebra & Calculus*, *Functional Dependencies and Normalization*, *Transaction Processing*, *Concurrency Control* and *Emerging Database Technologies and Applications*.

### Specific objectives include:

- ✓ To understand basic concepts of *Database and Database Users*, *Database Architecture*.
- ✓ To understand *ER*, *EER Modelling* and *Relational Algebra and Relational Calculus*.
- ✓ To learn the basics of *Functional Dependencies and Normalization* for Relational Databases.
- ✓ To learn *Transaction Processing* and *Concurrency Control Techniques*.
- ✓ To understand the *Structured Query Language* and *Emerging Database Technologies and Applications*:

### Course Learning Outcomes:

Upon successful completion of the course, the student will be able to:

**CO1:** Understand basic concepts of *Database and Database Users*, *Database Architecture*.

**CO2:** Understand *ER*, *EER Modeling* and *Relational Algebra and Relational Calculus*.

**CO3:** Learn the basics of *Functional Dependencies and Normalization* for Relational Databases.

**CO4:** Learn *Transaction Processing* and *Concurrency Control Techniques*.

**CO5:** Understand the *Structured Query Language* and *Emerging Database Technologies and Applications*.

### UNIT I (12 Hours)

**Database and Database Users:** Introduction, Characteristics of the Database Approach, Actors on the Scene, Workers behind the Scene, Advantages of the using the DBMS Approach.

**Database System Concepts and Architecture:** Data Models, Schemas and Instances, Three Schema Architecture and Data Independence, Database Languages and Interfaces, Centralized and Client/Server Architecture for DBMS, Classification of Database Management Systems.

### UNIT II (12 Hours)

**Data Modeling Using the ER Model:** Conceptual Data Models, Entity Types, Entity Sets, Attributes and Keys, Relationship Types, Relationship Sets, Roles and Structural Constraints, Weak Entity Types, Relationship Types of Degree Higher than Two, Refining the ER Design for the COMPANY Database.

**The Enhanced Entity-Relationship Model:** Sub Classes, Super Classes and Inheritance, Specialization and Generalization, Constraints and Characteristics of Specialization and Generalization.

**The Relational Algebra and Relational Calculus:** Unary Relational Operations: SELECT and PROJECT, Relational Algebra Operations from Set Theory, Binary Relational Operations: JOIN and DIVISION, Additional Relational Operations, Examples, The Tuple Calculus and Domain Calculus.

### UNIT III (12 Hours)

**Functional Dependencies and Normalization for Relational Databases:** Informal Design Guidelines for Relation Schemas, Functional Dependencies, Normal Forms Based in Primary Keys, General Definitions of Second and Third Normal Forms, Boyce-Codd Normal Form, Multivalued Dependencies and Fourth Normal Form, Join Dependencies and Fifth Normal Form, Inclusion Dependencies.

### UNIT IV (12 Hours)

**Introduction to Transaction Processing Concepts and Theory:** Introduction to Transaction Processing, Transaction and System Concepts, Desirable Properties of Transactions, Characterizing Schedules Based on Recoverability, Characterizing Schedules based on Serializability.

**Concurrency Control Techniques:** Two Phase Locking Techniques for Concurrency Control, Concurrency Control Based on Timestamp Ordering, Multiversion Concurrency control techniques, Validation Concurrency Control Techniques.

### UNIT V (12 Hours)

**SQL-99:** Schema Definition, Constraints, Queries and Views: SQL Data Definitions and Data Types, Specifying Constraints in SQL, Schema Change Statements on SQL, Basic Queries in SQL, More Complex SQL Queries, INSERT, DELETE and UPDATE statements in SQL, Triggers and Views.

**Emerging Database Technologies and Applications:** Mobile Databases, Multimedia Databases, Geographic Information Systems.

#### Reference Text Books:

1. Ramez Elmasri, Shamkant B. Navathe, Fundamentals of Database Systems, Pearson Education, Seventh Edition, 2017.
2. C.J.Date, A.Kannan, S.Swamynathan, An Introduction to Database Systems, VII Edition, Pearson Education, 2006.
3. Peter Rob, Carlos Coronel, Database Systems-Design, Implementation and Management, Eight Edition, Thomson, 2008
4. Raman A Mata, Toledo, Panline K. Cushman, Database Management Systems, Schaum's Outlines, TMH, 2007.
5. Steven Feuerstein, Oracle PL/SQL, Programming, 10th Anniversary Edition, OREILLY, 2008.



**PARVATHANENI BRAHMAYYA SIDDHARTHA COLLEGE OF ARTS & SCIENCE**  
(An Autonomous College in the jurisdiction of Krishna University)  
M.Sc.(Computer Science), First Semester  
**Course Name:** Database Management Systems  
**Course Code:** 22CS1T2  
(w.e.f admitted batch 2022-23)

**Time: 3 Hours**

**Max Marks: 70**

**SECTION-A**

**Answer ALL questions. All Questions Carry Equal Marks. (5×4 = 20 Marks)**

- 1.(a) Name the advantages of the DBMS. (CO1,L1)  
(or)  
(b) What is Data Independence? Explain the difference between *Physical Data Independence* and *Logical Data Independence*. (CO1,L1)
2. (a) What is *Generalization*? Explain it diagram. (CO2,L1)  
(or)  
(b) What are various symbols used in *ER Modeling*. (CO2,L1)
3. (a) Explain *First Normal Form*. (CO3,L2)  
(or)  
(b) Explain *Dependency Preservation* with example. (CO3,L2)
4. (a) Explain *Properties of Transaction*. (CO4,L2)  
(or)  
(b) Explain *Shared* and *Exclusive* Locks. (CO4,L2)
5. (a) Explain *DML Commands* with example. (CO5,L5)  
(or)  
(b) Explain *Mobile Databases*. (CO5,L5)

**SECTION-B**

**Answer ALL questions. All Questions Carry Equal Marks. (5×10 = 50 Marks)**

6. (a) Explain various *Data Models* of Database Management Systems. (CO1,L2)  
(or)  
(b) Explain *Three Schema Architecture* of DBMS with neat diagram. (CO1,L2)
7. (a) Demonstrate *Select* and *Project* operations of *Relational Algebra*. (CO2,L2)  
(or)  
(b) Explain *ER Design* for the *Company Database* with all constraints. (CO2,L2)
8. (a) Explain *BCNF* with example. (CO3,L5)  
(or)  
(b) Explain *Fifth Normal Form* with example. (CO3,L5)

9. (a) Identify whether the transactions T1 & T2 ensure *serializability*. (CO4,L3)

T1	T2
read_item(x); X:=X - N;	
	read_item(x); X:=X + M;
write_item(X); read_item(Y);	
	Write_item(x);
Y:=Y+N; Write_item(Y);	

(or)

(b) Develop a technique for *Concurrency Control Based on Timestamp Ordering*. (CO4,L3)

10. (a) Analyze *Multimedia Databases* in detail. (CO5,L4)

(or)

(b) Distinguish various *Constraints* of SQL. (CO5,L4)

## 22CS1T3: FORMAL LANGUAGES AND AUTOMATA THEORY

<b>Course Name</b>	Formal Languages and Automata Theory	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>CIA</b>	<b>SEE</b>	<b>TM</b>
<b>Course Code</b>	22CS1T3	4	0	0	4	30	70	100
<b>Year of Introduction:</b> 2018	<b>Year of Offering:</b> 2022	<b>Year of Revision:</b> 2022		<b>Percentage of Revision:</b> 20				
L-Lecture, T-Tutorial, P-Practical, C-Credits, CIA-Internal Marks, SEE-External Marks, TM-Total Marks								

### Course Description and Purpose:

Formal Languages and Automata Theory deals with the concepts of *Automata*, *Formal Languages*, *Grammar*, *Algorithms*, *Computability*, *Decidability and Complexity*. It also helps to develop methods by which computer scientists can describe and analyze the dynamic behavior of *Discrete Systems*, in which signals are sampled periodically.

### Course Objectives:

- ✓ To understand basic properties of *Deterministic* and *Nondeterministic Finite Automata*.
- ✓ To understand *Context Free Languages* and *Grammars*, and also *Normalising CFG*.
- ✓ To understand the concept of *Pushdown Automata Turing Machine* and its application.
- ✓ To understand Basic Structure of *Compiler Design*.
- ✓ To understand the concept of *Lex* and *Syntax Analysis*.

### Course Learning Outcomes:

At the end of this course the students should be able to:

**CO1:** Understand basic properties of *Deterministic* and *Nondeterministic Finite Automata*.

**CO2:** Understand the *Context Free Languages* and *Grammars*, and also *Normalising CFG*.

**CO3:** Understand the concept of *Pushdown Automata Turing Machine* and its application.

**CO4:** Understand Basic Structure of *Compiler Design*.

**CO5:** Understand the concept of *Lex* and *Syntax Analysis*.

### UNIT I (12 Hours)

**Fundamentals:** Strings, Alphabet, Language, Operations, Finite Automaton Model, Acceptance of Strings and Languages, Transition Table and Transition Diagrams.

**Finite Automata:** Deterministic Finite Automaton, Non deterministic Finite Automaton and NFA with  $\epsilon$  Transitions, Significance, Equivalence between NFA with and without  $\epsilon$  Transitions, NFA to DFA Conversion, Minimization of FSM, Equivalence between two FSMs, Finite Automata with Output-Moore and Mealy Machines.

### UNIT II (12 Hours)

**Regular Languages:** Regular Sets, Regular Expressions, Identity Rules, Construction of Finite Automata (DFA) for a given Regular Expressions and its inter conversion using State Elimination and Ardens Theorem, Pumping Lemma of Regular Sets, Closure Properties of Regular Sets (Proofs not required).

### UNIT III (12 Hours)

**Context free grammar:** Introduction, Derivation Trees, Ambiguity in Context Free Grammars. Minimization of Context Free Grammars. Chomsky Normal Form, Greibach Normal Form.

**Push down Automata:** Definition, Model, Design of PDA. The Language of PDA- Acceptance by Final State, Acceptance by Empty Stack, Equivalence of CFL and PDA -Conversion of CFL to PDA and PDA to CFL

**Turing Machine:** Definition, Turing Machine Model, Types of Turing machine (problems not required), Types of Turing machine, Recursively Enumerable Languages and Recursive Languages Chomsky Hierarchy of Languages and Post correspondence problem

#### **UNIT IV (12 Hours)**

**Compiler:** Introduction, Structure of a compiler, Design issues of compiler, Phases of Compiler, Lexical Analysis, Role of Lexical Analyzer, Input Buffering, Specification of Tokens, Recognition of Tokens

#### **UNIT V (12 Hours)**

**Lex (Lexical-Analyzer Generator):** Uses of Lex, Structure of Lex Programs, Conflict Resolution in Lex , The Lookahead Operator.

**Syntax Analysis:** Top Down Parsing, Recursive-Descent Parsing, FIRST and FOLLOW, LL(l) Grammar, Nonrecursive Predictive Parsing, Error Recovery in Predictive Parsing.

Bottom-Up Parsing- Reductions, Handle Pruning, Shift-Reduce Parsing ,Conflicts During Shift-Reduce Parsing

#### **Reference Text Books:**

1. Hopcroft. H.E. and Ullman, Introduction to Automata Theory Languages and Computation, J. D. Pearson Education, January 2008.
2. Compilers-Principles, Techniques and Tools, Jeffery D.Ullman 2<sup>nd</sup> Edition, Pearson Education, January 2013.
3. John C Martin, Introduction to Languages and the Theory of Computation, Tata McGraw-Hill, 2003.

**KRISHNA UNIVERSITY, MACHILIPATNAM, A.P., INDIA.**  
**M.Sc.,(COMPUTER SCIENCE) DEGREE EXAMINATIONS**  
**FIRST SEMESTER**  
**FORMAL LANGUAGES AND AUTOMATA THEORY**  
**SYLLABUS W.E.F 2022-2022 (R22)**

Time 3 Hours

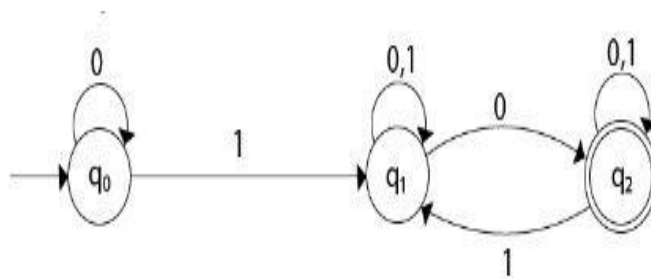
Max.Marks: 70

**SECTION-A**Answer any five questions.  $5 \times 4 = 20$  Marks

1. (a) What is NFA with example?(CO1,L1)  
(or)  
(b) Define Mealy Machine with example (CO1,L1)
2. (a) Define regular set .What are the closure properties of regular sets? (CO2,L1)  
(or)  
(b) Define Expression. What are the different identity rules used in regular expression. (CO2,L1)
3. (a) Explain Ambiguity in context free grammars with example.(CO3,L2)  
(or)  
(b) Explain LMD and RMD with example(CO3,L2)
4. (a) Define input buffering with example. (CO4,L1)  
(or)  
(b) What is the role of Lexical Analyzer. (CO4,L1)
5. (a) Explain Conflict Resolution in Lex. (CO5,L2)  
(or)  
(b) Explain error recovery in predictive parsing. (CO5,L2)

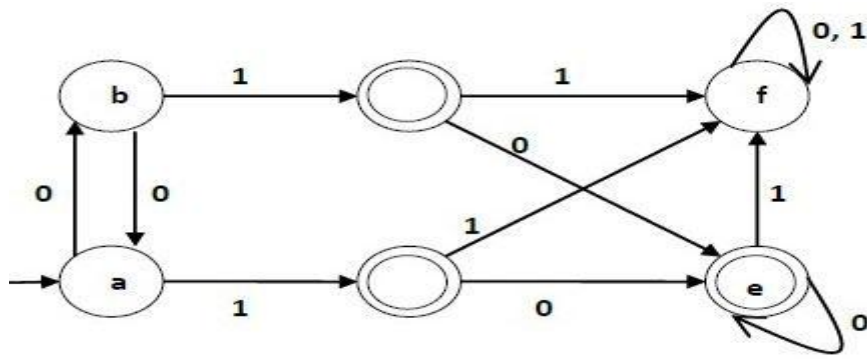
**SECTION-B**Answer all questions.  $5 \times 10 = 50$  Marks

6. (a) Construct the given NFA to DFA. (CO1,L3) 10 Marks

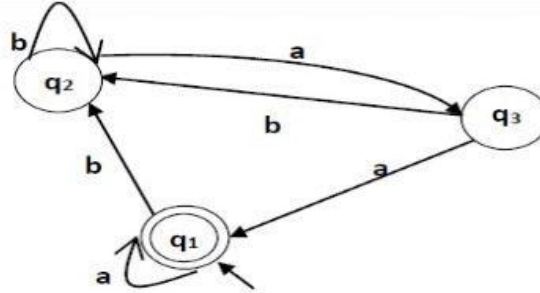


(or)

- (b) Construct the given DFA into minimized DFA (CO1,L3)



7. (a) Construct a regular expression corresponding to the automata given below (CO2,L3)



(or)

(b) Solve the given Language  $L = \{0^n 1^n \mid n \geq 1\}$  is not a regular language using pumping lemma (CO2,L3)

8. (a) Translate the given grammar to CNF (CO3,L2)

- $S \rightarrow aAD$
- $A \rightarrow aB / bAB$
- $B \rightarrow b$
- $D \rightarrow d$

(or)

(b) Explain Chomsky Hierarchy of Languages and Post correspondence problem with example.(CO3,L2)

9. (a) what are the design issues of compiler? (CO4,L1)

(or)

(b) What are the different phases used in Compiler Design with diagram 10 Marks (CO4,L1)

10. (a) Define Lex. explain structure of Lex program and its uses (CO5,BTL2)

(or)

(b) Explain top down and bottom up parsing with example(CO5,L2)

## 22CS1T4: OPERATING SYSTEMS

<b>Course Name</b>	Operating Systems	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>CIA</b>	<b>SEE</b>	<b>TM</b>
<b>Course Code</b>	22CS1T4	4	0	0	4	30	70	100
<b>Year of Introduction:</b> 1991	<b>Year of Offering:</b> 2022	<b>Year of Revision:</b> 2022		<b>Percentage of Revision:</b> 20				
L-Lecture, T-Tutorial, P-Practical, C-Credits, CIA-Internal Marks, SEE-External Marks, TM-Total Marks								

### Course Description and Purpose:

Operating Systems is a course that illustrates *Operating System Concepts, Operating System Structure, Processes Concepts, Threads, Process Synchronization, Scheduling, Deadlocks, Main Memory, Virtual Memory, Mass Storage Structure, File System Implementation, Distributed Operating Systems and Mobile & Android Operating Systems*

### Course Objectives:

This course will help enable the students to understand and learn *Operating System Concepts, Operating Structure, Process Concepts, Thread Concept, Process Synchronization, Scheduling, Deadlocks, Main Memory, Virtual Memory and Mass Storage Structure, File System Implementation, Distributed Operating Systems and Mobile & Android Operating Systems*.

### Specific objectives include:

- ✓ To understand the *Basic Concepts of Operating System, Operating System Structure and Process Concept*.
- ✓ To apply concepts of *Threads, Process Synchronization & CUP Scheduling*.
- ✓ To understand *Deadlock, Main Memory & Virtual Memory*.
- ✓ To explain *Mass Storage Structure, File System Interface & File System Implementation*.
- ✓ To understand the concepts of *Distributed Operating Systems and Mobile & Android Operating Systems*.

### Course Learning Outcomes:

Upon successful completion of the course, the student will be able to:

**CO1:** Understand the *Basic Concepts of Operating System, Operating System Structure and Process Concept*.

**CO2:** Applying concepts of *Threads, Process Synchronization & CUP Scheduling*.

**CO3:** Understand *Deadlock, Main Memory & Virtual Memory*.

**CO4:** Explain *Mass Storage Structure, File System Interface & File System Implementation*.

**CO5:** Understand the concepts of *Distributed Operating Systems and Mobile & Android Operating Systems*.

### UNIT I (12 Hours)

**Introduction to Operating System Concepts:** Functions of Operating System, Operating System Structure, Operating System Operations, Kernel Data Structure, Computing Environment.

**Operating System Structures:** Operating System Services, System Calls, Types of System Calls.

**Processes:** Process Concept, Process Scheduling, Operations on Processes, Inter Process Communication, Communication in Client-Server Systems.

### UNIT II (12 Hours)

**Threads:** Overview, Multicore Programming, Multithreading Models, Thread Libraries, Implicit Threading, Threading Issues.

**Process Synchronization:** Background, The Critical Section Problem, Peterson's Solution, Synchronization Hardware, Mutex Locks, Semaphores, Classic Problems of Synchronization, Monitors.

**CPU Scheduling:** Basic Concepts, Scheduling Criteria, Scheduling Algorithms, Thread Scheduling, Multiple Processor Scheduling.

### UNIT III (12 Hours)

**Deadlocks:** System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock.

**Main Memory:** Swapping, Contiguous Memory Allocation, Segmentation, Paging, Structure of

thePage Table, Intel 32 and 64-bit Architectures.

**Virtual Memory:** Background, Demand Paging, Copy-on-Write, Page Replacement, Allocation of Frames, Thrashing.

#### **UNIT IV (12 Hours)**

**File System Interface:** File Concept, Access Methods, Directory and Disk Structure, File System Mounting, Protection.

**File System Implementation:** File System Structure, File System Implementation, Directory Implementation, Allocation Methods, Free Space Management, Efficiency and Performance, Recovery.

#### **UNIT V (12 Hours)**

**Distributed Operating Systems:** Types of Network based Operating Systems, Network Structure, Network Topology, Communication Structure, Communication Protocols, Robustness, Design Issues.

**Mobile & Android Operating Systems:** A review of Mobile Operating Systems, Features of Android Operating Systems.

#### **Reference Text Books:**

1. Abraham Silberschatz & Peter Baer Galvin, Greg, Operating System Concept, Ninth Edition, Wiley, 2015.
2. William Stallings, Operating Systems-Internals and Design Principles, Fifth Edition, Pearson Education, 2007
3. Achyut S Godbole, Operating Systems, Second Edition, TMH, 2007.
4. Flynn/McHoes, Operating Systems, Cengage Learning, 2008.
5. Deitel & Deitel, Operating System, Third Edition, Pearson Education, 2008.



**PARVATHANENI BRAHMAYYA SIDDHARTHA COLLEGE OF ARTS & SCIENCE**  
(An Autonomous College in the jurisdiction of Krishna University)  
M.Sc.(Computer Science), First Semester  
**Course Name:** Operating Systems  
**Course Code:** 22CS1T4  
(w.e.f admitted batch 2022-22)

**Time: 3 Hours**

**Max Marks: 70**

**SECTION-A**

**Answer ALL questions. All Questions Carry Equal Marks. (5×4 = 20 Marks)**

- 1.(a) Explain the structure of Operating System. (CO1,L2)  
(or)  
(b) Explain *Inter Process Communication*. (CO1,L2)
2. (a) List various *Multithreading Model*. (CO2,L1)  
(or)  
(b) What is *Semaphore*. (CO2,TL1)
3. (a) Test for *Demand Paging*. (CO3,L4)  
(or)  
(b) Analyze Paging. (CO3,L4)
4. (a) Demonstrate the *File Concept* (CO4,L2)  
(or)  
(b) Explain various *File Operations*. (CO4,L2)
5. (a) Construct a *Network Topology*. (CO5,L3)  
(or)  
(b) Identify the design issues in *Distributed OS*. (CO5,L3)

**SECTION-B**

**Answer ALL questions. All Questions Carry Equal Marks. (5×10 = 50 Marks)**

6. (a) Explain *Operating System Services*. (CO1,L2)  
(or)  
(b) Explain various types *System Calls*. (CO1,L2)
7. (a) Illustrate the *Dining Philosophers Problem* of Process Synchronization. (CO2,L2)  
(or)  
(b) Demonstrate (CO2,L2)  
(i) First-Come, First-Served Scheduling with the following data

Process	Burst Time
P1	24
P2	3
P3	3

(ii) Shortest-Job-First Scheduling with following data

Process	Burst Time
P1	6
P2	8
P3	7
P4	3

8. (a) Apply the necessary conditions for preventing *Deadlock Situation*. (CO3,L3)

(or)

(b) Utilize the reference string 7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 1, 2, 0, 1, 7, 0, 1 for a memory with three frames implement *Optimal Page Replacement* and *LRU PageReplacement*. (CO3,L3)

9. (a) Compare *Single-Level Directory*, *Two Level Directory*, and *Tree-Structured Directories*. (CO4,L4)

(or)

(b) Categorize various *Allocation Methods* of *File System Implementation*. (CO4,L4)

10. (a) Explain various types of *Network based Operating Systems*. (CO5,L5)

(or)

(b) Explain features of *Mobile Operating Systems*. (CO5,L5)

## 22CSIL1: PROGRAMMING AND PROBLEM SOLVING USING PYTHON LAB

<b>Course Name</b>	Programming and Problem Solving using Python Lab	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>CIA</b>	<b>SEE</b>	<b>TM</b>
<b>Course Code</b>	22CS1L1	0	0	6	3	30	70	100
<b>Year of Introduction:</b> 2019	<b>Year of Offering:</b> 2022	<b>Year of Revision:</b> 2022		<b>Percentage of Revision:</b> 30				
L-Lecture, T-Tutorial, P-Practical, C-Credits, CIA-Internal Marks, SEE-External Marks, TM-Total Marks								

### Course Description and Purpose:

Python Programming is a course that illustrates Basic Concepts of Python programming, Decision Control Statements, Functions and Modules, Python Strings Revisited, Data Structures, Classes and Objects, Inheritance, Operator Overloading, Pandas, Error and Exception Handling, File Handling, Numpy, Matplotlib.

### Course Objectives:

This course will help enable the students to understand, learn and develop a various Decision Control Statements, Functions & Modules, Strings, Data Structures, Classes and Objects, Inheritance, Operator Overloading, Pandas, Error and Exception Handling, Handling Files, Databases.

### Specific objectives include:

- ✓ To understand *Basics of Python Programming, Decision Control Statements.*
- ✓ To know the concepts of *Data Structures, Functions and Modules.*
- ✓ To know the concepts of *Classes and Objects, Object Oriented Programming.*
- ✓ To apply *Error and Exception Handling.*
- ✓ To implement *Database Access and File Handling.*

### Course Learning Outcomes:

Upon successful completion of the course, the student will be able to:

**CO1:** Understand *Basics of Python Programming, Decision Control Statements.*

**CO2:** Know the concepts of *Data Structures, Functions and Modules.*

**CO3:** Know the concepts of *Classes and Objects, Object Oriented Programming.*

**CO4:** Apply *Error and Exception Handling.*

**CO5:** Implement *Database Access and File Handling.*

1. Write a program to find total for given number of tens, number of fives, number of twos and number of ones. (CO1, L1)
2. Write a program to enter a number and display its hex and octal equivalent and its square root. (CO1, L1)
3. Write a program to read and print values of variables of different data types. (CO1, L1)
4. Write a program to calculate the distance between two points. (CO1, L1)
5. Write a program to calculate area of triangle using Heron's formula. (CO1, L1)  
(Hint: Heron's formula is given as:  $\text{area} = \sqrt{S(S-a)(S-b)(S-c)}$ )
6. Write a program to calculate the distance between two points. (CO1, L1)
7. Write a program to perform addition, subtraction, multiplication, division, integer division. (CO1, L1)
8. Write a program to find the greatest number from three numbers. (CO1, L1)
9. Write a program to calculate tax given the following conditions: (CO1, L1)  
If income is less than 1,50,000 then no tax  
If taxable income is Rs.1,50,001 - Rs.300,000 then charge 10% tax  
If taxable income is Rs.3,00,001 - Rs.500,000 then charge 20% tax

If taxable income is above Rs.5,00,001 then charge 30% tax

10. Write a program to calculate roots of quadratic equation. (CO1, L1)
11. Write a program to enter the marks of a student in four subjects. Then calculate the total and aggregate, and display the grade obtained by the student. If the student scores an aggregate greater than 75%, then the grade is Distinction. If aggregate is  $60 \geq$  and  $< 75$ , then grade is First Division. If the aggregate is  $50 \geq$  and  $< 60$ , then the grade is Second Division. If aggregate is  $40 \geq$  and  $< 50$ , then the grade is Third Division. Else the grade is Fail. (CO1, L1)
12. Write a program to read the numbers until -1 is encountered. Find the average of positive numbers and negative numbers entered by the user. (CO1, L1)
13. Write a program to find whether the given number is an *Armstrong Number* or not. (CO1, L1)
14. Write a program to enter a Decimal Number. Calculate and display its Binary Equivalent. (CO1, L1)
15. Write a program to demonstrate List Operations. (CO2, L1)
  - Access List Items
  - Change Item Value
  - Appended Items
  - Remove Specified Item
  - Loop Through a List
  - List Comprehension
  - Sort List Alphanumerically
  - Copy a List
  - Join Two Lists
  - List Methods
16. Write a program to demonstrate Tuple Operations. (CO2, L1)
  - Access Tuple Items
  - Negative Indexing
  - Range of Indexes
  - Range of Negative Indexes
  - Check if Item Exists
  - Update Tuples
  - Add Items
  - Remove Items
  - Unpacking a Tuple
  - Using Asterisk\*
  - Loop Through a Tuple
  - Loop Through the Index Numbers
  - Using a While Loop:
  - Python - Join Tuples
  - Join Two Tuples
  - Multiply Tuples

17. Write a program to demonstrate Set Operations. (CO2, L1)
  - Access Set Items
  - Add Set Items
  - Loop Sets
  - Join Two Sets
  - Keep ONLY the Duplicates
  - Keep All, But NOT the Duplicates
18. Write a program to demonstrate Dictionary Operations. (CO2,L1)
  - Ordered or Unordered?
  - Changeable
  - Duplicates Not Allowed
  - Accessing Items
  - Change Values
  - Update Dictionary
  - Adding Items
  - Remove Dictionary Items
  - Loop Through a Dictionary
  - Copy a Dictionary
  - Nested Dictionaries
19. Write a program to enter a number and then calculate the *Sum of Its Digits*. (CO2,L1)
20. Write a program to print the *Reverse Number*. (CO2,L1)
21. Write a program to calculate GCD of two numbers. (CO2,L1)
22. Write a program that prompts users to enter numbers. The process will repeat until user enters -1. Finally, the program prints the count of prime and composite numbers entered. (CO2,L1)
23. Write a program (CO2,L1)
  - (a) To calculate the factorial of number recursively.
  - (b) To calculate GCD using the recursive functions.
24. Write a program (CO2,L1)
  - (a) To calculate  $\exp(x,y)$  using recursive functions
  - (b) To print the Fibonacci Series using Recursion.
25. Write a program make a *Simple Calculator*. (CO2,L1)
26. Write a program that defines a function large in a module which will be used to find large of two values and called from a code in another module. (CO2,L1)
27. Write a program that demonstrate the use of method `__init__`. (CO3,L1)
28. Write a program to illustrate the modification of instance variable. (CO3,L1)
29. Write a program for modifying a mutable type attribute. (CO3,L1)
30. Write a program to demonstrate the use of inheritance. (CO3,L1)
31. Write a Program to demonstrate Polymorphism. (CO3,L1)
32. Write a program to demonstrate Polymorphism using Function Overloading. (CO3,L2)

33. Write Program to demonstrate Method Overriding with arguments. (CO3,L2)
34. Write a python program to demonstrate multilevel inheritance. (CO3,L2)
35. Write a program to demonstrate Multipath Inheritance (or) Hybrid Inheritance. (CO3,L2)
36. Write a program to demonstrate Multi Level Inheritance (A person is teacher & having designation HOD) (CO3,L2)
37. Write a program to demonstrate *Multi-Path Inheritance*. (CO3,L2)
38. Write a program to illustrate the concept of Abstract Class. (CO3,L2)
39. Write a program to overload the + operator on a complex object. (CO3,L2)
40. Write a program to handle Divide by Zero Exception. (CO4,L2)
41. Write a program to handle Multiple Errors with One Except statement. (CO4,L2)
42. Write a program with Multiple Except Blocks. (CO4,L2)
43. Write a program to demonstrate else statement in exception handling. (CO4,L2)
44. Write a python program to illustrate the try...catch...finally in exception handling. (CO4,L2)
45. Write a program to demonstrate Regular Expression Functions. (CO2,L2)
  - findall()
  - Search
  - Split
  - sub()
46. Write a program Demonstrate Regular Expression Meta Characters. (CO2,L2)
  - Python program to match string using metacharacter []
  - Program to find digits in character using metacharacter \
  - Program for sequence that starts with "he", followed by two (any) characters using metacharacter ..
  - Program to check if the string starts with 'hello' using metacharacter ^
  - Program to check the string ends with 'world' using metacharacter \$
  - Program to check the string contains "ai" followed by 0 or more "x" characters
  - Program to check the string contains "ai" followed by 1 or more "x" characters
  - Program to check if the string contains "a" followed by exactly two "l" characters
  - Program to check if the string contains either "falls" or "stays" using meta character |
47. Write a program to demonstrate Regular Expression Sequences. (CO2,L2)
  - Program to check if the string starts with "The"
  - Program to check if "ain" is present at the beginning of a word
  - Program to check if "ain" is present at the end of a word.
  - Program to check if "ain" is present, but NOT at the beginning of a word.
  - Program to check if "ain" is present, but NOT at the end of a word.
  - Program to Check if the string contains any digits (numbers from 0-9).
  - Program to return a match at every no-digit character.
  - Program to return a match at every white-space character.
  - Program to return a match at every NON white-space character.

- Program to return a match at every word character (characters from a to Z, digits from 0-9, and the underscore \_ character)
- Program to return a match at every NON word character (characters NOT between a and Z. Like "!", "?" white-space etc.)
- Program to check if the string ends with "Spain".

48. Write a program to demonstrate Regular Expression Sets.

- Program Check if the string has any a, r, or n characters.
- Program to Check if the string has any characters between a and n.
- Program to Check if the string has other characters than a, r, or n.
- Program to check if the string has any 0, 1, 2, or 3 digits.
- Program to check if a string has any digits.
- Program to check if the string has any two-digit numbers, from 00 to 59.
- Program to Check if the string has any characters from a to z lower case, and A to Z upper case.
- Program to check if the string has any + characters.

49. Write a program to (CO5,L2)

- Create EMP table with attributes ENO,ENAME and ESAL into PBS database.
- Insert rows into EMP table of PBS database.
- Update rows of EMP table of PBS database.
- Delete rows from EMP table of PBS database.
- Drop EMP table of PBS database.

50. Write a program to open the file and count the number of times a character appears in the file. (CO5,L1)

## 22CS1L2: DATABASE MANAGEMENT SYSTEMS LAB

<b>Course Name</b>	Database Management Systems Lab	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>CIA</b>	<b>SEE</b>	<b>TM</b>
<b>Course Code</b>	22CS1L2	0	0	6	3	30	70	100
<b>Year of Introduction:</b> 1991	<b>Year of Offering:</b> 2022	<b>Year of Revision:</b> 2022			<b>Percentage of Revision:</b> 20			
L-Lecture, T-Tutorial, P-Practical, C-Credits, CIA-Internal Marks, SEE-External Marks, TM-Total Marks								

### Course Description and Purpose:

Database Management Systems Laboratory is a course that illustrates *DDL and DML Commands, Basic SQL Queries, Complex SQL Queries, Joins, Integrity Constraints, Views, Cursors, Triggers, and Functions and Procedures using PL/SQL.*

### Course Objectives:

This course will help enable the students to understand, learn and practice develop a various *Relational Data Models, Querying, DDL and DML Commands, Basic SQL Queries, Complex SQL Queries, Joins, Integrity Constraints, Views, Cursors, Triggers, and Functions and Procedures using PL/SQL.*

### Specific objectives include:

1. Database creation using DDL Commands.
2. Retrieval of Data from database using DML Commands for a given situation.
3. Use SQL commands familiarizing with a Query Language.
4. Using Nested Queries, Joins, Integrity Constraints and Views in database.
5. Demonstrating Triggers, Functions and Procedures using PL/SQL.

### Course Learning Outcomes:

Upon successful completion of the course, the student will be able to:

**CO1:** Create database using *DDL Commands.*

**CO2:** Retrieve data from database using *DML Commands* for a given situation.

**CO3:** Familiarize with a Query Language through basic SQL Queries.

**CO4:** Experiment *Nested Queries, Joins, Integrity Constraints and Views* in database.

**CO5:** Demonstrate *Triggers, Functions and Procedures* using PL/SQL.

### CYCLE-I

Aim: Marketing Company wishes to computerize their operations by using following tables.

Table Name: Client- Master			
Column Name	Data Type	Size	Attribute
CLIENT_NO	Varchar2	6	Primary key and first letter must start with
NAME	Varchar2	20	Not null
ADDRESS 1	Varchar2	30	
ADDRESS S	Varchar2	30	
CITY	Varchar2	15	
PINCODE	Varchar2	8	
STATE	Varchar2	15	
BAL_DUE	Number	10,2	



Table Name: Product_Master			
Column Name	Data Type	Size	Attribute
PRODUCT_NO	Varchar2	6	Primary key and first letter must start with
DESCRIPTION	Varchar2	15	Not null
PROFIT_PERCENT	Number	4,2	Not null
UNIT_MEASUE	Varchar2	10	
QTY_ON_HAND	Number	8	
REORDER_LVL	Number	8	
SELL_PRICE	Number	8, 2	Not null, cannot be 0
COST_PRICE	Number	8,2	Not null, cannot be 0

Table Name: Salesman_Master			
Column Name	Data Type	Size	Attribute
SALESMAN_NO	Varchar2	6	Primary key and first letter must start with 'S'
SALESMAN_NAME	Varchar2	20	Not null
ADDRESS1	Varchar2	30	
ADDRESS2	Varchar2	30	
CITY	Varchar2	20	
PINCODE	Number	8	
STATE	Vachar2	20	

SAL_AMT	Number	8,2	Not null, cannot be 0
TGT_TO_GET	Number	6,2	Not null, cannot be 0
YTD_SALES	Number	6,2	Not null
REMARKS	Varchar2	20	

Table Name: Sales_Order			
Column Name	Data Type	Size	Attribute
ORDER_NO	Varchar2	6	Primary key and first letter must start with 'S'
CLIENT_NO	Varchar2	6	Foreign Key
ORDER_DATE	Date		
DELY_ADDRESS	Varchar2	25	
SALESMAN_NO	Varchar2	6	Foreign Key
DELY_TYPE	Char	1	Delivery: part(p)/ full(f) and default 'F'
BILL_YN	Char	1	
DELY_DATE	Date		Can't be less than order date
ORDER_STATUS	Varchar2	10	Values ("In Process", "Fulfilled",

Table Name: Sales_Order_Details			
Column Name	Data Type	Size	Attribute
ORDER_NO	Varchar2	6	Primary key references SALES_ORDER table
PRODUCT_NO	Varchar2	6	Foreign Key references SALES_ORDER_table
QTY_ORDERED	Number	8	
QTY_DISP	Number	8	
PRODUCT_RATE	Number	10,2	Foreign Key

Solve the following queries by using above tables

1. Retrieve the list of names, city and the state of all the clients. (CO2,L2)
2. List all the clients who are located in 'Mumbai' or 'Bangalore'. (CO2,L2)
3. List the various products available from the product\_master table. (CO2,L2)
4. Find the names of sales man who have a salary equal to Rs.3000. (CO2,L2)
5. List the names of all clients having 'a' as the second letter in their names. (CO2,L2)
6. List all clients whose Bal due is greater than value 1000. (CO2,L2)
7. List the clients who stay in a city whose first letter is 'M'. (CO2,L2)
8. List all information from sales-order table for orders placed in the month of July. (CO2,L2)
9. List the products whose selling price is greater than 1000 and less than or equal to 3000. (CO2,L2)
10. Find the products whose selling price is greater than 1000 and also find the new selling price as original selling price 0.50. (CO2,L2)
11. Find the products in the sorted order of their description. (CO2,L2)
12. Find the products with description as '540HDD' and 'Pen drive'. (CO2,L2)
13. Count the total number of orders. (CO2,L2)
14. Print the description and total qty sold for each product. (CO4,L2)
15. Calculate the average qty sold for each client that has a maximum order value of 15,000. (CO4,L2)
16. Find all the products whose quantity on hand is less than reorder level. (CO4,L2)
17. List the order number and day on which clients placed their order. (CO4,L2)
18. Find out the products and their quantities that will have to deliver in the current month. (CO4,L2)
19. Find the names of clients who have placed orders worth of 10000 or more. (CO4,L2)
20. Find the client names who have placed orders before the month of June,2018. (CO4,L2)

### CYCLE-II

Aim: A manufacturing company deals with various parts and various suppliers supply these parts. It consists of three tables to record its entire information. Those are as follows.

Supplier (Supplier\_No, Sname, City, status) Part( Part\_no, pname, color, weight, city, cost) Shipment (supplier\_No, Part\_no, city)

JX( project\_no, project\_name, city)

SPJX (Supplier\_no, part\_no, project\_no, city)

Solve the following queries by using above tables.

1. Get supplier numbers and status for suppliers in Chennai with status > 20. (CO4,L2)
2. Get project names for projects supplied by supplier S. (CO4,L2)
3. Get colors of parts supplied by supplier S1. (CO4,L2)
4. Get part numbers for parts supplied to any project in Mumbai. (CO4,L2)
5. Find the id's of suppliers who supply a red or pink parts. (CO4,L2)
6. Find the pnames of parts supplied by London supplier and by no one else. (CO4,L2)
7. Get the names of the parts supplied by the supplier 'Mart' and 'Miller'. (CO4,L2)
8. Get supplier names for suppliers who do not supply part P2. (CO4,L2)
9. Get all pairs of supplier numbers such that the suppliers concerned are "colocated". (CO4,L2)
10. Get suppliers names for the suppliers who supply at least one red part. (CO4,L2)

### CYCLE-III

Aim: An enterprise wishes to maintain a database to automate its operations. Enterprise divided into a certain departments and each department consists of employees. The following two tables describes the automation schemas.

Emp(Empno, Ename, Job, Mgr, Hiredate, Sal, Comm, Deptno) Dept(Deptno, Dname, Loc)

Solve the following queries by using above tables.

1. List the details of employees who have joined before the end of September' 81. (CO2,L2)
2. List the name of the employee and designation of the employee, who does not report to anybody. (CO2,L2)
3. List the name, salary and PF amount of all the employees (PF is calculated as 10% of salary) (CO2,L2)
4. List the names of employees who are more than 2 years old in the organization. (CO2,L2)
5. Determine the number of employees, who are taking commission. (CO2,L2)
6. Update the employee salary by 20% , whose experience is greater than 12 years. (CO2,L2)
7. Determine the department does not contain any employees. (CO4,L2)
8. Create a view, which contains employee name and their manager names working in sales department. (CO4,L2)
9. Determine the employees, whose total salary is like the minimum salary of any department. (CO4,L2)
10. List the department numbers and number of employees in each department. (CO4,L2)
11. Determine the employees, whose total salary is like the minimum salary of any department. (CO4,L2)
12. List average salary for all departments employing more than five people. (CO2,L2)
13. Determine the names of employees, who take highest salary in their departments. (CO4,L2)
14. Determine the names of employees, who earn more than their managers. (CO4,L2)
15. Display ename, dname, even if no employee belongs to that department (use outer join). (CO4,L2)

### CYCLE-IV

An Airline system would like to keep track their information by using the following relations.

FLIGHTS( fl\_no: integer, from: string, to: string, distance: integer, price:

integer)AIRCRAFT(aid: integer, aname: string, cruising\_range: integer)

CERTIFIED(eid: integer, aid: integer)

Employees( eid: integer, ename: string, salary: real)

Note that the employees relation describes pilots and other kinds of employees as well; every pilot is certified for aircraft and only pilots are certified to fly. Resolve the following queries.

- a. Find the names of pilots whose salary is less than the price of the cheapest route from Newyork to Chicago. (CO4,L2)
- b. For each pilot who is certified for more than 2 aircraft, find the eid's and the maximum cruising range of the aircraft that he or she certified for. (CO4,L2)
- c. For all aircraft with cruising range over 1,500 miles, find the name of the aircraft and the average salary of all pilots certified for this aircraft. (CO4,L2)
- d. Find the aid's of all aircraft than can be used from chicaga to LosAngels. (CO4,L2)
- e. Find the name of the pilots certified from some Boeing aircraft. (CO4,L2)
- f. Print the enames of pilots who can operate planes with cruising range greater than 3,500 miles, but are not certified by Boeing aircraft. (CO4,L2)
- g. Find the eid's of employees who are certified for exactly 2 aircrafts. (CO4,L2)
- h. Find the total amount paid to employees as salaries. (CO4,L2)
- i. Find the aid's of all than can be used on non-stop flights from Chennai to Dubai. (CO4,L2)
- j. Find the eid's of employee who make second highest salary. (CO4,L2)

### PL/SQL PROGRAMS

1. Write a PL/SQL program to check the given number is strong or not. (CO5,L2)
2. Write a PL/SQL program to check the given string is palindrome or not. (CO5,L2)
3. Write a PL/SQL program to swap two numbers without using third variable. (CO5,L2)
4. Write a PL/SQL program to generate multiplication tables for 2, 4, 6. (CO5,L2)
5. Write a PL/SQL program to check the given number is Armstrong or not. (CO5,L2)
6. Write a PL/SQL code to find the factorial of any number. (CO5,L2)
7. Write a PL/SQL program to display sum of even numbers and sum of odd numbers in the given range. (CO5,L2)
8. Write a PL/SQL program to check the given number is palindrome or not. (CO5,L2)
9. The HRD manager has decided to raise the employee salary by 15% write a PL/SQL block to accept the employee number and update the salary of that employee. Display appropriate message based on the existence of the record in Emp table. (CO5,L2)
10. Write a PL/SQL program to display top 10 rows in Emp table based on their job and salary. (CO5,L2)
11. Write a PL/SQL program to raise the employee salary by 10% for department number 30 people and also maintain the raised details in the raise table. (CO5,L2)
12. Write a procedure to update the salary of Employee, who are not getting commission by 10%. (CO5,L2)
13. Write a PL/SQL procedure to prepare an electricity bill by using following table. (CO5,L2)

Table used: Elect		
Name	Null?	Type
MNNO	NOT NULL	NUMBER(3)
CNAME		VARCHAR2(20)
CUR_READ		NUMBER(5)
PREV_READ		NUMBER(5)
NO_UNITS		NUMBER(5)
AMOUNT		NUMBER(8,2)
SER_TAX		NUMBER(8,2)
NET_AMT		NUMBER(9,2)

14. Write a PL/SQL program to prepare an telephone bill by using following table and print the monthly bills for each customer. (CO5,L2)

Table used: Phone		
Name	Null?	Type
TEL_NO	NOT NULL	NUMBER(6)
CNAME		VARCHAR2(20)
CITY		VARCHAR2(10)
PR_READ		NUMBER(5)
CUR_READ		NUMBER(5)
NET_AMT		NUMBER(5)
TOT-AMT		NUMBER(8,2)

15. Write a PL/SQL program to raise the employee salary by 10 %, who are completed their 25 years of service and store the details at appropriate tables (Define the Retair\_Emp\_Table). (CO5,L2)
16. Write a PL/SQL program to evaluate the grade of a student with following conditions: For pass: all marks > 40  
 For I class: Total % > 59  
 For II Class: Total % between >40 and < 60 For III class: total % = 40  
 And also maintain the details in abstract table. (CO5,L2)

1. Table Std		
Name	Null?	Type
NO	NOT NULL	NUMBER
NAME		VARCHAR2(10)
INTNO		NUMBER
CLASS	NOT NULL	VARCHAR2(10)
M1		NUMBER
M2		NUMBER
M3		NUMBER
M4		NUMBER
M5		NUMBER

2. Table Abstract		
Name	Null?	Type
STDNO		NUMBER
STDNAME		VARCHAR2(10)
CLASS		VARCHAR2(10)
MONTH		VARCHAR2(10)
INTNO (INTEGER NUMBER)		NUMBER
TOT		NUMBER
GRADE		VARCHAR2(10)
PERCENT		NUMBER
DAT_ENTER		DATE

**APPENDIX-II**  
**PROGRAM STRUCTURE & SYLLABI FOR M.C.A PROGRAMME (R22)**



**P.B.Siddhartha College of Arts & Science, Vijayawada**  
**Programme Structure for M.C.A**  
**Under Choice Based Credit System (CBCS)**  
**W.E.F 2022-23 (R22 Regulations)**

I SEMESTER (For the batch of students admitted during 2022-2023)					M.C.A			
Course Code	Course Name	Teaching Hours/Week			CORE/IDC/DSE/SEC/OE C/ MOOCS	CIA	SEE	No. of Credits
		Lecture	Practical	Tutorial				
22CA1T1	Programming and Problem Solving Using Python	4	0	0	Core	30	70	4
22CA1T2	Database Management Systems	4	0	0	Core	30	70	4
22CA1T3	Mathematical and Statistical Foundations	4	0	0	Core	30	70	4
22CA1T4	Operating Systems	4	0	0	Core	30	70	4
22CA1T5	Personality Development through Life Enlightenment Skills	3	1	0	Core	30	70	3
22CA1L1	Programming and Problem solving using Python Lab	0	6	0	Core	30	70	3
22CA1L2	Database Management Systems Lab	0	6	0	Core	30	70	3
<b>TOTAL FOR FIRST SEMESTER</b>						<b>210</b>	<b>490</b>	<b>25</b>

II SEMESTER (For the batch of students admitted during 2022-2023)					M.C.A			
Course Code	Course Name	Teaching Hours/ Week			CORE/IDC/DSE/SEC/OEC/ MOOCS	CIA	SEE	No. of Credits
		Lecture	Practical	Tutorial				
22CA2T1	Computer Networks	4	0	0	Core	30	70	4
22CA2T2	Data Structures	4	0	0	Core	30	70	4
22CA2T3	Web Technologies	4	0	0	Core	30	70	4
22PG201	Research Methodology& IPR	3	1	0	SEC	30	70	3
<b>DOMAIN SPECIFIC ELECTIVE COURSES (CHOOSE ANY ONE)</b>								
22CA2E1	Software Engineering	4	0	0	DSE	30	70	4
22CA2E2	Mobile Applications	4	0	0	DSE	30	70	4
22CA2E3	Unix Programming	4	0	0	DSE	30	70	4
<b>LAB PRACTICALS</b>								
22CA2L1	Data Structures Lab	0	6	0	Core	30	70	3
22CA2L2	Web Technologies Lab	0	6	0	Core	30	70	3
<b>TOTAL FOR SECOND SEMESTER</b>						<b>210</b>	<b>490</b>	<b>25</b>

At the end of 2<sup>nd</sup> semester, every student must undergo *Summer Internship/Apprenticeship/Project Work/Industrial Training/Research based Project Work* for **Six Weeks** and must prepare a report concerned as per approved project guidelines, and submit the same to the University 14 days before the commencement of third semester end examinations.

**Note: Students may be allowed to register and appear for MOOCS from the third semester itself. However, students are to complete the MOOCS successfully and submit pass certificate of the same to the University through the Principal of the College concerned for approval and endorsement of the same on grade cards and PCA and ODs as per the regulations of the University.**

III SEMESTER (For the batch of students admitted during 2022-2023)					M.C.A			
Course Code	Course Name	Teaching Hours/ week			CORE/IDC/DSE/ SEC/OEC/MOOCs	CIA	SEE	No. of Credits
		Lecture	Practical	Tutorial				
22CA3T1	Data Science	4	0	0	Core	30	70	4
<b>DOMAIN SPECIFIC ELECTIVE COURSES (CHOOSE ANY THREE)</b>								
22CA3E1	Design & Analysis of Algorithms	4	0	0	DSE	30	70	4
22CA3E2	Data Mining Techniques	4	0	0	DSE	30	70	4
22CA3E3	Cryptography & Network Security	4	0	0	DSE	30	70	4
22CA3E4	Artificial Intelligence	4	0	0	DSE	30	70	4
22CA3E5	Internet of Things	4	0	0	DSE	30	70	4
22CA3E6	Block Chain Technologies	4	0	0	DSE	30	70	4
<b>LAB PRACTICALS</b>								
22CA3L1	Data Science Lab	0	6	0	Core	30	70	3
22CA3L2	Cryptography & Network Security Lab	0	6	0	Core	30	70	3
<b>OPEN ELECTIVE (INTERDISCIPLINARY/MULTIDISCIPLINARY) COURSES (CHOOSE ANY ONE)</b>								
22OE301	Python Programming	3	0	0	OEC	30	70	3
22OE302	Office Tools	3	0	0	OEC	30	70	3
22OE303	Mobile Computing	3	0	0	OEC	30	70	3
22OE304	R Programming	3	0	0	OEC	30	70	3
22OE305	Web Development	3	0	0	OEC	30	70	3
<b>TOTAL FOR THIRD SEMESTER</b>						<b>210</b>	<b>490</b>	<b>25</b>

IV SEMESTER (For the batch of students admitted during 2022-2023)					M.C.A				
Course Code	Course Name	Teaching Hours/ week			CORE / IDC/DSE/ SEC/OEC/MOOCs	CIA	SEE	No. of Credits	
		Lecture	Practical	Tutorial					
22CA4T1	Machine Learning	4	0	0	Core	30	70	4	
<b>DOMAIN SPECIFIC ELECTIVE COURSES (CHOOSE ANY ONE)</b>									
22CA4E1	Cloud Computing	4	0	0	DSE	30	70	4	
22CA4E2	Social Media Analytics	4	0	0	DSE	30	70	4	
22CA4E3	Deep Learning	4	0	0	DSE	30	70	4	
22CA4E4	Technical Report Writing	4	0	0	DSE	30	70	4	
<b>LAB PRACTICALS</b>									
22CA4L1	Machine Learning Lab	0	6	0	Core	30	70	3	
<b>ENTREPRENEURIAL &amp; INNOVATION/IT SKILL RELATED TO DOMAIN SPECIFIC ELECTIVE COURSES (CHOOSE ANY ONE)</b>									
22CA4E5	Big Data Analytics	3	0	0	SEC	30	70	3	
22CA4E6	Dynamic Web Programming using Python	3	0	0	SEC	30	70	3	
22CA4E7	Software Testing and Project Management	3	0	0	SEC	30	70	3	
<b>* CHOOSE MOOCs FROM SWAYAM/NPTEL SOURCES</b>									
MOOCs									4
<b>PROJECT WORK EVALUATION AND VIVA-VOCE</b>						Nil	200	12	
<b>TOTAL FOR IV SEMESTER</b>						<b>120</b>	<b>480</b>	<b>30</b>	

## 22CA1T1: PROGRAMMING AND PROBLEM SOLVING USING PYTHON

<b>Course Name</b>	Programming and Problem Solving Using Python	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>CIA</b>	<b>SEE</b>	<b>TM</b>
<b>Course Code</b>	22CA1T1	4	0	0	4	30	70	100
<b>Year of Introduction:</b> 2020	<b>Year of Offering:</b> 2022	<b>Year of Revision:</b> 2022		<b>Percentage of Revision:</b> 10				
L-Lecture, T-Tutorial, P-Practical, C-Credits, CIA-Internal Marks, SEE-External Marks, TM-Total Marks								

**Course Description and Purpose:** Python Programming is a course that illustrates basic concepts of Python programming, Decision Control Statements, Functions and Modules, Python Strings Revisited, Data Structures, Classes and Objects, Inheritance, Operator Overloading, Pandas, Error and Exception Handling, File Handling, Numpy, Matplotlib.

### Course Objectives:

This course will help enable the students to understand, learn and develop a various Decision Control Statements, Functions & Modules, Strings, Data Structures, Classes and Objects, Inheritance, Operator Overloading, Pandas, Error and Exception Handling, Handling Files, Databases.

### Specific objectives include:

- ✓ To understand basics of *Python Programming*.
- ✓ To gain knowledge on *Decision Control Statements and Functions & Modules and Python Strings and Data Structures*.
- ✓ To gain knowledge on *Classes & Objects, Inheritance*.
- ✓ To apply *Operator Overloading, Error and Exception Handling* and Pandas.
- ✓ To gain knowledge on File Handling, Database Connection, Basics of *Numpy* and *matplotlib*.

### Course Learning Outcomes:

Upon successful completion of the course, the student will be able to:

**CO1:** Understand basics of Python Programming.

**CO2:** Gain knowledge on *Decision Control Statements and Functions & Modules and Python Strings and Data Structures*.

**CO3:** Gain knowledge on *Classes & Objects & Inheritance*.

**CO4:** Apply Operator Overloading, Error and Exception Handling and Pandas.

**CO5:** Gain Knowledge on File Handling, Database Connection and basics of *Numpy* and *matplotlib*.

### UNIT I (12 Hours)

**Basics of Python Programming:** Features of Python, History of Python, The Future of Python, Writing and Executing First Python Program, Literal Constants, Variables and Identifiers, Data Types, Input Operation, Comments, Reserved Words, Indentation, Operators and Expressions, Expressions in Python, Operations on Strings, Other Data Types, Type Conversion.

**Decision Control Statements:** Conditional Branching Statements, Basic Loop Structures, Nested Loops, The Break Statement, The Continue Statement, The Pass Statement, The Else Statement used with Loops.

### UNIT II (12 Hours)

**Functions and Modules:** Function Definition, Function Call, Variable Scope and Lifetime, The Return Statement, More on Defining Functions, Recursive Functions, Modules, Packages in Python, Standard Library Modules.

**Python Strings Revisited:** Concatenating, Appending and Multiplying Strings, String Formatting Operator, Built in String Methods and Functions, Comparing Strings, Regular Expressions.

**Data Structures:** Sequence, Lists, Functional Programming, Tuple, Sets, Dictionaries.

### UNIT III (12 Hours)

**Classes and Objects:** Classes and Objects, Class Method and self Argument, Class Variables and Object Variables, Public and Private Data Members, Private Methods, Calling a Class Method from Another Class Method, Built in Class Attributes, Class Methods, Static Methods.

**Inheritance:** Inheriting Classes in Python, Types of Inheritance, Abstract Classes and Interfaces.



#### UNIT IV (12 Hours)

**Operator Overloading:** Concept of Operator Overloading, Advantage of Operator Overloading, Implementing Operator Overloading.

**Pandas:** Introduction, Getting Started, Series, Data Frame, Read CSV, Read JSON -Analyzing Data Frames, Cleaning Data, Cleaning Empty Cell, Cleaning Wrong Format, Cleaning Wrong Data, Removing Duplicates, Correlations, Plotting.

**Error and Exception Handling:** Introduction to Errors and Exceptions, Handling Exceptions, Raising Exceptions, Built in and User defined Exceptions.

#### UNIT V (12 Hours)

**File Handling:** File Path, Types of Files, Opening and Closing Files, Reading and Writing Files.

**Databases:** Database Table Creation, Select Operation, Insert Operation, Delete Operation, Update Operation, Drop Table.

**Numpy:** Basic Functions of Numpy.

**Matplotlib:** Basic Functions of Matplotlib.

#### Reference Text Books:

1. Reema Thareja, Python Programming Using Problem Solving Approach, Oxford University Press, June 2017.
2. Vamsi Kurama, Python Programming, A Modern Approach, Pearson, 2017.
3. Wesley Chun, Core Python Programming, Prentice Hall, December 2000.

**e-resources:** <https://www.w3schools.com/python/pandas/>

**PARVATHANENI BRAHMAYYA SIDDHARTHA COLLEGE OF ARTS & SCIENCE**

(An Autonomous College in the jurisdiction of Krishna University)

M.C.A, First Semester

**Course Name: PROBLEM SOLVING USING PYTHON PROGRAMMING**

**Course Code: 22CA1T1**

**(w.e.f admitted batch 2022-22)**

**SECTION-A**

**Time: 3 Hours**

**Max. Marks: 70**

**Answer ALL questions**

**(5×4 = 20 Marks)**

1. a) Explain *Future of Python* (CO1,L2)  
(or)  
b) Explain different *Data Types* in *Python* (CO1,L2)
2. a) What is Recursive Function? Explain with example.(CO2,L1)  
(or)  
b) List out and explain any 4 Built in String Method?(CO2,L1)
3. a) What is the *Differences between Class Variable and Object Variable*?(CO3,L1)  
(or)  
b) List out *Built in Class Attributes*? (CO3,L1)
4. a) Explain *Advantages of Operator Overloading*? (CO4,L2)  
(or)  
b) Explain *Exception Hierarchy*? (CO4,L2)
5. a) Explain Types of Plots in Matplotlib? (CO5,L2)  
(or)  
b) Explain different ways of creating Arrays using Numpy. (CO5,L2)

**SECTION-B**

**Answer Five Questions Choosing One Question from Each Unit.**

**All Questions Carry Equal Marks.**

**(5×10 = 50 Marks)**

6. a) Explain the *features of Python Programming Language*.(CO1,L2)  
(or)  
b) Explain *Different Loops* in Python with example. (CO1,L2)
7. a) Apply *Modules Concept in Python with examples*. (CO2,L3)  
(or)  
b) Build the List *Data Structure and their built in functions* with examples. (CO2,L3)
8. a) What are *Classes and Objects*? Write a program in Python to illustrate an *instancevariable*. (CO3,L1)  
(or)  
b) What is *Inheritance*? Explain *different types of Inheritance*. (CO3,L1)
9. a) Explain how to *Implement Operator Overloading* in Python. (CO4,L2)  
(or)  
b) Explain *process of Analyzing Data Frames*. (CO4,L2)
10. a) Explain *process of Writing and Reading data from file with example*. (CO5,L5)  
(or)  
b) Explain process of *Update Data into Database with relevant examples*. (CO5,L5)

## 22CA1T2: DATABASE MANAGEMENT SYSTEMS

<b>Course Name</b>	Database Management Systems	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>CIA</b>	<b>SEE</b>	<b>TM</b>
<b>Course Code</b>	22CA1T2	4	0	0	4	30	70	100
<b>Year of Introduction:</b> 1991	<b>Year of Offering:</b> 2022	<b>Year of Revision:</b> 2022		<b>Percentage of Revision:</b> 10				
L-Lecture, T-Tutorial, P-Practical, C-Credits, CIA-Internal Marks, SEE-External Marks, TM-Total Marks								

### Course Description and Purpose:

Database Management Systems is a course that illustrates basic concepts of *Databases and Database Users, Database System Architecture, ER & EER Relationship Modeling, Structured Query Language, Relational Algebra and Relational Calculus, Functional Dependencies and Normalization for Relational Databases, Transaction Processing Concepts, Concurrency Control Techniques and Emerging Database Technologies and Applications.*

### Course Objectives:

This course will help enable the students to understand, learn and develop a various *Relational Data Models, Querying, ER & EER Modeling, Relational Algebra & Calculus, Functional Dependencies and Normalization, Transaction Processing, Concurrency Control and Emerging Database Technologies and Applications.*

#### Specific objectives include:

- ✓ To understand basic concepts of *Database and Database Users, Database Architecture.*
- ✓ To understand *ER, EER Modelling and Relational Algebra and Relational Calculus.*
- ✓ To learn the basics of *Functional Dependencies and Normalization for Relational Databases.*
- ✓ To learn *Transaction Processing and Concurrency Control Techniques.*
- ✓ To understand the *Structured Query Language and Emerging Database Technologies and Applications:*

### Course Learning Outcomes:

Upon successful completion of the course, the student will be able to:

**CO1:** Understand basic concepts of *Database and Database Users, Database Architecture.*

**CO2:** Understand *ER, EER Modeling and Relational Algebra and Relational Calculus.*

**CO3:** Learn the basics of *Functional Dependencies and Normalization for Relational Databases.*

**CO4:** Learn *Transaction Processing and Concurrency Control Techniques.*

**CO5:** Understand the *Structured Query Language and Emerging Database Technologies and Applications.*

### UNIT I (12 Hours)

**Database and Database Users:** Introduction, Characteristics of the Database Approach, Actors on the Scene, Workers behind the Scene, Advantages of the using the DBMS Approach.

**Database System Concepts and Architecture:** Data Models, Schemas and Instances, Three Schema Architecture and Data Independence, Database Languages and Interfaces, Centralized and Client/Server Architecture for DBMS, Classification of Database Management Systems.

### UNIT II (12 Hours)

**Data Modeling Using the ER Model:** Conceptual Data Models, Entity Types, Entity Sets, Attributes and Keys, Relationship Types, Relationship Sets, Roles and Structural Constraints, Weak Entity Types, Relationship Types of Degree Higher than Two, Refining the ER Design for the COMPANY Database.

**The Enhanced Entity-Relationship Model:** Sub Classes, Super Classes and Inheritance, Specialization and Generalization, Constraints and Characteristics of Specialization and Generalization.

**The Relational Algebra and Relational Calculus:** Unary Relational Operations: SELECT and PROJECT, Relational Algebra Operations from Set Theory, Binary Relational Operations: JOIN and DIVISION, Additional Relational Operations, Examples, The Tuple Calculus and Domain Calculus.

### UNIT III (12 Hours)

**Functional Dependencies and Normalization for Relational Databases:** Informal Design Guidelines for Relation Schemas, Functional Dependencies, Normal Forms Based in Primary Keys, General Definitions of Second and Third Normal Forms, Boyce-Codd Normal Form, Multivalued Dependencies and Fourth Normal Form, Join Dependencies and Fifth Normal Form, Inclusion Dependencies.

### UNIT IV (12 Hours)

**Introduction to Transaction Processing Concepts and Theory:** Introduction to Transaction Processing, Transaction and System Concepts, Desirable Properties of Transactions, Characterizing Schedules Based on Recoverability, Characterizing Schedules based on Serializability.

**Concurrency Control Techniques:** Two Phase Locking Techniques for Concurrency Control, Concurrency Control Based on Timestamp Ordering, Multiversion Concurrency control techniques, Validation Concurrency Control Techniques.

### UNIT V (12 Hours)

**SQL-99:** Schema Definition, Constraints, Queries and Views: SQL Data Definitions and Data Types, Specifying Constraints in SQL, Schema Change Statements on SQL, Basic Queries in SQL, More Complex SQL Queries, INSERT, DELETE and UPDATE statements in SQL, Triggers and Views.

**Emerging Database Technologies and Applications:** Mobile Databases, Multimedia Databases, Geographic Information Systems.

#### Reference Text Books:

1. Ramez Elmasri, Shamkant B. Navathe, Fundamentals of Database Systems, Pearson Education, Seventh Edition, 2017.
2. C.J.Date, A.Kannan, S.Swamynathan, An Introduction to Database Systems, VII Edition, Pearson Education, 2006.
3. Peter Rob, Carlos Coronel, Database Systems-Design, Implementation and Management, Eight Edition, Thomson, 2008
4. Raman A Mata, Toledo, Panline K. Cushman, Database Management Systems, Schaum's Outlines, TMH, 2007.
5. Steven Feuerstein, Oracle PL/SQL, Programming, 10<sup>th</sup> Anniversary Edition, OREILLY, 2008.

**PARVATHANENI BRAHMAYYA SIDDHARTHA COLLEGE OF ARTS & SCIENCE**

(An Autonomous College in the jurisdiction of Krishna University)

M.Sc.(Computer Science), First Semester

**Course Name:** Database Management Systems

**Course Code:** 22CA1T2

(w.e.f admitted batch 2022-23)

**Time: 3 Hours**

**Max Marks: 70**

**SECTION-A**

**Answer ALL questions. All Questions Carry Equal Marks. (5×4 = 20 Marks)**

1.(a) Name the advantages of the DBMS. (CO1,L1)

(or)

(b) What is Data Independence? Explain the difference between *Physical Data Independence* and *Logical Data Independence*. (CO1,L1)

2. (a) What is *Generalization*? Explain it diagram. (CO2,L1)

(or)

(b) What are various symbols used in *ER Modeling*. (CO2,L1)

3. (a) Explain *First Normal Form*. (CO3,L2)

(or)

(b) Explain *Dependency Preservation* with example. (CO3,L2)

4. (a) Explain *Properties of Transaction*. (CO4,L2)

(or)

(b) Explain *Shared* and *Exclusive* Locks. (CO4,L2)

5. (a) Explain *DML Commands* with example. (CO5,L5)

(or)

(b) Explain *Mobile Databases*. (CO5,L5)

**SECTION-B**

**Answer ALL questions. All Questions Carry Equal Marks. (5×10 = 50 Marks)**

6. (a) Explain various *Data Models* of Database Management Systems. (CO1,L1)

(or)

(b) Explain *Three Schema Architecture* of DBMS with neat diagram. (CO1,L1)

7. (a) Demonstrate *Select* and *Project* operations of *Relational Algebra*. (CO2,L2)

(or)

(b) Explain *ER Design* for the *Company Database* with all constraints. (CO2,L2)

8. (a) Explain *BCNF* with example. (CO3,L5)

(or)

(b) Explain *Fifth Normal Form* with example.(CO3,L5)

9. (a) Identify whether the transactions T1 & T2 ensure *serializability*. (CO4,L3)

T1	T2
read_item(x); X:=X - N;	
	read_item(x); X:=X + M;
write_item(X); read_item(Y);	
	Write_item(x);
Y:=Y+N; Write_item(Y);	

(or)

(b) Develop a technique for *Concurrency Control Based on Timestamp Ordering*. (CO4,L3)

10. (a) Analyze *Multimedia Databases* in detail. (CO5,L4)

(or)

(b) Distinguish various *Constraints* of SQL. (CO5,L4)

## 22CA1T3: MATHEMATICAL AND STATISTICAL FOUNDATIONS

<b>Course Name</b>	Mathematical and Statistical Foundations	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>CIA</b>	<b>SEE</b>	<b>TM</b>
<b>Course Code</b>	22CA1T3	4	0	0	4	30	70	100
<b>Year of Introduction:</b> 2022	<b>Year of Offering:</b> 2022	<b>Year of Revision:</b> 2022		<b>Percentage of Revision:</b> Nil				
L-Lecture, T-Tutorial, P-Practical, C-Credits, CIA-Internal Marks, SEE-External Marks, TM-Total Marks								

### Course Description and Purpose:

This course helps in learning Mathematical and Statistical foundations to understand the basics and apply them in *Computer Science, Data Science* and *Analytical Applications*.

### Course Objectives:

To understand and apply Mathematical and Statistical Foundations including *Recursion, Advanced Counting Techniques, Relations, Graphs, Probability Laws, Discrete Distributions, Inferences on the Mean and the Variance of a Distribution* and *Inferences on Proportions*.

### Specific objectives include:

- ✓ To understand *Mathematical Foundations* and *Recursion*.
- ✓ To learn and apply *Advanced Counting Techniques*.
- ✓ To understand the *Relations* and *Applications of Graphs*.
- ✓ To learn and apply *Probability Laws* and *Discrete Distributions*.
- ✓ To understand *Inferences on the Mean and the Variance of a Distribution* and *Inferences on Proportions*.

### Course Learning Outcomes:

Upon successful completion of the course, the student will be able to:

**CO1:** Understand *Mathematical Foundations* and *Recursion*.

**CO2:** Learn and apply *Advanced Counting Techniques*.

**CO3:** Understand the *Relations* and *Applications of Graphs*.

**CO4:** Learn and apply *Probability Laws* and *Discrete Distributions*.

**CO5:** Understand *Inferences on the Mean and the Variance of a Distribution* and *Inferences on Proportions*.

### Course Content:

#### UNIT I (12 Hours)

**The Foundations: Logic and Proofs:** Propositional Logic, Propositional Equivalences, Predicates and Quantifiers, Nested Quantifiers.

**Introduction and Recursion:** Mathematical Induction, Strong Induction and Well-Ordering, Recursive Definitions and Structural Induction, Recursive Algorithms, Program Correctness.

#### UNIT II (12 Hours)

**Advanced Counting Techniques:** Recurrence Relations, Solving Linear Recurrence Relations, Divide and Conquer Algorithms and Recurrence Relations, Generating Functions, Inclusion & Exclusion, Applications of Inclusion & Exclusion.

#### UNIT III (12 Hours)

**Relations:** Relations and Their Properties, Equivalence Relations, Partial Orderings.

**Graphs:** Graphs and Graph Models, Graph Terminology and Special Types of Graphs, Representing Graphs and Graph Isomorphism's, Connectivity, Euler and Hamilton Paths, Shortest Path Problems, Planar Graphs, Graph Coloring.

#### UNIT IV (12 Hours)

**Some Probability Laws:** Axioms of Probability, Conditional Probability, Independence of the Multiplication Rule, Bayes' Theorem.

**Discrete Distributions:** Random Variables, Discrete Probability Densities, Expectation and Distribution Parameters, Binomial Distribution, Poisson Distribution, Simulating a Discrete Distribution.

#### UNIT V (12 Hours)

**Inferences on the Mean and the Variance of a Distribution:** Hypothesis Testing, Significance Testing, Hypothesis and Significance Test on the Mean, Hypothesis Tests on the Variance.

**Inferences on Proportions:** Estimating Proportions, Testing Hypothesis on a Proportion, Comparing two Proportions: Estimation, Comparing two Proportions: Hypothesis Testing.

#### Reference Textbooks:

1. Susan Milton and Jesse C. Arno Id, Introduction to Probability and Statistics, Fourth Edition, November 2002.
2. William Mendenhall, Robert J Beaver, Barbara M Beaver, Introduction to Probability and Statistics, Twelfth Edition, Thomson, January 2012.
3. Kenneth H Rosen, Discrete Mathematics and its Applications, 6<sup>th</sup> Edition, McGraw-Hill, Chapters [1-10], 2007.
4. Ralph P. Grimaldi, B.V. Ramana, Discrete and Combinational Mathematics, 5<sup>th</sup> Edition, Pearson Education, 2008.
5. Swapan Kumar Sarkar, A Text Book of Discrete Mathematics, S.Chand, 2008.
6. D.S.Malik and M.K.Sen, Discrete Mathematical Structures, Thomson, 2006.



**PARVATHANENI BRAHMAYYA SIDDHARTHA COLLEGE OF ARTS & SCIENCE**

(An Autonomous College in the jurisdiction of Krishna University)

M.C.A, First Semester

**Course Name:** Mathematical and Statistical Foundations

**Course Code:** 22CA1T3

(w.e.f admitted batch 2022-23)

**Time: 3 Hours**

**Max Marks: 70**

**SECTION-A**

**Answer all questions:**

**5 × 4 = 20 Marks**

1. (a) Show that  $p \wedge (q \vee r)$  and  $(p \vee q) \wedge (p \vee r)$  are logically equivalent. (CO1,L 2)  
(or)  
(b) Show that if  $n$  is a positive integer, then  $1+2+\dots+n = n(n+1)/2$  (CO1,L2)
2. (a) Solve the recurrence relation  $a_n = a_{n-1} + 2a_{n-2}$  with  $a_0 = 2$  and  $a_1 = 7$  (CO2,L3)  
(or)  
(b) Find the number of solutions of  $e_1 + e_2 + e_3 = 17$  where  $e_1, e_2$  and  $e_3$  are non negative integers with  $2 \leq e_1 \leq 5$ ,  $3 \leq e_2 \leq 6$ , and  $4 \leq e_3 \leq 7$ . (CO2,L3)
3. (a) Define *Symmetric* and *Anti Symmetric* relations and give an example of each. (CO3,L2)  
(or)  
(b) Write *Dijkstra's Algorithm* (CO3,L2)
4. (a) State *Algorithms of Probability*? (CO4,L2)  
(or)  
(b) Explain (i) *Discrete Random Variables* (ii) *Continuous Random Variables*. (CO4,L2)
5. (a) Explain Procedure for Testing of Hypothesis. (CO5,L2)  
(or)  
(b) Explain (i) *Type-I Error* (ii) *Type-II Error*. (CO5,L2)

**SECTION-B**

**Answer all questions:**

**5 × 10 = 50 Marks**

6. (a) (i) prove that  $[(p \vee q) \wedge (p \rightarrow r) \wedge (q \rightarrow r)] \rightarrow r$  is a tautology using truth table. (CO1,L2)  
(ii) Prove that  $\neg \forall x(p(x) \rightarrow Q(x))$  and  $\exists x(p(x) \wedge \neg Q(x))$  are logically equivalent. (CO1,L2)  
(b) Use mathematical induction to prove that  $n^3 - n$  is divisible by 3, where  $n$  is a positive integer. (CO1,L2)
7. (a) Solve the recurrence relation  $a_n = 6a_{n-1} - 9a_{n-2}$  with initial conditions  $a_0 = 1$  and  $a_1 = 6$ ? (CO2,L2)  
(or)  
(b) Use generating functions to find the number of  $r$  combinations from a set with  $n$  elements when repetition of elements is allowed. (CO2,L2)
8. (a) Show that the relation  $R$  on a set  $A$  is transitive if and only if  $R^n \subseteq R$  for  $n=1,2,3,\dots$  (CO3,L2)  
(or)  
(b) Show that a connected multigraph with atleast two vertices has an Euler circuit if and only if its vertices have even degree. (CO3,L2)
9. (a) If 5% of the electric bulbs manufactured by a company are defective use Poisson distribution to find the probability that in a sample of 100 bulbs (i) none is defective, (ii) 5 bulbs will be defective (Given ;  $e^{-5} = 0.007$ ) (CO4,L3)  
(or)  
(b) In a bolt factory machines A, B, C manufacture respectively 25%, 35% and 40% of the total of their output 5, 4, 2 percent are defective bolts. A bolt is drawn at random from the product and is found to be defective. What are the probabilities that it was manufactured by machines A, B and C? (CO4,L3)
10. (a) A machine puts out 16 imperfect articles in a sample of 500. After machine is overhauled, it puts out 3 imperfect articles in a batch of 100. Has the machine improved? (CO5,L3)  
(or)  
(b) Given the following information relating to two places, A and B, test whether there is any significant difference between their mean wages. (CO5,L3)

	A	B
Mean Wages (Rs)	47	49
Standard Deviation (Rs.)	28	40
Number of Workers	1000	1500

## 22CA1T4: OPERATING SYSTEMS

<b>Course Name</b>	Operating Systems	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>CIA</b>	<b>SEE</b>	<b>TM</b>
<b>Course Code</b>	22CA1T4	4	0	0	4	30	70	100
<b>Year of Introduction:</b> 1991	<b>Year of Offering:</b> 2022	<b>Year of Revision:</b> 2022		<b>Percentage of Revision:</b> 20				
L-Lecture, T-Tutorial, P-Practical, C-Credits, CIA-Internal Marks, SEE-External Marks, TM-Total Marks								

### Course Description and Purpose:

Operating Systems is a course that illustrates *Operating System Concepts, Operating System Structure, Processes Concepts, Threads, Process Synchronization, Scheduling, Deadlocks, Main Memory, Virtual Memory, Mass Storage Structure, File System Implementation, Distributed Operating Systems and Mobile & Android Operating Systems*

### Course Objectives:

This course will help enable the students to understand and learn *Operating System Concepts, Operating Structure, Process Concepts, Thread Concept, Process Synchronization, Scheduling, Deadlocks, Main Memory, Virtual Memory and Mass Storage Structure, File System Implementation, Distributed Operating Systems and Mobile & Android Operating Systems*.

### Specific objectives include:

- ✓ To understand the *Basic Concepts of Operating System, Operating System Structure and Process Concept*.
- ✓ To apply concepts of *Threads, Process Synchronization & CUP Scheduling*.
- ✓ To understand *Deadlock, Main Memory & Virtual Memory*.
- ✓ To explain *Mass Storage Structure, File System Interface & File System Implementation*.
- ✓ To understand the concepts of *Distributed Operating Systems and Mobile & Android Operating Systems*.

### Course Learning Outcomes:

Upon successful completion of the course, the student will be able to:

**CO1:** Understand the Basic Concepts of Operating System, Operating System Structure and Process Concept.

**CO2:** Applying concepts of Threads, Process Synchronization & CUP Scheduling.

**CO3:** Understand Deadlock, Main Memory & Virtual Memory.

**CO4:** Explain Mass Storage Structure, File System Interface & File System Implementation.

**CO5:** Understand the concepts of Distributed Operating Systems and Mobile & Android Operating Systems.

### UNIT I (12 Hours)

**Introduction to Operating System Concepts:** Functions of Operating System, Operating System Structure, Operating System Operations, Kernel Data Structure, Computing Environment.

**Operating System Structures:** Operating System Services, System Calls, Types of System Calls.

**Processes:** Process Concept, Process Scheduling, Operations on Processes, Inter Process Communication, Communication in Client-Server Systems.

### UNIT II (12 Hours)

**Threads:** Overview, Multicore Programming, Multithreading Models, Thread Libraries, Implicit Threading, Threading Issues.

**Process Synchronization:** Background, The Critical Section Problem, Peterson's Solution, Synchronization Hardware, Mutex Locks, Semaphores, Classic Problems of Synchronization, Monitors.

**CPU Scheduling:** Basic Concepts, Scheduling Criteria, Scheduling Algorithms, Thread Scheduling, Multiple Processor Scheduling.

### UNIT III (12 Hours)

**Deadlocks:** System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock.

**Main Memory:** Swapping, Contiguous Memory Allocation, Segmentation, Paging, Structure of the Page Table, Intel 32 and 64-bit Architectures.

**Virtual Memory:** Background, Demand Paging, Copy-on-Write, Page Replacement, Allocation of Frames, Thrashing.

#### **UNIT IV (12 Hours)**

**File System Interface:** File Concept, Access Methods, Directory and Disk Structure, File System Mounting, Protection.

**File System Implementation:** File System Structure, File System Implementation, Directory Implementation, Allocation Methods, Free Space Management, Efficiency and Performance, Recovery.

#### **UNIT V (12 Hours)**

**Distributed Operating Systems:** Types of Network based Operating Systems, Network Structure, Network Topology, Communication Structure, Communication Protocols, Robustness, Design Issues.

**Mobile & Android Operating Systems:** A review of Mobile Operating Systems, Features of Android Operating Systems.

#### **Reference Text Books:**

1. Abraham Silberschatz, & Peter Baer Galvin, Greg, Operating System Concept, Ninth Edition, Wiley, 2015
2. William Stallings, Operating Systems-Internals and Design Principles, Fifth Edition, Pearson Education, 2007
3. Achyut S Godbole, Operating Systems, Second Edition, TMH, 2007
4. Flynn/McHoes, Operating Systems, Cengage Learning, 2008.
5. Deitel & Deitel, Operating System, Third Edition, Pearson Education, 2008

**PARVATHANENI BRAHMAYYA SIDDHARTHA COLLEGE OF ARTS & SCIENCE**

(An Autonomous College in the jurisdiction of Krishna University)

M.Sc.(Computer Science), First Semester

**Course Name:** Operating Systems

**Course Code:** 22CA1T4

**(w.e.f admitted batch 2022-22)**

**Time: 3 Hours**

**Max Marks: 70**

**SECTION-A**

**Answer ALL questions. All Questions Carry Equal Marks. (5×4 = 20 Marks)**

1.(a) Explain the structure of Operating System. (CO1,L2)

(or)

(b) Explain *Inter Process Communication*. (CO1,L2)

2. (a) List various *Multithreading Model*. (CO2,L1)

(or)

(b) What is *Semaphore*. (CO2,L1)

3. (a) Test for *Demand Paging*. (CO3,L4)

(or)

(b) Analyze Paging. (CO3,L4)

4. (a) Demonstrate the *File Concept* (CO4,L2)

(or)

(b) Explain various *File Operations*. (CO4,L2)

5. (a) Construct a *Network Topology*. (CO5,L3)

(or)

(b) Identify the design issues in *Distributed OS*. (CO5,L3)

**SECTION-B**

**Answer ALL questions. All Questions Carry Equal Marks. (5×10 = 50 Marks)**

6. (a) Explain *Operating System Services*. (CO1,L2)

(or)

(b) Explain various types *System Calls*. (CO1,L2)

7. (a) Illustrate the *Dining Philosophers Problem* of Process Synchronization. (CO2,L2)

(or)

(b) Demonstrate (CO2,L2)

(i) First-Come, First-Served Scheduling with the following data

Process	Burst Time
P1	24
P2	3
P3	3

(ii) Shortest-Job-First Scheduling with following data

Process	Burst Time
P1	6
P2	8
P3	7
P4	3

8. (a) Apply the necessary conditions for preventing *Deadlock Situation*. (CO3,L3)

(or)

(b) Utilize the reference string 7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 1, 2, 0, 1, 7, 0, 1 for a memory with three frames implement *Optimal Page Replacement* and *LRU PageReplacement*. (CO3,L3)

9. (a) Compare *Single-Level Directory*, *Two Level Directory*, and *Tree-Structured Directories*. (CO4,L4)

(or)

(b) Categorize various *Allocation Methods* of *File System Implementation*. (CO4,L4)

10.(a) Explain various types of *Network based Operating Systems*. (CO5,L5)

(or)

(b) Explain features of *Mobile Operating Systems*. (CO5,L5)

## 22CA1L1: PROGRAMMING AND PROBLEM SOLVING USING PYTHON LAB

<b>Course Name</b>	Programming and Problem Solving using Python Lab	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>CIA</b>	<b>SEE</b>	<b>TM</b>
<b>Course Code</b>	22CA1L1	0	0	6	3	30	70	100
<b>Year of Introduction:</b> 2019	<b>Year of Offering:</b> 2022	<b>Year of Revision:</b> 2022		<b>Percentage of Revision:</b> 30				
L-Lecture, T-Tutorial, P-Practical, C-Credits, CIA-Internal Marks, SEE-External Marks, TM-Total Marks								

### Course Description and Purpose:

Python Programming is a course that illustrates Basic Concepts of Python programming, Decision Control Statements, Functions and Modules, Python Strings Revisited, Data Structures, Classes and Objects, Inheritance, Operator Overloading, Pandas, Error and Exception Handling, File Handling, Numpy, Matplotlib.

### Course Objectives:

This course will help enable the students to understand, learn and develop a various Decision Control Statements, Functions & Modules, Strings, Data Structures, Classes and Objects, Inheritance, Operator Overloading, Pandas, Error and Exception Handling, Handling Files, Databases.

### Specific objectives include:

- ✓ To understand *Basics of Python Programming, Decision Control Statements.*
- ✓ To know the concepts of *Data Structures, Functions and Modules.*
- ✓ To know the concepts of *Classes and Objects, Object Oriented Programming.*
- ✓ To apply *Error and Exception Handling.*
- ✓ To implement *Database Access and File Handling.*

### Course Learning Outcomes:

Upon successful completion of the course, the student will be able to:

**CO1:** Understand *Basics of Python Programming, Decision Control Statements.*

**CO2:** Know the concepts of *Data Structures, Functions and Modules.*

**CO3:** Know the concepts of *Classes and Objects, Object Oriented Programming.*

**CO4:** Apply *Error and Exception Handling.*

**CO5:** Implement *Database Access and File Handling.*

1. Write a program to find total for given number of tens, number of fives, number of twos and number of ones. (CO1, L1)
2. Write a program to enter a number and display its hex and octal equivalent and its square root. (CO1, L1)
3. Write a program to read and print values of variables of different data types. (CO1, L1)
4. Write a program to calculate the distance between two points. (CO1, L1)
5. Write a program to calculate area of triangle using Heron's formula. (CO1, L1)  
(Hint: Heron's formula is given as:  $\text{area} = \sqrt{S(S-a)(S-b)(S-c)}$ )
6. Write a program to calculate the distance between two points. (CO1, L1)
7. Write a program to perform addition, subtraction, multiplication, division, integer division. (CO1, L1)
8. Write a program to find the greatest number from three numbers. (CO1, L1)
9. Write a program to calculate tax given the following conditions: (CO1, L1)  
If income is less than 1,50,000 then no tax  
If taxable income is Rs.1,50,001 - Rs.300,000 then charge 10% tax  
If taxable income is Rs.3,00,001 - Rs.500,000 then charge 20% tax  
If taxable income is above Rs.5,00,001 then charge 30% tax

10. Write a program to calculate roots of quadratic equation. (CO1, L1)
11. Write a program to enter the marks of a student in four subjects. Then calculate the total and aggregate, and display the grade obtained by the student. If the student scores an aggregate greater than 75%, then the grade is Distinction. If aggregate is  $60 \leq$  and  $< 75$ , then grade is First Division. If the aggregate is  $50 \leq$  and  $< 60$ , then the grade is Second Division. If aggregate is  $40 \leq$  and  $< 50$ , then the grade is Third Division. Else the grade is Fail. (CO1, L1)
12. Write a program to read the numbers until -1 is encountered. Find the average of positive numbers and negative numbers entered by the user. (CO1, L1)
13. Write a program to find whether the given number is an *Armstrong Number* or not. (CO1, L1)
14. Write a program to enter a Decimal Number. Calculate and display its Binary Equivalent. (CO1, L1)
15. Write a program to demonstrate List Operations. (CO2, L1)
  - Access List Items
  - Change Item Value
  - Appended Items
  - Remove Specified Item
  - Loop Through a List
  - List Comprehension
  - Sort List Alphanumerically
  - Copy a List
  - Join Two Lists
  - List Methods
16. Write a program to demonstrate Tuple Operations. (CO2, L1)
  - Access Tuple Items
  - Negative Indexing
  - Range of Indexes
  - Range of Negative Indexes
  - Check if Item Exists
  - Update Tuples
  - Add Items
  - Remove Items
  - Unpacking a Tuple
  - Using Asterisk\*
  - Loop Through a Tuple
  - Loop Through the Index Numbers
  - Using a While Loop:
  - Python - Join Tuples
  - Join Two Tuples
  - Multiply Tuples
17. Write a program to demonstrate Set Operations. (CO2, L1)

- Access Set Items
  - Add Set Items
  - Loop Sets
  - Join Two Sets
  - Keep ONLY the Duplicates
  - Keep All, But NOT the Duplicates
18. Write a program to demonstrate Dictionary Operations. (CO2,L1)
- Ordered or Unordered?
  - Changeable
  - Duplicates Not Allowed
  - Accessing Items
  - Change Values
  - Update Dictionary
  - Adding Items
  - Remove Dictionary Items
  - Loop Through a Dictionary
  - Copy a Dictionary
  - Nested Dictionaries
19. Write a program to enter a number and then calculate the *Sum of Its Digits*. (CO2,L1)
20. Write a program to print the *Reverse Number*. (CO2,L1)
21. Write a program to calculate GCD of two numbers. (CO2,L1)
22. Write a program that prompts users to enter numbers. The process will repeat until user enters -1. Finally, the program prints the count of prime and composite numbers entered. (CO2,L1)
23. Write a program (CO2,L1)
- (a) To calculate the factorial of number recursively.
- (b) To calculate GCD using the recursive functions.
24. Write a program (CO2,L1)
- (a) To calculate exp(x,y) using recursive functions
- (b) To print the Fibonacci Series using Recursion.
25. Write a program make a *Simple Calculator*. (CO2,L1)
26. Write a program that defines a function large in a module which will be used to find large of two values and called from a code in another module. (CO2,L1)
27. Write a program that demonstrate the use of method `__init__`. (CO3,L1)
28. Write a program to illustrate the modification of instance variable. (CO3,L1)
29. Write a program for modifying a mutable type attribute. (CO3,L1)
30. Write a program to demonstrate the use of inheritance. (CO3,L1)
31. Write a Program to demonstrate Polymorphism. (CO3,L1)
32. Write a program to demonstrate Polymorphism using Function Overloading. (CO3,L2)
33. Write Program to demonstrate Method Overriding with arguments. (CO3,L2)



34. Write a python program to demonstrate multilevel inheritance. (CO3,L2)
35. Write a program to demonstrate Multipath Inheritance (or) Hybrid Inheritance. (CO3,L2)
36. Write a program to demonstrate Multi Level Inheritance (A person is teacher & having designation HOD) (CO3,L2)
37. Write a program to demonstrate *Multi-Path Inheritance*. (CO3,L2)
38. Write a program to illustrate the concept of Abstract Class. (CO3,L2)
39. Write a program to overload the + operator on a complex object. (CO3,L2)
40. Write a program to handle Divide by Zero Exception. (CO4,L2)
41. Write a program to handle Multiple Errors with One Except statement. (CO4,L2)
42. Write a program with Multiple Except Blocks. (CO4,L2)
43. Write a program to demonstrate else statement in exception handling. (CO4,L2)
44. Write a python program to illustrate the try...catch...finally in exception handling. (CO4,L2)
45. Write a program to demonstrate Regular Expression Functions. (CO2,L2)
  - findall()
  - Search
  - Split
  - sub()
46. Write a program Demonstrate Regular Expression Meta Characters. (CO2,L2)
  - Python program to match string using metacharacter []
  - Program to find digits in character using metacharacter \
  - Program for sequence that starts with "he", followed by two (any) characters using metacharacter ..
  - Program to check if the string starts with 'hello' using metacharacter ^
  - Program to check the string ends with 'world' using metacharacter \$
  - Program to check the string contains "ai" followed by 0 or more "x" characters
  - Program to check the string contains "ai" followed by 1 or more "x" characters
  - Program to check if the string contains "a" followed by exactly two "l" characters
  - Program to check if the string contains either "falls" or "stays" using meta character |
47. Write a program to demonstrate Regular Expression Sequences. (CO2,L2)
  - Program to check if the string starts with "The"
  - Program to check if "ain" is present at the beginning of a word
  - Program to check if "ain" is present at the end of a word.
  - Program to check if "ain" is present, but NOT at the beginning of a word.
  - Program to check if "ain" is present, but NOT at the end of a word.
  - Program to Check if the string contains any digits (numbers from 0-9).
  - Program to return a match at every no-digit character.
  - Program to return a match at every white-space character.
  - Program to return a match at every NON white-space character.
  - Program to return a match at every word character (characters from a to Z, digits from 0-9, and the underscore \_ character)

- Program to return a match at every NON word character (characters NOT between a and Z. Like "!", "?" white-space etc.)
  - Program to check if the string ends with "Spain".
48. Write a program to demonstrate Regular Expression Sets.
- Program Check if the string has any a, r, or n characters.
  - Program to Check if the string has any characters between a and n.
  - Program to Check if the string has other characters than a, r, or n.
  - Program to check if the string has any 0, 1, 2, or 3 digits.
  - Program to check if a string has any digits.
  - Program to check if the string has any two-digit numbers, from 00 to 59.
  - Program to Check if the string has any characters from a to z lower case, and A to Z upper case.
  - Program to check if the string has any + characters.
49. Write a program to (CO5,L2)
- Create EMP table with attributes ENO,ENAME and ESAL into PBS database.
  - Insert rows into EMP table of PBS database.
  - Update rows of EMP table of PBS database.
  - Delete rows from EMP table of PBS database.
  - Drop EMP table of PBS database.
50. Write a program to open the file and count the number of times a character appears in the file. (CO5,L1)

## 22CA1L2: DATABASE MANAGEMENT SYSTEMS LAB

<b>Course Name</b>	Database Management Systems Lab	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>CIA</b>	<b>SEE</b>	<b>TM</b>
<b>Course Code</b>	22CA1L2	0	0	6	3	30	70	100
<b>Year of Introduction:</b> 1991	<b>Year of Offering:</b> 2022	<b>Year of Revision:</b> 2022			<b>Percentage of Revision:</b> Nil			
<b>L-Lecture, T-Tutorial, P-Practical, C-Credits, CIA-Internal Marks, SEE-External Marks, TM-Total Marks</b>								

### Course Description and Purpose:

Database Management Systems Laboratory is a course that illustrates *DDL and DML Commands, Basic SQL Queries, Complex SQL Queries, Joins, Integrity Constraints, Views, Cursors, Triggers, and Functions and Procedures using PL/SQL.*

### Course Objectives:

This course will help enable the students to understand, learn and practice develop a various *Relational Data Models, Querying, DDL and DML Commands, Basic SQL Queries, Complex SQL Queries, Joins, Integrity Constraints, Views, Cursors, Triggers, and Functions and Procedures using PL/SQL.*

### Specific objectives include:

1. Database creation using DDL Commands.
2. Retrieval of Data from database using DML Commands for a given situation.
3. Usage of SQL commands with a Query Language.
4. Using Nested Queries, Joins, Integrity Constraints and Views in database.
5. Demonstrating Triggers, Functions and Procedures using PL/SQL.

### Course Learning Outcomes:

Upon successful completion of the course, the student will be able to:

**CO1:** Create database using *DDL Commands.*

**CO2:** Retrieve data from database using *DML Commands* for a given situation.

**CO3:** Apply Query Language through basic SQL Queries.

**CO4:** Experiment *Nested Queries, Joins, Integrity Constraints and Views* in database.

**CO5:** Demonstrate *Triggers, Functions and Procedures* using PL/SQL.

### CYCLE-I

Aim: Marketing Company wishes to computerize their operations by using following tables.

Table Name: Client- Master			
Column Name	Data Type	Size	Attribute
CLIENT_NO	Varchar2	6	Primary key and first letter must start with
NAME	Varchar2	20	Not null
ADDRESS 1	Varchar2	30	
ADDRESS S	Varchar2	30	
CITY	Varchar2	15	
PINCODE	Varchar2	8	
STATE	Varchar2	15	
BAL_DUE	Number	10,2	

Table Name: Product_Master			
Column Name	Data Type	Size	Attribute
PRODUCT_NO	Varchar2	6	Primary key and first letter must start with
DESCRIPTION	Varchar2	15	Not null
PROFIT_PERCENT	Number	4,2	Not null
UNIT_MEASUE	Varchar2	10	
QTY_ON_HAND	Number	8	
REORDER_LVL	Number	8	
SELL_PRICE	Number	8, 2	Not null, cannot be 0
COST_PRICE	Number	8,2	Not null, cannot be 0

Table Name: Salesman_Master			
Column Name	Data Type	Size	Attribute
SALESMAN_NO	Varchar2	6	Primary key and first letter must start with 'S'
SALESMAN_NAME	Varchar2	20	Not null
ADDRESS1	Varchar2	30	
ADDRESS2	Varchar2	30	
CITY	Varchar2	20	
PINCODE	Number	8	
STATE	Vachar2	20	

SAL_AMT	Number	8,2	Not null, cannot be 0
TGT_TO_GET	Number	6,2	Not null, cannot be 0
YTD_SALES	Number	6,2	Not null
REMARKS	Varchar2	20	

Table Name: Sales_Order			
Column Name	Data Type	Size	Attribute
ORDER_NO	Varchar2	6	Primary key and first letter must start with 'S'
CLIENT_NO	Varchar2	6	Foreign Key
ORDER_DATE	Date		
DELY_ADDRESS	Varchar2	25	
SALESMAN_NO	Varchar2	6	Foreign Key
DELY_TYPE	Char	1	Delivery: part(p)/ full(f) and default 'F'
BILL_YN	Char	1	
DELY_DATE	Date		Can't be less than order date
ORDER_STATUS	Varchar2	10	Values ("In Process", "Fulfilled",

Table Name: Sales_Order_Details			
Column Name	Data Type	Size	Attribute
ORDER_NO	Varchar2	6	Primary key references SALES_ORDER table
PRODUCT_NO	Varchar2	6	Foreign Key references SALES_ORDER_table
QTY_ORDERED	Number	8	
QTY_DISP	Number	8	
PRODUCT_RATE	Number	10,2	Foreign Key

Solve the following queries by using above tables

1. Retrieve the list of names, city and the state of all the clients. (CO2,L2)
2. List all the clients who are located in 'Mumbai' or 'Bangalore'. (CO2,L1)
3. List the various products available from the product\_master table. (CO2,L1)
4. Find the names of sales man who have a salary equal to Rs.3000. (CO2,L1)
5. List the names of all clients having 'a' as the second letter in their names. (CO2,L1)
6. List all clients whose Bal due is greater than value 1000. (CO2,L1)
7. List the clients who stay in a city whose first letter is 'M'. (CO2,12)
8. List all information from sales-order table for orders placed in the month of July. (CO2,L1)
9. List the products whose selling price is greater than 1000 and less than or equal to 3000. (CO2,L1)
10. Find the products whose selling price is greater than 1000 and also find the new selling price as original selling price 0.50. (CO2,L1)
11. Find the products in the sorted order of their description. (CO2,L1)
12. Find the products with description as '540HDD' and 'Pen drive'. (CO2,L1)
13. Count the total number of orders. (CO2,L2)
14. Print the description and total qty sold for each product. (CO4,L2)
15. Calculate the average qty sold for each client that has a maximum order value of 15,000. (CO4,L2)
16. Find all the products whose quantity on hand is less than reorder level. (CO4,L2)
17. List the order number and day on which clients placed their order. (CO4,L2)
18. Find out the products and their quantities that will have to deliver in the current month. (CO4,L2)
19. Find the names of clients who have placed orders worth of 10000 or more. (CO4,L2)
20. Find the client names who have placed orders before the month of June,2018. (CO4,L2)

### CYCLE-II

Aim: A manufacturing company deals with various parts and various suppliers supply these parts. It consists of three tables to record its entire information. Those are as follows.

Supplier (Supplier\_No, Sname, City, status) Part( Part\_no, pname, color, weight, city, cost) Shipment (supplier\_No, Part\_no, city)

JX( project\_no, project\_name, city)

SPJX (Supplier\_no, part\_no, project\_no, city)

Solve the following queries by using above tables.

1. Get supplier numbers and status for suppliers in Chennai with status > 20. (CO4,L2)
2. Get project names for projects supplied by supplier S. (CO4,L2)
3. Get colors of parts supplied by supplier S1. (CO4,L2)
4. Get part numbers for parts supplied to any project in Mumbai. (CO4,L2)
5. Find the id's of suppliers who supply a red or pink parts. (CO4,L2)
6. Find the pnames of parts supplied by London supplier and by no one else. (CO4,L2)
7. Get the names of the parts supplied by the supplier 'Mart' and 'Miller'. (CO4,L2)
8. Get supplier names for suppliers who do not supply part P2. (CO4,L2)
9. Get all pairs of supplier numbers such that the suppliers concerned are "colocated". (CO4,L2)
10. Get suppliers names for the suppliers who supply at least one red part. (CO4,L2)

### CYCLE-III

Aim: An enterprise wishes to maintain a database to automate its operations. Enterprise divided into a certain departments and each department consists of employees. The following two tables describes the automation schemas.

Emp(Empno, Ename, Job, Mgr, Hiredate, Sal, Comm, Deptno) Dept(Deptno, Dname, Loc)

Solve the following queries by using above tables.

1. List the details of employees who have joined before the end of September' 81. (CO2,L2)
2. List the name of the employee and designation of the employee, who does not report to anybody. (CO2,L2)
3. List the name, salary and PF amount of all the employees (PF is calculated as 10% of salary) (CO2,L2)
4. List the names of employees who are more than 2 years old in the organization. (CO2,L2)
5. Determine the number of employees, who are taking commission. (CO2,L2)
6. Update the employee salary by 20% , whose experience is greater than 12 years. (CO2,L2)
7. Determine the department does not contain any employees. (CO4,L2)
8. Create a view, which contains employee name and their manager names working in sales department. (CO4,L2)
9. Determine the employees, whose total salary is like the minimum salary of any department. (CO4,L2)
10. List the department numbers and number of employees in each department. (CO4,L2)
11. Determine the employees, whose total salary is like the minimum salary of any department. (CO4,L2)
12. List average salary for all departments employing more than five people. (CO2,L2)
13. Determine the names of employees, who take highest salary in their departments. (CO4,L2)
14. Determine the names of employees, who earn more than their managers. (CO4,L2)
15. Display ename, dname, even if no employee belongs to that department (use outer join). (CO4,L2)

### CYCLE-IV

An Airline system would like to keep track their information by using the following relations.

FLIGHTS( fl\_no: integer, from: string, to: string, distance: integer, price: integer)

AIRCRAFT(aid: integer, aname: string, cruising\_range: integer)

CERTIFIED(eid: integer, aid: integer)

Employees( eid: integer, ename: string, salary: real)

**Note** that the employees relation describes pilots and other kinds of employees as well; every pilot is certified for aircraft and only pilots are certified to fly. Resolve the following queries.

- a) Find the names of pilots whose salary is less than the price of the cheapest route from Newyork to Chicago. (CO4,L2)
- b) For each pilot who is certified for more than 2 aircraft, find the eid's and the maximum cruising range of the aircraft that he or she certified for. (CO4,L2)
- c) For all aircraft with cruising range over 1,500 miles, find the name of the aircraft and the average salary of all pilots certified for this aircraft. (CO4,L2)
- d) Find the aid's of all aircraft than can be used from chicaga to LosAngels. (CO4,L2)
- e) Find the name of the pilots certified from some Boeing aircraft. (CO4,L2)
- f) Print the enames of pilots who can operate planes with cruising range greater than 3,500 miles, but are not certified by Boeing aircraft. (CO4,L2)
- g) Find the eid's of employees who are certified for exactly 2 aircrafts. (CO4,L2)
- h) Find the total amount paid to employees as salaries. (CO4,L2)
- i) Find the aid's of all than can be used on non-stop flights from Chennai to Dubai. (CO4,L2)
- j) Find the eid's of employee who make second highest salary. (CO4,L2)

## PL/SQL PROGRAMS

1. Write a PL/SQL program to check the given number is strong or not. (CO5,L3)
2. Write a PL/SQL program to check the given string is palindrome or not. (CO5,L3)
3. Write a PL/SQL program to swap two numbers without using third variable. (CO5,L3)
4. Write a PL/SQL program to generate multiplication tables for 2, 4, 6. (CO5,L3)
5. Write a PL/SQL program to check the given number is Armstrong or not. (CO5,L3)
6. Write a PL/SQL code to find the factorial of any number. (CO5,L3)
7. Write a PL/SQL program to display sum of even numbers and sum of odd numbers in the given range. (CO5,L3)
8. Write a PL/SQL program to check the given number is palindrome or not. (CO5,L3)
9. The HRD manager has decided to raise the employee salary by 15% write a PL/SQL block to accept the employee number and update the salary of that employee. Display appropriate message based on the existence of the record in Emp table. (CO5,L3)
10. Write a PL/SQL program to display top 10 rows in Emp table based on their job and salary. (CO5,L3)
11. Write a PL/SQL program to raise the employee salary by 10% for department number 30 people and also maintain the raised details in the raise table. (CO5,L3)
12. Write a procedure to update the salary of Employee, who are not getting commission by 10%. (CO5,L3)
13. Write a PL/SQL procedure to prepare an electricity bill by using following table. (CO5,L3)

Table used: Elect		
Name	Null?	Type
MNNO	NOT NULL	NUMBER(3)
CNAME		VARCHAR2(20)
CUR_READ		NUMBER(5)
PREV_READ		NUMBER(5)
NO_UNITS		NUMBER(5)
AMOUNT		NUMBER(8,2)
SER_TAX		NUMBER(8,2)
NET_AMT		NUMBER(9,2)

14. Write a PL/SQL program to prepare an telephone bill by using following table and print the monthly bills for each customer. (CO5,L3)

Table used: Phone		
Name	Null?	Type
TEL_NO	NOT NULL	NUMBER(6)
CNAME		VARCHAR2(20)
CITY		VARCHAR2(10)
PR_READ		NUMBER(5)
CUR_READ		NUMBER(5)
NET_AMT		NUMBER(5)
TOT-AMT		NUMBER(8,2)

15. Write a PL/SQL program to raise the employee salary by 10 %, who are completed their 25 years of service and store the details at appropriate tables (Define the Retair\_Emp\_Table). (CO5,L3)
16. Write a PL/SQL program to evaluate the grade of a student with following conditions: For pass: all marks > 40  
For I class: Total % > 59  
For II Class: Total % between >40 and < 60 For III class: total % = 40  
And also maintain the details in abstract table. (CO5,L3)

1. Table Std		
Name	Null?	Type
NO	NOT NULL	NUMBER
NAME		VARCHAR2(10)
INTNO		NUMBER
CLASS	NOT NULL	VARCHAR2(10)
M1		NUMBER
M2		NUMBER
M3		NUMBER
M4		NUMBER
M5		NUMBER

2. Table Abstract		
Name	Null?	Type
STDNO		NUMBER
STDNAME		VARCHAR2(10)
CLASS		VARCHAR2(10)
MONTH		VARCHAR2(10)
INTNO (INTEGER NUMBER)		NUMBER
TOT		NUMBER
GRADE		VARCHAR2(10)
PERCENT		NUMBER
DAT_ENTER		DATE



**APPENDIX-III**  
**PROGRAM STRUCTURE & SYLLABI FOR M.Sc.(COMPUTATIONAL DATA SCIENCE)**



**P.B.Siddhartha College of Arts & Science, Vijayawada**  
**Programme Structure for M.Sc.(Computational Data Science)**  
**Under Choice Based Credit System (CBCS)**  
**W.E.F 2022-23 (R22 Regulations)**

I SEMESTER (For the batch of students admitted during 2022-2023)					M.Sc.(Computational Data Science)			
Course Code	Course Name	Teaching Hours / Week			CORE/IDC /DSE/SEC/ OEC/MOOCs	CIA	SEE	No. of Credits
		Lecture	Practical	Tutorial				
22DS1T1	Data Structures	4	0	0	Core	30	70	4
22DS1T2	Object Oriented Programming	4	0	0	Core	30	70	4
22DS1T3	Advanced Database Management Systems	4	0	0	Core	30	70	4
22DS1T4	Data Mining Techniques	4	0	0	Core	30	70	4
22DS1T5	Personality Development through Life Enlightenment Skills	3	1	0	Core	30	70	3
22DS1L1	Data Structures Lab	0	6	0	Core	30	70	3
22DS1L2	Object Oriented Programming Lab	0	6	0	Core	30	70	3
<b>TOTAL FOR FIRST SEMESTER</b>						<b>210</b>	<b>490</b>	<b>25</b>

II SEMESTER (For the batch of students admitted during 2022-2023)					M.Sc.(Computational Data Science)			
Course Code	Course Name	Teaching Hours / Week			CORE/IDC /DSE/SEC/ OEC/MOOCs	CIA	SEE	No. of Credits
		Lecture	Practical	Tutorial				
22DS2T1	Essentials of Statistics for Data Science using R	4	0	0	Core	30	70	4
22DS2T2	Machine Learning	4	0	0	Core	30	70	4
22DS2T3	Web Technologies	4	0	0	Core	30	70	4
22PG201	Research Methodology & IPR	3	1	0	SEC	30	70	3
<b>DOMAIN SPECIFIC ELECTIVE COURSES (CHOOSE ANY ONE)</b>								
22DS2E1	Mobile Computing	4	0	0	DSE	30	70	4
22DS2E2	Design & Analysis of Algorithms	4	0	0	DSE	30	70	4
22DS2E3	Cyber Security	4	0	0	DSE	30	70	4
<b>LAB PRACTICALS</b>								
22DS2L1	Machine Learning Lab	0	6	0	Core	30	70	3
22DS2L2	Web Technologies Lab	0	6	0	Core	30	70	3
<b>TOTAL FOR SECOND SEMESTER</b>						<b>210</b>	<b>490</b>	<b>25</b>

At the end of 2<sup>nd</sup> semester, every student must undergo *Summer Internship/Apprenticeship/Project Work/Industrial Training/Research based Project Work* for **Six Weeks** and must prepare a report concerned as per approved project guidelines, and submit the same to the University 14 days before the commencement of third semester end examinations.

**Note:** Students may be allowed to register and appear for MOOCs from the third semester itself. However, students are to complete the MOOCs successfully and submit pass certificate of the same to the University through the Principal of the College concerned for approval and endorsement of the same on grade cards and PCs and ODs as per the regulations of the University.

III SEMESTER (For the batch of students admitted during 2022-2023)								
Course Code	Course Name	Teaching Hours/Week			CORE / IDC/DSE/ SEC/OEC/MOOCs	CIA	SEE	No. of Credits
		Lecture	Practical	Tutorial				
22DS3T1	Data Science	4	0	0	Core	30	70	4
<b>DOMAIN SPECIFIC ELECTIVE COURSES (CHOOSE ANY THREE)</b>								
22DS3E1	Cloud Computing	4	0	0	DSE	30	70	4
22DS3E2	Internet of Things	4	0	0	DSE	30	70	4
22DS3E3	Big Data and Analytics	4	0	0	DSE	30	70	4
22DS3E4	Deep Learning	4	0	0	DSE	30	70	4
22DS3E5	Software Engineering	4	0	0	DSE	30	70	4
22DS3E6	Block Chain Technology	4	0	0	DSE	30	70	4
<b>LAB PRACTICALS</b>								
22DS3L1	Deep Learning Lab	0	6	0	Core	30	70	3
22DS3L2	Big Data and Analytics Lab	0	6	0	Core	30	70	3
<b>OPEN ELECTIVE (INTERDISCIPLINARY/MULTIDISCIPLINARY) COURSES (CHOOSE ANY ONE)</b>								
22OE301	Python Programming	3	0	0	OEC	30	70	3
22OE302	Office Tools	3	0	0	OEC	30	70	3
22OE303	Mobile Computing	3	0	0	OEC	30	70	3
22OE304	R Programming	3	0	0	OEC	30	70	3
22OE305	Web Development	3	0	0	OEC	30	70	3
						<b>210</b>	<b>490</b>	<b>25</b>

IV SEMESTER (For the batch of students admitted during 2022-2023)									
Course Code	Course Name	Teaching Hours/ Week			CORE / IDC/DSE/ SEC/OEC/MOOCs	CIA	SEE	No. of Credits	
		Lecture	Practical	Tutorial					
22DS4T1	Data Visualization	4	0	0	Core	30	70	4	
<b>DOMAIN SPECIFIC ELECTIVE COURSES (CHOOSE ANY THREE)</b>									
22DS4E1	Natural Language Processing	4	0	0	DSE	30	70	4	
22DS4E2	Business Analytics	4	0	0	DSE	30	70	4	
22DS4E3	Software Testing and Project Management	4	0	0	DSE	30	70	4	
22DS4E4	Applied Data Analysis	4	0	0	DSE	30	70	4	
22DS4E5	Artificial Intelligence	4	0	0	DSE	30	70	4	
22DS4E6	Cryptography & Network Security	4	0	0	DSE	30	70	4	
<b>LAB PRACTICALS</b>									
22DS4L1	Data Visualization Lab	0	6	0	Core	30	70	3	
<b>ENTREPRENURAL &amp; INNOVATION/IT SKILL RELATED TO DOMAIN SPECIFIC ELECTIVE COURSES (CHOOSE ANY ONE)</b>									
22DS4E7	Social Media Analytics	3	0	0	SEC	30	70	3	
22DS4E8	Dynamic Web Programming using Python	3	0	0	SEC	30	70	3	
22DS4E9	Mobile Application Development	3	0	0	SEC	30	70	3	
<b>* CHOOSE MOOCs FROM SWAYAM/NPTEL SOURCES</b>									
MOOCs									4
<b>PROJECT WORK EVALUATION AND VIVA-VOCE</b>						100		4	
<b>TOTAL FOR IV SEMESTER</b>						<b>180</b>	<b>520</b>	<b>30</b>	

## 22DS1T1: DATA STRUCTURES

<b>Course Name</b>	Data Structures	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>CIA</b>	<b>SEE</b>	<b>TM</b>
<b>Course Code</b>	22DS1T1	4	0	0	4	30	70	100
<b>Year of Introduction:</b> 2021	<b>Year of Offering:</b> 2022	<b>Year of Revision:</b> No Revision			<b>Percentage of Revision:</b> Nil			
L-Lecture, T-Tutorial, P-Practical, C-Credits, CIA-Internal Marks, SEE-External Marks, TM-Total Marks								

**Course Description and Purpose:** Data Structure is a course that illustrates *Mathematical and Algorithmic Notations, Complexities of Algorithms, String Processing, Array Processing, Linked Lists, Stacks, Recursion, Trees, Graphs and Searching and Sorting.*

### Course Objectives:

This course will help enable the students to understand and learn various *Mathematical and Algorithmic Notations, Time and Space Complexities, String Processing, Array Processing, Linked Lists, Stacks and their Applications, Trees, Graphs and Searching and Sorting.*

### Specific objectives include:

- ✓ To understand *Overview and Preliminaries of Data Structure.*
- ✓ To understand the concepts of *String Processing, Arrays, Records and Pointers.*
- ✓ To understand and implement *Linked Lists, Stacks, Queues and Recursion.*
- ✓ To analyze and implement *Tree Concepts.*
- ✓ To understand and implement *Graphs, Sorting and Searching.*

### Course Learning Outcomes:

Upon successful completion of the course, the student will be able to:

**CO1:** Learn overview and Preliminaries of Data Structure.

**CO2:** Understand the concepts of *String Processing, Arrays, and Records and Pointers.*

**CO3:** Understand and implement *Linked Lists, Stacks, and Queues and Recursion.*

**CO4:** Analyze and implement *Tree Concepts.*

**CO5:** Understand and implement *Graphs, Sorting and Searching.*

### UNIT I (12 Hours)

**Introduction and Overview:** Elementary Data Organization - Data Structures - Data Structure Operations - Algorithms: Complexity - Time Space Tradeoff.

**Preliminaries:** Mathematical Notation and Functions - Algorithmic Notation - Control Structures - Complexity of Algorithms - Other Asymptotic Notations - Sub Algorithms - Variables - Data Types.

### UNIT II (12 Hours)

**String Processing:** Storing Strings - Character Data Type - String Operations - Word Processing - Pattern Matching Algorithms.

**Arrays, Records and Pointers:** Linear Arrays - Representation and Traversing Linear Arrays - Inserting and Deleting - Bubble Sort - Linear Search - Binary Search - Multidimensional Arrays - Pointer Arrays - Record Structures - Representation of Records in Memory - Parallel Arrays - Matrices - Sparse Matrices.

### UNIT III (12 Hours)

**Linked Lists:** Representation - Traversing - Searching - Memory Allocation: Garbage Collection, Insertion, Deletion, Header Linked Lists, Two Way Lists.

**Stacks, Queues, Recursion:** Stacks - Array Representation - Linked List Representation - Arithmetic Expressions: Polish Notation, Quick Sort, Recursion, Towers of Hanoi, Implementation of recursive procedures by stacks, Queues, Linked representation of Queues, DEqueues, Priority Queues.

#### **UNIT IV (12 Hours)**

**Trees:** Binary Trees - Representing and Traversing Binary Trees - Traversal Algorithms Using Stacks - Header Nodes - Binary Search Trees - Searching - Insertion and Deletion in Binary Search Trees - AVL Search Trees - Insertion and Deletion in AVL Trees - M Way Search Trees - Searching - Insertion and Deletion in M Way Search Tree - B Trees - Searching - Insertion and Deletion in B Tree - Heap: Heap Sort - Huffman's Algorithms - General Trees.

#### **UNIT V (12 Hours)**

**Graphs:** Terminology - Sequential representation of Graphs - Warshall's Algorithm - Linked Representation of Graphs - Operations on Graphs - Traversing a Graph - Topological Sorting.

**Sorting and Searching:** Insertion Sort - Selection Sort - Merging - Merge Sort - Radix Sort - Searching and Data Modification - Hashing.

#### **Reference Text Books:**

1. Seymour Lipschutz, Data Structures, The McGrawHill (Schaum's Outlines), February 2014.
2. Seymour Lipschutz, Theory and Problems of Data Structures, The McGrawHill, Schaum's Outlines, March 1986.
3. Aho, Hopcroft & Ullman, Data Structures & Algorithms, Addison-Wesley, 1982.
4. M.A.Weiss, Data Structures & Algorithms in C, Addison Wesley, 2000.

**P.B.Siddhartha College of Arts & Science, Vijayawada - 520 010.**  
**(An Autonomous College in the jurisdiction of Krishna University)**  
**M.Sc. (Computational Data Science) Programme – I Semester**  
**Course Code: 22DS1T1 Title: DATA STRUCTURES**  
**(w.e.f admitted batch 2022-23)**

**SECTION-A**

**Answer ALL questions**

**(5×4 = 20 Marks)**

1. a) Define Data Structures. Explain different data types. (CO1,L2)  
(or)  
b) Explain how to analyse the complexity using various Asymptotic Notations with examples. (CO1,L2)
2. a) State different *String Operations* with examples. (CO2,L3)  
(or)  
b) Discuss *Priority Queues* with examples. (CO2,L3)
3. a) Discuss *Insertion and deletion* operations in a Linked List. (CO3,L2)  
(or)  
b) Explain *Towers of Hanoi problem* with a neat diagram. (CO3,L2)
4. a) Explain how *insertion and deletion* are performed in *AVL Trees*. (CO4,L2)  
(or)  
b) Write the algorithm for *Heap Sort*. (CO4,L2)
5. a) Explain a *Graph Traversal technique and apply it on example*. (CO5,L3)  
(or)  
b) How do we perform radix sort? Give an example. (CO5,L3)

**SECTION-B**

**Answer Five Questions Choosing One Question from Each Unit.**

**All Questions Carry Equal Marks.**

**(5×10 = 50Marks)**

6. a) Discuss *Elementary Data Organization and Data Structure Operations*. (CO1,L2)  
(or)  
b) Explain various *Control Structures*. (CO1,L2)
7. a) Explain *Binary Search Algorithm and Linear Search Algorithm* with an example. (CO2,L3)  
(OR)  
b) Discuss *The Second Pattern Matching Algorithm* with example. (CO2,L3)
8. a) Explain *Quick Sort Algorithm* with example. (CO3,L2)  
(or)  
b) Explain *Operations of Stack* and its representation using *Linked List and Array* with example. (CO3,L2)
9. a) Discuss *Binary Tree Traversal Techniques* using *Stack* in detail. (CO4,L2)  
(or)  
b) Briefly discuss about the insertion and deletion operations of *Binary Search Trees* with example. (CO4,L2)
10. a) Explain the process of *Topological Sorting*. (CO5,L3)  
(or)  
b) Discuss about *Merge Sort* with an example. (CO5,L3)

## 22DS1T2: OBJECT ORIENTED PROGRAMMING

<b>Course Name</b>	Object Oriented Programming	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>CIA</b>	<b>SEE</b>	<b>TM</b>
<b>Course Code</b>	22DS1T2	4	0	0	4	30	70	100
<b>Year of Introduction:</b> 2021	<b>Year of Offering:</b> 2022	<b>Year of Revision:</b> No Revision			<b>Percentage of Revision:</b> Nil			
L-Lecture, T-Tutorial, P-Practical, C-Credits, CIA-Internal Marks, SEE-External Marks, TM-Total Marks								

**Course Description and Purpose:** Python Programming is a course that illustrates basic concepts of *Python Programming, Decision Control Statements, Functions and Modules, Python Strings Revisited, Data Structures, Classes and Objects, Inheritance, Operator Overloading, Pandas, Error and Exception Handling, File Handling, Numpy, Matplotlib.*

### Course Objectives:

This course will help enable the students to understand, learn and develop a various *Decision Control Statements, Functions & Modules, Strings, Data Structures, Classes and Objects, Inheritance, Operator Overloading, Pandas, Error and Exception Handling, Handling Files and Databases.*

### Specific objectives include:

- ✓ To understand basics of *Python Programming.*
- ✓ To gain knowledge on *Decision Control Statements and Functions & Modules and Python Strings and Data Structures.*
- ✓ To gain knowledge on *Classes & Objects, Inheritance.*
- ✓ To apply *Operator Overloading, Error and Exception Handling and Pandas.*
- ✓ To gain knowledge on *File Handling, Database Connection, Basics of Numpy and matplotlib.*

### Course Learning Outcomes:

Upon successful completion of the course, the student will be able to:

**CO1:** Understand basics of Python Programming.

**CO2:** Gain knowledge on *Decision Control Statements and Functions & Modules and Python Strings and Data Structures.*

**CO3:** Gain knowledge on *Classes & Objects & Inheritance.*

**CO4:** Apply *Operator Overloading, Error and Exception Handling and Pandas.*

**CO5:** Gain Knowledge on *File Handling, Database Connection and basics of Numpy and matplotlib*

### UNIT I (12 Hours)

**Basics of Python Programming:** Features of Python - History of Python - The Future of Python - Writing and Executing First Python Program - Literal Constants - Variables and Identifiers - Data Types - Input Operation - Comments - Reserved Words - Indentation - Operators and Expressions - Expressions in Python - Operations on Strings - Other Data Types - Type Conversion.

**Decision Control Statements:** Conditional Branching Statements - Basic Loop Structures - Nested Loops - The Break Statement - The Continue Statement - The Pass Statement - The Else Statement used with Loops.

### UNIT II (12 Hours)

**Functions and Modules:** Function Definition - Function Call - Variable Scope and Lifetime - The Return Statement - More on Defining Functions - Recursive Functions - Modules - Packages in Python - Standard Library Modules.

**Python Strings Revisited:** Concatenating - Appending and Multiplying Strings - String Formatting Operator - Built in String Methods and Functions - Comparing Strings - Regular Expressions.

**Data Structures:** Sequence - Lists - Functional Programming - Tuple - Sets - Dictionaries.

### UNIT III (12 Hours)

**Classes and Objects:** Classes and Objects - Class Method and self Argument - Class Variables and Object Variables - Public and Private Data Members - Private Methods - Calling a Class Method from Another Class Method - Built in Class Attributes - Class Methods - Static Methods.

**Inheritance:** Inheriting Classes in Python - Types of Inheritance - Abstract Classes and Interfaces.

### UNIT IV (12 Hours)

**Operator Overloading:** Concept of Operator Overloading - Advantage of Operator Overloading - Implementing Operator Overloading.

**Pandas:** Introduction - Getting Started - Series - Data Frame - Read CSV - Read JSON -Analyzing Data Frames - Cleaning Data - Cleaning Empty Cell - Cleaning Wrong Format - Cleaning Wrong Data - Removing Duplicates - Correlations - Plotting.

**Error and Exception Handling:** Introduction to Errors and Exceptions - Handling Exceptions - Raising Exceptions - Built in and User defined Exceptions.

### UNIT V (12 Hours)

**File Handling:** File Path - Types of Files - Opening and Closing Files - Reading and Writing Files.

**Databases:** Database Table Creation - Select Operation - Insert Operation - Delete Operation - Update Operation - Drop Table.

**Numpy:** Basic Functions of Numpy.

**Matplotlib:** Basic Functions of Matplotlib.

#### Reference Text Books:

1. Reema Thareja, Python Programming Using Problem Solving Approach, Oxford University Press, June 2017.
2. Vamsi Kurama, Python Programming, A Modern Approach, Pearson, 2017.
3. Wesley Chun, Core Python Programming, Prentice Hall, December 2000.

**e-resources:** <https://www.w3schools.com/python/pandas/>

**PARVATHANENI BRAHMAYYA SIDDHARTHA COLLEGE OF ARTS & SCIENCE**

(An Autonomous College in the jurisdiction of Krishna University)

M.Sc.(Computer Science), First Semester

**Course Name: OBJECT ORIENTED PROGRAMMING**

**Course Code: 22DS1T2**

**(w.e.f admitted batch 2022-23)**

**SECTION-A**

**Time: 3 Hours**

**Max Marks: 70**

**Answer ALL questions**

**(5×4 = 20 Marks)**

1. a) Explain *Future of Python* (CO1,L2)  
(or)  
b) Explain different *Data Types* in *Python* (CO1,L2)
2. a) What is *Recursive Function*? Explain with *example*.(CO2,L1)  
(or)  
b) List out and explain any *4 Built in String Method*?(CO2,L1)
3. a) What is the *Differences between Class Variable and Object Variable*?(CO3,L1)  
(or)  
b) List out *Built in Class Attributes*? (CO3,L1)
4. a) Explain *Advantages of Operator Overloading*? (CO4,L2)  
(or)  
b) Explain *Exception Hierarchy*? (CO4,L2)
5. a) Explain *Types of Plots in Matplotlib*? (CO5,L2)  
(or)  
b) Explain different ways of *creating Arrays* using *Numpy*. (CO5,L2)

**SECTION-B**

**Answer Five Questions Choosing One Question from Each Unit.**

**All Questions Carry Equal Marks.**

**(5×10 = 50 Marks)**

- 6.a) Explain the *features of Python Programming Language*.(CO1,L2)  
(or)  
b) Explain *Different Loops* in *Python* with *example*. (CO1,L2)
- 7.a) Apply *Modules Concept in Python* with *examples*. (CO2,L3)  
(or)  
b) Build the *List Data Structure and their built in functions* with *examples*. (CO2,L3)
- 8.a) What are *Classes and Objects*? Write a program in *Python* to illustrate an *instancevariable*. (CO3,L1)  
(or)  
b) What is *Inheritance*? Explain *different types of Inheritance*. (CO3,L1)
- 9.a) Explain how to *Implement Operator Overloading* in *Python*. (CO4,L2)  
(or)  
b) Explain *process of Analyzing Data Frames*. (CO4,L2)
- 10.a) Explain *process of Writing and Reading data from file* with *example*. (CO5,L5)  
(or)  
b) Explain *process of Update Data into Database* with *relevant examples*. (CO5,L5)



## 22DS1T3: ADVANCED DATABASE MANAGEMENT SYSTEMS

<b>Course Name</b>	Advanced Database Management Systems	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>CIA</b>	<b>SEE</b>	<b>TM</b>
<b>Course Code</b>	22DS1T3	4	0	0	4	30	70	100
<b>Year of Introduction:</b> 2021	<b>Year of Offering:</b> 2022	<b>Year of Revision:</b> 2022			<b>Percentage of Revision:</b> 7%			
<b>L-Lecture, T-Tutorial, P-Practical, C-Credits, CIA-Internal Marks, SEE-External Marks, TM-Total Marks</b>								

### Course Description and Purpose:

Advanced Database Management Systems is a course that illustrates basic concepts of *Structured Query Language, Relational Algebra and Relational Calculus, Functional Dependencies and Normalization for Relational Databases, Transaction Processing Concepts, Concurrency Control Techniques, Data Models, Distribution Models & Consistency of NoSQL, Querying and Creating, Updating & Deleting Documents in Mongo DB, Data Lakes.*

### Course Objectives:

This course will help enable the students to understand, learn and develop a various *Data Models and Basic Querying, Transaction Processing, Concurrency Control, Distributed Databases, Data Lakes* also apply *Creating, Querying, Updating & Deleting Documents in Mongo DB.*

### Specific objectives include:

- ✓ To understand basic concepts of *Structured Query Language, Relational Algebra and Relational Calculus.*
- ✓ To learn the basics of *Functional Dependencies and Normalization for Relational Databases and Transaction Processing Concepts.*
- ✓ To learn *Concurrency Control Techniques and Distributed Database Concepts.*
- ✓ To understand the *Data Models, Distribution Models & Consistency of NoSQL.*
- ✓ To know *Querying, Creating, Updating & Deleting Documents in Mongo DB, Data Lakes.*

### Course Learning Outcomes:

Upon successful completion of the course, the student will be able to:

**CO1:** Understand basic concepts of *Structured Query Language & Relational Algebra and Relational Calculus.*

**CO2:** Learn the basics of *Functional Dependencies and Normalization for Relational Databases and Transaction Processing Concepts.*

**CO3:** Learn *Concurrency Control Techniques and Distributed Database Concepts.*

**CO4:** To understand the *Data Models, Distribution Models & Consistency of NoSQL.*

**CO5:** To know *Querying, Creating, Updating & Deleting documents in Mongo DB, Data Lakes.*

### UNIT I (12 Hours)

**Basic & More SQL:** SQL Data Definition and Data Types - Specifying Constraints in SQL - Basic Retrieval Queries in SQL - INSERT, DELETE, and UPDATE Statements in SQL - Additional Features of SQL - More Complex SQL Retrieval Queries - Specifying Constraints as Assertions and Actions as Triggers - Views (Virtual Tables) in SQL - Schema Change Statements in SQL.

**Data Modeling Using the ER Model:** Entity - Entity Types - Entity Sets - Attributes and Keys - Relationship Types - Relationship Sets - Roles and Structural Constraints - Weak Entity Types - Relationship Types of Degree Higher than Two - Refining the ER Design for the COMPANY Database.

**The Relational Algebra and Relational Calculus:** Unary Relational Operations: SELECT and PROJECT-Relational Algebra

Operations from Set Theory - Binary Relational Operations: JOIN and DIVISION - Additional Relational Operations - Examples of Queries in Relational Algebra - The Tuple Relational Calculus - The Domain Relational Calculus.

## UNIT II (12 Hours)

**Basics of Functional Dependencies and Normalization for Relational Databases:** Functional Dependencies - Normal Forms Based on Primary Keys - General Definitions of Second and Third Normal Forms - Boyce Codd Normal Form - Multivalued Dependency and Fourth Normal Form - Join Dependencies and Fifth Normal Form.

**Introduction to Transaction Processing Concepts and Theory:** Introduction to Transaction Processing - Transaction and System Concepts - Desirable Properties of Transactions - Characterizing Schedules Based on Recoverability - Characterizing Schedules Based on Serializability - Transaction Support in SQL.

## UNIT III (12 Hours)

**Concurrency Control Techniques:** Two-Phase Locking Techniques for Concurrency Control - Concurrency Control Based on Timestamp Ordering - Multiversion Concurrency Control Techniques - Validation (Optimistic) Techniques and Snapshot Isolation Concurrency Control - Granularity of Data Items and Multiple Granularity Locking - Using Locks for Concurrency Control in Indexes - Other Concurrency Control Issues.

**Distributed Database Concepts:** Data Fragmentation, Replication, and Allocation Techniques for Distributed Database Design - Overview of Concurrency Control and Recovery in Distributed Databases - Overview of Transaction Management in Distributed Databases - Query Processing and Optimization in Distributed Databases - Types of Distributed Database Systems - Distributed Database Architectures - Distributed Catalog Management.

## UNIT IV (12 Hours)

**Why NoSQL:** The Value of Relational Database - Emergence of NoSQL .

**Aggregate Data Models:** Aggregates - Keyvalue and Document Data Models - Column Family Stores.

**More Details on Data Models:** Relationships - Graphs DB - Schemaless DB - Materialized Views.

**Distribution Models:** Single Server - Sharding - Master Slave Replication.

**Consistency:** Update - Read - Relax Consistency.

## UNIT V (12 Hours)

**Getting Started:** Documents - Collections - Databases - Data Types.

**Creating, Updating & Deleting Documents:** Inserting & Saving Documents - Removing Documents - Updating Documents.

**Querying:** Introduction to Find - Query Criteria - Type Specific Queries - Where Queries - Cursors.

**Data Lakes:** Introduction - What is Data Lake? - The value of the Data Lake to ING - The 5 Level Model of Governance Maturity.

### Reference Text Books:

1. Ramez Elmasri & Shamkant B. Navathe, Fundamentals of Database Systems, Pearson, Seventh Edition, 2016
2. Pramod J.Sadalage & Martin Fowler, No SQL Distilled, Addison-Wesley, Second Edition, 2013.
3. Kristina Chodorow, Mongo DB, O'Reilly, Second Edition, 2013
4. Mandy Chessell, Ferd Scheepers, Maryna Strelchuk, Ron van der Starre, Seth Dobrin, Daniel Hernandez, From Data Lake to Data Driven Organization, IBM-Red Guide,2018, <https://www.redbooks.ibm.com/redpapers/pdfs/redp5486.pdf>
5. Shashank Tiwari, Professional NoSQL, Wiley, 2011, Second Edition, 2011
6. Abraham Silberschatz, Henry F Korth , S Sudarshan, Database System Concepts, McGraw-Hill International Edition, Sixth Edition,2011

**PARVATHANENI BRAHMAYYA SIDDHARTHA COLLEGE OF ARTS & SCIENCE**

(An Autonomous College in the jurisdiction of Krishna University)

M.Sc.(Computer Science), First Semester

**Course Name:** Advanced Database Management Systems

**Course Code:** 22DS1T3

**(w.e.f admitted batch 2022-23)**

**Time: 3 Hours**

**Max Marks: 70**

**SECTION-A**

**Answer ALL questions. All Questions Carry Equal Marks. (5×4 = 20 Marks)**

- 1.(a) Explain Trigger in SQL with example. (CO1,L2)  
(or)  
(b) Illustrate *DDL Commands* in SQL. (CO1,L2)
2. (a) Analyze *Second Normal Form*. (CO2,L4)  
(or)  
(b) List the *Properties of Transactions*. (CO2,L4)
3. (a) Explain *Multiple Granularity Locking*. (CO3,L2)  
(or)  
(b) Explain *Query Processing and Optimization* in Distributed Databases. (CO3,L2)
4. (a) Explain important features of NoSQL databases. (CO4,L5)  
(or)  
(b) Explain *Aggregate Data Models*. (CO4,L5)
5. (a) Apply Triggers in MongoDB. (CO5,L3)  
(or)  
(b) Construct where query in MongoDB. (CO5,L3)

**SECTION-B**

**Answer ALL questions. All Questions Carry Equal Marks. (5×10 = 50 Marks)**

6. (a) Explain *various constraints* of Relational Model. (CO1,L2)  
(or)  
(c) Illustrate *Select & Project* operations of *Relational Algebra*. (CO1,L2)
- 7.(a) Explain *Fifth Normal Forms* in detail. (CO2,L5)  
(or)  
(b) Prove whether the transactions T1 & T2 ensure *serializability*. (CO2,L5)

T1	T2
read_item(x); X:=X - N;	
	read_item(x); X:=X + M;
write_item(X); read_item(Y);	
	Write_item(x);
Y:=Y+N; Write_item(Y);	

8. (a) Build *Concurrency Control* based on *Timestamp Ordering*. (CO3,L3)  
(or)  
(d) Identify the usage of *Data Fragmentation, Replication, and Allocation Techniques* for *Distributed Database Design*. (CO3,L3)
9. (a) Analyze *Graphs DB* and *Schemaless DB* in detail. (CO4,L4)  
(or)  
(b) Compare *Sharding* and *Master Slave Replication* in detail. (CO4,L4)
10. (a) Demonstrate *CRED Operation* in *MongoDB*? (CO5,L2)  
(or)  
(b) Explain the concepts of *Data Lake* in detail? (CO5,L2)

## 22DSIT4: DATA MINING TECHNIQUES

<b>Course Name</b>	Data Mining Techniques	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>CIA</b>	<b>SEE</b>	<b>TM</b>
<b>Course Code</b>	22DSIT4	4	0	0	4	30	70	100
<b>Year of Introduction:</b> 2020	<b>Year of Offering:</b> 2022	<b>Year of Revision:</b> No Revision			<b>Percentage of Revision:</b> Nil			
L-Lecture, T-Tutorial, P-Practical, C-Credits, CIA-Internal Marks, SEE-External Marks, TM-Total Marks								

**Course Description and Purpose:** Python Programming is a course that illustrates to *Data Mining Concepts, Data Preprocessing, Data Warehousing and Online Analytical Processing, Mining Frequent Patterns, Association and Correlation, Basic Concepts and Methods, Advanced Pattern Mining, Classification Basic and Advanced Methods, Clustering Analysis and Outlier Detection.*

### Course Objectives:

This course will help enable the students to understand and learn Data Mining Techniques like *Data Preprocessing, Data Warehousing and Online Analytical Processing, Mining Frequent Patterns, Association and Correlations, Pattern Mining Techniques, Classification and Clustering Techniques.*

### Specific objectives include:

- ✓ To understand *Fundamentals of Data Mining & Data Preprocessing.*
- ✓ To learn *Data Warehousing and Online Analytical Processing* concepts.
- ✓ To understand various *Mining Frequent Patterns Methods & Various Association Rules.*
- ✓ To learn different *Classification & Prediction* Methods.
- ✓ To *understand & apply* various Clustering Algorithms.

### Course Learning Outcomes:

Upon successful completion of the course, the student will be able to:

**CO1:** Understand *Fundamentals of Data Mining & Data Preprocessing.*

**CO2:** Learn *Data Warehousing and Online Analytical Processing* concepts.

**CO3:** Understand various *Mining Frequent Patterns Methods & Various Association Rules.*

**CO4:** Learn different *Classification & Prediction* Methods.

**CO5:** *Understand & apply* various Clustering Algorithms.

### UNIT I (12 Hours)

**Introduction:** What is Data mining - *What Kind of Data can be Mined* (Database Data, Data Warehouses Transactional Data, Other Kinds of Data) - *What kinds of Patterns can be Mined* (Class/Concept Description: Characterization and Discrimination, Mining Frequent Patterns, Associations and Correlations, Classification and Regression for Predictive Analysis, Cluster Analysis, Outlier Analysis, Are All Patterns Interesting?) - *Which Technologies are Used?* (Statistics, Machine Learning, Database Systems and Data Warehouses, Information Retrieval) - *Major Issues in Data Mining* (Mining Methodology User Interaction, Efficiency and Scalability, Diversity of Database Types, Data Mining and Society)

**Data Preprocessing:** *An Overview of Data Preprocessing* (Why Preprocess the Data?, Major Tasks in Data Preprocessing) - *Data Cleaning* (Missing Values, Noisy Data, Data Cleaning as a Process) - *Data Integration* (Entity Identification Problem, Redundancy and Correlation Analysis, Tuple Duplication, Data Value Conflict Detection and Resolution) - *Data Reduction* (Overview of Data Reduction Strategies, Attribute Subset Selection, Regression and Log Linear Models, Histograms, Sampling and Datacube Aggregation) - *Data Transformation* (Data Transformation strategies Overview, Data Transformation by Normalisation, Discretization by Binning).

## UNIT II (12 Hours)

**Data Warehousing and Online Analytical Processing:** *Data Warehouse Basic Concepts* (What Is a Data Warehouse?, Difference between Operational Database Systems and Data Warehouses, Why have a separate Data warehouse?, Data Warehousing: A Multitiered Architecture, Data Warehouse Models: Enterprise Warehouse, Data Mart and Virtual Warehouse, Extraction, Transformation and Loading, Metadata Repository, Datawarehouse Modeling: Datacube and OLAP, Data Cube: A Multidimensional Data Model, Stars, Snowflakes, and Fact Constellations Schemas for Multidimensional Data Models, Dimensions: The Role of Concept Hierarchies, Measures: Their Categorisation and Computation, Typical OLAP Operations, A Starlet Query Model for Querying Multidimensional Databases) - *Data Warehouse Implementation* (Efficient Data Cube Computation: An Overview Indexing OLAP, Data: Bitmap Index and Join Index, OLAP Server Architectures: ROLAP versus MOLAP versus HOLAP).

## UNIT III (12 Hours)

**Mining Frequent Patterns, Associations, and Correlations: Basic Concepts and Methods:**

*Basic Concept* (Market Basket Analysis: A Motivational Example, Frequent Itemsets, Closed Itemsets and Association Rules) - *Frequent itemset Mining Methods* (Apriori Algorithm: Finding Frequent Itemsets by Confined Candidate Generation, Generating Association Rules from Frequent Itemsets, Improving the Efficiency of Apriori, A Pattern Growth Approach for Mining Frequent Itemsets, Mining Frequent Itemsets Using Vertical Data Format)

**Advanced Pattern Mining:** *Pattern Mining: A Road Map - Pattern Mining in Multilevel, Multidimensional Space* (Mining Multilevel Association Rules, Mining Multi Dimensional Associations, Mining Quantitative Association Rules).

## UNIT IV (12 Hours)

**Classification: Basic Concepts:** *Basic Concepts* (What Is Classification?, General Approaches to Classification) - *Decision Tree Induction* (Decision Tree Induction, Attribute Selection Measures, Tree Pruning, Scalability and Decision Tree Induction) - *Bayes Classification Methods* (Bayes Theorem, Naïve Bayesian Classification) - *Model Evaluation and Selection* (Metrics for Evaluating Classifier Performance, Holdout Method and Random Subsampling, Cross - Validation and Bootstrap).

**Classification: Advanced Methods:** *Bayesian Belief Networks* (Concepts and Mechanisms, Training Bayesian Belief Networks) - *Classification by Back Propagation* (A Multilayer Feed Forward Neural Network, Defining a Network Topology, Backpropagation).

## UNIT V (12 Hours)

**Cluster Analysis: Basic Concepts and Methods:** *Cluster Analysis* (What is Cluster Analysis? Requirements for Cluster Analysis) - *A Partitioning Methods* (*k*-Means and K-Medoid) - *Hierarchical Methods* (Agglomerative versus Divisive Hierarchical Clustering, Distance Measures in Algorithmic Methods, BRICH: Multiphase Hierarchical Clustering using Clustering Feature Trees, Chameleon: Multiphase Hierarchical Clustering Using Dynamic Modeling Hierarchical Clustering) - *Density Based Method* (DBSCAN).

**Outlier Detection:** *Outliers and Outlier Analysis* (What are Outliers Analysis?, Types of Outliers) - *Statistical Approaches* (Parametric Methods, Nonparametric Methods).

### Reference Text Books:

1. Jiawei Han, Micheline Kamber, Data Mining: Concepts & Techniques, 2012.
2. Ralph Kimball, The Data Warehousing Toolkit, Wiley, Thomson, July 2013.
3. S.N.Sivanandam and S.Sumathi, Data Mining Concepts, Tasks and Techniques, Springer, October 2006.

**PARVATHANENI BRAHMAYYA SIDDHARTHA COLLEGE OF ARTS & SCIENCE**

(An Autonomous College in the jurisdiction of Krishna University)

M.Sc.(Computer Science), First Semester

**Course Name:** Data Mining Techniques

**Course Code:** 22DS1T4

**(w.e.f admitted batch 2022-23)**

**Time: 3 Hours**

**Max Marks: 70**

**SECTION-A**

**Answer all questions**

**5\*4 = 20 Marks**

1. a) What are major issues of Data Mining?(CO1,L1)  
(or)  
b) Define *Data Preprocessing* and its steps (CO1,L1)
2. a) What is a *Data Warehouse* and OLTP? (CO2,L1)  
(or)  
b) What is difference between *OLAP Server* and *RLAP Server* (CO2,L1)
3. a) What is Pattern Mining? Lst out different methods for *Pattern Mining*. (CO3,L1)  
(or)  
b) What is *Market Basket Analysis* with example. (CO3L1)
4. a) Explain *Classification*? (CO4,L2)  
(or)  
b) Explain is *Bayes Theorem*. (CO4,L2)
5. a) What is *Cluster Analysis*? State different types *Cluster Analysis*? (CO5,L1)  
(or)  
b) What is *Outliers Analysis* and its method? (CO5,L1)

**Answer all questions. All question carry equal marks.**

**5 × 10 = 50 Marks**

6. a) Define *Data Mining*. Describe the functionalities of Data Mining. (CO1,L1) 5 Marks  
b) What is *Noisy Data*? Explain the *Binning Methods* for Data Smoothing. (CO1,L1) 5 Marks  
(or)  
c) What are different methods used in *Data Cleaning* and *Data Transformation* in *Data Preprocessing*? (CO1,L1) 10 Marks
7. a) Define *Data Warehouse*. Differentiate *Operational Databases* and *Data Warehouses*. (CO2,L1) 10Marks  
(or)  
b) List different schemas used in *Multidimensional Data Models* with diagrams. (CO2,L1) 5 Marks  
c) What are the different OLAP operations in *Multidimensional Data Models*? (CO2,L1) 5 Marks
8. a) Explain the *Frequent Itemset Generation* in the *Apriori Algorithm*. (CO3,L2) 5 Marks  
b) Explain different types of *Association Rules* (CO3,L2) 5 Marks  
(or)  
c) Explain *FP-Growth Algorithm* with example. (CO3,L2) 10 Marks
9. a) Explain how classification is done using *Decision Tree*. (CO4,L5) 5 Marks  
b) Explain algorithm for *Decision Tree Induction*. (CO4,L5) 5 Marks  
(or)  
c) Explain *Bayes Theorem* in detail. (CO4,L5) 5 Marks  
d) Explain *Bayesian Belief Network*. (CO4,L5) 5 Marks
10. a) Explain *Partitioning Methods* in *Cluster Analysis* with examples. (CO5,L5) 10 Marks  
(or)  
b) Explain *Chameleon & BIRCH Hierarchical Clustering*. (CO5,L5) 5 Marks  
c) Explain different types of *Outliers*. (CO5,L5) 5 Marks

## 22DS1L1: DATA STRUCTURES LAB

<b>Course Name</b>	Data Structures Lab	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>CIA</b>	<b>SEE</b>	<b>TM</b>
<b>Course Code</b>	22DS1L1	0	0	6	3	30	70	100
<b>Year of Introduction:</b> 2020	<b>Year of Offering:</b> 2022	<b>Year of Revision:</b> No Revision			<b>Percentage of Revision:</b> Nil			
<b>L-Lecture, T-Tutorial, P-Practical, C-Credits, CIA-Internal Marks, SEE-External Marks, TM-Total Marks</b>								

### Course Description and Purpose:

Data Structures Lab is a course that illustrates concepts of *Stacks*, *Queues*, and *Tree Traversals*, *Singly Linked Lists*, *Doubly Linked Lists*, *Circular Linked Lists*, *Binary Search Tree*, *Binary Search Tree Traversals*, *Sparse Matrix* and *DFS & BFS Algorithm*, *Searching & Sorting Algorithms*, *AVL-Trees* and *B-Trees* and its operations and implementations.

### Course Objectives:

This course will help enable the students to understand learn, apply/ implement the concepts of *Stacks*, *Queues*, and *Tree Traversals*, *Singly Linked Lists*, *Doubly Linked Lists*, *Circular Linked Lists*, *Binary Search Tree*, *Binary Search Tree Traversals*, *Sparse Matrix* and *DFS & BFS Algorithm*, *Searching & Sorting Algorithms*, *AVL-Trees* and *B-Trees*.

### Specific Objectives include:

- ✓ To understand the concepts of Stacks, Queues, and Tree Traversals.
- ✓ To apply the operations of Singly Linked Lists, Doubly Linked Lists, Circular Linked Lists and Operations on Stacks and Queues.
- ✓ To apply operations on Binary Search Tree, Binary Search Tree Traversals, Sparse Matrix and DFS & BFS Algorithm.
- ✓ To implement Searching & Sorting Algorithms.
- ✓ To implement AVL-Trees and B-Trees.

### Course Learning Outcomes:

Upon successful completion of the course, the student will be able to:

**CO1:**Understand the concepts of *Stacks*, *Queues*, and *Tree Traversals*.

**CO2:** Apply the operations of *Singly Linked Lists*, *Doubly Linked Lists*, *Circular Linked Lists* and *Operations on Stacks and Queues*.

**CO3:**Apply operations on *Binary Search Tree*, *Binary Search Tree Traversals*, *Sparse Matrix* and *DFS & BFS Algorithm*.

**CO4:**Implement *Searching & Sorting Algorithms*.

**CO5:**Implement *AVL-Trees* and *B-Trees*.

### CYCLE 1

1. Write a Java Program to create a class called Stack and implement Stack Operations. (CO1,L1)
2. Write a Java Program to create a class called Queue and implement Stack Operations. (CO1,L1)
3. Write a Java Program to convert the Infix to Postfix Expression. (CO1,L1)
4. Write a Java Program to evaluate Postfix Expression. (CO1,L1)
5. Write a Java Program to obtain the Binary Number for a given Decimal Number. (CO1,L1)

### CYCLE 2

1. Write a Java Class to implement the operations of a Singly Linked List. (CO2,L1)
2. Write a Java Class to implement the operations of a Doubly Linked List. (CO2,L1)
3. Write a Java Class to implement the operations of a Circular Linked List. (CO2,L1)
4. Write a java program for the following a) Reverse a Linked List b) Sort the data in a Linked List c) Remove Duplicates d) Merge Two Linked Lists (CO2,L1)
5. Write a java program for performing various operations on Stack using Linked List. (CO2,L1)
6. Write a java program for performing various operations on Queue using Linked List. (CO2,L1)



### **CYCLE 3**

1. Write a Java Program to implement operations on Binary Trees Using Recursive and Non- Recursive Methods. (CO3,L1)
2. Write a Java Program to perform Binary Search Tree Traversal. (CO3,L1)
3. Write a Java Program to implement Sparse Matrix. (CO3,L1)
4. Write a Java Program to implement DFS Algorithm. (CO3,L1)
5. Write a Java Program to implement BFS Algorithm. (CO3,L1)

### **CYCLE 4**

1. Write a Java Program to implement the following sorting techniques:  
a. Bubble Sort      b. Merge Sort.    c. Quick Sort.    d. Heap Sort. (CO4,L1)
2. Write a Java Program to implement Quick Sort of given elements. (CO4,L1)
3. Write a Java Program to implement the Following search techniques:  
a. Linear Search      b. Binary Search      (CO4,L1)

### **CYCLE 5**

1. Write a Java Program to implement various operations on AVL Trees. (CO5,L1)
2. Write a Java Program to perform the following operations: a) Insertion into a B-Tree b) Searching in a B-Tree (CO5,L1)
3. Write a Java Program to implementation of recursive and non-recursive functions to Binary Tree Traversals (CO5,L1)
4. Write a Java Program to implement all the functions of Dictionary (ADT) using Hashing. (CO5,L1)

## 22DS1L2: OBJECT ORIENTED PROGRAMMING LAB

<b>Course Name</b>	Object Oriented Programming Lab	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>CIA</b>	<b>SEE</b>	<b>TM</b>
<b>Course Code</b>	22DS1L2	0	0	6	3	30	70	100
<b>Year of Introduction:</b> 2020	<b>Year of Offering:</b> 2022	<b>Year of Revision:</b> No Revision			<b>Percentage of Revision:</b> Nil			
<b>L-Lecture, T-Tutorial, P-Practical, C-Credits, CIA-Internal Marks, SEE-External Marks, TM-Total Marks</b>								

### Course Description and Purpose:

Python Programming is a course that illustrates Basic Concepts of *Python Programming, Decision Control Statements, Functions and Modules, Python Strings Revisited, Data Structures, Classes and Objects, Inheritance, Operator Overloading, Pandas, Error and Exception Handling, File Handling, Numpy, Matplotlib.*

### Course Objectives:

This course will help enable the students to understand, learn and develop a various *Decision Control Statements, Functions & Modules, Strings, Data Structures, Classes and Objects, Inheritance, Operator Overloading, Pandas, Error and Exception Handling, Handling Files, Databases.*

### Specific objectives include:

- ✓ To understand *Basics of Python Programming, Decision Control Statements.*
- ✓ To know the concepts of *Data Structures, Functions and Modules.*
- ✓ To know the concepts of *Classes and Objects, Object Oriented Programming.*
- ✓ To apply *Error and Exception Handling.*
- ✓ To implement *Database Access and File Handling.*

### Course Learning Outcomes:

Upon successful completion of the course, the student will be able to:

**CO1:** Understand *Basics of Python Programming, Decision Control Statements.*

**CO2:** Know the concepts of *Data Structures, Functions and Modules.*

**CO3:** Know the concepts of *Classes and Objects, Object Oriented Programming.*

**CO4:** Apply *Error and Exception Handling.*

**CO5:** Implement *Database Access and File Handling.*

1. Write a program to find total for given number of tens, number of fives, number of twos and number of ones. (CO1, L1)
2. Write a program to enter a number and display its hex and octal equivalent and its square root. (CO1, L1)
3. Write a program to read and print values of variables of different data types. (CO1, L1)
4. Write a program to calculate the distance between two points. (CO1, L1)
5. Write a program to calculate area of triangle using Heron's formula. (CO1, L1)  
(Hint: Heron's formula is given as:  $\text{area} = \sqrt{S(S-a)(S-b)(S-c)}$ )
6. Write a program to calculate the distance between two points. (CO1, L1)
7. Write a program to perform addition, subtraction, multiplication, division, integer division. (CO1, L1)
8. Write a program to find the greatest number from three numbers. (CO1, L1)
9. Write a program to calculate tax given the following conditions: (CO1, L1)  
If income is less than 1,50,000 then no tax  
If taxable income is Rs.1,50,001 - Rs.300,000 then charge 10% tax  
If taxable income is Rs.3,00,001 - Rs.500,000 then charge 20% tax  
If taxable income is above Rs.5,00,001 then charge 30% tax

10. Write a program to calculate roots of quadratic equation. (CO1, L1)
11. Write a program to enter the marks of a student in four subjects. Then calculate the total and aggregate, and display the grade obtained by the student. If the student scores an aggregate greater than 75%, then the grade is Distinction. If aggregate is  $60 \geq$  and  $< 75$ , then grade is First Division. If the aggregate is  $50 \geq$  and  $< 60$ , then the grade is Second Division. If aggregate is  $40 \geq$  and  $< 50$ , then the grade is Third Division. Else the grade is Fail. (CO1, L1)
12. Write a program to read the numbers until -1 is encountered. Find the average of positive numbers and negative numbers entered by the user. (CO1, L1)
13. Write a program to find whether the given number is an *Armstrong Number* or not. (CO1, L1)
14. Write a program to enter a Decimal Number. Calculate and display its Binary Equivalent. (CO1, L1)
15. Write a program to demonstrate List Operations. (CO2, L1)
  - Access List Items
  - Change Item Value
  - Appended Items
  - Remove Specified Item
  - Loop Through a List
  - List Comprehension
  - Sort List Alphanumerically
  - Copy a List
  - Join Two Lists
  - List Methods
16. Write a program to demonstrate Tuple Operations. (CO2, L1)
  - Access Tuple Items
  - Negative Indexing
  - Range of Indexes
  - Range of Negative Indexes
  - Check if Item Exists
  - Update Tuples
  - Add Items
  - Remove Items
  - Unpacking a Tuple
  - Using Asterisk\*
  - Loop Through a Tuple
  - Loop Through the Index Numbers
  - Using a While Loop:
  - Python - Join Tuples
  - Join Two Tuples
  - Multiply Tuples

17. Write a program to demonstrate Set Operations. (CO2, L1)
    - Access Set Items
    - Add Set Items
    - Loop Sets
    - Join Two Sets
    - Keep ONLY the Duplicates
    - Keep All, But NOT the Duplicates
  18. Write a program to demonstrate Dictionary Operations. (CO2,L1)
    - Ordered or Unordered?
    - Changeable
    - Duplicates Not Allowed
    - Accessing Items
    - Change Values
    - Update Dictionary
    - Adding Items
    - Remove Dictionary Items
    - Loop Through a Dictionary
    - Copy a Dictionary
    - Nested Dictionaries
  19. Write a program to enter a number and then calculate the *Sum of Its Digits*. (CO2,L1)
  20. Write a program to print the *Reverse Number*. (CO2,L1)
  21. Write a program to calculate GCD of two numbers. (CO2,L1)
  22. Write a program that prompts users to enter numbers. The process will repeat until user enters -1. Finally, the program prints the count of prime and composite numbers entered. (CO2,L1)
  23. Write a program (CO2,L1)
    - (a) To calculate the factorial of number recursively.
    - (b) To calculate GCD using the recursive functions.
  24. Write a program (CO2,L1)
    - (a) To calculate  $\exp(x,y)$  using recursive functions
    - (b) To print the Fibonacci Series using Recursion.
  25. Write a program make a *Simple Calculator*. (CO2,L1)
  26. Write a program that defines a function large in a module which will be used to find large of two values and called from a code in another module. (CO2,L1)
  27. Write a program that demonstrate the use of method `__init__`. (CO3,L1)
  28. Write a program to illustrate the modification of instance variable. (CO3,L1)
  29. Write a program for modifying a mutable type attribute. (CO3,L1)
  30. Write a program to demonstrate the use of inheritance. (CO3,L1)
  31. Write a Program to demonstrate Polymorphism. (CO3,L1)
-

32. Write a program to demonstrate Polymorphism using Function Overloading. (CO3,L2)
33. Write Program to demonstrate Method Overriding with arguments. (CO3,L2)
34. Write a python program to demonstrate multilevel inheritance. (CO3,L2)
35. Write a program to demonstrate Multipath Inheritance (or) Hybrid Inheritance. (CO3,L2)
36. Write a program to demonstrate Multi Level Inheritance (A person is teacher & having designation HOD) (CO3,L2)
37. Write a program to demonstrate *Multi-Path Inheritance*. (CO3,L2)
38. Write a program to illustrate the concept of Abstract Class. (CO3,L2)
39. Write a program to overload the + operator on a complex object. (CO3,L2)
40. Write a program to handle Divide by Zero Exception. (CO4,L2)
41. Write a program to handle Multiple Errors with One Except statement. (CO4,L2)
42. Write a program with Multiple Except Blocks. (CO4,L2)
43. Write a program to demonstrate else statement in exception handling. (CO4,L2)
44. Write a python program to illustrate the try...catch...finally in exception handling. (CO4,L2)
45. Write a program to demonstrate Regular Expression Functions. (CO2,L2)
  - findall()
  - Search
  - Split
  - sub()
46. Write a program Demonstrate Regular Expression Meta Characters. (CO2,L2)
  - Python program to match string using metacharacter []
  - Program to find digits in character using metacharacter \
  - Program for sequence that starts with "he", followed by two (any) characters using metacharacter ..
  - Program to check if the string starts with 'hello' using metacharacter ^
  - Program to check the string ends with 'world' using metacharacter \$
  - Program to check the string contains "ai" followed by 0 or more "x" characters
  - Program to check the string contains "ai" followed by 1 or more "x" characters
  - Program to check if the string contains "a" followed by exactly two "l" characters
  - Program to check if the string contains either "falls" or "stays" using meta character |
47. Write a program to demonstrate Regular Expression Sequences. (CO2,L2)
  - Program to check if the string starts with "The"
  - Program to check if "ain" is present at the beginning of a word
  - Program to check if "ain" is present at the end of a word.
  - Program to check if "ain" is present, but NOT at the beginning of a word.
  - Program to check if "ain" is present, but NOT at the end of a word.
  - Program to Check if the string contains any digits (numbers from 0-9).
  - Program to return a match at every no-digit character.
  - Program to return a match at every white-space character.

- Program to return a match at every NON white-space character.
  - Program to return a match at every word character (characters from a to Z, digits from 0-9, and the underscore \_ character)
  - Program to return a match at every NON word character (characters NOT between a and Z. Like "!", "?" white-space etc.)
  - Program to check if the string ends with "Spain".
48. Write a program to demonstrate Regular Expression Sets. (CO2,L2)
- Program Check if the string has any a, r, or n characters.
  - Program to Check if the string has any characters between a and n.
  - Program to Check if the string has other characters than a, r, or n.
  - Program to check if the string has any 0, 1, 2, or 3 digits.
  - Program to check if a string has any digits.
  - Program to check if the string has any two-digit numbers, from 00 to 59.
  - Program to Check if the string has any characters from a to z lower case, and A to Z upper case.
  - Program to check if the string has any + characters.
49. Write a program to (CO5,L2)
- Create EMP table with attributes ENO,ENAME and ESAL into PBS database.
  - Insert rows into EMP table of PBS database.
  - Update rows of EMP table of PBS database.
  - Delete rows from EMP table of PBS database.
  - Drop EMP table of PBS database.
50. Write a program to open the file and count the number of times a character appears in the file. (CO5,L1)

**APPENDIX-IV**  
**SYLLABUS FOR THE ACADEMIC YEARS 2021-2022(R20)**  
**M.SC. (COMPUTER SCIENCE), THIRD SEMESTER**

Applicable for the batch of students admitted during the Academic Year 2020-2021										
M.Sc.(Computer Science)					SEMESTER III					
S.No.	Course Code	Title of the Course	Instruction Hours per Week			Credits	Evaluation			Total Marks
			L	T	P		CIA Marks	SEE		
								Marks	Duration	
1	20CS3T1	Internet of Things (IoT)	4			4	30	70	3 Hours	100
2	20CS3T2	Cryptography & Network Security	4			4	30	70	3 Hours	100
3	20CS3T3	Design & Analysis of Algorithms	4			4	30	70	3 Hours	100
4	20CS3T4	Data Mining Techniques	4			4	30	70	3 Hours	100
5		Open Elective-II (Student has to select one open elective from the elective courses provided)	4			4	30	70	3 Hours	100
6	20CS3L1	Web Technologies Lab			8	4	30	70	3 Hours	100
7	20CS3L2	Data Mining Lab			8	4	30	70	3 Hours	100
Total			36			28	210	490		700
CIA=Continuous Internal Assessment					SEE=Semester End Examinations					



# P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

Siddhartha Nagar, Vijayawada – 520 010.

NAAC reaccredited at 'A+' level

Autonomous -ISO 9001 – 2015 Certified

**Programme: M.Sc.(Computer Science)**

**Title of the Paper: Internet of Things**

**Semester: III**

Course Code	20CS3T1	Course Delivery Method	Class Room / Blended Mode
Credits	4	CIA Marks	30
No. of Lecture Hours / Week	4	Semester End Exam Marks	70
Total Number of Lecture Hours	60	Total Marks	100
Year of Introduction :2018	Year of Offering:2021	Year of Revision:2021-22	Percentage of Revision: 60%

**Course Objective:** To understand and gain knowledge on *Over View of Internet of Things, Models, Layers & Standardization, Protocols & Design Principles* for Connected Devices, *Internet Connectivity Principles, Protocols & Application Layer Protocols, Data Acquiring, Business Models and Business Processes.*

**Course Outcomes:** On successful completion of the course student will be able to:

**CO1:** Attain knowledge over view of *Internet of Things.*

**CO2:** Understand *Models, Layers & Standardization.*

**CO3:** Apply *Protocols & Design Principles* for Connected Devices.

**CO4:** Understand *Internet Connectivity Principles, Protocols & Application Layer Protocols.*

**CO5:** Understand *Data Acquiring, Business Models and Business Processes.*



## Syllabus

### Course Details

Unit	Learning Units	Lecture Hours
I	<b>The Internet of Things:</b> An Overview of Internet of Things, Internet of Things Technology, Behind IoT Sources of the IoT, M2M Communication, Examples of IoT, Design Principles for Connected Devices, Business Models for Business Processes in the Internet of Things.	12
II	<b>Design Principles for Connected Devices:</b> IoT / M2M systems layers and Designs Standardizations, Modified OSI Stack for the IoT / M2M Systems, ETSI M2M Domains and High-level Capabilities ,Communication Technologies, Data Enrichment and Consolidation and Device Management Gateway ease of Designing and Affordability.	12
III	<b>Design Principles for the Web Connectivity:</b> Design Principles for the Web Connectivity for Connected Devices, Web Communication Protocols for Connected Devices, Message Communication Protocols for Connected Devices, Web Connectivity for Connected Devices.	12
IV	<b>Internet Connectivity Principles:</b> Introduction, Internet Connectivity, Application Layer Protocols: <i>HTTP, HTTPS, FTP, Telnet</i> .	12
V	<b>Data Acquiring, Organizing and Analytics in IoT / M2M:</b> Introduction, Applications / Services / Business Processes, IOT / M2M Data Acquiring and Storage, Business Models for Business Processes in the Internet of Things, Organizing Data, Transactions, Business Processes, Integration and Enterprise Systems.	12

Prescribed Text Book			
	Author	Title	Publisher
1	Rajkamal	Internet of Things: Architecture, Design Principles and Applications	McGraw Hill Higher Education

Reference Text Book			
	Author	Title	Publisher
1	Adrian McEwen and Hakim Cassimally	Designing the Internet of Things	Wiley
2	CunoPfister	Getting Started with the Internet of Things.	Oreilly

**Course Focus:** Employability

#### Websites of Interest:

1. <https://dzone.com/iot-developer-tutorials-tools-news-reviews>
2. <https://www.ibm.com/blogs/internet-of-things/>

**P.B. Siddhartha College of Arts & Science, Vijayawada - 520 010.**  
**(An Autonomous College in the jurisdiction of Krishna University)**  
**M.Sc., (Computer Science) Programme - III Semester**

**Course Code: 20CS3T1**

**Title: Internet of Things (IoT)**

**(w.e.f admitted batch 2020-21)**

**Time: 3 Hours**

**Max. Marks: 70**

**Answer ALL questions**

**(10×2 = 20 Marks)**

1. a) What is *M2M Communication*. (CO1,L1)
- b) What are *Connected Devices*? (CO1,L1)
- c) Write about *Modified ISO*. (CO2,L1)
- d) What is a *Gateway*? (CO2,L1)
- e) What is *Communication Protocol*? (CO3,L1)
- f) What is *Resource and Resource Repository*? (CO3,L1)
- g) What is *Header*? Explain *TCP Header*. (CO4,L1)
- h) What is *Protocol Data Unit and Maximum Transferable Unit*. (CO4,L1)
- i) Write about *Event Data*. (CO5,L1)
- j) What are *Active and Passive Devices*? (CO5,L1)

**Answer Five Questions Choosing One Question from Each Unit.**  
**All Questions Carry Equal Marks. (5×10 = 50 Marks)**

UNIT I

2. a) Explain an overview of IOT. (CO1,L2)
- (or)
- b) Explain M2M Communication. (CO1,L2)

UNIT II

3. a) Explain various *Layers & Design Standardization Principles* of IOT. (CO2,L2)
- (or)
- b) Explain different *communication technologies* used in IOT. (CO2,L2)

UNIT III

4. a) What are *Web Communication Protocols* for Connected Devices? (CO3,L1)
- (or)
- b) What are various *Design Principles* for the Web Connectivity? (CO3,L1)

UNIT IV

5. a) Explain in detail *Internet Connectivity Principles*. (CO4,L5)
- (or)
- b) Explain any two *Application Layer Protocols*. (CO4,L5)

UNIT V

6. a) Illustrate *Business Models* for *Business Processes* in the Internet of Things. (CO5,L2)
- (or)
- b) Explain *Integration and Enterprise Systems*. (CO5,L2)



# P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

Siddhartha Nagar, Vijayawada – 520 010.

NAAC recredited at 'A+' level

Autonomous -ISO 9001 – 2015 Certified

**Programme: M.Sc.(Computer Science)**

**Title of the Paper: Cryptography & Network Security**

**Semester: III**

Course Code	20CS3T2	Course Delivery Method	Class Room / Blended Mode
Credits	4	CIA Marks	30
No. of Lecture Hours / Week	4	Semester End Exam Marks	70
Total Number of Lecture Hours	60	Total Marks	100
Year of Introduction : 2005	Year of Offering: 2021	Year of Revision: 2021-22	Percentage of Revision: 30%

**Course Objective:** To understand and gain knowledge on *Computer & Network Security, Number Theory, Classical Encryption Techniques, Advanced Encryption Standard and Random Bit Generation and Stream Ciphers, Number Theory, Public Key Cryptography and RSA, Other Public-Key Crypto Systems and Message Authentication Codes, Digital Signatures, Key Management and Distribution and User Authentication, Transport Level Security, Electronic Mail Security and IP Security and Intruders and Firewalls.*

**Course Outcomes:** On successful completion of this course, the students will be able to:

**CO1:** Understand *Computer & Network Security Concepts, Classical Encryption Techniques and Advanced Encryption Standard.*

**CO2:** Gain knowledge on *Number Theory, Public Key Cryptography and RSA, Other Public-Key Crypto Systems and Message Authentication Codes.*

**CO3:** Know *Digital Signatures, Key Management and Distribution and User Authentication.*

**CO4:** Understand *Transport Level Security, Electronic Mail Security and IP Security.*

**CO5:** Gain knowledge about *Intruders and Firewalls.*

## Syllabus

### Course Details

Unit	Learning Units	Lecture Hours
I	<p><b>Computer &amp; Network Security Concepts:</b> Computer Security Concepts, The OSI Security Architecture, Security Attacks, Security Services, Security Mechanisms, A Model for Network Security.</p> <p><b>Classical Encryption Techniques:</b> Symmetric Cipher Model, Substitution Techniques, Transposition Techniques</p> <p><b>Advanced Encryption Standard:</b> AES Structure, An AES Example, AES Implementation. Random Bit Generation and Stream Ciphers: Principles of Pseudo Random Number Generation, Pseudo Random Number Generators.</p>	12
II	<p><b>Introduction to Number Theory:</b> Divisibility and the Division Algorithm, The Euclidean Algorithm, Modular Arithmetic, Prime Numbers, Fermat's and Euler's Theorems, Testing for Primality, The Chinese Remainder Theorem, Discrete Logarithms.</p> <p><b>Public Key Cryptography and RSA:</b> Principles of Public Key Crypto Systems, The RSA Algorithm.</p> <p><b>Other Public-Key Crypto Systems:</b> Key Management, Diffie-Hellman Key Exchange, Elliptic Curve Arithmetic, Elliptic Curve Cryptography.</p> <p><b>Message Authentication Codes:</b> Message Authentication Requirements, Message Authentication Functions, Requirements for Message Authentication Codes, Security of MACs, MACs Based on Hash Functions: HMAC.</p>	12
III	<p><b>Digital Signatures:</b> Digital Signatures, NIST Digital Signature Algorithm.</p> <p><b>Key Management and Distribution:</b> Symmetric Key Distribution Using Asymmetric Encryption, Distribution of Public Keys.</p> <p><b>User Authentication:</b> Kerberos, Remote User-Authentication Using Asymmetric Encryption.</p>	12
IV	<p><b>Transport Level Security:</b> Transport Layer Security.</p> <p><b>Electronic Mail Security:</b> S/MIME, Pretty Good Privacy.</p> <p><b>IP Security:</b> IP Security Overview, IP Security Policy, Encapsulating Security Payload, Combining Security Associations.</p>	12
V	<p><b>Intruders:</b> Intruders, Intrusion Detection, Password Management.</p> <p><b>Firewalls:</b> The Need for Firewalls, Firewall Characteristics and Access Policy, Types of Firewalls.</p>	12

Prescribed Text Book			
	Author	Title	Publisher
1	William Stallings	Cryptography and Network Security	Pearson, Seventh Edition, 2017

Reference Text Book			
	Author	Title	Publisher
1	William Stallings	Cryptography and Network Security	Pearson, Sixth Edition, 2014
2	William Stallings	Network Security Essentials- Applications and Standards	Pearson Education (2007), Third Edition.
3	Chris McNab	Network Security Assessment	OReilly (2007), 2 <sup>nd</sup> Edition
4	Jon Erickson	Hacking-The Art of Exploitation	Press (2006), SPD
5	Neal Krawety	Introduction to Network Security	Thomson (2007).

6	Ankit Fadia	Network Security-A Hackers Perspective	Macmillan (2008)
7	Behrouz A Forouzan, Debdeep Mukhopadhyay	Cryptography and Network Security	MCGraw-Hill, Indian Special Edition, Third Edition, 2015

**Course has focus on :** Employability

**Websites of Interest :**

1. [https://www.pearsonhighered.com/assets/hip/us/hip\\_us\\_pearsonhighered/preface/0132775069.pdf](https://www.pearsonhighered.com/assets/hip/us/hip_us_pearsonhighered/preface/0132775069.pdf)
2. <http://faculty.mu.edu.sa/public/uploads/1360993259.0858Cryptography%20and%20Network%20Security%20Principles%20and%20Practice,%205th%20Edition.pdf>

**Co-curricular Activities :** Programming Contests, Hackathons & Quiz.

**P.B. Siddhartha College of Arts & Science, Vijayawada - 520 010.**  
**(An Autonomous College in the jurisdiction of Krishna University)**  
**M.Sc., (Computer Science) Programme - III Semester**  
**Course Code: 20CS3T2 Title: CRYPTOGRAPHY & NETWORK SECURITY**  
**(w.e.f admitted batch 2020-21)**

**Time: 3 Hours**

**Max. Marks: 70**

**Answer ALL questions**

**(10×2 = 20 Marks)**

- 1) a) What is *Caesar Cipher*? (CO1,L1)
- b) Write any two characteristics of Randomness. (CO1,L1)
- c) What is the Purpose of the *Euclidean Algorithm*? (CO2,L1)
- d) What is Message Encryption? (CO2,L1)
- e) What is the difference between *Symmetric Key Distribution & Asymmetric Key Distribution*? (CO3,L1)
- f) What is *Mutual Authentication*? (CO3,L1)
- g) State any two Protocols of *Transport Layer Security*. (CO4,L1)
- h) What is *Pretty Good Privacy*? (CO4,L1)
- i) What is *Firewall*? (CO5,L1)
- j) State any two *Intrusion Detection Techniques*. (CO5,L1)

**Answer Five Questions Choosing One Question from Each Unit.**  
**All Questions Carry Equal Marks. (5×10 = 50 Marks)**

UNIT I

- 2) a) Explain various *Security Attacks* and *Security Services*. (CO1,L2) 10 Marks  
(or)
- b) Explain *AES Encryption* and *Decryption* Process. (CO1,L2) 10 Marks

UNIT II

- 3) a) Illustrate *Diffie-Hellman Key Exchange*. (CO2,L2) 10 Marks  
(or)
- b) Explain *Internal and External Error Control* in Message Authentication Functions. (CO2,L2)  
10 Marks

UNIT III

- 4) a) Explain *NIST Digital Signature Algorithm* with diagram. (CO3,L5) 10 Marks  
(or)
- b) Explain *Kerberos* in detail. (CO3,L5) 10 Marks

UNIT IV

- 5) a) Explain *Confidentiality* and *Authentication* in S/MIME (CO5,L5) 10 Marks  
(or)
- b) Illustrate *Overview of IP Security*. (CO4,L5) 10 Marks

UNIT V

- 6) a) Discuss what are the problems that may intruder create and explain how to overcome those problem?  
(CO5,L6) 10 Marks  
(or)
- b) Discuss *Various Types of Firewalls*. (CO5,L6) 10 Marks



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Autonomous -ISO 9001 – 2015 Certified

**Programme: M.Sc.(Computer Science)**

**Title of the Paper: Design & Analysis of Algorithms**

**Semester: III**

Course Code	20CS3T3	Course Delivery Method	Class Room / Blended Mode
Credits	4	CIA Marks	30
No. of Lecture Hours / Week	4	Semester End Exam Marks	70
Total Number of Lecture Hours	60	Total Marks	100
Year of Introduction :2005	Year of Offering:2021	Year of Revision: No	Percentage of Revision:0%

**Course Objective:** The objective of this course is to develop proficiency in *Problem Solving and Programming, To Perform Analysis of various Algorithms in regard to Time and Space Complexity, Gain good understanding of Applications of Data Structures, To develop a base for Advanced Study in Computer Science, To apply Design Techniques to solve different types of problems as per their Complexity and Develop ability to segregate NP-Hard and NP-Complete problems.*

**Course Outcomes:** On successful completion of this course, the students will be able to:

**CO1:** Understand *Basic Ideas about Analysis of Algorithms and the Concept of Data Structures.*

**CO2:** Know *Divide and Conquer ,Greedy Methods and Solving Various Problems* by applying them.

**CO3:** Apply *Dynamic Programming Method and Basic Traversal and Search Techniques* to solve various Problems.

**CO4:** Understand *Backtracking and Branch and Bound Techniques* to Design Algorithms.

**CO5:** Categorize *NP-Hard and NP-Complete Problems.*

## Syllabus

### Course Details

Unit	Learning Units	Lecture Hours
I	<b>Introduction:</b> What is Algorithm, Algorithm Specification Pseudo code Conventions, Recursive Algorithms, Performance Analysis: Space Complexity Time Complexity, Asymptotic Notation, Performance Measurement, Randomized Algorithms: Basics of Probability Theory, Randomized Algorithms Identifying the Repeated Element, Primality Testing: Advantages and Disadvantages. <b>Elementary Data Structures:</b> Stacks and Queues, Trees: Terminology, Binary Trees, Dictionaries: Binary Search Trees, Priority Queues, Heaps , Heapsort , Sets and Disjoint Set Union: Introduction-Union and Find Operations, Graphs: Introduction, Definitions, Graph Representations.	10
II	<b>Divide-and-Conquer:</b> General Method, Defective Chess Board, Binary Search, Finding Maximum and Minimum, Merge Sort, Quick Sort, Selection Problem, Strassen's Matrix Multiplication, Convex Hull: Some Geometric Primitives, The Quick Hull Algorithm,	14

	Graham's Scan, An $O(n \log n)$ Divide and Conquer Algorithm. <b>The Greedy Method:</b> The General Method, Container Loading, Knapsack Problem, Tree Vertex Splitting, Job Sequencing with Deadlines, Minimum Cost Spanning Trees: Prim's Algorithm, Kruskal's Algorithm, Optimal Storage on Tapes, Optimal Merge Patterns, Single Source Shortest Paths.	
III	<b>Dynamic Programming:</b> The General Method, Multi Stage Graphs, All Pairs Shortest Paths, Single Source Shortest Paths, Optimal Binary Search Trees, String Editing -0/1 Knapsack, Reliability Design, The Traveling Sales Person Problem, Flow Shop Scheduling. <b>Basic Traversal and Search Techniques:</b> Techniques for Binary Trees, Techniques for Graphs: Breadth First Search and Traversal-Depth First Search, Connected Components and Spanning Trees, Bi-Connected Components and DFS.	17
IV	<b>Backtracking:</b> The General Method, The 8-Queens Problem, Sum of Subsets, Graph Coloring, Hamiltonian Cycles, Knapsack Problem. <b>Branch and Bound :</b> The Method: Least Cost Search, The 15 Puzzle Control Abstractions for LC Search, Bounding, FIFO Branch and Bound , LC Branch and Bound, 0/1 Knapsack Problem, LC Branch and Bound Solution, FIFO Branch and Bound Solution, Traveling Sales person.	11
V	<b>NP-Hard and NP-Complete Problems:</b> Basic Concepts: Non Deterministic Algorithms, The Classes NP Hard and NP Complex, Cook's Theorem, NP Hard Graph Problems, Clique Decision Problem, Node Cover Decision Problem Chromatic Number Decision Problem, Directed Hamiltonian Cycle, Traveling Sales Person Decision Problem, AND/OR Graph Decision Problem, NP-Hard Scheduling Problems, Scheduling Identical Processors, Flow Shop Scheduling, Job Scheduling, NP-Hard Code Generation Problems, Code Generation With Common Sub Expressions, Implementing Parallel Assignment Instructions, Some Simplified NP-Hard Problems.	8

#### Prescribed Text Book

S.No	Author	Title	Publisher
1	Sartaj Sahni	Fundamentals of Computer Algorithms	Second Edition, Universities Press (2008)

#### Reference Text Books

S.No.	Author	Title	Publisher
1	Anany Levitin	Introduction to the Design & Analysis of	Second Edition, Pearson
2	I.Chandra Mohan	Design and Analysis of Algorithms	PHI
3	Prabhakar Gupta, Vineet Agrawal	Design and Analysis of Algorithms	PHI
4	Parag Himanshu, Dave	Design and Analysis of Algorithms	Pearson Education (2008)

**Course Focus:** Foundation / Skill Development.

#### Reference Websites :

- <https://epgp.inflibnet.ac.in/Home>
- <https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-046j-design-and-analysis-of-algorithms-spring-2015/lecture-notes/>
- [https://www.cukashmir.ac.in/cukashmir/User\\_Files/imagefile/DIT/StudyMaterial/DAA/DAA\\_UNIT I\\_6th-Sem\\_StudyMaterial.pdf](https://www.cukashmir.ac.in/cukashmir/User_Files/imagefile/DIT/StudyMaterial/DAA/DAA_UNIT_I_6th-Sem_StudyMaterial.pdf)



**P.B. Siddhartha College of Arts & Science, Vijayawada - 520 010.**  
**(An Autonomous College in the jurisdiction of Krishna University)**  
**M.Sc.(Computer Science) Programme - III Semester**  
**Course Code: 20CS3T3 Title: DESIGN AND ANALYSIS OF ALGORITHMS**  
**(w.e.f admitted batch 2020-21)**

**Time: 3 Hours**

**Max. Marks: 70**

**Answer ALL questions**

**(10×2 = 20 Marks)**

1.
  - a) Define *Algorithm*. (CO1,L1)
  - b) What is a *Priority Queue*? (CO1,L1)
  - c) Define *Convex Hull*. (CO2,L1)
  - d) What is *Tree Vertex Splitting*? (CO2,L1)
  - e) What is *String Editing*? (CO3,L1)
  - f) Differentiate *DFS and BFS*. (CO3,L1)
  - g) What is *Graph Colouring*? (CO4,L1)
  - h) What is *LC and FIFO Branch and Bound*? (CO4,L1)
  - i) Compare *NP Hard and NP Complete Classes*. (CO5,L1)
  - j) What is *flow shop scheduling in NP Hard Scheduling problems*? (CO5,L1)

**Answer Five Questions Choosing One Question from Each Unit.**  
**All Questions Carry Equal Marks. (5×10 = 50 Marks)**

UNIT – I

2. a) Explain *Asymptotic Notations* regarding time and space complexities of an algorithm. (CO1,L2)  
(or)  
b) Explain in detail about *Heap Sort Technique* with an example. (CO1,L2)

UNIT – II

3. a) What is *Divide and Conquer approach*? Apply it on *Quick Sort* with an example. (CO2,L2)  
(or)  
b) What is *Greedy method*? Explain *Kruskal's Algorithm* to find *minimum cost spanning tree* with an example. (CO2,L2)

UNIT – III

4. a) Explain the application of *Dynamic Programming* on *Travelling Salesman Problem*. (CO3,L2)  
(or)  
b) Explain the procedure to obtain *Optimal Binary Search Tree* by applying *Dynamic Programming* approach. (CO3,L2)

UNIT – IV

5. a) What is *0/1-Knapsack Problem*? Solve it using *Branch and Bound Technique*. (CO4,L2)  
(or)  
b) Explain the *Sum of Subsets Problem*. How can it be solved using *Back Tracking Technique*? (CO4,L2)

UNIT – V

6. a) Write *Cook's theorem*. Briefly explain *Cook's theorem*. (CO5,L2)  
(or)  
b) Discuss various *NP Hard Graph Problems*. (CO5,L2)



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**Programme: M.Sc. (Computer Science)**

**Title of the Paper: Data Mining Techniques**

**Semester: III**

Course Code	20CS3T4	Course Delivery Method	Class Room / Blended Mode
Credits	4	CIA Marks	30
No. of Lecture Hours / Week	4	Semester End Exam Marks	70
Total Number of Lecture Hours	60	Total Marks	100
Year of Introduction :2005	Year of Offering:2021	Year of Revision: 2018-19	Percentage of Revision:20%

## Course Objective:

To understand and gain knowledge on *Basic Concepts, Applications, Techniques of Data Mining, Data Warehouse Architecture and its Components, Schemas, Different OLAP Operations, Characterize The Kinds of Patterns that can be discovered by Association Rule Mining, Data Classification and Prediction Techniques, Identify the Similarities among the data Using Clustering Algorithms and Outlier Analysis.*

**Course Outcomes:** On successful completion of this course, the students will be able to

**CO1:** Understand the *Basics of Data Mining and Data Pre-Processing Techniques.*

**CO2:** Aware of constructing the *Data Warehouse, OLAP and relevant Data Model Concepts.*

**CO3:** Understand the *Frequent Itemset Mining Methods* and Different Levels in Association Rules.

**CO4:** Understand the *Basic Concepts in Classification and Advanced Classification Methods* by implementing *Various Algorithms.*

**CO5:** Find the similarities among the data using *Clustering Algorithms and Outlier Analysis.*

## Syllabus

### Course Details

Unit	Learning Units	Lecture Hours
I	<p><b>Introduction:</b> What is Data mining?, What Kind of Data can be Mined, What kinds of Patterns can be Mined, Major Issues in Data Mining.</p> <p><b>Data Preprocessing:</b> Data Preprocessing : An Overview, Data Cleaning, Data Integration, Data Reduction-Overview of Data Reduction Strategies, Attribute Subset Selection, Regression and Log Linear Models, Histograms and Clustering, Data Transformation : Data Transformation Strategies Overview, Data Transformation by Normalisation, Discretization by Binning.</p>	12
II	<p><b>Data Warehousing and OLAP:</b> Data Warehouse : Basic Concepts, What Is a Data Warehouse?, Difference between Operational Database Systems and Data Warehouses, Why have a separate Data Warehouse?, Data Warehousing : A Multiered Architecture, Data Warehouse Models, Extraction, Transformation and Loading, Metadata Repository, Data Warehouse Modeling : Data Cube and OLAP-A Multidimensional Data Mode-From Tables and Spreadsheets to Data Cubes, Stars, Snowflakes and Fact Constellations : Schemas for Multidimensional Data Models , Dimensions : The Role of Concept Hierarchies, Measures: their categorisation and computation, Typical OLAP Operations in the Multidimensional Data Model, A Starnet Query Model for Querying Multidimensional Databases.</p>	12
III	<p><b>Mining Frequent patterns, Associations:</b> Basic Concept, Market Basket Analysis : A Motivational Example, Frequent Item Sets, Closed Item Sets and Association Rules, Frequent Item Set Mining Methods.</p> <p><b>Advanced Pattern Mining:</b> Pattern Mining : A Road Map, Pattern Mining in Multilevel, Multidimensional Space, Mining Multilevel Association Rules, Mining Multi Dimensional Associations, Mining Quantitative Association Rules.</p>	12
IV	<p><b>Classification: Basic Concepts:</b> What is Classification?, General Approaches to Classification, Decision Tree Induction, Attribute Selection Measures, Tree Pruning, Scalability and Decision Tree Induction, Bayes Classification Methods, Bayes Theorem, Navie Bayesian Classification.</p> <p><b>Classification: Advanced Methods:</b> Bayesian Belief Networks, Concepts and Mechanisms, Training Bayesian Belief Networks, Classification by Back Propagation.</p>	12
V	<p><b>Cluster Analysis Introduction:</b> What is Cluster Analysis?, Requirements for Cluster Analysis, A Partitioning Methods : K-Means, K-Medoid, Hierarchical Methods : Agglomerative versus Divisive Hierarchical Clustering, Distance Measures in Algorithmic Methods, BRICH : Multiphase Hierarchical Clustering using Clustering Feature Trees, Chameleon Hierarchical Clustering, Density Based Methods : DBSCAN.</p> <p><b>Outlier Detection:</b> What is Outliers Analysis?, Types of Outliers, Challenges of Outlier Detection.</p>	12

Text Books			
	Author	Title	Publisher
1	Jiawei Han, Micheline Kamber	Data mining : Concepts & Techniques	Morgan Kaufmann 3 <sup>rd</sup> Edition Chapter-1 1.2,1.3,1.4,1.7 Chapter-3 3.1,3.2,3.3,3.4(3.4.1,3.4.4,3.4.5,3.4.6,3.4.7) Chapter-4 4.1 to 4.2 Chapter-6 6.1 to 6.2 Chapter-7 7.1,7.2(7.2.1 to7.2.3) Chapter-8 8.1,8.2(8.2.1,8.2.2,8.2.3,8.2.4),8.3 Chapter-9 9.1 to 9.2 Chapter-10 10.1,10.2,10.3(10.3.1,10.3.2,10.3.3,10.3.4),10.4(10.4.1) Chapter-12 12.1(12.1.1,12.1.2,12.1.3)

Reference Books			
	Author	Title	Publisher
1	Ralph Kimball	The Data Warehousing Toolkit	Wiley
2	S.N.Sivanandam, S.Sumathi	Data Mining-Concepts, Tasks and Techniques	Thomson

### Websites of Interest:

1. [www- db.stanford.edu /ullman/mining/mining.html](http://www-db.stanford.edu/~ullman/mining/mining.html) : Data mining lecture notes.
2. [ocw.mit.edu/ocwweb/slon-School-of-management/15-062Data-Mining Spring2003/course](http://ocw.mit.edu/ocwweb/slon-School-of-management/15-062Data-Mining Spring2003/course)

**Course Focus:** Foundation / Employability / Skill Development.

**P.B. Siddhartha College of Arts & Science, Vijayawada - 520 010.**  
**(An Autonomous College in the jurisdiction of Krishna University)**  
**M.Sc., (Computer Science) Programme - III Semester**  
**Course Code: 20CS3T4 Title: DATA MINING TECHNIQUES**  
**(w.e.f admitted batch 2020-21)**

**Time: 3 Hours**

**Max. Marks: 70**

**Answer ALL questions**

**(10×2 = 20 Marks)**

1. a) Difference between *Data Mining* and *KDD* (CO1,L4)
- b) What is meant by *Data Preprocessing*? (CO1,L1)
- c) Define *Multidimensional Data model*. (CO2,L1)
- d) OLAP versus OLTP (CO2,L4)
- e) Give one example for *Closed Itemset* and *Maximal Frequent Itemset* (CO3,L1)
- f) What is meant by *Association Rule*? (CO3,L1)
- g) Explain *Bayes Theorem*. (CO4,L2)
- h) Define *Classification* with Example. (CO4,L1)
- i) What are the requirements of *Cluster Analysis*? (CO5,L1)
- j) What is meant by *Outliers*? (CO5,L1)

**Answer Five Questions Choosing One Question from Each Unit.**

**All Questions Carry Equal Marks.**

**(5×10 = 50 Marks)**

UNIT – I

2. a) Define Data Mining. What kinds of Patterns can be mined in *Data Mining*. 10M (CO1,L1)  
(or)
- b) Define *Data Integration*. What are the *Different Techniques used in Data Integration*. 10M (CO1,L1)

UNIT – II

3. a) Define *Data Warehouse*. Explain *Data Warehouse Architecture* with neat Diagram. 10M (CO2,L1)  
(or)
- b) What are the different types of *Schemas* used in *Multi Dimensional Data Model*? 10M (CO2,L1)

UNIT – III

4. a) Explain *Aprior Algorithm* with Example. 10M (CO3,L2)  
(or)
- b) Explain *Multi Level and Multi Dimensional Association Rules* with Examples. 10M (CO3,L2)

UNIT – IV

5. a) Explain *Decision Tree Induction Algorithm* with Example. 10M (CO4,L5)  
(or)
- b) Explain *Naïve Bayes Classification* with Example. 10M (CO4,L5)

UNIT – V

6. a) Explain *Different Partitioning Methods* used in *Cluster Analysis*. 10M (CO5,L2)  
(or)
- b) Explain in detail about *Hierarchical Clustering*. 10M (CO5,L2)



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**Programme: M.Sc.(Computer Science)**

**Title of the Paper: Web Technologies Lab**

**Semester: III**

Course Code	20CS3L1	Course Delivery Method	Class Room / Blended Mode
Credits	4	CIA Marks	30
No. of Lecture Hours / Week	8	Semester End Exam Marks	70
Total Number of Lecture	90	Total Marks	100
Year of Introduction :2006	Year of Offering:2021	Year of Revision: 2021-22	Percentage of Revision: 20%

**Course Objective:** Able to build functional *Web Applications using HTML*, Able to use *JavaScript and DHTML for Web Designing*, Able to code using XML and PHP for *Integrating with Web Pages*, Create *Dynamic Web Pages* where in client interaction is facilitated using advanced server technology like *JSP* and *Web Pages with Database Connectivity using PHP*.

**Course Outcomes:** On successful completion of the course student will be able to:

**CO1:** Build functional *Web Applications HTML*.

**CO2:** Incorporates *Multimedia Capabilities and Web Page Designs using Cascading Style Sheets*.

**CO3:** Code *Client Server Interaction Programs* using *Java Based Server Technology* named *Servlets*.

**CO4:** Create *Dynamic Web Pages* where in *Client Interaction* is facilitated using *Advanced Server Technology* like *JSP*.

**CO5:** Integrate *Offline Data Storage, Background Processes* and *APIs* using *Database Connectivity* and *ASP*.

## Syllabus

### Course Details

#### HTML:

1. Develop HTML code to provide intra document linking. (CO1,L6)
2. Develop HTML code to provide inter document linking. (CO1,L6)
3. Develop a program to implement the three types of lists. (CO1,L6)
4. Create a HTML page using frames. (CO1,L6)
5. Develop a program to embed college picture into your web page and develop a short note on your college using paragraph tag. (CO1,L6)
6. Illustrate a suitable example; depict how we can align text using a table tag as follows. (CO1,L2)

II M.C.A	Pass percentage=95%
	Fail percentage=5%
III M.C.A	Pass percentage=97%
	Fail percentage=3%

7. Develop a program to create the time table as follows: (CO1,L6)

	1	2	3		4	5	6
<b>MON</b>	<-----WEB LAB----->				SE	WEB	PPL
<b>TUE</b>	UML	CRY	SE	B	<-----VB LAB----->		
<b>WED</b>	WEB	SE	UML	R	CRY	PPL	
<b>THU</b>	CRY	WEB	PPL	E	<-----WEB LAB----->		
<b>FRI</b>	<-----VB LAB----->			A	PPL	WEB	UML
<b>SAT</b>	SE	CRY	UML	K	<-----SEMINARS----->		

8. Create a Registration form that interacts with the user. Collect login name, password, date of birth,sex, address, qualification and display a “Thank you for registering” message when the user submits the form. (CO1,L6)

Login name:    
 Enter Password:    
 Reenter Password:    
 Birthdate:    
 Sex:  Male  Female  
 Enter Address:   
 Enter qualification:

**Java Script:**

9. Develop a script to compare two strings using String object. (CO1,L6)
10. Develop a script to generate random numbers within 1 to 10 and display the numbers in a table. (CO1,L6)
11. Develop a Java Script to update the information into the array, in the “onClick” event of the button “Update”. (CO1,L6)
12. Create a web page for a shopping mall that allows the user to tick off his purchases and obtain the bill with the total being added up simultaneously. (CO1,L6)

Item details	Price of item	Click here to select
	8399	<input type="checkbox"/>
	5000	<input checked="" type="checkbox"/>
	450	<input checked="" type="checkbox"/>
	399	<input type="checkbox"/>
YOUR TOTAL BILL IS 5450		



13. Develop a script to find the duplicate elements of an array. (CO1,L6)
14. Develop a script which generates a different greeting each time the script is executed. (CO1,L6)
15. Develop a JavaScript to check the number is Armstrong number or not by getting the number from textbox and the result is displayed in a alert dialog box. (CO1,L6)
16. Develop a java script code that accepts user name and password from user, Check their correctness and display appropriate alert messages. (CO1,L6)

**DHTML:**

17. Create an inline style sheet. Illustrate the use of an embedded style sheet. (CO2,L6)
18. Create an external style sheet to illustrate the “Font” elements. (CO2,L6)
19. Develop a program to switch on and off light using onClick event. (CO2,L6)
20. Illustrate different types of filters (at least six) on a sample text. (CO2,L2)
21. Develop a program to illustrate tabular data control for data binding. (CO2,L6)

**XML:**

22. Create a small XML file designed to contain information about student performance on a module. Each student has a name, a roll number, a subject mark and an exam mark. (CO3,L6)
23. Create a internal DTD file. (CO3,L6)
24. Create an external DTD file. (CO3,L6)
25. Create a XSLT style sheet to display the student data as an HTML table. (CO3,L6)

**PHP:**

26. Illustrate PHP declarations and expressions to find factorial of a given number using. (CO5,L2)
27. Develop a PHP program that interacts with the user .Collect first name last name and date of birth and displays that information back to the user. (CO5,L6)
28. Develop a PHP program to connect MySQL Database. (CO5,L6)

**JSP:**

29. Develop a program to implement JSP directives. (CO4,L6)
30. Develop a JSP program for session tracking. (CO4,L6)

Prescribed Textbook			
	Author	Title	Publisher
1	N.P.Gopalan, J.Akilandeswari	Web Technologies-A Developer’s Perspective	PHI(2008)
2	Harvey M. Deitel and Paul I. Deitel	Internet and World Wide Web How To Program, 5e	Prentice Hall; 4th edition

**Course Focus:** Employability

**Websites of Interest:**

1. <https://www.w3schools.com>
2. <https://www.edx.org/learn/web-development>
3. <https://www.codecademy.com/learn/paths/web-development>



# P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

Siddhartha Nagar, Vijayawada – 520 010.

NAAC reaccredited at 'A+' level

Autonomous -ISO 9001 – 2015 Certified

**Programme: M.Sc.(Computer Science)**

**Title of the Paper: Data Mining Lab**

**Semester: III**

Course Code	20CS3L2	Course Delivery Method	Class Room / Blended Mode
Credits	4	CIA Marks	30
No. of Lecture Hours / Week	8	Semester End Exam Marks	70
Total Number of Lecture Hours	90	Total Marks	100
Year of Introduction : 2018	Year of Offering : 2021	Year of Revision : 2021-22	Percentage of Revision: 20%

### Course Objective:

The main objective of this lab is to impart the knowledge on *How to implement Data Mining Algorithms using Various Tools* and *How to characterize the kinds of Patterns* that can be discovered by *Association Rule Mining, Classification, Clustering, Identifying Outliers* and *Emphasize Hands-on Experience* working with all *Real Time Data Sets*.

**Course Outcomes:** On successful completion of this course, the students will be able to

**CO1:** Understand the *Various Kinds of Tools*.

**CO2:** Apply *Mining Techniques* for *Realistic Data*.

**CO3:** Understand the *Basic Concepts* in R and *Weka*.

**CO4:** Understand how to import and export *CSV Files* and *Package* installation in R.

**CO5:** Develop and visualization of *Data Mining Algorithms* in R.

### Using Weka Tool:

1. How to create and load *Data Set* in Weka. (CO4,L1)
2. Interpret all the *Categorical (or Nominal) Attributes* and the *Real-Valued Attributes* separately. (CO2,L2)
3. Construct *Association Rules* using Weka.(CO2,L6)
4. Construct *Multilayer Perceptron* or *Neural Network*. (CO5,L6)
5. Construct *Time Series Forecasting* using Weka. (CO5,L6)
6. Demonstration of preprocessing to remove *Attributes, Instances* and *Perform Discretization* using dataset weather.arff. (CO2,L2)
7. Create *K-Mean Clustering* using Weka. (CO3,L6)
8. Develop *Decision Tree* by training data set using Weka. (CO3,L6)
9. Create *Hierarchical Clustering* using Weka. (CO3,L6)
10. Identifying and removing *Outliers* using Weka. (CO3,L1)

### Using R Programming:

11. How to import data into R from text and excel files using *read.table()* and *read.csv* functions. (CO1,L1).
12. Create *Association Rules* using *Aprior Algorithm* in R. (CO5,L6)
13. Construct *Multilayer Perceptron* or *Neural Network* using R. (CO5,L6)
14. Apply *Time Series Analysis* using R. (CO5,L3)
15. Apply *Time Series Forecasting* using R. (CO5,L3)
16. Apply *Time Series Decomposition* using R. (CO5,L3)
17. Create *K-Means Clustering Algorithm* using R. (CO5,L6)
18. Construct *Decision Tree* in R using package *party*. (CO5,L6)
19. Create *Hierarchical Clustering* using R. (CO5,L6)
20. Create Hierarchical Clustering with Euclidean Distance using R. (CO5,L6)
21. Examine *K-Medoids* clustering using R. (CO5,L4)
22. *Detecting and Removing* outliers using R. (CO5,L1)
23. Construct *Density Based Clustering* using R. (CO5,L6)
24. Illustrate *Linear Regression* using R. (CO5,L2)
25. Illustrate *Multiple Regression* using R. (CO5,L2)
26. Illustrate *Logistic Regression* using R. (CO5,L2)
27. Construct *Outlier Detection by Clustering* using R. (CO5,L6)
28. *Detecting and Removing* Missing values in R. (CO3,L1)
29. Create different kinds of *Charts* using *Sample Data Sets* in R. (CO3,L6)
30. Create *Word Cloud* using R. (CO3,L6)

### Websites of Interest :

1. <https://www.cs.waikato.ac.nz/ml/weka>.
2. <https://weka.wikispaces.com>
3. <https://www.rdocumentation.org/packages/stats/versions/3.6.2>
4. <http://www.r-bloggers.com/>

**Course Focus:** Foundation / Employability / Skill Development.

**APPENDIX-V**  
**SYLLABUS FOR THE ACADEMIC YEARS 2021-2022(R20)**  
**M.C.A, THIRD SEMESTER**

Applicable for the batch of students admitted during the Academic Year 2020-2021										
M.C.A					SEMESTER III					
S.No.	Course Code	Title of the Course	Instruction Hours per Week			Credits	Evaluation			Total Marks
			L	T	P		CIA Marks	SEE		
								Marks	Duration	
1	20CA3T1	Big Data and Analytics	4			4	30	70	3 Hours	100
2	20CA3T2	Artificial Intelligence & Machine Learning	4			4	30	70	3 Hours	100
3	20CA3T3	Design & Analysis of Algorithms	4			4	30	70	3 Hours	100
4		Open Elective-II (Student has to select one open elective from the elective courses provided)	4			4	30	70	3 Hours	100
5	Core Elective-I		4			4	30	70	3 Hours	100
	20CA3T4	Cloud Computing								
	20CA3T4i	Block Chain Technology								
6	Core Elective-II				4	4	30	70	3 Hours	100
	20CA3T5	Cryptography & Network Security								
	20CA3T5i	Internet of Things (IoT)								
7	20CA3L1	Big Data and Analytics Lab			8	4	30	70	3 Hours	100
8	20CA3L2	Data Mining Lab			8	4	30	70	3 Hours	100
Total			40			32	240	560		800
CIA=Continuous Internal Assessment					SEE=Semester End Examinations					



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Siddhartha Nagar, Vijayawada – 520 010

*Autonomous -ISO 9001 - 2015 Certified*

**Programme: M.C.A**

**Title of the Paper: Big Data and Analytics**

**Semester: III**

Course Code	20CA3T1	Course Delivery Method	Class Room / Blended Mode
Credits	4	CIA Marks	30
No. of Lecture Hours / Week	4	Semester End Exam Marks	70
Total Number of Lecture Hours	60	Total Marks	100
Year of Introduction : 2018	Year of Offering: 2021	Year of Revision: 2021-22	Percentage of Revision: 10%

**Course Objective:** To understand *Big Data and Analytics*, To gain knowledge on *Hadoop Distributed File System* and *Hadoop Eco system*, To know *Processing Data with Hadoop Environment*, To implement *Map Reduce Operations*, To implement *NoSQL Databases (MongoDB)*, To understand *Hadoop Eco System components (Hive, Apache PIG and Hbase)*, To know *Basic Visualization using Tableau, Extracting Data, Data Blending, Creating Charts*.

**Course Outcomes :** At the end of this course, students should be able to:

**CO1:** Understand *Big Data, Importance of Big Data and Challenges in Big Data Implementation*.

**CO2:** Understand the *Distribution Computing Challenges (HDFS), Hadoop Environment and Hadoop Eco System*.

**CO3:** Process *Data with Hadoop, Map Reduce Programming and MongoDB*.

**CO4:** Understand the *Hadoop Eco System (HIVE, Hbase and Apache PIG)*.

**CO5:** Extract *Data, Data Blending and Connecting Various Data Sources and Use them in Data Visualization*.

<b>Syllabus</b>		
<b>Unit</b>	<b>Learning Units</b>	<b>Lecture Hours</b>
I	<p>Types of Digital Data: Classification of Digital Data.</p> <p>Introduction to Big Data: Characteristics of Data, Evolution of Big Data, Definition of Big Data, Challenges with Big Data, What is Big Data?, Other Characteristics of Data, Why Big Data?,</p> <p>Traditional Business Intelligence versus Big Data, Typical Data Warehouse Environment, Typical Hadoop Environment, Coexistence of Big Data and Data Warehouse, What is Changing in the realms of Big Data.</p> <p>Big Data Analytics: What is Big Data Analytics, What Big Data Analytics Isn't?, Why this sudden Hype around Big Data Analytics?, Classification of Analytics, Greatest Challenges that Prevent Business from Capitalizing Big Data, Top Challenges facing Big Data, Why Big Data Analytics Important?, What Kind of Technologies are we looking toward to help meet the challenges posed by Big Data?, Data Science, Data Scientist, Terminologies used in Big Data Environments.</p>	12
II	<p>Hadoop: Features of Hadoop, Key advantages of Hadoop, Versions of Hadoop, Overview of Hadoop Ecosystem, Hadoop Distributions, Why Hadoop?, Why not RDBMS, RDBMS versus Hadoop, Distribution Computing Challenges, History of Hadoop, Hadoop Overview, Hadoop Distributed File System.</p>	12
III	<p>Processing Data with Hadoop, Managing Resource and Applications with Hadoop with YARN (Yet Another Recourse Negotiator), Interfacing with Hadoop Ecosystem.</p> <p>Introduction to Map Reduce Programming: Introduction, Mapper, Reducer, Combiner, Partitioner, Searching, Sorting, Compression,</p> <p>NoSQL: Where it is used?, What is it?, Types of NoSQL Databases, Why NoSQL?, Advantages of NoSQL, What we miss with NoSQL?, Use of NoSQL in Industry, SQL versus NoSQL.</p> <p>MongoDB: What is MongoDB, Why MongoDB, Using JavaScript, Script Object Notation, Generating Unique Key, Support for Dynamic Queries, Storing Binary Data, Relication, Sharding, Updating Information in Place, Terms used in RDBMS and MongoDB, Data Types in MongoDB, MongoDB Query Language?</p>	12
IV	<p>Hadoop Eco System</p> <p>Hive: What is Hive, Hive Architecture, Hive Data Types, Hive File Format, Hive Query Language (HQL), RC File Implementation, User Defined Function.</p> <p>PIG: What is PIG, Anatomy of Pig, Pig on Hadoop, Pig Philosophy, Use Case for Pig, Pig Latin, Data type in Pig, Running Pig, Execution Mode of Pig, HDFS Commands, Relational Operators, Eval Funtions, Complex Data Types, User Defined Functions, Parameter Substitution.</p> <p>HBase: HBasics, Concepts, Clients, HBase vs RDBMS</p>	12
V	<p>Introduction to Tableau: What is Tableau? Opening Existing Workbooks, Creating New Workbooks, Tableau.</p> <p>Basic Visualization Design: Using Show Me, Choosing Mark Types, Color, Size, Shape, and Label Options, Choosing Color Options, Setting Mark Size, Choosing Shapes, Text Tables and Mark Labels, Formatting Options, Evaluating Multiple Measures, Shared Axis Charts, Measure Names and Measure Values, Dual Axis Charts.</p> <p>Connecting to Data: Connecting to Various Data Sources, The Data Source Page.</p> <p>Customizing Your View of the Data: Changing Data Type, Modifying Dimension/ Measure Assignment, Hiding, Renaming, and Combining Fields, Splitting Fields ,Changing the Default Field Appearance, Organizing Dimensions in Hierarchies Using Table or Folder View, Saving and Sharing Metadata</p> <p>Extracting Data, Data Blending, Moving from Test to Production Databases (Top 10 Chart Types): Bar Chart, Line/Area Chart, Pie Chart, Text Table/Crosstab, Scatter Plot, Bubble Chart, Bullet Graph, Box Plot, Tree Map, Word Cloud.</p>	12

Prescribed Text Book			
	Author	Title	Publisher
1	Seema Acharya, Subhashini Chellappan	BigData and Analytics 2 <sup>nd</sup> edition	Wiley Publications. (Unit I, II, III,IV)
2	George Peck	Tableau 9 - The official Guide	Mcgraw hill - 2016

**Course has focus on :** Employability

**Websites of Interest :**

1. Big Data Computing (noc19-cs33 – NPTEL videos ):Prof Rajiv Misra,Dept of CSE, IIT Patna
2. Tableau Training for Beginners | Edureka <https://www.youtube.com/watch?v=aHaOivR00So>
3. Tableau Training for Beginners | Simplilearn <https://www.youtube.com/watch?v=Wh4sCCZjOwo>

**Co-curricular Activities :** Programming Contests, workshops & Quiz.

Reference Text Book			
	Author	Title	Publisher
1	Tom White	Hadoop: The Definitive guide	O'Reilly 4e
2	Nathan, Marz James Warren	Big Data Principles and Best Practices of Scalable Real Time Data Systems	MANNING Publications 2015
3	Stirrup,Nandeshwar,Ohmann,Floyd	Tableau: Creating Interactive Data Visualizations	Packt Publishing 2016
4	Visual Analytics with Tableau	Alexander Loth	Wiley 2019
5	Data Analytics and Visualization in Quality Analysis Using Tableau	Jaejin Hwang and Youngjin Yoon	CRC Press-Taylor & Francis Group

**P.B. Siddhartha College of Arts & Science, Vijayawada - 520 010.**  
**(An Autonomous College in the jurisdiction of Krishna University)**

**M.C.A Programme - III Semester**

**Course Code: 20CA3T1 Title: Big Data and Analytics**

**(w.e.f admitted batch 2020-21)**

**Time: 3 Hours**

**Max. Marks: 70**

**Answer ALL questions**

**(10×2 = 20 Marks)**

- 1) a) How to Deal with Unstructured Data? (CO1,L1)
- b) Write short notes on vertical scaling and horizontal scaling. (CO1,L1)
- c) What is the role of Data Scientist? (CO2,L1)
- d) What is Brewers theorem? (CO2,L1)
- e) What is the role of combiner in Map-reduce? (CO3,L1)
- f) What are advantages and disadvantages of NoSQL? (CO3,L1)
- g) State any two Hive storage formats. (CO4,L1)
- h) What is role of zoo keeper in *Hbase*? (CO4,L1)
- i) What is role of Apache pig in Hadoop Ecosystem ? (CO5,L1)
- j) State join techniques in Tableau . (CO5,L1)

**Answer Five Questions Choosing One Question from Each Unit.**  
**All Questions Carry Equal Marks. (5×10 = 50 Marks)**

**UNIT I**

- 2) a) Explain V's in BigData. (CO1,L2) 10 Marks
- (or)
- b) Explain Top challenges facing Big Data. (CO1,L2) 10 Marks

**UNIT II**

- 3) a) *Explain architecture of HDFS with neat diagram.* (CO2,L2) 10 Marks
- (or)
- b) Illustrate Hadoop eco-system with neat diagram (CO2,L2) 10 Marks

**UNIT III**

- 4) a) Explain Map-Reduce framework with suitable examples. (CO3,L5) 10 Marks
- (or)
- b) Explain CRUD operations in MongoDB with examples (CO3,L5) 5 Marks
- c) Explain exporting and importing of JSON files in MongoDB with examples (CO3,L5) 5 Marks

**UNIT IV**

- 5) a) Explain Hive architecture with neat diagram (CO4,L5) 10 Marks
- (or)
- b) Illustrate Anatomy of apache PIG. (CO4,L5) 10 Marks

**UNIT V**

- 6) a) Discuss the process of data blending in Tableau with example (CO5,L6) 10 Marks
- (or)
- b) Explain the process of creating any four charts in Tableau with examples. (CO5,L5) 10 Marks





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**Programme: M.C.A**

**Title of the Paper: Artificial Intelligence & Machine Learning**

**Semester: III**

Course Code	20CA3T2	Course Delivery Method	Class Room / Blended Mode
Credits	4	CIA Marks	30
No. of Lecture Hours / Week	4	Semester End Exam Marks	70
Total Number of Lecture Hours	60	Total Marks	100
Year of Introduction :2018	Year of Offering:2021	Year of Revision:2021-22	Percentage of Revision:10%

**Course Objective:** This course focuses on *How to realize the Intelligent Human Behaviors on a Computer and introduces the Fundamental Methods at the core of modern Machine Learning*. It enables a computer to *Learn, Plan, and Solve* problems *Autonomously*. It covers *Theoretical Foundations* as well as *Essential Concepts* in *Supervised and Unsupervised Learning, ANN, Instance Based Learning*.

**Course Outcomes:**

At the end of this course, students will be able to:

**CO1:** Identify problems that are amenable to *AI Techniques* and analyse *Search Techniques* to solve those problems.

**CO2:** Understand *Representation Languages* like *First Order Logic*.

**CO3:** Formalize and implement different *AI Algorithms*, various *Knowledge Representations* and identify the importance of planning to solve *AI Problems*.

**CO4:** Understand about basics of *Machine Learning* and *Conceptual Learning*.

**CO5:** Acquire knowledge about *ANN* and *Instance Based Learning*.

## Syllabus

### Course Details

Unit	Learning Units	Lecture Hours
I	<b>Introduction:</b> What Is AI? The Foundations of Artificial Intelligence, The History of Artificial Intelligence. <b>Solving Problems by Searching:</b> Problem-Solving Agents, Example Problems, Searching for Solutions, Uninformed Search Strategies, Informed (Heuristic) Search Strategies, Heuristic Functions.	10
II	<b>First-Order Logic:</b> Syntax and Semantics of First-Order Logic, Using First-Order Logic, Knowledge Engineering in First-Order Logic. <b>Inference in First-Order Logic:</b> Propositional vs. First-Order Inference, Unification and Lifting, Forward Chaining, Backward Chaining, Resolution.	10
III	<b>Classical Planning:</b> Definition of Classical Planning ,Algorithms for Planning as State-Space Search, Planning Graphs, Other Classical Planning Approaches, Analysis of Planning Approaches. <b>Knowledge Representation:</b> Ontological Engineering, Categories and Objects Events, Mental Events and Mental Objects.	15
IV	<b>Learning from Examples:</b> Forms of Learning, Supervised Learning, Learning Decision Trees, Evaluating and Choosing the Best Hypothesis, The Theory of Learning, Regression and Classification with Linear Models. <b>Reinforcement Learning:</b> Introduction, Passive Reinforcement Learning, Active Reinforcement Learning, Generalization in Reinforcement Learning, Policy Search, Applications of Reinforcement Learning.	15
V	<b>Artificial Neural Networks:</b> Neural Network Representation, Appropriate Problems for Neural Network Learning, Perceptrons, Multilayer Networks and the Backpropagation Algorithm, Remarks on the Backpropagation Algorithm, Recurrent Networks, Dynamically Modifying Network Structure. <b>Instance-Based Learning:</b> Introduction, K-Nearest Neighbour Learning, Radial Basis Functions, Case-Based Reasoning.	10

#### Prescribed Text Book

	Author	Title	Publisher
1	Stuart J. Russell and Peter Norvig	Artificial Intelligence A Modern Approach	Prentice Hall, Third edition,2010 1.1,1.2,1.3,3.1,3.2,3.3,3.4,3.5,3.6, 8.2,8.3,8.4,9.1,9.2,9.3,9.4,9.5, 10.1,10.2,10.3,10.4,10.5,12.1,12.2, 12.3,12.4,18.1,18.2,18.3,18.4,18.5, 21.1, 21.2, 21.3, 21.4, 21.5, 21.6
2	Tom.M. Mitchell	Machine Learning	TMH (2013) 4.2,4.3,4.4,4.5,4.6,4.7, 4.8,8.1,8.2,8.4,8.5.

Reference Text Book			
	Author	Title	Publisher
1	Winston. P.H	Artificial Intelligence	Addison Wesley (1993)
2	Peter Flach	Machine Learning The Art and Cambridge Science of Algorithms that University Make Sense of Data Press	PearsonEducation (2007), Third Edition.
3	Elaine Rich& Kevin Knight	Artificial Intelligence	TMH (1991)

**Course has focus on :** Foundation, Employability

**Websites of Interest :**

1. <https://www.cs.utexas.edu/~mooney/cs343/>
2. <https://www.cin.ufpe.br/~cavmj/Machine%20-%20Learning%20-%20Tom%20Mitchell.pdf>
3. [https://www.researchgate.net/publication/337704931\\_Concept\\_of\\_Artificial\\_Intelligence\\_its\\_Impact\\_and\\_Emerging\\_Trends](https://www.researchgate.net/publication/337704931_Concept_of_Artificial_Intelligence_its_Impact_and_Emerging_Trends)
4. <https://machinelearningmastery.com/basic-concepts-in-machine-learning/>

Time: 3 Hours

Max. Marks: 70

Answer ALL questions

(10×2 = 20 Marks)

- 1) a) What is *Artificial Intelligence*? (CO1,L1)
- b) What is *Heuristic*? (CO1,L1)
- c) What are *quantifiers*? (CO2,L1)
- d) Differentiate *Propositional vs First Order Logic*. (CO2,L1)
- e) What is *PDDL*? (CO3,L1)
- f) What are *categories and Objects*? (CO3,L1)
- g) What is *Regression*? (CO4,L1)
- h) What is *Q Learning*? (CO4,L1)
- i) What is *Perceptron*? (CO5,L1)
- j) What is *Case Based Reasoning*? (CO5,L1)

Answer Five Questions Choosing One Question from Each Unit.  
All Questions Carry Equal Marks. (5×10 = 50 Marks)

UNIT I

- 2) a) Explain *Gestation and Birth of AI*. (CO1,L1) 10 Marks  
(or)
- b) Explain *Informed Search Strategies* in brief. (CO1,L2) 10 Marks

UNIT II

- 3) a) Discuss Syntax and Semantics of *First Order Logic*. (CO2,L2) 10 Marks  
(or)
- a) Explain *Forward chaining and Backward Chaining Algorithms* with an example. (CO2,L2)  
10 Marks

UNIT III

- 4) a) Explain Algorithms for *State space Search* briefly. (CO3,L2) 10 Marks  
(or)
- b) Explain *Mental Events and Mental Objects* in detail. (CO3,L2) 10 Marks

UNIT IV

- 5) a) Explain *Decision Trees* concept with an example. (CO4,L5) 10 Marks  
(or)
- b) Compare *Passive Reinforcement Learning* and *Active Reinforcement Learning*. (CO4,L5)  
10 Marks

UNIT V

- 6) a) Discuss *MultiLayer Networks* and *Backpropagation* Algorithm. (CO5,L6) 10 Marks  
(or)
- b) Discuss the concepts in *K-Nearest Neighbour Learning*. (CO5,L6) 10 Marks



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**Programme: M.C.A**

**Title of the Paper: Design & Analysis of Algorithms**

**Semester: III**

Course Code	20CA3T3	Course Delivery Method	Class Room / Blended Mode
Credits	4	CIA Marks	30
No. of Lecture Hours / Week	4	Semester End Exam Marks	70
Total Number of Lecture Hours	60	Total Marks	100
Year of Introduction :2005	Year of Offering:2021	Year of Revision: No	Percentage of Revision: 0%

**Course Objective:** The objective of this course is to develop proficiency in *Problem Solving and Programming*, To Perform Analysis of various Algorithms in regard to Time and Space Complexity, Gain good understanding of Applications of Data Structures, To develop a base for Advanced Study in Computer Science, To apply Design Techniques to solve different types of problems as per their Complexity and Develop ability to segregate NP-Hard and NP-Complete problems.

**Course Outcomes:** On successful completion of this course, the students will be able to:

**CO1:** Understand *Basic Ideas* about Analysis of Algorithms and the Concept of Data Structures.

**CO2:** Know *Divide and Conquer*, *Greedy Methods* and *Solving Various Problems* by applying them.

**CO3:** Apply *Dynamic Programming Method* and *Basic Traversal and Search Techniques* to solve various Problems.

**CO4:** Understand *Backtracking* and *Branch and Bound* Techniques to Design Algorithms.

**CO5:** Categorize *NP-Hard* and *NP-Complete* Problems.

## Syllabus

### Course Details

Unit	Learning Units	Lecture Hours
I	<b>Introduction:</b> What is Algorithm, Algorithm Specification Pseudo code Conventions, Recursive Algorithms, Performance Analysis: Space Complexity Time Complexity, Asymptotic Notation, Performance Measurement, Randomized Algorithms: Basics of Probability Theory, Randomized Algorithms Identifying the Repeated Element, Primality Testing: Advantages and Disadvantages. <b>Elementary Data Structures:</b> Stacks and Queues, Trees: Terminology, Binary Trees, Dictionaries: Binary Search Trees, Priority Queues, Heaps, Heapsort, Sets and Disjoint Set Union: Introduction-Union and Find Operations, Graphs: Introduction, Definitions, Graph Representations.	10
II	<b>Divide-and-Conquer:</b> General Method, Defective Chess Board, Binary Search, Finding Maximum and Minimum, Merge Sort, Quick Sort, Selection Problem, Strassen's Matrix Multiplication, Convex Hull: Some Geometric Primitives, The Quick Hull Algorithm, Graham's Scan, An $O(n \log n)$ Divide and Conquer Algorithm.	14

	<b>The Greedy Method:</b> The General Method, Container Loading, Knapsack Problem, Tree Vertex Splitting, Job Sequencing with Deadlines, Minimum Cost Spanning Trees: Prim's Algorithm, Kruskal's Algorithm, Optimal Storage on Tapes, Optimal Merge Patterns, Single Source Shortest Paths.	
III	<b>Dynamic Programming:</b> The General Method, Multi Stage Graphs, All Pairs Shortest Paths, Single Source Shortest Paths, Optimal Binary Search Trees, String Editing -0/1 Knapsack, Reliability Design, The Traveling Sales Person Problem, Flow Shop Scheduling. <b>Basic Traversal and Search Techniques:</b> Techniques for Binary Trees, Techniques for Graphs: Breadth First Search and Traversal-Depth First Search, Connected Components and Spanning Trees, Bi-Connected Components and DFS.	17
IV	<b>Backtracking:</b> The General Method, The 8-Queens Problem, Sum of Subsets, Graph Coloring, Hamiltonian Cycles, Knapsack Problem. <b>Branch and Bound :</b> The Method: Least Cost Search, The 15 Puzzle Control Abstractions for LC Search, Bounding, FIFO Branch and Bound , LC Branch and Bound, 0/1 Knapsack Problem, LC Branch and Bound Solution, FIFO Branch and Bound Solution, Traveling Sales person.	11
V	<b>NP-Hard and NP-Complete Problems:</b> Basic Concepts: Non Deterministic Algorithms, The Classes NP Hard and NP Complex, Cook's Theorem, NP Hard Graph Problems, Clique Decision Problem, Node Cover Decision Problem Chromatic Number Decision Problem, Directed Hamiltonian Cycle, Traveling Sales Person Decision Problem, AND/OR Graph Decision Problem, NP-Hard Scheduling Problems, Scheduling Identical Processors, Flow Shop Scheduling, Job Scheduling, NP-Hard Code Generation Problems, Code Generation With Common Sub Expressions, Implementing Parallel Assignment Instructions, Some Simplified NP-Hard Problems.	8

#### Prescribed Text Book

S.No	Author	Title	Publisher
1	Sartaj Sahni	Fundamentals of Computer Algorithms	Second Edition, Universities Press (2008)

#### Reference Text Books

S.No.	Author	Title	Publisher
1	Anany Levitin	Introduction to the Design & Analysis of	Second Edition, Pearson
2	I.Chandra Mohan	Design and Analysis of Algorithms	PHI
3	Prabhakar Gupta, Vineet Agrawal	Design and Analysis of Algorithms	PHI
4	Parag Himanshu, Dave	Design and Analysis of Algorithms	Pearson Education (2008)

**Course Focus:** Foundation / Skill Development.

#### Reference Websites :

1. <https://epgp.inflibnet.ac.in/Home>
2. <https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-046j-design-and-analysis-of-algorithms-spring-2015/lecture-notes/>
3. [https://www.cukashmir.ac.in/cukashmir/User\\_Files/imagefile/DIT/StudyMaterial/DAA/DAA\\_UNIT I\\_6th-Sem\\_StudyMaterial.pdf](https://www.cukashmir.ac.in/cukashmir/User_Files/imagefile/DIT/StudyMaterial/DAA/DAA_UNIT I_6th-Sem_StudyMaterial.pdf)

**P.B. Siddhartha College of Arts & Science, Vijayawada - 520 010.**  
**(An Autonomous College in the jurisdiction of Krishna University)**  
**M.C.A. Programme - III Semester**

**Course Code: 20CA3T3 Title: DESIGN AND ANALYSIS OF ALGORITHMS**  
**(w.e.f admitted batch 2020-21)**

**Time: 3 Hours**

**Max. Marks: 70**

**Answer ALL questions**

**(10×2 = 20 Marks)**

1. a) Define *Algorithm*. (CO1,L1)
- b) What is a *priority queue*? (CO1,L1)
- c) Define *Convex Hull*. (CO2,L1)
- d) What is *tree vertex splitting*? (CO2,L1)
- e) What is *String Editing*? (CO3,L1)
- f) Differentiate *DFS and BFS*. (CO3,L1)
- g) What is *Graph colouring*? (CO4,L1)
- h) What is *LC and FIFO Branch and Bound*? (CO4,L1)
- i) Compare *NP hard and NP complete classes*. (CO5,L1)
- j) What is *flow shop scheduling in NP Hard Scheduling problems*? (CO5,L1)

**Answer Five Questions Choosing One Question from Each Unit.**  
**All Questions Carry Equal Marks. (5×10 = 50 Marks)**

**UNIT – I**

2. A) Explain *Asymptotic Notations* regarding time and space complexities of an algorithm. (CO1,L2)  
(or)  
B) Explain in detail about *Heap Sort Technique* with an example. (CO1,L2)

**UNIT – II**

3. A) What is *Divide and Conquer approach*? Apply it on *Quick Sort* with an example. (CO2,L2)  
(or)  
B) What is *Greedy method*? Explain *Kruskal's Algorithm* to find *minimum cost spanning tree* with an example. (CO2,L2)

**UNIT – III**

4. A) Explain the application of *Dynamic Programming* on *Travelling Salesman Problem*. (CO3,L2)  
(or)  
B) Explain the procedure to obtain *Optimal Binary Search Tree* by applying *Dynamic Programming* approach. (CO3,L2)

**UNIT – IV**

5. A) What is *0/1-Knapsack Problem*? Solve it using *Branch and Bound* technique. (CO4,L2)  
(or)  
B) Explain the *Sum of Subsets Problem*. How can it be solved using *Back Tracking Technique*? (CO4,L2)

**UNIT – V**

6. A) Write *Cook's theorem*. Briefly explain *Cook's theorem*. (CO5,L2)  
(or)  
B) Discuss various *NP Hard Graph Problems*. (CO5,L2)



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Siddhartha Nagar, Vijayawada – 520 010.

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Autonomous -ISO 9001 – 2015 Certified

**Programme: M.C.A**

**Title of the Paper: Cloud Computing**

**Semester: III**

Course Code	20CA3T4	Course Delivery Method	Class Room / Blended Mode
Credits	4	CIA Marks	30
No. of Lecture Hours / Week	4	Semester End Exam Marks	70
Total Number of Lecture Hours	60	Total Marks	100
Year of Introduction :2018	Year of Offering:2021	Year of Revision: No	Percentage of Revision: 0%

**Course Objective:** To understand benefits of *Cloud Computing* and *Virtualization, Services and Deployment Models of Cloud Computing*, To develop *Cloud Applications* using *Open Source Cloud Software, AAA Model*, Challenges and Benefits of *Mobile Cloud Computing*.

**Course Outcomes:** On successful completion of the course student will be able to:

**CO1:** Articulate the *Main Concepts, Key Technologies, Strengths, and Limitations* of *Cloud Computing* and the core issues of *Virtualization*.

**CO2:** Understand the *Open Source Architectures and Services of Cloud Computing*.

**CO3:** Develop and deploy *Cloud Applications* using *Popular Cloud Platforms*.

**CO4:** Explore the *Risks, Consequences and Costs of Cloud Computing* and understand the implementations of *AAA Model* in the *Cloud*.

**CO5:** Introduce the broad perspective of *Mobile Cloud Computing*.

## Syllabus

### Course Details

Unit	Learning Units	Lecture Hours
I	<b>Era of Cloud Computing:</b> Getting to Know the Cloud, Peer-to-Peer, Client-Server and Grid Computing, Cloud Computing versus Client-Server Architecture, Cloud computing versus Peer-To Peer Architecture, Cloud computing versus Grid Computing, How we got to the Cloud, Server Virtualization versus Cloud Computing, Components of Cloud Computing, Cloud Types, Cloud Computing Service Delivery Models. <b>Introducing Virtualization:</b> Introducing Virtualization and its Benefits, Implementation Levels of Virtualization, Virtualization at the OS Level, Virtualization Structure, Virtualization Mechanisms, Open Source Virtualization Technology, Binary Translation with Full Virtualization, Virtualization of CPU, Memory and I/O Devices, Hardware support for Virtualization in Intex x86 Processor.	12
II	<b>Cloud Computing Services:</b> Infrastructure as a Service, Platform as a Service, Language and Pass, Software as a Service, Database as a Service. <b>Open Source Cloud Implementations and Administration:</b> Open-Source Eucalyptus Cloud Architecture, Open-Source Open Stack Cloud Architecture.	12



III	<p><b>Application Architecture for Cloud:</b> Cloud Application Requirements, Recommendations for Cloud Application Architecture, Fundamental Requirements for Cloud Application Architecture, Relevance and use of Client-Server architecture for Cloud Application, Service Oriented Architecture for Cloud Applications.</p> <p><b>Cloud Programming:</b> Programming Support for Google Apps Engine, Big Table as Google's NOSQL System, Chubby as Google Distributed Lock Service, Programming Support for Amazon EC2, Elastic Block Store (ESB).</p>	12
IV	<p><b>Risks, Consequences and Costs for Cloud Computing:</b> Introducing Risks in Cloud Computing, Risk Assessment and Management, Risk of Vendor Lock-In, Risk of Loss Control, Risk of Not Meeting Regulatory Compliances, Risk of Resource Scarcity, Risk in Multi Tenant Environment, Risk of Failure, Risk of Failure of Supply Chain, Risk of Malware and Internet Attacks, Risk of Inadequate SLA , Risk of Management of Cloud Resources, Risk of Network Outages, Risks in the Physical Infrastructure, Legal Risk due to Legislation, Risks with Software and Application Licensing, Security and Compliance Requirements in a Public Cloud, Direct and Indirect Cloud Costs, Calculating Total Cost of Ownership for Cloud Computing, Cost Allocations in a Cloud.</p> <p><b>AAA Administration for Clouds:</b> The AAA Model, Single Sign-On for Clouds, Industry Implementations for AAA, Authentication Management in the Cloud, Authorization Management in the Cloud.</p>	12
V	<p><b>Application Development for Cloud:</b> Developing On-Premise Versus Cloud Applications, Modifying Traditional Applications for Deployment in Cloud, Stages during the development process of Cloud Application, Managing a Cloud Application, Using Agile Software Development for Cloud Application, Cloud Applications: What Not to do, Static Code Analysis for Cloud Applications, Developing Synchronous and Asynchronous Cloud Applications.</p> <p><b>Mobile Cloud Computing:</b> Definition of Mobile Cloud Computing, Architecture of Mobile Cloud Computing, Benefits of Mobile Cloud Computing, Mobile Cloud Computing Challenges.</p>	12

Prescribed Text Book			
	Author	Title	Publisher
1	Kailash Jayaswal, Jagannath Kallakurchi, Donald J. Houde & Dr. Deven Shah	Cloud Computing, Black Book	DreamTech Press

Reference Text Book			
	Author	Title	Publisher
1	Thomas Erl, Zaigham Mahmood, Ricardo Puttini	Cloud Computing Concepts Technology and Architecture	Pearson
2	Raj Kumar Buyya, Christen Vecctiola, S Tammarai selvi	Mastering Cloud Computing, Foundations and Application Programming	TMH

**Course Focus:** Employability

**Websites of Interest:**

1. <https://aws.amazon.com>
2. <https://portal.azure.com>

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**M.C.A Programme - III Semester**

**Course Code: 20CA3T4**

**Title: Cloud Computing**

**(w.e.f admitted batch 2020-21)**

**Time: 3 Hours**

**Max. Marks: 70**

**Answer ALL questions**

**(10×2 = 20 Marks)**

- 1) a) What is *Client-Server Architecture*? (CO1,L1)
- b) What are the differences between *Cloud Computing and Virtualisation*? (CO1,L1)
- c) What is *DBaaS*? (CO2,L1)
- d) What is a *Cinder*? (CO2,L1)
- e) What is *EC2*? (CO3,L1)
- f) What is *GFS*? (CO3,L1)
- g) List *risks* of using *Inadequate SLA*. (CO4,L1)
- h) Define *SSO*. (CO4,L1)
- i) Why *Static Code Analysis* is used for Cloud Applications? (CO5,L1)
- j) What is *Mobile Cloud Computing*? (CO5,L1)

**Answer Five Questions Choosing One Question from Each Unit.**

**All Questions Carry Equal Marks.**

**(5×10 = 50 Marks)**

UNIT I

- 2) a) Explain the *Various Types of Cloud* with neat diagrams. (CO1,L2)
- b) Compare and contrast *Cloud Computing Architecture* with *Peer to Peer Architecture*. (CO1,L2)  
(or)
- c) Explain *Virtualization* and its benefits and levels. (CO1,L2)
- d) Explain the *Virtualization Structures and Virtualization Mechanisms*. (CO1,L2)

UNIT II

- 3) a) Explain *Cloud Computing Services*. (CO2,L2)  
(or)
- b) Explain *Open Source Cloud Architectures*. (CO2,L2)

UNIT III

- 4) a) Summarize the requirements of *Cloud Application*. (CO3,L2)
- b) Explain *Service Oriented Architecture* for Cloud Applications. (CO3,L2)  
(or)
- c) Explain the *Big Table* as Google's NoSQL System. (CO3,L2)
- d) Explain *Elastic Block Store*. (CO3,L2)

UNIT IV

- 5) a) Explain the *Risks in Cloud Computing*. (CO4,L2)  
(or)
- b) Describe the *AAA Model for Clouds*. (CO4,L2)

UNIT V

- 6) a) What are the *Stages during the Development Process* of *Cloud Applications*? (CO5,L1)
- b) How can we use *Agile Software Development* for *Cloud Applications*? (CO5,L1)  
(or)
- c) What are the benefits and challenges of *Mobile Cloud Computing*? (CO5,L1)
- d) What are the components in *Mobile Cloud Computing*? (CO5,L1)



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**Programme: M.C.A**

**Title of the Paper: Block Chain Technology**

**Semester: III**

Course Code	20CA3T4i	Course Delivery Method	Class Room / Blended Mode
Credits	4	CIA Marks	30
No. of Lecture Hours / Week	4	Semester End Exam Marks	70
Total Number of Lecture Hours	60	Total Marks	100
Year of Introduction :2021	Year of Offering:2021	Year of Revision: No	Percentage of Revision: 0%

**Course Objective:** To understand and gain knowledge on basic concepts of *Blockchain & Limitations*, To know *How Bitcoin Achieves Decentralization*, *How to Store Bitcoins* and *How to Use Bitcoins*, *Ethereum and Smart Contracts* and *Blockchain Applications*, *Mining Consensus* and *Bitcoin Security*.

**Course Outcomes:** On successful completion of the course student will be able to:

**CO1:** Understands basic concepts of *Blockchain & Limitations*.

**CO2:** Learn *How Bitcoin Achieves Decentralization*.

**CO3:** Familiar with *How to Store Bitcoins* and *How to Use Bitcoins*.

**CO4:** Know *Ethereum and Smart Contracts* and *Blockchain Applications*.

**CO5:** To gain knowledge on *Mining Consensus* and *Bitcoin Security*.

## Syllabus

### Course Details

Unit	Learning Units	Lecture Hours
I	<b>Why Blockchain is Need:</b> Discovering the Core Problem - Public Ledgers - Block in Blockchain - Public versus Private Blockchain. <b>How Blockchain Works:</b> Planning the Blockchain - Hashing Data - Identifying & Protecting user Accounts - Authorizing Transactions - Using Data Store - Protecting Data Store - Choosing Transaction History - Paying for Integrity. <b>Limitations:</b> Seeing the Limitations - Reinventing the Block Chain.	12
II	<b>How Bitcoin Achieves Decentralization:</b> Centralized versus Decentralization - Distributed Consensus - Bitcoin Transactions - Bitcoin Scripts - Applications of Bitcoin Scripts - Bitcoin Blocks.	12
III	<b>How to Store Bitcoins:</b> Simple Local Storage - Hot and Cold Storage - Splitting and Sharing Keys. <b>How to Use Bitcoins:</b> Online Wallets and Exchanges - Payment Services - Transaction Fees - Currency Exchange Markets.	12

IV	<b>Ethereum and Smart Contracts:</b> Smart Contract Programming Model, Namecoin in Ethereum, Gas Incentives and Security, Data Structures in Ethereum. <b>Blockchain Applications:</b> Applications from Building Blocks, Colored Coins, Counterparty, Payment Channels and State Channels, Routed Payment Channels.	12
V	<b>Mining Consensus:</b> Decentralized Consensus - Independent Verification of Transactions - Mining Nodes - Aggregating Transactions into Blocks - Mining the Block - Validating a New Block - Assembling and Selecting Chains of Blocks - Consensus Attacks. <b>Bitcoin Security:</b> Security Principles - User Security Best Practices.	12

Prescribed Text Book			
	Author	Title	Publisher
1	Daniel Drescher	Blockchain Basics	A Press, Second Edition, 2017
2	Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller, and Steven Goldfeder	Bitcoin and Cryptocurrency Technologies: A Comprehensive Introduction.	Princeton University Press, 2016, Second Edition
3	Andreas M Antonopoulos	Mastering Bitcoin: Unlocking Digital Crypto Currencies	ORELLY,2015

Reference Text Book			
	Author	Title	Publisher
1	Melanie	Blockchain : Blue Print for New Economy	ORELLY,2015

**Course Focus:** Employability

**Websites of Interest:**

1. <https://ethereum.org/en/>
2. <https://www.trufflesuite.com/ganache>

**P.B. Siddhartha College of Arts & Science, Vijayawada - 520 010.**  
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**M.C.A Programme - III Semester**

**Course Code: 20CA3T4i**

**Title: Block Chain Technology**

**(w.e.f admitted batch 2020-21)**

**Answer ALL questions**

**(10×2 = 20 Marks)**

1. a) What *Hashing Data*? (CO1,L1)
- b) How to protect *Data Store*? (CO1,L1)
- c) What is *Bit Coin Block*? (CO2,L1)
- d) What is *Distributed Consensus*. (CO2,L1)
- e) What is *Splitting*? (CO3,L1)
- f) What is *Transaction*? (CO3,L1)
- g) Define *Name Coin*. (CO4,L1)
- h) What are *Colored Coins*. (CO4,L1)
- i) What is *Decentralized Consensus*. (CO5,L1)
- j) What are *Security Best Practices*? (CO5,L1)

**Answer Five Questions Choosing One Question from Each Unit.**

**All Questions Carry Equal Marks.**

**(5×10 = 50 Marks)**

UNIT I

2. (a) What are Public Ledgers? Explain Public & Private Blockchains.(CO2,L1) 10 Marks  
(or)
- (b) How to identify and protect User Accounts and Authorize Transactions? (CO2,L1) 10 Marks

UNIT II

3. (a) Differentiate Centralized & Decentralized in Bitcoin.(CO2,L2) 10 Marks  
(or)
- (b) Explain Bitcoin Scripts and their Applications. (CO2,L2) 10 Marks

UNIT III

4. (a) What are Hot & Cold Storages? Explain in detail. (CO3,L1)10 Marks  
(or)
- (b) How bitcoins are used in online Wallets & Exchanges and payment services? (CO3,L1) 10 Marks

UNIT IV

5. (a) Explain Smart Contract Programming Model & Data Structures in Ethereum. (CO4,L2) 10 Marks  
(or)
- (b) Write about Applications from Building Blocks and Colored Coins. (CO4,L2) 10 Marks

UNIT V

6. (a) Explain Mining, Validating, Assembling and Selecting Chains of blocks. (CO5,L2) 10 Marks  
(or)
- (b) Explain the Security Principles in Bitcoin Security. (CO5,L2) 10 Marks



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**Programme: M.C.A**

**Title of the Paper: Cryptography & Network Security**

**Semester: III**

Course Code	20CA3T5	Course Delivery Method	Class Room / Blended Mode
Credits	4	CIA Marks	30
No. of Lecture Hours / Week	4	Semester End Exam Marks	70
Total Number of Lecture Hours	60	Total Marks	100
Year of Introduction : 2005	Year of Offering: 2021	Year of Revision: 2021-22	Percentage of Revision: 30%

**Course Objective:** To understand and gain knowledge on *Computer & Network Security, Number Theory, Classical Encryption Techniques, Advanced Encryption Standard and Random Bit Generation and Stream Ciphers, Number Theory, Public Key Cryptography and RSA, Other Public-Key Crypto Systems and Message Authentication Codes, Digital Signatures, Key Management and Distribution and User Authentication, Transport Level Security, Electronic Mail Security and IP Security and Intruders and Firewalls.*

**Course Outcomes:** On successful completion of this course, the students will be able to:

**CO1:** Understand *Computer & Network Security Concepts, Classical Encryption Techniques and Advanced Encryption Standard.*

**CO2:** Gain knowledge on *Number Theory, Public Key Cryptography and RSA, Other Public-Key Crypto Systems and Message Authentication Codes.*

**CO3:** Know *Digital Signatures, Key Management and Distribution and User Authentication.*

**CO4:** Understand *Transport Level Security, Electronic Mail Security and IP Security.*

**CO5:** Gain knowledge about *Intruders and Firewalls.*

## Syllabus

### Course Details

Unit	Learning Units	Lecture Hours
I	<p><b>Computer &amp; Network Security Concepts:</b> Computer Security Concepts, The OSI Security Architecture, Security Attacks, Security Services, Security Mechanisms, A Model for Network Security.</p> <p><b>Classical Encryption Techniques:</b> Symmetric Cipher Model, Substitution Techniques, Transposition Techniques</p> <p><b>Advanced Encryption Standard:</b> AES Structure, An AES Example, AES Implementation. Random Bit Generation and Stream Ciphers: Principles of Pseudo Random Number Generation, Pseudo Random Number Generators.</p>	12
II	<p><b>Introduction to Number Theory:</b> Divisibility and the Division Algorithm, The Euclidean Algorithm, Modular Arithmetic, Prime Numbers, Fermat's and Euler's Theorems, Testing for Primality, The Chinese Remainder Theorem, Discrete Logarithms.</p> <p><b>Public Key Cryptography and RSA:</b> Principles of Public Key Crypto Systems, The RSA Algorithm.</p> <p><b>Other Public-Key Crypto Systems:</b> Key Management, Diffie-Hellman Key Exchange, Elliptic Curve Arithmetic, Elliptic Curve Cryptography.</p> <p><b>Message Authentication Codes:</b> Message Authentication Requirements, Message Authentication Functions, Requirements for Message Authentication Codes, Security of MACs, MACs Based on Hash Functions: HMAC.</p>	12
III	<p><b>Digital Signatures:</b> Digital Signatures, NIST Digital Signature Algorithm.</p> <p><b>Key Management and Distribution:</b> Symmetric Key Distribution Using Asymmetric Encryption, Distribution of Public Keys.</p> <p><b>User Authentication:</b> Kerberos, Remote User-Authentication Using Asymmetric Encryption.</p>	12
IV	<p><b>Transport Level Security:</b> Transport Layer Security.</p> <p><b>Electronic Mail Security:</b> S/MIME, Pretty Good Privacy.</p> <p><b>IP Security:</b> IP Security Overview, IP Security Policy, Encapsulating Security Payload, Combining Security Associations.</p>	12
V	<p><b>Intruders:</b> Intruders, Intrusion Detection, Password Management.</p> <p><b>Firewalls:</b> The Need for Firewalls, Firewall Characteristics and Access Policy, Types of Firewalls.</p>	12

Prescribed Text Book			
	Author	Title	Publisher
1	William Stallings	Cryptography and Network Security	Pearson, Seventh Edition, 2017

<b>Reference Text Book</b>			
	Author	Title	Publisher
1	William Stallings	Cryptography and Network Security	Pearson, Sixth Edition, 2014
2	William Stallings	Network Security Essentials- Applications and Standards	Pearson Education (2007), Third Edition.
3	Chris McNab	Network Security Assessment	OReilly (2007), 2 <sup>nd</sup> Edition
4	Jon Erickson	Hacking-The Art of Exploitation	Press (2006), SPD
5	Neal Krawety	Introduction to Network Security	Thomson (2007).
6	Ankit Fadia	Network Security-AHackers Perspective	Macmillan (2008)
7	Behrouz A Forouzan, Debdeep Mukhopadhyay	Cryptography and Network Security	MCGraw-Hill, Indian Special Edition, Third Edition, 2015

**Course has focus on :** Employability

**Websites of Interest :**

1. [https://www.pearsonhighered.com/assets/hip/us/hip\\_us\\_pearsonhighered/preface/0132775069.pdf](https://www.pearsonhighered.com/assets/hip/us/hip_us_pearsonhighered/preface/0132775069.pdf)
2. <http://faculty.mu.edu.sa/public/uploads/1360993259.0858Cryptography%20and%20Network%20Security%20Principles%20and%20Practice,%205th%20Edition.pdf>

**Co-curricular Activities:** Programming Contests, Hackathons & Quiz.



Time: 3 Hours

Max. Marks: 70

Answer ALL questions

(10×2 = 20 Marks)

- 1) a) What is *Caesar Cipher*? (CO1,L1)
- b) Write any two characteristics of Randomness. (CO1,L1)
- c) What is the Purpose of the *Euclidean Algorithm*? (CO1,L1)
- d) What is Message Encryption? (CO1,L1)
- e) What is the difference between *Symmetric Key Distribution & Asymmetric Key Distribution*? (CO1,L1)
- f) What is *Mutual Authentication*? (CO1,L1)
- g) State any two Protocols of *Transport Layer Security*. (CO1,L1)
- h) What is *Pretty Good Privacy*? (CO1,L1)
- i) What is *Firewall*? (CO1,L1)
- j) State any two *Intrusion Detection Techniques*. (CO1,L1)

Answer Five Questions Choosing One Question from Each Unit.  
All Questions Carry Equal Marks. (5×10 = 50 Marks)

UNIT I

- 2) a) Explain various *Security Attacks* and *Security Services*. (CO1,L2) 10 Marks  
(or)
- b) Explain *AES Encryption* and *Decryption* Process. (CO1,L2) 10 Marks

UNIT II

- 3) a) Illustrate *Diffie-Hellman Key Exchange*. (CO2,L2) 10 Marks  
(or)
- b) Explain *Internal and External Error Control* in Message Authentication Functions. (CO2,L2) 11 Marks

UNIT III

- 4) a) Explain *NIST Digital Signature Algorithm* with diagram. (CO3,L5) 10 Marks  
(or)
- b) Explain *Kerberos* in detail. (CO3,L5) 10 Marks

UNIT IV

- 5) a) Explain *Confidentiality* and *Authentication* in S/MIME(CO4,L5) 10 Marks  
(or)
- b) Illustrate *Overview of IP Security*. (CO4,L5) 10 Marks

UNIT V

- 6) a) Discuss what are the problems that may intruder create and explain how to overcome those problems? (CO5,L6) 10 Marks  
(or)
- b) Discuss *Various Types of Firewalls*. (CO5,L6) 10 Marks



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NAAC reaccredited at 'A+' level

Autonomous -ISO 9001 – 2015 Certified

**Programme: M.C.A**

**Title of the Paper: Internet of Things**

**Semester: III**

Course Code	20CA3T5i	Course Delivery Method	Class Room / Blended Mode
Credits	4	CIA Marks	30
No. of Lecture Hours / Week	4	Semester End Exam Marks	70
Total Number of Lecture Hours	60	Total Marks	100
Year of Introduction :2018	Year of Offering:2021	Year of Revision: No	Percentage of Revision: 0%

**Course Objective:** To understand and gain knowledge on *Over View of Internet of Things, Models, Layers & Standardization, Protocols & Design Principles* for Connected Devices, *Internet Connectivity Principles, Protocols & Application Layer Protocols, Data Acquiring, Business Models and Business Processes.*

**Course Outcomes:** On successful completion of the course student will be able to:

**CO1:** Attain knowledge over view of *Internet of Things.*

**CO2:** Understand *Models, Layers & Standardization.*

**CO3:** Apply *Protocols & Design Principles* for Connected Devices.

**CO4:** Understand *Internet Connectivity Principles, Protocols & Application Layer Protocols.*

**CO5:** Understand *Data Acquiring, Business Models and Business Processes.*

## Syllabus

### Course Details

Unit	Learning Units	Lecture Hours
I	<b>The Internet of Things:</b> An Overview of Internet of Things, Internet of Things Technology, Behind IoT Sources of the IoT, M2M Communication, Examples of IoT, Design Principles for Connected Devices, Business Models for Business Processes in the Internet of Things.	12
II	<b>Design Principles for Connected Devices:</b> IoT / M2M systems layers and Designs Standardizations, Modified OSI Stack for the IoT / M2M Systems, ETSI M2M Domains and High-level Capabilities ,Communication Technologies, Data Enrichment and Consolidation and Device Management Gateway ease of Designing and Affordability.	12
III	<b>Design Principles for the Web Connectivity:</b> Design Principles for the Web Connectivity for Connected Devices, Web Communication Protocols for Connected Devices, Message Communication Protocols for Connected Devices, Web Connectivity for Connected Devices.	12
IV	<b>Internet Connectivity Principles:</b> Introduction, Internet Connectivity, Application Layer Protocols: <i>HTTP, HTTPS, FTP, Telnet.</i>	12
V	<b>Data Acquiring, Organizing and Analytics in IoT / M2M:</b> Introduction, Applications / Services / Business Processes, IOT / M2M Data Acquiring and Storage, Business Models for Business Processes in the Internet of Things, Organizing Data, Transactions, Business Processes, Integration and Enterprise Systems.	12

Prescribed Text Book			
	Author	Title	Publisher
1	Rajkamal	Internet of Things: Architecture, Design Principles and Applications	McGraw Hill Higher Education

Reference Text Book			
	Author	Title	Publisher
1	Adrian McEwen and Hakim Cassimally	Designing the Internet of Things	Wiley
2	CunoPfister	Getting Started with the Internet of Things.	Oreilly

**Course Focus:** Employability

#### Websites of Interest:

1. <https://dzone.com/iot-developer-tutorials-tools-news-reviews>
2. <https://www.ibm.com/blogs/internet-of-things/>

**P.B. Siddhartha College of Arts & Science, Vijayawada - 520 010.**  
**(An Autonomous College in the jurisdiction of Krishna University)**  
**M.C.A Programme - III Semester**

**Course Code: 20CA3T5i**

**Title: Internet of Things (IoT)**

**(w.e.f admitted batch 2020-21)**

**Time: 3 Hours**

**Max. Marks: 70**

**Answer ALL questions**

**(10×2 = 20 Marks)**

1. a) What is M2M communication. (CO1,L1)
- b) What are *Connected Devices*? (CO1,L1)
- c) Write about *modified ISO*. (CO2,L1)
- d) What is a *Gateway*? (CO2,L1)
- e) What is *Communication Protocol*? (CO3,L1)
- f) What is *Resource and Resource Repository*? (CO3,L1)
- g) What is *Header*? Explain *TCP Header*. (CO4,L1)
- h) What is *Protocol Data Unit* and *Maximum Transferable Unit*. (CO4,L1)
- i) Write about *Event Data*. (CO5,L1)
- j) What are *Active* and *Passive Devices*? (CO5,L1)

**Answer Five Questions Choosing One Question from Each Unit.**  
**All Questions Carry Equal Marks. (5×10 = 50 Marks)**

UNIT – I

2. a) Explain an overview of IOT. (CO1,L2)
- (or)
- b) Explain M2M Communication. (CO1,L2)

UNIT – II

3. a) Explain various *Layers & Design Standardization Principles* of IOT. (CO2,L2)
- (or)
- b) Explain different *communication technologies* used in IOT. (CO2,L2)

UNIT – III

4. a) What are *Web Communication Protocols* for Connected Devices? (CO3,L1)
- (or)
- b) What are various *Design Principles* for the Web Connectivity? (CO3,L1)

UNIT – IV

5. a) Explain in detail *Internet Connectivity Principles*. (CO4,L5)
- (or)
- b) Explain any two *Application Layer Protocols*. (CO4,L5)

UNIT – V

6. a) Illustrate *Business Models* for *Business Processes* in the Internet of Things. (CO5,L1)
- (or)
- b) Explain *Integration* and *Enterprise Systems*. (CO5,L1)



# P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

Siddhartha Nagar, Vijayawada – 520 010

*Autonomous -ISO 9001 - 2015 Certified*

**Programme: Master of Computer Applications**

**Title of the Paper: Big Data and Analytics Lab**

**Semester: III**

Course Code	20CA3L1	Course Delivery Method	Face-to-face/Blended Mode
Credits	4	CIA Marks	30
No. of Lecture Hours / Week	8	Semester End Exam Marks	70
Total Number of Lecture Hours	96	Total Marks	100
Year of Introduction : 2020	Year of Offering: 2021	Year of Revision: 2021-22	Percentage of Revision: 20%

**Course Objectives :** This Course focuses on implementation of *Hadoop Distributed File System*, Implementation of *Map Reduce Operations*, Implementation of *Nosql Database (MongoDB)*, Implementation of *Hadoop Eco System Components (Apache PIG)*, Implementation of *Basic Visualization and Analytics* using Tableau.

**Course Outcomes :** At the end of this course, students should be able to:

**CO1:** To implement *Hadoop Distributed File System*.

**CO2:** Evaluate *Map-reduce in Java / Python in HDFS*.

**CO3:** Evaluate to implement *Processing Data with NoSQL (MongoDB)*.

**CO4:** Evaluate Map Reduce in *Java/Python, Apache Pig*.

**CO5:** Extracting *Data, Data Blending, Moving from Test to Production Databases in Tableau*, Connecting to various *Data Sources*, Creation of *Charts, Data Blending and Trend Lines* in Tableau for *Data Visualization*.

1. Demonstration of Hadoop standalone installation in Linux. (CO1,L2)
2. Demonstration of Hadoop installation on Windows Environment - VM Virtual Box. (CO1,L2)
3. Illustration of Hadoop Distributed File System. (HDFS). (CO1,L2)
4. Apply Map Reduce Algorithm for Word Count. (Java/Python). (CO2,L2)
5. Experimenting *Map Reduce Program* that mines *Weather Data*. (Java / Python). (CO2,L3)
6. Demonstration *Apache Pig Installation*. (CO4,L2)
7. Apply Basic Operations on Apache Pig (*Load, Foreach..Generate, Group, Join, Dump / Store.*) (CO4,L3)

8. Apply Operations (Create, Alter, and Drop) on Hive *Databases, Tables, Views, Functions, and Indexes*. (CO4,L3)
9. Illustration of *MongoDb* installation. (CO3,L3)
10. Apply *MongoDB* Commands. (CO3,L3)
11. Apply *CRUD (Create Read Update and Delete)* operations in *MongoDB*. (CO3,L3)
12. Create a *Collection with Bulk Documents* in one level (CO3,L6)
13. Apply operation on arrays in *MongoDB*. (CO3,L3)
14. Apply *Aggregate and Map Reduce Function* in *MongoDB*. (CO3,L3)
15. Creating *New Workbooks, Opening Existing Workbooks* in *Tableau*. (CO5,L6)
16. Create *Bar Chart, Line / Area Chart, Pie Charts* in *Tableau*. (CO5,L6)
17. Create a *Cross-Tab* in *Tableau*. (CO5,L6)
18. Apply *Data Blending using different data sources* in *Tableau*. (CO5,L6)
19. Create *Dual Axis / Shared Axis* in *Tableau*. (CO5,L6)
20. Create *Scatter Plot, Bubble Chart Blending* in *Tableau*. (CO5,L6)
21. Build *Trend Lines and Analytic* in *Tableau*. (CO5,L6)

**Course has focus on :** Employability

**Websites of Interest :**

1. Big Data Computing (noc19-cs33 – NPTEL videos ) :Prof Rajiv Misra,Dept of CSE, IIT Patna
2. Tableau Training for Beginners | Edureka <https://www.youtube.com/watch?v=aHaOivR00So>
3. Tableau Training for Beginners | Simplilearn <https://www.youtube.com/watch?v=Wh4sCCZjOwo>

**Co-curricular Activities :** Programming Contests, workshops & Quiz.



# P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

Siddhartha Nagar, Vijayawada – 520 010.

NAAC reaccredited at 'A+' level

Autonomous -ISO 9001 – 2015 Certified

**Programme: M.C.A**

**Title of the Paper: Data Mining Lab**

**Semester: III**

Course Code	20CA3L2	Course Delivery Method	Class Room / Blended Mode
Credits	4	CIA Marks	30
No. of Lecture Hours / Week	8	Semester End Exam Marks	70
Total Number of Lecture Hours	90	Total Marks	100
Year of Introduction : 2018	Year of Offering : 2021	Year of Revision : 2021-22	Percentage of Revision: 20%

### Course Objective:

The main objective of this lab is to impart the knowledge on *How to implement Data Mining Algorithms using Various Tools* and *How to characterize the kinds of Patterns* that can be discovered by *Association Rule Mining, Classification, Clustering, Identifying Outliers* and *Emphasize Hands-on Experience* working with all *Real Time Data Sets*.

**Course Outcomes:** On successful completion of this course, the students will be able to

**CO1:** Understand the *Various Kinds of Tools*.

**CO2:** Apply *Mining Techniques* for *Realistic Data*.

**CO3:** Understand the *Basic Concepts* in R and *Weka*.

**CO4:** Understand how to import and export *CSV Files* and *Package* installation in R.

**CO5:** Develop and visualization of *Data Mining Algorithms* in R.

### Using Weka Tool:

1. How to create and load *Data Set* in Weka. (CO4,L1)
2. Interpret all the *Categorical (or Nominal) Attributes* and the *Real-Valued Attributes* separately. (CO2,L2)
3. Construct *Association Rules* using Weka.(CO2,L6)
4. Construct *Multilayer Perceptron* or *Neural Network*. (CO5,L6)
5. Construct *Time Series Forecasting* using Weka. (CO5,L6)
6. Demonstration of preprocessing to remove *Attributes, Instances* and *Perform Discretization* using dataset *weather.arff*. (CO2,L2)
7. Create *K-Mean Clustering* using *Weka*. (CO3,L6)
8. Develop *Decision Tree* by training data set using *Weka*. (CO3,L6)
9. Create *Hierarchical Clustering* using *Weka*. (CO3,L6)
10. Identifying and removing *Outliers* using *Weka*. (CO3,L1)

### Using R Programming:

11. How to import data into R from text and excel files using *read.table()* and *read.csv* functions. (CO1,L1).

12. Create *Association Rules* using *Aprior Algorithm* in R. (CO5,L6)
13. Construct *Multilayer Perceptron* or *Neural Network* using R. (CO5,L6)
14. Apply *Time Series Analysis* using R. (CO5,L3)
15. Apply *Time Series Forecasting* using R. (CO5,L3)
16. Apply *Time Series Decomposition* using R. (CO5,L3)
17. Create *K-Means Clustering Algorithm* using R. (CO5,L6)
18. Construct *Decision Tree* in R using package *party*. (CO5,L6)
19. Create *Hierarchical Clustering* using R. (CO5,L6)
20. Create *Hierarchical Clustering* with *Euclidean Distance* using R. (CO5,L6)
21. Examine *K-Medoids* clustering using R. (CO5,L4)
22. *Detecting and Removing* outliers using R. (CO5,L1)
23. Construct *Density Based Clustering* using R. (CO5,L6)
24. Illustrate *Linear Regression* using R. (CO5,L2)
25. Illustrate *Multiple Regression* using R. (CO5,L2)
26. Illustrate *Logistic Regression* using R. (CO5,L2)
27. Construct *Outlier Detection by Clustering* using R. (CO5,L6)
28. *Detecting and Removing* Missing values in R. (CO3,L1)
29. Create different kinds of *Charts* using *Sample Data Sets* in R. (CO3,L6)
30. Create *Word Cloud* using R. (CO3,L6)

**Websites of Interest:**

1. <https://www.cs.waikato.ac.nz/ml/weka>.
2. <https://weka.wikispaces.com>
3. <https://www.rdocumentation.org/packages/stats/versions/3.6.2>
4. <http://www.r-bloggers.com/>

**Course Focus:** Foundation / Employability / Skill Development.



**APPENDIX-VI**  
**SYLLABUS FOR THE ACADEMIC YEARS 2021-2022(R20)**  
**M.SC. (COMPUTATIONAL DATA SCIENCE), THIRD SEMESTER**

M.Sc.(Computational Data Science)						SEMESTER III				
S.No.	Course Code	Title of the Course	Instruction Hours per Week			Credits	Evaluation			Total Marks
			L	T	P		IA Marks	SEE		
								Marks	Duration	
1	21DS3T1	Cloud Computing	4			4	30	70	3 Hours	100
2	21DS3T2	Cyber Security	4			4	30	70	3 Hours	100
3	21DS3T3	Big Data and Analytics	4			4	30	70	3 Hours	100
4	21DS3T4	Deep Learning (Open Elective-II)	4			4	30	70	3 Hours	100
5	Core Elective-I		4			4	30	70	3 Hours	100
	21DS3T5	Social Media Analytics								
	21DS3T5i	Block Chain Technology								
6	21DS3L1	Deep Learning Lab			6	3	30	70	3 Hours	100
7	21DS3L2	Big Data and Analytics Lab			6	3	30	70	3 Hours	100
8	21DS3P1	Mini Project				1	50	Nil	Nil	50
Total			32			27	260	490		750

**CLOUD COMPUTING**  
**SYLLABUS W.E.F 2021-2022**

**Course Category:** Programme Core **Course Type:** Theory **Credits:** 4 **Semester:** III  
**Prerequisites:** Programming Skills, Databases, Security and Privacy **Lecture-Tutorial-Practice:** 4-0-0  
**Continuous Evaluation:** 30 **Semester end Evaluation:** 70 **Total Marks:** 100

**Course Objectives:**

1. To understand the *Benefits of Cloud Computing and Virtualization*.
2. To understand the *Services and Deployment Models of Cloud Computing*.
3. To develop *Cloud Applications using Open Source Cloud Software*.
4. To understand the *Risks, Consequences and Costs for Cloud Computing, AAA Model*.
5. To understand *Application Development for Cloud and Architecture, Challenges and Benefits of Mobile Cloud Computing*.

**Course Outcomes:**

On successful completion of this course, the students able to:

**CO1:** Understand the *Benefits of Cloud Computing and Virtualization*.

**CO2:** Understand the *Services and Deployment Models of Cloud Computing*.

**CO3:** Develop *Cloud Applications using Open Source Cloud Software*.

**CO4:** Understand the *Risks, Consequences and Costs for Cloud Computing, AAA Model*.

**CO5:** Understand *Application Development for Cloud and Architecture, Challenges and Benefits of Mobile Cloud Computing*.

**UNIT I**

**Era of Cloud Computing:** Getting to Know the Cloud - Peer to Peer - Client Server and Grid Computing - Cloud Computing versus Client Server Architecture - Cloud computing versus Peer To Peer Architecture - Cloud computing versus Grid Computing - How we got to the Cloud - Server Virtualization versus Cloud Computing - Components of Cloud Computing - Cloud Types - Cloud Computing Service Delivery Models.

**Introducing Virtualization:** Introducing Virtualization and its Benefits - Implementation Levels of Virtualization - Virtualization at the OS Level - Virtualization Structure - Virtualization Mechanisms - Open Source Virtualization Technology - Binary Translation with Full Virtualization - Virtualization of CPU - Memory and I/O Devices - Hardware support for Virtualization in Intex x86 Processor.

**UNIT II**

**Cloud Computing Services:** Infrastructure as a Service - Platform as a Service - Language and Pass - Software as a Service - Database as a Service.

**Open Source Cloud Implementations and Administration:** Open Source Eucalyptus Cloud Architecture - Open Source Open Stack Cloud Architecture - Private Cloud Deployment using Eucalyptus - Cloud Implementation using OpenStack and Meghdooth (Single Node & Multi Node).

**UNIT III**

**Application Architecture for Cloud:** Cloud Application Requirements - Recommendations for Cloud Application Architecture - Fundamental Requirements for Cloud Application Architecture - Relevance and use of Client Server architecture for Cloud Application - Service Oriented Architecture for Cloud Applications.

**Cloud Programming:** Programming Support for Google Apps Engine - Big Table as Google's NOSQL System - Chubby as Google Distributed Lock Service - Administrating AWS - Deploying in AWS.

**UNIT IV**

**Risks, Consequences and Costs for Cloud Computing:** Introducing Risks in Cloud Computing - Risk Assessment and Management - Risk of Vendor Lock In - Risk of Loss Control - Risk of Not Meeting Regulatory Compliances - Risk of Resource Scarcity - Risk in Multi Tenant Environment - Risk of Failure - Risk of Failure of Supply Chain - Risk of Malware and Internet Attacks - Risk of Inadequate SLA - Risk of

Management of Cloud Resources - Risk of Network Outages - Risks in the Physical Infrastructure - Direct and Indirect Cloud Costs - Calculating Total Cost of Ownership for Cloud Computing - Cost Allocations in a Cloud. **AAA Administration for Clouds:** The AAA Model - Single Sign On for Clouds - Industry Implementations for AAA - Authentication Management in the Cloud - Authorization Management in the Cloud.

### UNIT V

**Application Development for Cloud:** Developing on Premise Versus Cloud Applications - Modifying Traditional Applications for Deployment in Cloud - Stages during the development process of Cloud Application - Managing a Cloud Application - Using Agile Software Development for Cloud Application - Cloud Applications: What Not to do - Static Code Analysis for Cloud Applications - Developing Synchronous and Asynchronous Cloud Applications.

**Mobile Cloud Computing:** Definition of Mobile Cloud Computing - Architecture of Mobile Cloud Computing - Benefits of Mobile Cloud Computing - Mobile Cloud Computing Challenges.

Prescribed Text Books			
S.No	Author	Title	Publisher
1	KailashJayaswal, JagannathKallakurchi, Donald J. Houde & Dr. Deven Shah	Cloud Computing, Black Book	Dreamtech Press

Reference Text Books			
S.No	Author	Title	Publisher
1	Thomas Erl, ZaighamMahmood, Ricardo Puttini	Cloud Computing- Concepts Technology Architecture	Pearson
2	Raj Kumar Buyya, Christen Vecctiola, S Tammaraiselvi	Mastering Cloud Computing, Foundation Application Programming	TMH

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**M.Sc.,(DATA SCIENCE) DEGREE EXAMINATIONS THIRD SEMESTER**  
**21DS3T1- CLOUD COMPUTING**  
**SYLLABUS W.E.F 2021-2022**

**Time 3 Hours**

**Max.Marks: 70**

**Answer ALL questions**

**(10×2 = 20 Marks)**

- 1)
  - a) Define SaaS (CO1,L1)
  - b) What is Virtualization? (CO1,L1)
  - c) What is an Open Source? (CO2,L1)
  - d) What is Eucalyptus (CO2,L1)
  - e) What are the Advantages of SOA (CO3,L1)
  - f) What are the Drawbacks of GFS (CO3,L1)
  - g) List the risks of Malware (CO4,L1)
  - h) What is Authentication (CO4,L1)
  - i) What not to do in Cloud Application Development (CO5,L1)
  - j) What are the advantages of MCC (CO5,L1)

**Answer all questions. All question carry equal marks.**

**5 × 10 = 50 Marks**

- 2) a) Explain the *Various Types of Cloud* with neat diagrams. (CO1,L2) 5 Marks  
b) Compare and contrast Cloud Computing Architecture with Peer to Peer Architecture.  
(CO1,L2) 5 Marks  
(or)  
b) Explain *Virtualization* and its benefits and levels. (CO1,L2) 5 Marks  
c) Explain the *Virtualization Structures* and *Virtualization Mechanisms*. (CO1,L2) 5 Marks
- 3) a) Explain *Cloud Computing Services*. (CO2,L2) 10Marks  
(or)  
b) Explain *Open Source Cloud Architectures*. (CO2,L2) 10 Marks
- 4) a) Summarize the requirements of *Cloud Application*. (CO3,L2) 5 Marks  
b) Explain *Service Oriented Architecture* for Cloud Applications. (CO3,L2) 5 Marks  
(or)  
c) Explain the *Big Table* as Google's NoSQL System. (CO3,L2) 5 Marks  
d) Explain *Elastic Block Store*. (CO3,L2) 5 Marks
- 5) a) Explain the *Risks in Cloud Computing*. (CO4,L2) 10 Marks  
(or)  
b) Describe the *AAA Model for Clouds*. (CO4,L2) 10 Marks
- 6) a) What are the *Stages during the Development Process* of *Cloud Applications*? (CO5,L1) 5 Marks  
b) How can we use *Agile Software Development* for *Cloud Applications*? (CO5,L1) 5 Marks  
(or)  
c) What are the benefits and challenges of *Mobile Cloud Computing*? (CO5,L1) 5 Marks  
d) What are the components in *Mobile Cloud Computing*? (CO5,L1) 5 Marks

### **CYBER SECURITY**

#### **SYLLABUS W.E.F 2021-2022**

**Course Category:** Programme Core **Course Type:** Theory **Credits:** 4 **Semester:** III

**Prerequisites:** Computer Networks & Cryptography and Network Security **Lecture-Tutorial-Practice:** 4-0-0

**Continuous Evaluation:** 30 **Semester end Evaluation:** 70 **Total Marks:** 100

#### **Course Objectives:**

1. To understand the concepts of *Computer and Network Security, Classical Encryption Techniques and Advanced Encryption Standard.*
2. To know *Public Key Cryptography and RSA, Key Management, Message Authentication Codes.*
3. To be aware of *Cyber Crimes & Cyberoffenses.*
4. To understand *Mobile & Wireless Devices, Tools and Methods* used in *Cyber Crime.*
5. To know Forensics of *Hand Held Devices and Case Studies of Cyber Crimes.*

#### **Course Outcomes:**

On successful completion of this course, the students able to:

**CO1:** Understand the concepts of *Computer and Network Security, Classical Encryption Techniques and Advanced Encryption Standard.*

**CO2:** Know *Public Key Cryptography and RSA, Key Management, Message Authentication Codes.*

**CO3:** Be aware of *Cyber Crimes & Cyberoffenses.*

**CO4:** Understand *Mobile & Wireless Devices, Tools and Methods* used in *Cyber Crime.*

**CO5:** Know forensics of *Hand Held Devices and Case Studies of Cyber Crimes.*

#### **UNIT I**

**Computer and Network Security Concepts:** Computer Security Concepts - The OSI Security Architecture - Security Attacks - Security Services - Security Mechanisms - A Model for Network Security.

**Classical Encryption Techniques:** Symmetric Cipher Model - Substitution Techniques - Transposition Techniques - Rotor Machines - Steganography.

**Advanced Encryption Standard:** AES Structure - AES Transformation Functions - AES Key Expansion - An AES Example.

#### **UNIT II**

**Public Key Cryptography and RSA:** Principles of Public Key Crypto Systems - The RSA Algorithm.

**Key Management:** Other Public Key Crypto Systems: Diffie Hellman Key Exchange, Elgamal Cryptographic System, Elliptic Curve Arithmetic, Elliptic Curve Cryptography.

**Message Authentication Codes:** Authentication Requirements - Authentication Functions - Message Authentication Codes.

#### **UNIT III**

**Introduction to Cybercrime:** Introduction - Cybercrime: Definition and Origins of the Word - Cybercrime and Information Security - Who are Cybercriminals? - Classifications of Cybercrimes - Cybercrime: The Legal Perspectives - Cybercrimes: An Indian Perspective - Cybercrime and the Indian ITA 2000 - A Global Perspective on Cybercrimes - Cybercrime Era: Survival Mantra for the Netizens - Concluding Remarks and Way Forward to Further Chapters.

**Cyberoffenses: How Criminals Plan Them:** Introduction - How Criminals Plan the Attacks - Social Engineering - Cyberstalking - Cybercafe and Cybercrimes - Botnets: The Fuel for Cybercrime - Attack Vector - Cloud Computing.

#### UNIT IV

**Cybercrime: Mobile and Wireless Devices:** Introduction - Proliferation of Mobile and Wireless -Devices - Trends in Mobility - Credit Card Frauds in Mobile and Wireless Computing Era - Security Challenges Posed by Mobile Devices - Registry Settings for Mobile Devices - Authentication Service Security - Attacks on Mobile/Cell Phones - Mobile Devices: Security Implications for Organizations - Organizational Measures for Handling Mobile - Organizational Security Policies and Measures in Mobile Computing Era - Laptops.

**Tools and Methods Used in Cybercrime:** Introduction - Proxy Servers and Anonymizers - Phishing - Password Cracking - Keyloggers and Spywares - Virus and Worms - Trojan Horses and Backdoors - Steganography - DoS and DDoS Attacks - SQL Injection - Buffer Overflow - Attacks on Wireless Networks.

#### UNIT V

**Forensics of Hand Held Devices:** Introduction - Understanding Cell Phone Working Characteristics - Hand Held Devices and Digital Forensics - Toolkits for Hand-Held Device Forensics - Hunting threats with Pandas - MFT Analysis - Extracting Feature Vectors From URL Strings For Malicious URL Detection - Monitor Active SSH Sessions With Prometheus and Grafana.

**Cybercrime: Illustrations, Examples and Mini Cases:** Introduction - Real Life Examples - Mini Cases - Illustrations of Financial Frauds in Cyber Domain - Digital Signature - Related Crime Scenarios - Digital Forensics Case Illustrations - Online Scams.

Prescribed Text Book			
	Author	Title	Publisher
1	William Stallings	Cryptography and Network Security	Pearson, Seventh Edition, 2017
2	Nina Godbole, Sunit Belapur	Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives	Wiley India Publications, Second Edition April, 2011

Reference Text Book			
	Author	Title	Publisher
1	William Stallings	Network Security Essentials -Applications and Standards	Pearson Education (2007), Third Edition.
2	Chris McNab	Network Security Assessment	OReilly (2007), 2 <sup>nd</sup> Edition
3	Jon Erickson	Hacking-The Art of Exploitation	Press (2006),SPD
4	Neal Krawety	Introduction to Network Security	Thomson (2007)
5	Ankit Fadia	Network Security-A Hackers Perspective	Macmillan (2008)

**e-Resources** <https://towardsdatascience.com/tagged/cybersecurity>

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**M.Sc.,(DATA SCIENCE) DEGREE EXAMINATIONS THIRD SEMESTER**  
**21DS3T2 -CYBER SECURITY**  
**SYLLABUS W.E.F 2021-2022**

**Time 3 Hours**  
**Answer ALL questions**

**Max. Marks: 70**  
**(10×2 = 20 Marks)**

1.
  - a. List out Security Attacks (CO1,L1)
  - b. Define AES Structure (CO1,L1)
  - c. What are Authentication Requirements (CO2,L1)
  - d. List different Authentication Functions (CO2,L1)
  - e. Who are Cybercriminals(CO3,L1)
  - f. How criminals plan the attacks(CO3,L1)
  - g. What is DOS Attack (CO4,L1)
  - h. What is Phishing (CO4,L1)
  - i. List out different Online Scams (CO5,L1)
  - j. What are the Advantages of Digital Signature(CO5,L1)

**Answer all questions. All question carry equal marks.**

**5 × 10 = 50 Marks**

2. a) Explain *Security Attacks* and *Security Mechanism*. (CO1,L2) 5 Marks  
b) Explain *Substitution Techniques in Encryption* with examples.(CO1,L2) 5 Marks  
(or)  
c) Explain the AES Cipher Encryption. (CO1,L2) 10 Marks
3. a) Find e using RSA Algorithm with p=3, q=11, d=7 and what is the cipher text character corresponding to the plain text character N using the number corresponding to the letter the number 1 stands for 'A'. (CO2,L1) 5 Marks  
b)What is *Message Authentication*? (CO2,L1) 5 Marks  
(or)  
b) Define Hash Functions and its Security. (CO2,L1) 5 Marks  
c) How does *Diffie-Hellman Key Exchange works*? (CO2,L1) 5 Marks
4. a) Who are Cyber Criminals? Classify various Cyber Crimes. (CO3,L1) 10 Marks  
(or)  
b) What are Cyberstalking and Botnets? (CO3,L1) 10 Marks
5. a) Explain the Measures for Handling Mobile Security Policies. (CO4,L2) 10 Marks  
(or)  
b) Explain *Virus, Worms, Trojan Horses & Backdoors* in detail. (CO4,L2) 10 Marks
6. a) Explain *Cell Phone Working Characteristics* and *Digital Forensics*. (CO5,L2) 10 Marks  
(or)  
b) Illustrate *Financial Fraud in Cyber Domain* with *Case Studies*. (CO5,L2)10 Marks

**BIG DATA AND ANALYTICS**

SYLLABUS W.E.F 2021-2022

**Course Category:** Programme Core **Course Type:** Theory **Credits:** 4 **Semester:** III**Prerequisites:** Python Programming **Lecture-Tutorial-Practice:** 4-0-0**Continuous Evaluation:** 30 **Semester end Evaluation:** 70 **Total Marks:** 100**Course Objectives:**

1. To understand *Bigdata* and its role in *Daily Life*.
2. To know How data is *Stored* and *Processed* in Hadoop.
3. To acquire knowledge on *Modern Databases* used in *Big Data Analytics*.
4. To apply *Visualization of Data* with *Tableau*.
5. To implement *Apache Spark* with *API- SQL and Data Frames*.

**Course Outcomes:**

Upon successful completion of this course- the student will be able to:

**CO1:** Understand *Bigdata* and its role in *Daily Life*.

**CO2:** Know how data is *Stored* and *Processed* in Hadoop.

**CO3:** Acquire knowledge on *Modern Databases* used in *Big Data Analytics*.

**CO4:** Apply *Visualization of Data* with *Tableau*.

**CO5:** Implement *Apache Spark* with *API- SQL and Data Frames*.

**UNIT I**

**Types of Digital Data:** Classification of Digital Data.

Introduction to Big Data: Characteristics of Data - Evolution of Big Data - Definition of Big Data - Challenges with Big Data - What is Big Data? - Other Characteristics of Data - Why Big Data? -Traditional Business Intelligence versus Big Data - Typical Data Warehouse Environment - Typical Hadoop Environment - Coexistence of Big Data and Data Warehouse - What is Changing in the realms of Big Data.

**Big Data Analytics:** What is Big Data Analytics - What Big Data Analytics is not? - Why this sudden Hype around Big Data Analytics? - Classification of Analytics - Greatest Challenges that Prevent Business from Capitalizing Big Data - Top Challenges facing Big Data - Why Big Data Analytics Important? - What Kind of Technologies are we looking toward to help meet the challenges posed by Big Data? - Data Science - Data Scientist - Terminologies used in Big Data Environments.

**UNIT II**

**Hadoop:** Features of Hadoop - Key advantages of Hadoop - Versions of Hadoop - Overview of Hadoop Ecosystem - Hadoop Distributions - Why Hadoop? - Why not RDBMS - RDBMS versus Hadoop - Distribution Computing Challenges - History of Hadoop - Hadoop Overview - Hadoop Distributed File System.

**Processing Data with Hadoop:** Managing Resource and Applications with Hadoop with YARN (Yet Another Recourse Negotiator) - Interacting with Hadoop Ecosystem.

**UNIT III**

**Introduction to Map Reduce Programming:** Introduction - Mapper - Reducer - Combiner - Partitioner - Searching - Sorting – Compression.

**NoSQL:** Where it is used? - What is it? - Types of NoSQL Databases - Why NoSQL? - Advantages of NoSQL - What we miss with NoSQL? - Use of NoSQL in Industry - SQL versus NoSQL.

**UNIT IV**

**Hadoop Eco System:**

**Hive:** What is Hive? - Hive Architecture - Hive Data Types - Hive File Format - Hive Query Language (HQL) - RC File Implementation - User Defined Function.



**PIG:** What is PIG? - Anatomy of Pig - Pig on Hadoop - Pig Philosophy - Use Case for Pig - Pig Latin - Data type in Pig - Running Pig - Execution Mode of Pig - HDFS Commands - Relational Operators - Eval Functions - Complex Data Types - User Defined Functions - Parameter Substitution.  
**HBase:** HBasics - Concepts - Clients - HBase versus RDBMS.

## UNIT V

### Apache Spark:

**Introduction to Apache Spark:** A Unified Analytics - What Is Apache Spark? Unified Analytics - The Developer’s Experience - Using Scala and PySpark Shell - Understanding Spark Application Concepts - Transformations - Actions and Lazy Evaluation - The Spark UI.

**Apache Spark’s API:** What’s Underneath an RDD? - Structuring Spark - The Data Frame API - The Dataset API - Data Frames Versus Datasets - When to Use RDDs - Spark SQL and the Underlying Engine.

**Spark SQL and Data Frames:** Introduction to built in Data Sources - Using Spark SQL in Spark Applications - SQL Tables and Views - Data Sources for Data Frames and SQL Tables : Data Frame Reader - Data Frame Writer - JSON - CSV- Images - Binary Files.

**Common Data Frames and Spark SQL Operations:** Unions - Joins - Windowing Spark SQL and Datasets: Working with Datasets: Creating Sample Data - Transforming Sample Data.

Prescribed Text Books			
S.No	Author	Title	Publisher
1	Seema Acharya- Subhashini Chellappan	Big Data and Analytics	Wiley Publications - Second Edition (UNIT I, II, III,IV)
2	Karau H, Konwinski A, Wendell P, Zaharia M	Learning Spark : Lightning Fast Data Analytics	O'Reilley Second Edition (UNIT V: 1 to 6 Chapters)

Reference Text Books			
S.No	Author	Title	Publisher
1	Tom White	Hadoop:The Definitive Guide	O’Reilly, Yahoo Press, Third Edition
2	Bill Chambers & Matei Zaharia	SPARK: The Definitive Guide	O’Reilley, 2018 Edition
3	Guller M	Big data Analytics with Spark: A Practitioner's Guide to using Spark for Large Scale Data Analysis	Apress, 2015

**P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE (AUTONOMOUS)-VIJAYAWADA-520010**  
An Autonomous College in the Jurisdiction of Krishna University- A.P.- India.)  
**M.Sc.,(DATA SCIENCE) DEGREE EXAMINATIONS THIRD SEMESTER**  
**21DS3T3 -BIG DATA AND ANALYTICS**  
**SYLLABUS W.E.F 2021-2022**

**Time 3 Hours**

**Max.Marks: 70**  
**(10×2 = 20 Marks)**

**Answer ALL questions**

1.
  - a) Define Big Data (CO1,L1)
  - b) Define Analytics. (CO1,L1)
  - c) Label the difference between RDBMS and Hadoop. (CO2,L1)
  - d) List the Key Components of Yarn? (CO2,L1)
  - e) What is Hadoop Map Reduce? (CO3,L1)
  - f) List the types of NoSQL Databases(CO3,L1)
  - g) List the data types for Hive. (CO4,L1)
  - h) How HBase differs with RDBMS (CO4,L1)
  - i) What is Apache Spark? (CO5,L1)
  - j) Define JSON. (CO5,L1)

**Answer all questions. All question carry equal marks.**

**5 × 10 = 50 Marks**

**UNIT I**

2. a. Explain the *Digital data* with examples. (CO1,L2) 5Marks
  - a. Summarize the challenges faced by *Bigdata*. (CO1,L2) 5 Marks  
(or)
  - b. Explain *Brewers Theorem* with examples. (CO1,L2) 5 Marks
  - c. Explain the *In-memory Analytics*. (CO1,L2) 5 Marks

**UNIT II**

3. a. Explain *Hadoop Eco System* with neat diagram. (CO2,L2) 10 Marks  
(or)
- b. Explain *HDFS File Systems* with neat diagram. (CO2,L2)10 Marks

**UNIT III**

4. a. Explain *Map Reduce* in hadoop with example. (CO3,L2) 10 Marks  
(or)
- b. Demonstrate *File Read* and *File Write* in hadoop. (CO3,L2) 10 Marks

**UNIT IV**

5. a. Explain *Hive Architecture* with neat diagram. (CO4,L2) 10 Marks  
(or)
- b. Explain *CRUD Operations* in *MongoDB* with examples. (CO4,L2) 5 Marks
- c. Explain *mongoDB import* and *export* with examples. (CO4,L2) 5 Marks

**UNIT V**

6. a. Explain *TDD* in *Apache Spark* with examples. (CO5,L2) 10 Marks  
(or)
- b. Explain *Common Data Frames* and Distinguish between *Data Frames* Vs *Datasets*. (CO5,L2) 5 Marks
- c. Explain *Spark SQL Operations* in Spark. (CO5,L2) 5 Marks

**DEEP LEARNING****SYLLABUS W.E.F 2021-2022**

**Course Category:** Open Elective **Course Type:** Theory **Credits:** 4 **Semester:** III  
**Prerequisites:** Python Programming, Machine Learning **Lecture-Tutorial-Practice:** 4-0-0  
**Continuous Evaluation:** 30 **Semester end Evaluation:** 70 **Total Marks:** 100

## Course Objectives:

1. To gain familiarity in Basics of Deep Learning.
2. To understand the concepts of Memory Augmented Neural Networks.
3. To acquire knowledge Deep Reinforcement Learning.
4. To implement Neural Networks in Tensor Flow
5. To understand the Applications of Deep Learning.

## Course Outcomes:

Upon successful completion of the course, the student will be able to:

- CO1:** Gain familiarity in Basics of Deep Learning.  
**CO2:** Understand the concepts of Memory Augmented Neural Networks.  
**CO3:** Acquire knowledge Deep Reinforcement Learning.  
**CO4:** Implement Neural Networks in Tensor Flow  
**CO5:** Understand the Applications of Deep Learning.

**UNIT I**

**Basics of Deep Learning- Deep learning architectures:** Convolutional Neural Networks : Neurons in Human Vision - The Shortcomings of Feature Selection - Vanilla Deep Neural Networks Don't Scale - Filters and Feature Maps - Full Description of the Convolutional Layer - Max Pooling - Full Architectural Description of Convolution Networks - Closing the Loop on MNIST with Convolutional Networks - Image Preprocessing Pipelines Enable More Robust Models - Accelerating Training with Batch Normalization -Building a Convolutional Network for CIFAR 10 - Visualizing Learning in Convolutional Networks - Leveraging Convolutional Filters to Replicate Artistic Styles - Learning Convolutional Filters for Other Problem Domains - Training algorithms.

**UNIT II**

**Memory Augmented Neural Networks:** Neural Turing Machines - Attention Based Memory Access - NTM Memory Addressing Mechanisms - Differentiable Neural Computers - Interference Free Writing in DNCs-DNC Memory Reuse - Temporal Linking of DNC Writes - Understanding the DNC Read Head - The DNC Controller Network - Visualizing the DNC in Action-Implementing the DNC in Tensor Flow - Teaching a DNC to Read and Comprehend.

**UNIT III**

**Deep Reinforcement Learning:** Deep Reinforcement Learning Masters Atari Games - What Is Reinforcement Learning? - Markov Decision Processes (MDP) - Explore Versus Exploit - Policy versus Value Learning - Pole Cart with Policy Gradients- Q Learning and Deep Q Networks - Improving and Moving Beyond DQN.

**UNIT IV**

**Implementing Neural Networks in Tensor Flow:** What Is Tensor Flow? - How Does Tensor Flow Compare to Alternatives? - Installing Tensor Flow - Creating and Manipulating Tensor Flow Variables - Tensor Flow Operations-Placeholder Tensors-Sessions in Tensor Flow - Navigating Variable Scopes and Sharing Variables - Managing Models over the CPU and GPU - Specifying the Logistic Regression Model in Tensor Flow - Logging and Training the Logistic Regression Model.

## UNIT V

**Applications:** Large Scale Deep Learning - Computer Vision - Speech Reorganization - Natural Language Processing - Other Applications.

Prescribed Text Books			
	Author	Title	Publisher
1	Nikhil Buduma, Nicholas Locascio	Fundamentals of Deep Learning: Designing Next-Generation Machine Intelligence Algorithms.	O'Reilly Media, 2017
2	Ian Goodfellow, YoshuaBengio, Aaron Courville	Deep Learning (Adaptive Computation and Machine Learning series).	MIT Press, 2017

Reference Text Books			
	Author	Title	Publisher
1	Douwe Osinga	Deep learning Cook Book, Practical Recipes to Get Started Quickly	O'Reilly

e-Resources: 1) <https://keras.io/datasets/> 2) <http://deeplearning.net/tutorial/deeplearning.pdf> 3) <https://arxiv.org/pdf/1404.7828v4.pdf> 4) <https://github.com/lisa-lab/DeepLearningTutorials>

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**M.Sc.,(DATA SCIENCE) DEGREE EXAMINATIONS THIRD SEMESTER**  
**DEEP LEARNING SYLLABUS W.E.F 2021-2022**

**Time 3 Hours**

**Max.Marks: 70**

**Answer ALL questions**

**(10×2 = 20 Marks)**

1.
  - a) List out different *Filters* in *Feature Map*?(CO1,L1)
  - b) What is *Max Pooling*?(CO1,L1)
  - c) What is the *use of Neural Turing Machines*? (CO2,L1)
  - d) What is *DNC Read Head*?(CO2,L1)
  - e) What Is *Reinforcement Learning*? (CO3,L1)
  - f) How to *Improving Beyond DQN* (CO3,L1)
  - g) What Is *Tensor Flow*? (CO4,L1)
  - h) List out *Tensor Flow Operations*?(CO4,L1)
  - i) What is *Speech Reorganization*? (CO5,L1)
  - j) Define *Natural Language Processing*? (CO5,L1)

**Answer all questions. All question carry equal marks.**

**5 × 10 = 50 Marks**

- 2.(a) Explain *Filters & Feature Maps* in detail. (CO1,L2) 10 Marks  
(or)  
(b) Explain building *Convolutional Network* for CIFAR-10. (CO1,L2) 10 Marks
- 3.(a) Explain *Interference Free writing in DNCs*. (CO2,L5) 10 Marks  
(or)  
(b) Explain *visualizing the DNC in Action*. (CO2,L5) 10 Marks
- 4.(a) Explain *Agent and Building the model and Optimizer*. (CO3,L2) 10 Marks  
(or)  
(b) Explain *Setting Up Training Operations and Updating our Target Q - Network*. (CO3,L2) 10 Marks
5. (a) Discuss *Sessions in Tensor Flow*. (CO4, L6) 10 Marks  
(or)  
(b) Discuss specifying the *Logistic Regression Model in Tensor Flow*. (CO4,L6) 10 Marks
- 6.(a) Explain *Pre Processing and Data Set Augmentation* in Computer Vision. (CO5,L2) 10 Marks  
(or)  
(b) Explain use of *Shortlist and Hierarchical Softmax* in NLP. (CO5,L2) 10 Marks

**SOCIAL MEDIA ANALYTICS****SYLLABUS W.E.F 2021-2022**

**Course Category:** Programme Core **Course Type:** Theory **Credits:** 4 **Semester:** III  
**Prerequisites:** Python Programming & Machine Learning **Lecture-Tutorial-Practice:** 4-0-0  
**Continuous Evaluation:** 30 **Semester end Evaluation:** 70 **Total Marks:** 100

**Course Objectives:**

1. To understand basic concepts of *Social Media Mining & New Challenges for Mining*.
2. To learn *Graph Essentials*.
3. To familiar with *Network Measures* and *Network Models*.
4. To understand *Data Mining Essentials* and *Information Diffusion* in Social Media
5. To know *Recommendation Social Media* and *Behaviour Analysis*.

**Course Outcomes:**

Upon successful completion of the course, the student will be able to:

**CO1:** Understand basic concepts of *Social Media Mining & New Challenges for Mining*.

**CO2:** Learn *Graph Essentials*.

**CO3:** Familiar with *Network Measures* and *Network Models*.

**CO4:** Understand *Data Mining Essentials* and *Information Diffusion* in Social Media

**CO5:** Know *Recommendation Social Media* and *Behaviour Analysis*.

**UNIT I**

**Introduction:** What is Social Media Mining - New Challenges for Mining.

**Graph Essentials:** Graph Basics - Graph Representation - Types of Graphs - Connectivity in Graphs - Special graphs - Graph Algorithms.

**Web Scraping:** What Is Web Scraping? - Why Web Scraping for Data Science - Web Scraping Uses - Getting Ready - Setting Up A Quick Python Primer.

**UNIT II**

**Network Measures:** Centrality - Transitivity, Reciprocity - Balance and Status - Similarity.

**Network Models:** Properties of Real World Networks - Random Graphs - Small World Models - Preferential Attachment Model.

**UNIT III**

**Data Mining Essentials:** Data - Data Preprocessing - Supervised Learning Algorithms - Unsupervised Learning Algorithms.

**Communities and Interactions:** Community Analysis - Community Detection - Community Evolution - Community Evaluation.

**UNIT IV**

**Information Diffusion in Social Media:** Herd Behaviour - Information Cascades - Diffusion of Innovations - Epidemics.

**Influence and Homophily:** Measuring Assortativity - Influence - Homophily - Distinguishing Influence and Homophily.

**UNIT V**

**Recommendation Social Media:** Challenges - Classical Recommendation Algorithms - Recommendation Using Social Context - Evaluating Recommendations.

**Behaviour Analysis:** Individual Behaviour - Collective Behavior - Events Analytics in Social Media.

Prescribed Text Book			
	Author	Title	Publisher
1	Reza Zafarani, Mohammad Ali Abbasi, and Huan Liu.	Social Media Mining : An Introduction	Cambridge University Press, 2014
2	Sepepe Vanden Broucke, Bart Baesens	Practical Web Scraping for Data Science	Apress, 2018

Reference Text Books			
	Author	Title	Publisher
1	Matthew A. Russell	Mining the Social Web	2nd Edition. O'Reilly Media. 2013
2	Jennifer Golbeck	Analyzing the Social Web	Morgan Kaufmann 2013, ISBN 978-0124055315
3	Ricardo Baeza Yates and Berthier Ribeiro Neto.	Modern Information Retrieval: The Concepts and Technology behind Search	Second Edition, ACM Press Books, 2011, ISBN 978-0321416919
4	Charu C Aggarwal	Social Network Data Analytics	Springer, 2011

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**(An Autonomous College in the Jurisdiction of Krishna University, A.P., India.)**  
**M.Sc.,(DATA SCIENCE) DEGREE EXAMINATIONS THIRD SEMESTER**  
**21DS3T5 - SOCIAL MEDIA ANALYTICS**  
**SYLLABUS W.E.F 2021-2022**

**Time 3 Hours**

**Max.Marks:70**

**Section-A**

**Answer ALL questions**

**(10×2 = 20 Marks)**

1.
  - a) What is Social Media Mining? (CO1,L1)
  - b) Why Web Scraping for Data Science (CO1,L1)
  - c) List Transitivity Network Measures (CO2,L1)
  - d) Name Random Graphs Network Model (CO2,L1)
  - e) What is Data Preprocessing in Data Mining?(CO3,L1)
  - f) Define Community Evaluation. (CO3,L1)
  - g) Define Discuss Herd Behavior. (CO4,L1)
  - h) Define Influence and Homophily. (CO4,L1)
  - i) List Recommendations in Social Media. (CO5,L1)
  - j) Define Collective Behavior. (CO5,L1)

**Section-B**

**Answer all questions.**

**All question carry equal marks.**  
**Marks**

**5× 10=50**

2. (a) What are various types of Graphs in Graph Mining?(CO1,L1) 10 Marks  
(or)  
(b) What is Social Media Mining? State different Challenges for Mining. (CO1,L1) 10 Marks
3. (a) Explain Network Measures Transitivity & Reciprocity.(CO2,L2) 10 Marks  
(or)  
(b) State and explain Small World Models and its Properties.(CO2,L2) 10 Marks
4. (a) Summarize Naive Bayes Classification and Nearest Neighbor Classifier.(CO3,L2) 10 Marks  
(or)  
(b) Explain Community Detection in Evolving Networks.(CO3,L2) 10 Marks
5. (a) Write about Information Diffusion and Herd Behavior with Diners Example.(CO4,L1) 10 Marks  
(or)  
(b) How to measure and Model Homophily?(CO4,L1) 10 Marks
6. (a) What are their commendation of Social Media Context?(CO5,L1) 10 Marks  
(or)  
(b) What are Collective Behavior Analysis, Features and Prediction? (CO5,L1) 10 Marks



**BLOCK CHAIN TECHNOLOGY**

SYLLABUS W.E.F 2021-2022

**Course Category:** Programme Core **Course Type:** Theory **Credits:** 4 **Semester:** III**Prerequisites:** Cryptography and Network Security **Lecture-Tutorial-Practice:** 4-0-0**Continuous Evaluation:** 30 **Semester end Evaluation:** 70 **Total Marks:** 100**Course Objectives:**

1. To understand basic concepts of *Blockchain & Limitations*.
2. To learn *How Bitcoin Achieves Decentralization*.
3. To familiar with *How to Store Bitcoins* and *How to Use Bitcoins*.
4. To know *Ethereum and Smart Contracts* and *Blockchain Applications*.
5. To gain knowledge on *Mining Consensus* and *Bitcoin Security*.

**Course Outcomes:**

Upon successful completion of the course, the student will be able to:

CO1: Understands basic concepts of *Blockchain & Limitations*.

CO2: Learn *How Bitcoin Achieves Decentralization*.

CO3: Familiar with *How to Store Bitcoins* and *How to Use Bitcoins*.

CO4: Know *Ethereum and Smart Contracts* and *Blockchain Applications*.

CO5: To gain knowledge on *Mining Consensus* and *Bitcoin Security*.

**UNIT I**

**Why Blockchain is Need:** Discovering the Core Problem - Public Ledgers - Block in Blockchain - Public versus Private Blockchain.

**How Blockchain Works:** Planning the Blockchain - Hashing Data - Identifying & Protecting user Accounts - Authorizing Transactions - Using Data Store - Protecting Data Store - Choosing Transaction History - Paying for Integrity.

**Limitations:** Seeing the Limitations - Reinventing the Block Chain.

**UNIT II**

**How Bitcoin Achieves Decentralization:** Centralized versus Decentralization - Distributed Consensus - Bitcoin Transactions - Bitcoin Scripts - Applications of Bitcoin Scripts - Bitcoin Blocks.

**UNIT III**

**How to Store Bitcoins:** Simple Local Storage - Hot and Cold Storage - Splitting and Sharing Keys.

**How to Use Bitcoins:** Online Wallets and Exchanges - Payment Services - Transaction Fees - Currency Exchange Markets.

**UNIT IV**

**Ethereum and Smart Contracts:** Smart Contract Programming Model, Namecoin in Ethereum, Gas Incentives and Security, Data Structures in Ethereum.

**Blockchain Applications:** Applications from Building Blocks, Colored Coins, Counterparty, Payment Channels and State Channels, Routed Payment Channels.

## UNIT V

**Mining Consensus:** Decentralized Consensus - Independent Verification of Transactions - Mining Nodes - Aggregating Transactions into Blocks - Mining the Block - Validating a New Block - Assembling and Selecting Chains of Blocks - Consensus Attacks.

**Bitcoin Security:** Security Principles - User Security Best Practices.

Prescribed Text Book			
	Author	Title	Publisher
1	Daniel Drescher	Blockchain Basics	A Press, Second Edition, 2017
2	Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller, and Steven Goldfeder	Bitcoin and Cryptocurrency Technologies: A Comprehensive Introduction.	Princeton University Press, 2016, Second Edition
3	Andreas M Antonopoulos	Mastering Bitcoin: Unlocking Digital Crypto Currencies	ORELLY,2015

Reference Text Book			
	Author	Title	Publisher
1	Melanie	Blockchain : Blue Print for New Economy	ORELLY,2015

**Time 3 Hours**

**Answer ALL questions**

**Max.Marks: 70**

**(10×2 = 20 Marks)**

1. a) What is reinventing the Block Chain?(CO1,L1)
- b) How to use Data Store? (CO1,L1)
- c) What is Block in Block Chain? (CO2,L1)
- d) What is Script? (CO2,L1)
- e) What is Splitting? (CO3,L1)
- f) What is Transaction? (CO3,L1)
- g) What is Payment Channel? (CO4,L1)
- h) What is Colored Coin? (CO4,L1)
- i) What is Mining Node? (CO5,L1)
- j) List Security Principles (CO5,L1)

**Answer all questions. All question carry equal marks.**

**5 × 10=50Marks**

2. (a) What are Public Ledgers? Explain Public & Private Blockchains. (CO1,L1) 10 Marks  
(or)  
(b) How to identify and protect User Accounts and Authorize Transactions? (CO1,L1) 10 Marks
3. (a) Differentiate Centralized & Decentralized in Bitcoin.(CO2,L2) 10 Marks  
(or)  
(b) Explain Bitcoin Scripts and their Applications. (CO2,L2) 10 Marks
4. (a) What are Hot & Cold Storages? Explain in detail. (CO3,L1)10 Marks  
(or)  
(b) How bitcoins are used in online Wallets & Exchanges and payment services? (CO3,L1) 10 Marks
5. (a) Explain Smart Contract Programming Model & Data Structures in Ethereum. (CO4,L2) 10 Marks  
(or)  
(b) Write about Applications from Building Blocks and Colored Coins. (CO4,L2) 10 Marks
6. (a) Explain Mining, Validating, Assembling and Selecting Chains of blocks. (CO5,L2) 10 Marks  
(or)  
(b) Explain the Security Principles in Bitcoin Security. (CO5,L2) 10 Marks

**DEEP LEARNING LAB****SYLLABUS W.E.F 2021-2022****Course Category:** Programme Core **Course Type:** Practical **Credits:** 3 **Semester:** III**Prerequisites:** Python Programming **Lecture-Tutorial-Practice:** 0-0-6**Continuous Evaluation:** 30 **Semester end Evaluation:** 70 **Total Marks:** 100**Course Objectives:**

1. To learn developing *Face Recognition Application*.
2. To learn developing *Voice Recognition Application*.
3. To learn developing *Object Recognition Application*.
4. To learn developing *Object Counting Application*.
5. To learn developing *Sentiment Analysis Application & Fake News Detection Application*.

**Course Outcomes:**

On successful completion of this course, the students able to:

**CO1:** To learn developing *Face Recognition Application*.

**CO2:** To learn developing *Voice Recognition Application*.

**CO3:** To learn developing *Object Recognition Application*.

**CO4:** To learn developing *Object Counting Application*.

**CO5:** To learn developing *Sentiment Analysis Application & Fake News Detection Application*.

1. Implement *Face Recognition Application* using any frame work. (CO1,L6)
2. Implement *Voice Recognition Application* using any frame work. (CO2,L6)
3. Implement *Object Recognition Application* using any frame work. (CO3,L6)
4. Implement *Object Counting Application* using any frame work. (CO4,L6)
5. Implement *Sentiment Analysis Application* using any frame work. (CO5,L6)
6. Implement *Detection of Fake News Application* using any frame work. (CO5,L6)

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**BIG DATA AND ANALYTICS LAB****SYLLABUS W.E.F 2021-2022****Course Category:** Programme Core **Course Type:** Practical **Credits:** 3 **Semester:** III**Prerequisites:** Linux **Lecture-Tutorial-Practice:** 0-0-6**Continuous Evaluation:** 30 **Semester end Evaluation:** 70 **Total Marks:** 100**Course Objectives:**

1. To implement *Hadoop Installations, Hadoop Commands, Word Count* in Hadoop
2. To implement *Pig Installation, Pig Commands, MongoDB*.
3. To implement *MongoDB Commands, Tasks On Mongoddb, Bulk Documents in Mongoddb, Arrays in Mongoddb*.
4. To implement *Map Reduce in Mongoddb, Aggregate Functions in Mongoddb, Mongo Import & Export*.
5. To implement *Spark Installation, Operations of Rdd, Working With Data Frames, Spark SQL Operations*.

**Course Outcomes:**

Upon successful completion of the course, the student will be able to:

CO1: Implement *Hadoop Installations, Hadoop Commands, Word Count* in HadoopCO2: Implement *Pig Installation, Pig Commands, MongoDB*.CO3: Implement *MongoDB Commands, Tasks On Mongoddb, Bulk Documents in Mongoddb, Arrays in Mongoddb*.CO4: Implement *Map Reduce in Mongoddb, Aggregate Functions in Mongoddb, Mongo Import & Export*.CO5: Implement *Spark Installation, Operations of Rdd, Working With Data Frames, Spark SQL Operations*.

1. Hadoop Installation Steps. (CO1,L3)
2. Hadoop Commands. (CO1,L3)
3. Word Count Program in Hadoop. (CO1,L1)
4. Pig Installation Steps. (CO2,L3)
5. Pig Commands. (CO2,L3)
6. Introduction to Mongoddb. (CO3,L1)
7. Mongoddb Commands. (CO3,L3)
8. Tasks on Mongoddb. (CO3,L3)
9. Creating Bulk Documents in Mongoddb. (CO3,L6)
10. Arrays in Mongoddb. (CO3,L1)
11. Map Reduce in Mongoddb. (CO4,L3)
12. Aggregate Functions in Mongoddb. (CO4,L3)
13. Mongo Import. (CO4,L3)
14. Mongo Export. (CO4,L3)
15. Spark Installation. (CO5,L3)
16. Operations of Rdd. (CO5,L3)
17. Working With Data Frames. (CO5,L3)
18. Spark Sql Operations. (CO5,L3)

**APPENDIX-VII**  
**OPEN ELETIVES OFFERED BY COMPUTER SCIENCE PROGRAMME**



**P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE**

Siddhartha Nagar, Vijayawada – 520 010

*Autonomous - ISO 9001 - 2015 Certified*

**Programme:** Any Post Graduate Program

**Title of the Paper:** Visual Analytics for Executives

**Semester:** III

Course Code		Course Delivery Method	Face-to-face/Blended Mode
Course Category	Open elective	Lecture-Tutorial-Practice	2-0-4
Credits	4	CIA Marks	30
No. of Lecture Hours / Week	6	Semester End Exam Marks	70
Total Number of Lecture Hours	72	Total Marks	100
Year of Introduction : 2021	Year of Offering: 2021	Year of Revision:	Percentage of Revision:

**Course Objectives:** This Course focuses to know the importance of Visualization in the world of Data Analytics and Prediction.

- To handle Data sources in Tableau.
- To get familiarized about creating visualization using Different Types of Charts.
- To gain knowledge about using Maps in Tableau.
- To gain knowledge about Adhoc Analysis.
- To design interactive dash boards.

**Course Outcomes:** At the end of this course, students should be able to

**CO1:** Able to know the importance of Visualization and connect different data sources in Tableau

**CO2:** Able to create charts in tableau

**CO3:** Able to implement Aggregate Functions, Calculated Fields, Table Calculations and Level of Detail Calculations

**CO4:** Able to implement Maps and advance analytics

**CO5:** Able to create interactive dash boards

<b>Syllabus</b>		
<b>Unit</b>	<b>Learning Units</b>	<b>Lecture Hours</b>
I	<p><b>Introduction and Getting Started with Tableau:</b> The advantages of a Modern Analytics Platform, The Tableau Application Suite, Installing Tableau, Desktop Data Preparation, The Sample Dataset, The Tableau Workspace, Working With Measures and Dimensions, Working With Marks, Saving, Opening and Sharing your Workbooks.</p> <p><b>Adding Data Sources in Tableau:</b> Setting up a Data Connector, Selecting Data Tables, Joins, Unions, Data Extracts and Live Connections, Editing the Model's Metadata, Data Types, Adding Hierarchies, Calculated Fields and Table, Calculations, Data Collection, Checklist for increasing Performance.</p>	14
II	<p><b>Creating Data Visualizations:</b> Chart Types, Ready, Set, Show Me, Bar Charts, Legends, Filters and Hierarchies, Line Charts, Highlight Tables, Heat Maps, Bullet Charts, Cumulative Sums with Waterfall Charts, Reflection, The Anatomy of a Tableau Visualization.</p>	16
III	<p><b>Aggregate Functions, Calculated Fields and Parameters:</b> Aggregate Functions, Calculated Fields, Aggregations in Calculated Fields, Text Operators, Date Fields, Logical Functions in Calculated Fields, Parameters, Searching Text Fields.</p> <p><b>Table Calculations and Level of Detail Calculations:</b> Different types of Calculations, Quick Table Calculations, Customized Table Calculations, Level of detail Expressions.</p>	14
IV	<p><b>Maps:</b> Symbol Maps, Filled Maps, Density Maps, Map Layers, Maps With Pie Charts, Viz in Tooltip.</p> <p><b>Reflection:</b> The Anatomy of a Tableau Map, Alternative Map Services, Mapbox Maps, Spatial Data.</p> <p><b>Advanced Analytics:</b> Trends, Forecasts and Clusters.</p> <p><b>Other Statistical Tools:</b> Overview of the Tableau Analytics Pane, Constant, Average, and Reference Lines, Trend Lines, Forecasts, Cluster Analysis.</p>	16
V	<p><b>Interactive Dashboards:</b> Preliminary Considerations, Creating a New Dashboard, The Dashboard Pane, Placing Charts on the Dashboard, Dashboard Titles, Navigation Buttons, Dashboard Actions.</p> <p><b>Dashboard Starters:</b> Templates for Cloud Data, Dashboard Best Practices and Inspiration.</p>	12

Prescribed Text Book			
	Author	Title	Publisher
1	Alexander Loth	Visual Analytics With Tableau	Wiley 2019
2	Shankar Arul	Tableau for Business Users – A Hands on approach	Jupyterdata
3	Jaejin Hwang Youngjin Yoon	Data Analytics and Visualization in Quality Analysis using Tableau	CRC Press - Taylor & Francis Group 2022

Reference Text Book			
	Author	Title	Publisher
1	Carlos Daniel, Ponce García	Tableau Workout Book Learn Tableau fast 9 exercises to become a dashboard expert	e-book
2	Ryan Sleeper	Innovative Tableau -100 More Tips, Tutorials, and Strategies	O'Reilly
3	Lindy Ryan	Visual Data Storytelling with Tableau	Addison-Wesley
4	Anil K. Maheshwari	Data Analytics Made Accessible	2020 Kindle Edition
5	Tableau	Tableau Blue print	Tableau 2021

**Course has focus on:** Employability

#### Websites of Interest:

- [1]. Visual Analytics in Tableau | <https://www.youtube.com/watch?v=gEKQ3kigJsM>
- [2]. Tableau Training for Beginners | Edureka <https://www.youtube.com/watch?v=aHaOIvR00So>
- [3]. Tableau Training for Beginners | Simplilearn <https://www.youtube.com/watch?v=Wh4sCCZjOwo>
- [4]. Tableau Full Course| <https://youtu.be/KA0QHWm0nWo>

**Co-curricular Activities:** Programming Contests, Workshops & Quiz.

#### Lab List:

1. Tableau installation. (CO1,L1)
2. Tableau Introduction /Exploring Tableau. (CO1,L1)
3. Creating New Workbooks Opening Existing Workbooks in Tableau. (CO1,L1)
4. DATA COLLECTION from various sources web/text/csv/JSON. (CO1,L1)
5. Implementing joins and Unions (CO1,L1)
6. Creating Bar Chart. (CO2,L3)
7. Creating Pie Chart. (CO2,L3)
8. Creating Dual Axis Chart. (CO2,L3)
9. Creating Shared Axis. (CO2,L3)
10. Creating Cross Tab. (CO2,L3)
11. Creating Word Cloud. (CO2,L3)
12. Creating Scatter Plot. (CO2,L3)
13. Creating Bubble Chart. (CO2,L3)
14. Implementing Data Blending. (CO3,L3)
15. Implementing Word Cloud. (CO3,L3)
16. Implementing Aggregate Functions, Calculated Fields. (CO3,L3)
17. Implementing Table Calculations and Level of Detail Calculations. (CO3,L3)
18. Creating Maps. (CO3,L3)
19. Implementing Trend lines and analytics in Tableau. (CO4,L3)
20. Creating a Dash Board. (CO5,L3)

Note: Lab list can be modified for enhancement by adding few more exercises as and when teacher to implement new case studies or examples.



P.B. Siddhartha College of Arts & Science, Vijayawada - 520 010.  
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OPEN ELECTIVE

Course Code:

Title: Visual Analytics for Executives  
(w.e.f admitted batch 2020-21)

Time: 4 Hours

Answer ALL questions

Max. Marks: 70

Part-A - Max. Marks: 20

Theory - **On line Test**  
**minutes**

Number of questions - **60 Maximum**

Duration: **60**

(Marks can be downsized to 20 marks)

Note: Online Test Consisting of MCQ/True or False/MSQ (Multiple Selection Questions) consisting from L1 to L6 covering all Course Outcomes.

Online Test

- Consisting of MCQ/True or False/MSQ (Multiple Selection Questions)
- Provision for negative marking
- Randomised the question order during on-line assessment
- Randomised the answers for each question during on-line assessment
- The student has to get login with his/her roll-number for on line assessment
- Report of the assessment has to be submitted by the faculty/Examiner along with report generated by the tool.
- Tools for examination: Acadly, Google class or any online tool which meet above criteria

Part-B (Practical) Max. Marks: 50

Duration: **180 minutes**

(2×25 = 50 Marks)

Answer all Questions

1. a. Creating word clouds using tableau (CO3,L6)  
b. Create a dual axis chart using tableau (CO2,L6)
2. Creating a simple dash board using tableau (CO5,L6)

Record :10  
Procedure writing :10  
Execution :20  
Viva-Voce :10



## P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

Siddhartha Nagar, Vijayawada – 520 010.

NAAC reaccredited at 'A+' level

*Autonomous -ISO 9001 – 2015 Certified*

**Programme:** Any Post Graduate Program

**Course Type:** Open Elective

**Title of the Paper:** Data Visualization

**Semester:** III

Course Code		Course Delivery Method	Class Room / Blended Mode
Credits	4	CIA Marks	30
No. of Lecture Hours / Week	2 (Theory) + 4 (Lab)	Semester End Exam Marks	70
Total Number of Lecture Hours	60	Total Marks	100
Year of Introduction : 2021	Year of Offering: 2021	Year of Revision: Nil	Percentage of Revision: Nil

**Course Objective:** This course focuses towards the *Introduction of Power Bi, Various Operations on Power Bi and implementing Power Bi in an Organization.*

**Course Outcomes:** At the end of this course, students should be able to:

CO1 : Remember *Decorating the Report, Saving the Report, Pinning a Report, Filtering a Report.*

CO2 : Understand *Publishing to Power BI, Installing the Power BI Personal Gateway, Configuring Automatic Refresh, Connecting to a Database, Loading from Multiple Sources, Using Query Editor.*

CO3 : Develop calculated columns, Improving the report by using measures, Integrating budget information, Reallocating the budget.

CO4 : Analyze Improving reports by using custom visualizations, Identifying conditions when custom visualizations are required.

CO5 : Understand Integrating Power BI with Office, Publish Excel data models in Power BI, Consume Power BI content from Excel.

### UNIT I

Introducing Power BI, Getting started with Power BI, Uploading data to Power BI, Introducing Natural-Language Queries, Introducing Quick Insights, Introduction to Reports, Introducing Visual Interactions, Decorating the Report, Saving the Report, Pinning a Report, Filtering a Report.

### UNIT II

Introducing Data Refresh, Introducing the Power BI Refresh Architecture, Introducing Power BI Desktop, Publishing to Power BI, Installing the Power BI Personal Gateway, Configuring Automatic Refresh, Connecting to a Database, Loading from Multiple Sources, Using Query Editor, Hiding or Removing Tables, Handling Seasonality and Sorting Months.

### UNIT III

Consuming a Service Content Pack, Creating a Custom Dataset from a Service, Creating a Content Pack for your Organization, Consuming an Organizational Content Pack, Updating an Organizational Content Pack, Loading Individual Tables, Implementing Measures, Creating Calculated Columns, Improving The Report by using Measures, Integrating Budget Information, Reallocating The Budget.

#### UNIT IV

Choosing the Right Visualizations, Choosing between Standard Visuals, Using Custom Visualizations, First Steps With Custom Visualizations, Improving Reports by Using Custom Visualizations, Identifying Conditions When Custom Visualizations are Required, Using DAX In Data Models, Creating High-Density Reports.

#### UNIT IV

Getting Data from Existing Systems, Understanding differences between Data Refresh and Live Connections, Using Relational Databases On-premises, Using Relational Databases in the Cloud, Using Live Connections to Analysis Services, Integrating Power BI with Office, Publish Excel Data Models in Power BI, Consume Power BI content from Excel, Managing Security to Access Data, Using row-level Security, Extending and Customizing Power BI , Creating Custom Visualizations for Power BI, Pushing Real-Time Data to Power BI Dashboards.

Prescribed Text Book			
	Author	Title	Publisher
1	Alberto Ferrari and Marco Russo	Introducing Microsoft Power BI	Microsoft Press, 2016

Reference Text Book			
	Author	Title	Publisher
1	Rob Collie & Avi Singh	Power Pivot and Power BI: The Excel User's Guide to DAX Power Query, Power BI & Power Pivot in Excel 2010-2016	Holy Macrol Books, 2016

**Course Delivery method :** Face-to-face / Blended

**Course has focus on:** Employability / Skill

**APPENDIX-VIII**  
**OPEN ELETIVES OFFERED BY M.Sc.(COMPUTATIONAL DATA SCIENCE) PROGRAMME**



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**Programme:** Any Post Graduate Program

**Course Type:** Open Elective

**Title of the Paper:** Web Programming

**Semester:** III

Course Code		Course Delivery Method	Class Room / Blended Mode
Credits	4	CIA Marks	30
No. of Lecture Hours / Week	4	Semester End Exam Marks	70
Total Number of Lecture Hours	60	Total Marks	100
Year of Introduction :2021	Year of Offering:2021	Year of Revision:	Percentage of Revision: 0%

**Course Objective:** To provide knowledge on *Web Architecture, Web Services, Client Side and Server Side Scripting Technologies*, To focus on the development of *Web Based Information Systems and Web Services*, To provide skills to design *Interactive and Dynamic Web Sites*.

**Course Outcomes:** On successful completion of the course student will be able to:

**CO1:** Understand the *Web Architecture and Web Services*.

**CO2:** Design *Interactive Web Pages* using HTML and *Style Sheets*.

**CO3:** Design *Interactive Web Pages* using Forms and *Tables*.

**CO4:** Study about *CSS and XML*.

**CO5:** Create a *Website* using *Wix Platform*.

Syllabus		
Unit	Learning Units	Lecture Hours
I	<p><b>Introduction:</b> What is Internet, History of Internet, Internet Services and Accessibility, Uses of the Internet, Protocols, Web Concepts: The Client/Server Model, Retrieving Data from the Web, How the Web Works?, Web Browsers, Searching information on the Web, Internet Standards.</p> <p><b>Internet protocols:</b> Internet Protocols, Host Names, Internet Applications And Application Protocols, Email Protocols.</p> <p><b>World Wide Web:</b> Basics of WWW and Browsing, URL, Types of Browsers, Features of Browsers.</p>	12
II	<p><b>Introduction to HTML:</b> HTML Document Structure, Creating Headings on Webpage.</p> <p><b>Working with Links:</b> Creating Hyper Link, Setting The Hyper Link Colors, Linking Different Sections of Web Page.</p> <p><b>Working with images:</b> Inserting an Image, Displaying alternate Text for an Image, Adding a Border, Aligning an Image, Using Image as Links, Image Maps.</p>	12

	<b>Working with tables:</b> Creating a Table, Specifying Caption to a Table, Adding a Table Heading and Border, Aligning a Table and Cell Content, Setting The Width of a Table And Table Columns.	
III	<b>Forms:</b> Creating Forms, Named Input Fields, The <INPUT> Tag, Multiple Lines Text Windows, Drop Down and List Boxes, Text, Text Area, Password, Button, Submit, Reset, Radio, Checkbox, Select Option, Labeling Input Fields, Grouping Related Fields, Disabled and Read Only Fields. <b>Frames:</b> Introduction to Frames, Frames Document, The <FRAMESET> Tag, Nesting <FRAMESET> Tag, Placing Content in Frames with the <FRAME> Tag, Targeting Named Frames.	12
IV	<b>CSS:</b> Introduction to Style Sheets, Inline Styles, External Style Sheets, Internal Style Sheets, Style Classes, Multiple Styles. <b>XML:</b> Introduction, HTML vs. XML, Syntax of XML Document, XML Attributes, Use of Elements vs. Use of Attributes, XML Validation, Well Formed XML Documents, Valid XML Documents, XML DTD: Internal DTD, External DTD, The Buildings Blocks of XML Documents.	12
V	<b>Make a Website with Wix:</b> Planning your Wix Website Design, Planning your Website Pages Working, Planning your Website Pictures, Videos and Logos, Wix Signup and Selecting a Premade or Blank Template. <b>Building Your Wix Website:</b> Getting to know Wix platform, Getting to know Wix editor, Designing the Header, Footer and Menu, Background for Pages and Sections, Adding Text, Adding Photos, Adding Videos, Adding Icons, Shapes and Boxes, Adding Links, Adding Forms, Adding a Wix Store, Adding a Lightbox.	12

Prescribed Textbook			
	Author	Title	Publisher
1	N.P.Gopalan, J.Akilandeswari	Web Technologies-A Developer's Perspective	PHI(2008)

Reference Text Book			
	Author	Title	Publisher
1	Harvey M. Deitel and Paul I. Deitel	Internet and World Wide Web How To Program, 5e	Prentice Hall; 4th edition
2	Thomas Powell	Web Design The Complete Reference	TMH Tata McGraw Hill

**Course Focus:** Employability

**Websites of Interest:**

1. <https://www.w3schools.com/html/default.asp>
2. <https://www.udemy.com/course/wix-master-course-make-a-website-in-1-day-with-wix>

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**(An Autonomous College in the jurisdiction of Krishna University)**  
**Any PG Programme - III Semester**

**Course Code:**

**(w.e.f admitted batch 2020-21)**

**Title: Web Programming**

**Time: 3 Hours**

**Max. Marks: 70**

**Answer ALL questions**

**(10×2 = 20 Marks)**

1. a. What is *Web Browser*? Explain it? (CO1,L1)
- b. What is the *Functionality of HTTP*? (CO1,L1)
- c. List the difference between *Tag* and *Attribute*. (CO2,L2)
- d. How you will Embed *Images* in Web document. (CO2,L2)
- e. Why do we use *<frameset>*? (CO3,L1)
- f. Write tag for *Drop Down*. (CO3,L1)
- g. What is an *Inline Style Sheet*? (CO4,L1)
- h. What is the *Syntax of XML*? (CO4,BTL1)
- i. How to *Plan a Website Design*? (CO5,L1)
- j. How do you add a *photo* in *Wix Platform*? (CO5,L1)

**Answer Five Questions Choosing One Question from Each Unit.**

**All Questions Carry Equal Marks.**

**(5×10 = 50 Marks)**

UNIT I

- 2) a) Explain various *Services Offered by Internet* and the *Types of Internet Connections*. (CO1,L2)
- (or)
- b) Explain about *Internet Protocols*. (CO1,L2)

UNIT II

- 3) a) What is the structure of *HTML Document*? Explain with example. (CO2,L1)
- (or)
- b) How to *Create a Table in HTML* with various Attributes? (CO2,L1)

UNIT III

- 4) a) Discuss *Frame Set* and *Frame Attributes* by writing Program. (CO3,L6)
- (or)
- b) Develop a *Form* with *Various Tags* with suitable example. (CO3,L6)

UNIT IV

- 5) a) What are *Types of CSS*? Explain with example. (CO4,L2)
- (or)
- b) What are *Well Formed* and *Valid XML* Documents? (CO4,L2)

UNIT V

- 6) a) Explain Planning of *Wix Website Pages Working, Website Pictures, Videos and Logos*. (CO5,L5)
- (or)
- b) Explain *creating a Website* using *Wix Platform*. (CO5,L5)

## Department of Computer Science (UG)

Minutes of the meeting of Board of Studies in Computer Science (UG) held on 12-09-2022 at 11:00 AM

### LIST OF BOS MEMBERS

Name of the Member	Role
Dr. G.Krishna Mohan, HOD, Dept. of CS, P.B. Siddhartha College of Arts & Science. Mobile: 9440446847, Email: <a href="mailto:gvlkm@pbsiddhartha.ac.in">gvlkm@pbsiddhartha.ac.in</a>	Chairman
Dr. R.Vijaya Kumari, Head, Department of Computer Science, Krishna University, Machilipatnam. Ph : 9948593964, Email: <a href="mailto:vijayakumari28@gmail.com">vijayakumari28@gmail.com</a>	University Nominee, Krishna University
Dr. M. Babu Reddy, Principal, Krishna University College of Engineering and Technology, Krishna University, Machilipatnam. Mobile: 9963436460 Email: <a href="mailto:m_babureddy@yahoo.com">m_babureddy@yahoo.com</a>	Subject Expert
Dr. P.Deepalakshmi, ME, Ph.D. , Professor and Dean, School of Computing, Kalasalingam Academy of Research and Education, Krishnankoil - 626126. Virdhunagar(Dist.), Tamil Nadu, India. Email: <a href="mailto:deepa.kumar@klu.ac.in">deepa.kumar@klu.ac.in</a> , <a href="mailto:deansoc@klu.ac.in">deansoc@klu.ac.in</a> Mobile: 9865061291, 8838010443	Subject Expert
Bharat Kumar Reddy Gujavarti (MCA, PGDHRM), Hyderabad Founder & CEO, Pragmatiq Systems Inc. Director, Sunblue Technologies Co-founder, Edify Email: <a href="mailto:bharat@pragmatiq.in">bharat@pragmatiq.in</a> Mobile: 8978191977	Industrialist
Shankar Lakkaraju, Product Director, Blue Yonder India Email: <a href="mailto:shankar.lakkaraju@gmail.com">shankar.lakkaraju@gmail.com</a> Mobile: 98851 65651	Alumni Representative MCA: 1999-2002
Mr. K. Sridhar	Member
Mrs. M. Bhadraja	Member
Mr. R. Gopi	Member
Mr. S. Rajesh	Member
Mrs. Y. J. N. Lakshmi	Member
Mr. K. Sudhir	Member
Mrs. V. Jhansi Lakshmi	Member
Mrs. T. Malleswari	Member
Mr. E. V. V. S. Siva Kumar	Member
Mr. K. Veerendra Nath	Member
Mrs. M. Suneela	Member
Mrs. M.Vijitha	Member
Ms. A. Prathyusha	Member
Mrs. B. Tarmila Devi	Member
Mrs. Sk. John Bee	Member
Dr. K. Udaya Sree	Member
Mrs. M.Gayathri	Member

**DEPARTMENT OF COMPUTER SCIENCE (UG)**

<b>LIST OF COURSES INTRODUCED IN V SEMESTER 2022 - 2023</b>						
<b>S.No.</b>	<b>Title of the Course</b>	<b>Course Code</b>	<b>Offered in Sem</b>	<b>Year of Introduction</b>	<b>OBE with BTL</b>	<b>Offered to</b>
<b>GROUP A</b>						
1	Big data Analytics using R	BCASET01	V/VI	2022 - 2023	YES	BCA
2	Big data Analytics using R Lab	BCASEP01	V/VI	2022 - 2023	YES	BCA
3	Data Analysis using Python	BCASET02	V/VI	2022 - 2023	YES	BCA
4	Data Analysis using Python Lab	BCASEP02	V/VI	2022 - 2023	YES	BCA
5	Mobile application development	BCASET03	V/VI	2022 - 2023	YES	BCA
6	Mobile application development Lab	BCASEP03	V/VI	2022 - 2023	YES	BCA
7	Multimedia Tools and Applications	BCASET04	V/VI	2022 - 2023	YES	BCA
8	Multimedia Tools and Applications Lab	BCASEP04	V/VI	2022 - 2023	YES	BCA
9	Cyber Security and Malware Analysis	BCASET05	V/VI	2022 - 2023	YES	BCA
10	Cyber Security and Malware Analysis Lab	BCASEP05	V/VI	2022 - 2023	YES	BCA
11	Cyber Laws	BCASET06	V/VI	2022 - 2023	YES	BCA
12	Cyber Laws Lab	BCASEP06	V/VI	2022 - 2023	YES	BCA
<b>GROUP B</b>						
13	Machine Learning using Python	BCASET07	V/VI	2022 - 2023	YES	BCA
14	Machine Learning using Python Lab	BCASEP07	V/VI	2022 - 2023	YES	BCA
15	Web Application Development using Django	BCASET08	V/VI	2022 - 2023	YES	BCA
16	Web Application Development using Django Lab	BCASEP08	V/VI	2022 - 2023	YES	BCA
17	Security Analyst - III	BCASET09	V/VI	2022 - 2023	YES	BCA



18	Cyber Security, Analysis and Reporting Lab	BCASEP09	V/VI	2022 - 2023	YES	BCA
19	Software Testing	BCASET10	V/VI	2022 - 2023	YES	BCA
20	Software Testing Lab	BCASEP10	V/VI	2022 - 2023	YES	BCA
21	Digital Imaging	BCASET11	V/VI	2022 - 2023	YES	BCA
22	Digital Imaging Lab	BCASEP11	V/VI	2022 - 2023	YES	BCA
23	Computer Networking and PC trouble shooting	BCASET12	V/VI	2022 - 2023	YES	BCA
24	Computer Networking and PC trouble shooting Lab	BCASEP12	V/VI	2022 - 2023	YES	BCA
<b>GROUP C</b>						
25	Object Oriented Analysis & Design	BCASET13	V/VI	2022 - 2023	YES	BCA
26	Object Oriented Analysis & Design Lab	BCASEP13	V/VI	2022 - 2023	YES	BCA
27	Design of Object Oriented Applications	BCASET14	V/VI	2022 - 2023	YES	BCA
28	Design of Object Oriented Applications Lab	BCASEP14	V/VI	2022 - 2023	YES	BCA
29	E Commerce Application Development	BCASET15	V/VI	2022 - 2023	YES	BCA
30	E Commerce Application Development Lab	BCASEP15	V/VI	2022 - 2023	YES	BCA
31	Real time governance system (RTGS)	BCASET16	V/VI	2022 - 2023	YES	BCA
32	Real time governance system (RTGS) Lab	BCASEP16	V/VI	2022 - 2023	YES	BCA
33	Internet of Things	BCASET17	V/VI	2022 - 2023	YES	BCA
34	Internet of Things Lab	BCASEP17	V/VI	2022 - 2023	YES	BCA
<b>S.No.</b>	<b>Title of the Course</b>	<b>Course Code</b>	<b>Offered in Sem</b>	<b>Year of Introduction</b>	<b>OBE with BTL</b>	<b>Offered to</b>

35	Web Applications Development using PHP& MYSQL	BCASET18	V/VI	2022 - 2023	YES	BCA
36	Web Applications Development using PHP& MYSQL Lab	BCASEP18	V/VI	2022 - 2023	YES	BCA

**DEPARTMENT OF COMPUTER SCIENCE (UG)****LIST OF COURSES INTRODUCED IN V SEMESTER 2022 - 2023**

S.No.	Title of the Course	Course Code	Offered in Sem	Year of Introduction	OBE with BTL	Offered to
<b>GROUP A</b>						
1	IT Infrastructure Library	CGSSET01	V/VI	2022 - 2023	YES	B. Sc. (CSCS)
2	Client Relationship Management	CGSSET02	V/VI	2022 - 2023	YES	B. Sc. (CSCS)
3	Client Relationship Management Lab	CGSSEP02	V/VI	2022 - 2023	YES	B. Sc. (CSCS)
4	Mobile application development	CGSSET03	V/VI	2022 - 2023	YES	B. Sc. (CSCS)
5	Mobile application development Lab	CGSSEP03	V/VI	2022 - 2023	YES	B. Sc. (CSCS)
6	Cyber security and malware analysis	CGSSET04	V/VI	2022 - 2023	YES	B. Sc. (CSCS)
7	Cyber security and malware analysis Lab	CGSSEP04	V/VI	2022 - 2023	YES	B. Sc. (CSCS)
8	Data science	CGSSET05	V/VI	2022 - 2023	YES	B. Sc. (CSCS)
9	Data science Lab	CGSSEP05	V/VI	2022 - 2023	YES	B. Sc. (CSCS)
10	Python for Datascience	CGSSET06	V/VI	2022 - 2023	YES	B. Sc. (CSCS)
11	Python for Datascience Lab	CGSSEP06	V/VI	2022 - 2023	YES	B. Sc. (CSCS)
<b>GROUP B</b>						
12	Web Interface Designing Technologies	CGSSET07	V/VI	2022 - 2023	YES	B. Sc. (CSCS)
13	Web Interface Designing Technologies Lab	CGSSEP07	V/VI	2022 - 2023	YES	B. Sc. (CSCS)
14	Web Applications Development using PHP&MYSQL	CGSSET08	V/VI	2022 - 2023	YES	B. Sc. (CSCS)

S.No.	Title of the Course	Course Code	Offered in Sem	Year of Introduction	OBE with BTL	Offered to
15	Web Applications Development using PHP&MYSQL Lab	CGSSEP08	V/VI	2022 - 2023	YES	B. Sc. (CSCS)
16	Introduction to Digital Technology	CGSSET09	V/VI	2022 - 2023	YES	B. Sc. (CSCS)
17	Introduction to Digital Technology Lab	CGSSEP09	V/VI	2022 - 2023	YES	B. Sc. (CSCS)
18	Software Engineering and Testing	CGSSET10	V/VI	2022 - 2023	YES	B. Sc. (CSCS)
19	Software Engineering and Testing Lab	CGSSEP10	V/VI	2022 - 2023	YES	B. Sc. (CSCS)
20	Multimedia Tools and Applications	CGSSET11	V/VI	2022 - 2023	YES	B. Sc. (CSCS)
21	Multimedia Tools and Applications Lab	CGSSEP11	V/VI	2022 - 2023	YES	B. Sc. (CSCS)
22	Digital Imaging	CGSSET12	V/VI	2022 - 2023	YES	B. Sc. (CSCS)
23	Digital Imaging Lab	CGSSEP12	V/VI	2022 - 2023	YES	B. Sc. (CSCS)
<b>GROUP C</b>						
24	Bigdata Analytics using R	CGSSET13	V/VI	2022 - 2023	YES	B. Sc. (CSCS)
25	Bigdata Analytics using R Lab	CGSSEP13	V/VI	2022 - 2023	YES	B. Sc. (CSCS)
26	Data Science using Python	CGSSET14	V/VI	2022 - 2023	YES	B. Sc. (CSCS)
27	Data Science using Python Lab	CGSSEP14	V/VI	2022 - 2023	YES	B. Sc. (CSCS)
28	Internet of Things	CGSSET15	V/VI	2022 - 2023	YES	B. Sc. (CSCS)
29	Internet of Things Lab	CGSSEP15	V/VI	2022 - 2023	YES	B. Sc. (CSCS)
30	Application Development using Python	CGSSET16	V/VI	2022 - 2023	YES	B. Sc. (CSCS)
31	Application Development using Python Lab	CGSSEP16	V/VI	2022 - 2023	YES	B. Sc. (CSCS)

S.No.	Title of the Course	Course Code	Offered in Sem	Year of Introduction	OBE with BTL	Offered to
32	IT Cognition and problem Solving	CGSSET17	V/VI	2022 - 2023	YES	B. Sc. (CSCS)
33	Campus to Corporate	ENGSET01	V/VI	2022 - 2023	YES	B. Sc. (CSCS)

**DEPARTMENT OF COMPUTER SCIENCE (UG)**

**LIST OF COURSES INTRODUCED IN V SEMESTER 2022 - 2023**

S.No.	Title of the Course	Course Code	Offered in Sem	Year of Introduction	OBE with BTL	Offered to
1	Big data Analytics using R	CASSET01	V/VI	2022 - 2023	YES	B. Sc. (CAME, CAMS)
2	Big data Analytics using R Lab	CASSEP02	V/VI	2022 - 2023	YES	B. Sc. (CAME, CAMS)
3	Data Science using Python	CASSET02	V/VI	2022 - 2023	YES	B. Sc. (CAME, CAMS)
4	Data Science using Python Lab	CASSEP03	V/VI	2022 - 2023	YES	B. Sc. (CAME, CAMS)
5	Mobile application Development	CASSET03	V/VI	2022 - 2023	YES	B. Sc. (CAME, CAMS)
6	Mobile application Development Lab	CASSEP04	V/VI	2022 - 2023	YES	B. Sc. (CAME, CAMS)
7	Cyber Security and Malware Analysis	CASSET04	V/VI	2022 - 2023	YES	B. Sc. (CAME, CAMS)
8	Cyber Security and Malware Analysis Lab	CASSEP05	V/VI	2022 - 2023	YES	B. Sc. (CAME, CAMS)
9	Multimedia Tools and Applications	CASSET05	V/VI	2022 - 2023	YES	B. Sc. (CAME, CAMS)
10	Multimedia Tools and Applications Lab	CASSEP06	V/VI	2022 - 2023	YES	B. Sc. (CAME, CAMS)
11	Digital Imaging	CASSET06	V/VI	2022 - 2023	YES	B. Sc. (CAME, CAMS)
12	Digital Imaging Lab	CASSEP07	V/VI	2022 - 2023	YES	B. Sc. (CAME, CAMS)

**DEPARTMENT OF COMPUTER SCIENCE (UG)****LIST OF COURSES INTRODUCED IN V SEMESTER 2022 - 2023**

<b>S.No</b>	<b>Title of the Course</b>	<b>Course Code</b>	<b>Offered in Sem</b>	<b>Year of Introduction</b>	<b>OBE with BTL</b>	<b>Offered to</b>
1	Data Science	CSCSET01	V/VI	2022 - 2023	YES	B. Sc. (MPCS, MECS, MSCS)
2	Data Science Lab	CSCSEP01	V/VI	2022 - 2023	YES	B. Sc. (MPCS, MECS, MSCS)
3	Python for Data Science	CSCSET02	V/VI	2022 - 2023	YES	B. Sc. (MPCS, MECS, MSCS)
4	Python for Data Science Lab	CSCSEP02	V/VI	2022 - 2023	YES	B. Sc. (MPCS, MECS, MSCS)
5	Web Interface Designing Technologies	CSCSET03	V/VI	2022 - 2023	YES	B. Sc. (MPCS, MECS, MSCS)
6	Web Interface Designing Technologies Lab	CSCSEP03	V/VI	2022 - 2023	YES	B. Sc. (MPCS, MECS, MSCS)
7	Web Applications Development using PHP and MySql	CSCSET04	V/VI	2022 - 2023	YES	B. Sc. (MPCS, MECS, MSCS)
8	Web Applications Development using PHP and MySql Lab	CSCSEP04	V/VI	2022 - 2023	YES	B. Sc. (MPCS, MECS, MSCS)
9	Internet of Things	CSCSET05	V/VI	2022 - 2023	YES	B. Sc. (MPCS, MECS, MSCS)
10	Internet of Things Lab	CSCSEP05	V/VI	2022 - 2023	YES	B. Sc. (MPCS, MECS, MSCS)
11	Application Development using Python	CSCSET06	V/VI	2022 - 2023	YES	B. Sc. (MPCS, MECS, MSCS)
12	Application Development using Python Lab	CSCSEP06	V/VI	2022 - 2023	YES	B. Sc. (MPCS, MECS, MSCS)

**DEPARTMENT OF COMPUTER SCIENCE (UG)****LIST OF COURSES INTRODUCED IN V SEMESTER 2022 - 2023**

<b>S.No</b>	<b>Title of the Course</b>	<b>Course Code</b>	<b>Offered in Sem</b>	<b>Year of Introduction</b>	<b>OBE with BTL</b>	<b>Offered to</b>
1	Cyber Security and Malware Analysis	CABSET01	V/VI	2022 - 2023	YES	B. Com (CA)
2	Cyber Security and Malware Analysis Lab	CABSEP01	V/VI	2022 - 2023	YES	B. Com (CA)
3	Multimedia tools and Applications	CABSET02	V/VI	2022 - 2023	YES	B. Com (CA)
4	Multimedia tools and Applications Lab	CABSEP02	V/VI	2022 - 2023	YES	B. Com (CA)
5	Big data analysis using R	CABSET03	V/VI	2022 - 2023	YES	B. Com (CA)
6	Big data analysis using R Lab	CABSEP03	V/VI	2022 - 2023	YES	B. Com (CA)
7	Data Science using Python	CABSET04	V/VI	2022 - 2023	YES	B. Com (CA)
8	Data Science using Python Lab	CABSEP04	V/VI	2022 - 2023	YES	B. Com (CA)
9	Mobile Application Development	CABSET05	V/VI	2022 - 2023	YES	B. Com (CA)
10	Mobile Application Development Lab	CABSEP05	V/VI	2022 - 2023	YES	B. Com (CA)
11	Digital Imaging	CABSET06	V/VI	2022 - 2023	YES	B. Com (CA)
12	Digital Imaging Lab	CABSETP06	V/VI	2022 - 2023	YES	B. Com (CA)

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## **Resolutions:**

1. It is resolved and recommend to introduce “Big data Analytics using R”with course code BCASET01 in V/VI semester of B. C. A for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 25 to 27.
2. It is resolved and recommend to introduce “Big data Analytics using R Lab” with course code BCASEP01 in V/VI semester of B. C. A for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 28 to 30.
3. It is resolved and recommend to introduce “Data analysis using Python” with course code BCASET02 in V/VI semester of B. C. A for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 31 to 33.
4. It is resolved and recommend to introduce “Data analysis using Python Lab” with course code BCASEP02 in V/VI semester of B. C. A for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 34 to36.
5. It is resolved and recommend to introduce “Mobile Application Development” with course code BCASET03 in V/VI semester of B. C. A for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from37 to 39.
6. It is resolved and recommend to introduce “Mobile Application Development Lab” with course code BCASEP03 in V/VI semester of B. C. A for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 40 to 41.
7. It is resolved and recommend to introduce “Multimedia Tools and Applications” with course code BCASET04 in V/VI semester of B. C. A for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 42 to 44.
8. It is resolved and recommend to introduce “Multimedia Tools and Applications Lab” with course code BCASEP04 in V/VI semester of B. C. A for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 45 to 46.
9. It is resolved and recommend to introduce “Cyber Security and Malware Analysis” with course code BCASET05 in V/VI semester of B. C. A for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 47 to 50.



10. It is resolved and recommend to introduce “Cyber Security and Malware Analysis Lab” with course code BCASEP05 in V/VI semester of B. C. A for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 51 to 53.
11. It is resolved and recommend to introduce “Cyber Laws” with course code BCASET06 in V/VI semester of B. C. A for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 54 to 56 .
12. It is resolved and recommend to introduce “Cyber Laws Lab” with course code BCASEP06 in V/VI semester of B. C. A for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 57 to 58 .
13. It is resolved and recommend to introduce “Machine Learning using Python” with course code BCASET07 in V/VI semester of B. C. A for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 59 to 62.
14. It is resolved and recommend to introduce “Machine Learning using Python Lab” with course code BCASEP07 in V/VI semester of B. C. A for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 63 to 64.
15. It is resolved and recommend to introduce “Web Application Development using Django” with course code BCASET08 in V/VI semester of B. C. A for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 65 to 68.
16. It is resolved and recommend to introduce “Web Application Development using Django Lab” with course code BCASEP08 in V/VI semester of B. C. A for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 69 to 70.
17. It is resolved and recommend to introduce “Security Analyst - III” with course code BCASET09 in V/VI semester of B. C. A for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 71 to 73.
18. It is resolved and recommend to introduce “Cyber Security, Analysis and Reporting Lab” with course code BCASEP09 in V/VI semester of B. C. A for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 74 to 75.
19. It is resolved and recommend to introduce “Software Testing” with course code BCASET10 in V/VI semester of B. C. A for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 76 to 79.

20. It is resolved and recommend to introduce “Software Testing Lab” with course code BCASEP10 in V/VI semester of B. C. A for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 80 to 81.
21. It is resolved and recommend to introduce “Digital Imaging” with course code BCASET11 in V/VI semester of B. C. A for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 82 to 84 .
22. It is resolved and recommend to introduce “Digital Imaging Lab” with course code BCASEP11 in V/VI semester of B. C. A for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 85 to 86 .
23. It is resolved and recommend to introduce “Computer networking and PC troubleshooting” with course code BCASET12 in V/VI semester of B. C. A for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 87 to 90 .
24. It is resolved and recommend to introduce “Computer networking and PC troubleshooting Lab” with course code BCASEP12 in V/VI semester of B. C. A for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 91 to 93 .
25. It is resolved and recommend to introduce “Object Oriented Analysis & Design” with course code BCASET13 in V/VI semester of B. C. A for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 94 to 97 .
26. It is resolved and recommend to introduce “Object Oriented Analysis & Design Lab” with course code BCASEP13 in V/VI semester of B. C. A for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 98 to 99 .
27. It is resolved and recommend to introduce “Design of object oriented applications” with course code BCASET14 in V/VI semester of B. C. A for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 100 to 103 .
28. It is resolved and recommend to introduce “Design of object oriented applications Lab” with course code BCASEP14 in V/VI semester of B. C. A for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 104 to 105 .
29. It is resolved and recommend to introduce “E Commerce Application development” with course code BCASET15 in V/VI semester of B. C. A for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 106 to 109 .

30. It is resolved and recommend to introduce “E Commerce Application development Lab” with course code BCASEP15 in V/VI semester of B. C. A for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 110 to 111 .
31. It is resolved and recommend to introduce “Real Time Governance System (RTGS)” with course code BCASET16 in V/VI semester of B. C. A for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 112 to 115 .
32. It is resolved and recommend to introduce “Real Time Governance System (RTGS) Lab” with course code BCASEP16 in V/VI semester of B. C. A for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 116 to 117 .
33. It is resolved and recommend to introduce “Internet of Things” with course code BCASET17 in V/VI semester of B. C. A for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 118 to 121 .
34. It is resolved and recommend to introduce “Internet of Things Lab” with course code BCASEP17 in V/VI semester of B. C. A for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 122 to 123 .
35. It is resolved and recommend to introduce “Web Application Development using PHP & MySQL” with course code BCASET18 in V/VI semester of B. C. A for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 124 to 126 .
36. It is resolved and recommend to introduce “Web Application Development using PHP & MySQL Lab” with course code BCASEP18 in V/VI semester of B. C. A for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 127 to 128.
37. It is resolved and recommend revised syllabus & model question paper of Operating Systems with course code CGST12A in I semester of B.Sc.(CSCS) from the batch of students admitted in 2022-23 and onwards. For the syllabus and model question paper vide page number from 129 to 132 .
38. It is resolved and recommend the revised syllabus & model question paper of Operating Systems Lab with course code CGSP12A in I semester of B.Sc.(CSCS) from the batch of students admitted in 2022-23 and onwards. For the syllabus and model question paper vide page number from 133 to 134 .
39. It is resolved and recommend the revised of syllabus & model question paper of IT Infrastructure Management with revised course codes CGST31A in III semester of B.Sc.(CSCS)

from the batch of students admitted in 2021-22 and onwards. For the syllabus and model question paper vide page number from 135 to 138 .

40. It is resolved and recommend the revised of syllabus & model question paper of IT Infrastructure Management Lab with revised course codes CGSP31A in III semester of B.Sc.(CSCS) from the batch of students admitted in 2021-22 and onwards. For the syllabus and model question paper vide page number from 139 to 140 .
41. It is resolved and recommend to introduce IT Infrastructure Library with course code CGSSET01 in V semester of B.Sc. (CSCS)for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from141 to 143 .
42. It is resolved and recommend to introduce Client Relationship Management with course codes CGSSET02 in V semester of B.Sc.(CSCS) for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from144 to 147 .
43. It is resolved and recommend to introduce Client Relationship Management Lab with course codes CGSSEP02 in V semester of B.Sc.(CSCS) for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from148 to 149 .
44. It is resolved and recommend to introduce Mobile application development with course codes CGSSET03 in V semester of B.Sc. (CSCS)for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from150 to 152 .
45. It is resolved and recommend to introduce Mobile application development Lab with course codes CGSSEP03 in V semester of B.Sc. (CSCS)for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 153 to 154 .
46. It is resolved and recommend to introduce Cyber security and malware analysis with course codes CGSSET04 in V semester of B.Sc. (CSCS)for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from155 to 158 .
47. It is resolved and recommend to introduce Cyber security and malware analysis Lab with course codes CGSSEP04 in V semester of B.Sc. (CSCS)for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from159 to 161 .

48. It is resolved and recommend to introduce Data science with course codes CGSSET05 in V semester of B.Sc. (CSCS)for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 162 to 165 .
49. It is resolved and recommend to introduce Data science Lab with course codes CGSSEP05 in V semester of B.Sc. (CSCS)for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 166 to 168.
50. It is resolved and recommend to introduce Python for Data science with course codes CGSSET06 in V semester of B.Sc. (CSCS)for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 169 to 172 .
51. It is resolved and recommend to introduce Python for Data science Lab with course codes CGSSEP06 in V semester of B.Sc. (CSCS)for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 173 to 175 .
52. It is resolved and recommend to introduce Web Interface Designing Technologies with course codes CGSSET07 in V semester of B.Sc. (CSCS)for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 176 to 179 .
53. It is resolved and recommend to introduce Web Interface Designing Technologies Lab with course codes CGSSEP07 in V semester of B.Sc. (CSCS)for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 180 to 183 .
54. It is resolved and recommend to introduce Web Applications Development using PHP&MYSQL with course codes CGSSET08 in V semester of B.Sc. (CSCS)for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 184 to 187 .
55. It is resolved and recommend to introduce Web Applications Development using PHP&MYSQL Lab with course codes CGSSEP08 in V semester of B.Sc. (CSCS)for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 188 to 190
56. It is resolved and recommend to introduce Introduction to Digital Technology with course codes CGSSET09 in V semester of B.Sc.(CSCS)for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 191 to 194 .
57. It is resolved and recommend to introduce Introduction to Digital Technology Lab with course codes CGSSEP09 in V semester of B.Sc.(CSCS)for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 195 to 196 .

58. It is resolved and recommend to introduce Software Engineering and Testing with course codes CGSSET10 in V semester of B.Sc.(CSCS)for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 197 to 199 .
59. It is resolved and recommend to introduce Software Engineering and Testing Lab with course codes CGSSEP10 in V semester of B.Sc.(CSCS)for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 200 to 201 .
60. It is resolved and recommend to introduce Multimedia Tools and Applications with course codes CGSSET11 in V semester of B.Sc.(CSCS)for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 202 to 204 .
61. It is resolved and recommend to introduce Multimedia Tools and Applications Lab with course codes CGSSEP11 in V semester of B.Sc.(CSCS)for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 205 to 206 .
62. It is resolved and recommend to introduce Digital Imaging with course codes CGSSET12 in V semester of B.Sc.(CSCS)for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 207to 208 .
63. It is resolved and recommend to introduce Digital Imaging Lab with course codes CGSSEP12 in V semester of B.Sc.(CSCS)for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 210 to 211 .
64. It is resolved and recommend to introduce Big data Analytics using R with course codes CGSSET13 in V semester of B.Sc.(CSCS)for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 212 to 215 .
65. It is resolved and recommend to introduce Big data Analytics using R Lab with course codes CGSSEP13 in V semester of B.Sc.(CSCS)for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 216 to 218 .
66. It is resolved and recommend to introduce Data Science using Python with course codes CGSSET14 in V semester of B.Sc.(CSCS)for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 219 to 221.
67. It is resolved and recommend to introduce Data Science using Python Lab with course codes CGSSEP14 in V semester of B.Sc.(CSCS)for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from222 to 224.

68. It is resolved and recommend to introduce Internet of Things with course codes CGSSET15 in V semester of B.Sc.(CSCS)for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from225 to 228.
69. It is resolved and recommend to introduce Internet of Things Lab with course codes CGSSEP15 in V semester of B.Sc.(CSCS)for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from229to 230.
70. It is resolved and recommend to introduce Application Development using Python with course codes CGSSET16 in V semester of B.Sc.(CSCS)for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from231 to 234.
71. It is resolved and recommend to introduce Application Development using Python Lab with course codes CGSSEP16 in V semester of B.Sc.(CSCS)for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from235 to 238.
72. It is resolved and recommend to introduce IT Cognition and problem Solving with course code CGSSET17 in V semester of B.Sc.(CSCS) for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from239 to 242.
73. It is resolved and recommend to introduce Data Science with course code CSCSET01 in V semester for B.Sc. MSCS-A and VI Semester for B.Sc. (MSCS-B,MPCS,MECS)for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 243 to 246.
74. It is resolved and recommend to introduce Data Science Lab with course code CSCSEP01 in V semester for B.Sc. MSCS-A and VI SEMESTER FOR B.Sc. MSCS-B,MPCS,MECS for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 247 to 249.
75. It is resolved and recommend to introduce Python for Data Science with course code CSCSET02 in V semester for B.Sc. MSCS-A and VI SEMESTER FOR B.Sc. MSCS-B,MPCS,MECS for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 250 to 253.
76. It is resolved and recommend to introduce Python for Data Science Lab with course code CSCSEP02 in V semester for B.Sc. MSCS-A and VI SEMESTER FOR B.Sc. MSCS-B,MPCS,MECS for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 254 to 256.

77. It is resolved and recommend to introduce Web Interface Design Technologies with course code CSCSET03 in V semester for B.Sc. MSCS-A and VI SEMESTER FOR B.Sc. MSCS-B,MPCS,MECS for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 257 to 260.
78. It is resolved and recommend to introduce Web Interface Design Technologies Lab with course code CSCSEP03 in V semester for B.Sc. MSCS-A and VI SEMESTER FOR B.Sc. MSCS-B,MPCS,MECS for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 261 to 264.
79. It is resolved and recommend to introduce Web Applications Development Using PHP and MySQL with course code CSCSET04 in V semester for B.Sc. MSCS-A and VI SEMESTER FOR B.Sc. MSCS-B,MPCS,MECS for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 265 to 268.
80. It is resolved and recommend to introduce Web Applications Development Using PHP and MySQL Lab with course code CSCSEP04 in V semester for B.Sc. MSCS-A and VI SEMESTER FOR B.Sc. MSCS-B,MPCS,MECS for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 269 to 271.
81. It is resolved and recommend to introduce Internet Of Things with course code CSCSET05 in V semester for B.Sc. MSCS-A and VI SEMESTER FOR B.Sc. MSCS-B,MPCS,MECS for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 272 to 275.
82. It is resolved and recommend to introduce Internet Of Things Lab with course code CSCSEP05 in V semester for B.Sc. MSCS-A and VI SEMESTER FOR B.Sc. MSCS-B,MPCS,MECS for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 276 to 277.
83. It is resolved and recommend to introduce Application Development Using Python with course code CSCSET06 in V semester for B.Sc. MSCS-A and VI SEMESTER FOR B.Sc. MSCS-B,MPCS,MECS for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 278 to 280.
84. It is resolved and recommend to introduce Application Development Using Python Lab with course code CSCSEP06 in V semester for B.Sc. MSCS-A and VI SEMESTER FOR B.Sc. MSCS-



B,MPCS,MECS for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 281 to 285.

85. It is resolved and recommend to introduce Bigdata Analytics using R with course code CASSET01 in V and VI semesters for B.Sc. CAME and B.Sc. CAMS for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 286 to 289.
86. It is resolved and recommend to introduce Bigdata Analytics using R Lab with course code CASSEP01 in V and VI semesters for B.Sc. CAME and B.Sc. CAMS for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 290 to 292.
87. It is resolved and recommend to introduce Data Science Using Python with course code CASSET02 in V and VI semesters for B.Sc. CAME and B.Sc. CAMS for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 293 to 295.
88. It is resolved and recommend to introduce Data Science Using Python Lab with course code CASSEP02 in V and VI semesters for B.Sc. CAME and B.Sc. CAMS for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 296 to 298.
89. It is resolved and recommend to introduce Mobile Application Development with course code CASSET03 in V and VI semesters for B.Sc. CAME and B.Sc. CAMS for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 299 to 301.
90. It is resolved and recommend to introduce Mobile Application Development Lab with course code CASSEP03 in V and VI semesters for B.Sc. CAME and B.Sc. CAMS for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 302 to 303.
91. It is resolved and recommend to introduce Cyber Security and Malware Analysis with course code CASSET04 in V and VI semesters for B.Sc. CAME and B.Sc. CAMS for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 304 to 307.
92. It is resolved and recommend to introduce Cyber Security and Malware Analysis Lab with course code CASSEP04 in V and VI semesters for B.Sc. CAME and B.Sc. CAMS for the batch of students

- admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 308 to 310.
93. It is resolved and recommend to introduce Multimedia Tools and Applications with course code CASSET05 in V and VI semesters for B.Sc. CAME and B.Sc. CAMS for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 311 to 313.
  94. It is resolved and recommend to introduce Multimedia Tools and Applications Lab with course code CASSEP05 in V and VI semesters for B.Sc. CAME and B.Sc. CAMS for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 314 to 315.
  95. It is resolved and recommend to introduce Digital Imaging with course code CASSET06 in V and VI semesters for B.Sc. CAME and B.Sc. CAMS for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 316 to 318.
  96. It is resolved and recommend to introduce Digital Imaging Lab with course code CASSEP06 in V and VI semesters for B.Sc. CAME and B.Sc. CAMS for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 319 to 320.
  97. It is resolved and recommend to introduce Cyber Security and Malware Analysis with course code CABSET01 in VI semester of B.COM CA for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 321 to 324.
  98. It is resolved and recommend to introduce Cyber Security and Malware Analysis Lab with course code CABSET02 in VI semester of B.COM CA for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 325 to 327.
  99. It is resolved and recommend to introduce Multimedia Tools and Applications with course code CABSET02 in VI semester of B.COM CA for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 328 to 330.
  100. It is resolved and recommend to introduce Multimedia Tools and Applications Lab with course code CABSEP02 in VI semester of B.COM CA for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 331 to 332.
  101. It is resolved and recommend to introduce Big data Analytics using R with course code CABSET03 in VI semester of B.COM CA for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 333 to 336.

102. It is resolved and recommend to introduce Big data Analytics using R Lab with course code CABSEP03 in VI semester of B.COM CA for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 337 to 339.
103. It is resolved and recommend to introduce Data Science using Python with course code CABSET04 in VI semester of B.COM CA for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 340 to 343.
104. It is resolved and recommend to introduce Data Science using Python Lab with course code CABSEP04 in VI semester of B.COM CA for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 344 to 346.
105. It is resolved and recommend to introduce Mobile Application Development with course code CABSET05 in VI semester of B.COM CA for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 347 to 349.
106. It is resolved and recommend to introduce Mobile Application Development Lab with course code CABSEP05 in VI semester of B.COM CA for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 350 to 351.
107. It is resolved and recommend to introduce Digital Imaging with course code CABSET06 in VI semester of B.COM CA for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 352 to 354.
108. It is resolved and recommend to introduce Digital Imaging Lab with course code CABSEP06 in VI semester of B.COM CA for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 355 to 356.
109. It is resolved and recommend to introduce modified semester end theory model question paper in I semester for B.Sc. (MPCS, MECS, CAME, MSCS, CAMS, CSCS), B. C. A, B. Com (CA) for the batch of students admitted from academic year 2022 and onwards. For modified model question papers vide page number from 357 to 368.



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Course Code: **BCASET01**

Offered to: **BCA**

Domain Subject: **COMPUTER APPLICATIONS**

Semester – **V**

Max. Marks: **100** (CCIA: 25+ SEE: 75)

Theory Hrs. /Week: **3**

**Course 6A: BIGDATA ANALYTICS USING R**

Type of the Course: **Skill Enhancement Course** (Elective Theory), Credits: **03**

**I. Course Outcomes: Students at the successful completion of the course will be able to:**

CO1: Understand data and classification of digital data. (PO5)

CO2: Gain knowledge of technologies used in big data Analytics. (PO5, PO7)

CO3: Understand basics of R and control structures in R. (PO5)

CO4: Load data into R objects and manipulate them as needed. (PO5)

CO5: Create and edit visualizations with R (PO7)

**II. Syllabus:**

**(Total periods: 45)**

**UNIT – I**

**(8 periods)**

**Introduction to Big data:** What is data, Classification of Digital Data-Structured Unstructured, semi-structured data, Characteristics of data, Evaluation of big data, Definition and challenges of big data, what is big data and why to use big data?

**UNIT – II**

**(10 periods)**

**Big data Analytics:** What is and isn't big data analytics? Classification of analytics, Importance of big data analytics, Technologies needed to meet challenges of big data, data science, Data scientist.

**UNIT – III**

**(9 periods)**

**Introduction to R and getting started with R:** What is R? Why R? Advantages of R over other programming languages, Data types in R - logical, numeric, integer, character, double, Complex, raw, coercion, ls () command, Expressions, Variables and functions, control structures, Array, Matrix, Vectors, Factors, R packages

**UNIT – IV**

**(10 periods)**

**Exploring data in R–** Data frames-data frame access, Ordering data frames, functions for data frames dim(), nrow(), ncol(), str(), summary(), names(), head(), tail(), edit(), Load data frames—reading from .CSV files, Sub setting data frames, reading from tab separated value files, Reading from tables, merging data frames

## UNIT – V

(8 periods)

**Data Visualization using R:** Reading and getting data into R (External Data), Using CSV files, XML files, Web Data, JSON files, Databases, Excel files, Working with R Charts and Graphs: Histograms, Boxplots, Bar Charts, Line Graphs, Scatterplots, Pie Chart

### Textbooks:

1. Seema Acharya--Data Analytics using R, McGraw Hill education (India) Private Limited.
2. Big Data Analytics, Introduction to Hadoop, Spark, and Machine-Learning, Raj Kamal, Preeti Saxena, McGraw Hill, 2018

### Reference Books:

1. Seema Acharya, Subhashini Chellappan --- Big Data and Analytics second edition, Wiley
2. Big Data, Big Analytics: Emerging Business intelligence and Analytic trends for Today's Business, Michael Minnelli, Michelle Chambers, and Ambiga Dhiraj, John Wiley & Sons, 2013
3. An Introduction to R, Notes on R: A Programming Environment for Data Analysis and Graphics. W. N. Venables, D.M. Smith and the R Development Core Team

## IV. RECOMMENDED CO-CURRICULAR ACTIVITIES:

(Co-curricular activities shall not promote copying from textbook or from others work and shall encourage self/independent and group learning)

### A. Measurable

1. Assignments (in writing and doing forms on the aspects of syllabus content and outside the syllabus content. Shall be individual and challenging)
2. Student seminars (on topics of the syllabus and related aspects (individual activity))
3. Quiz (on topics where the content can be compiled by smaller aspects and data (Individuals or groups as teams))
4. Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual participation and contribution of students shall be ensured (team activity)

### B. General

1. Group Discussion
2. Try to solve MCQ's available online.
3. Others



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**Model Question Paper**  
**Title of the Course: BIGDATA ANALYTICS USING R**

Course Code: **BCASET01**

Offered to: **BCA**

**Max Marks: 75**

**Time: 3 Hrs.**

**SECTION – A**

**Short Answer Questions (25 Marks: 5 x 5)**

**Answer any Five questions. (At least 1 question should be given from each Unit)**

1. What is big data and why to use a big data? (CO1, L1)
2. What is big data analytics? (CO2, L1)
3. Explain ls () command in R. (CO3, L2)
4. Explain about functions in R? (CO3, L1)
5. Write a short note on charts. (CO5, L1)
6. Develop R script to load data into data frames from files. (CO4, L6)
7. Develop bar chart in R. (CO4, L6)
8. Write about the control structures in R with examples. (CO3, L1)

**SECTION B (Total: 5 x 10 = 50 Marks)**

**Answer all questions. (Two questions should be given from each unit with internal choice)**

9(a) Give Classification of Digital Data and explain it. (CO1, L2)

**OR**

(b) Explain Characteristics of Data with an example. (CO1, L2)

10. (a) Write about Importance of big Data Analytics. (CO2, L1)

**OR**

(b) Explain Classification of Analytics. (CO2, L2)

11(a) Write about the Data types in Explain with examples. (CO3, L1)

**OR**

(b) Construct Vector in R and explain various operations on it. (CO3, L3)

12. (a) What are the data frames? Write its significance in R-Language. (CO4, L1)

**OR**

(b) Demonstrate various functions used in data frames. (CO4, L2)

13(a) Build a code in R for reading and getting data into R from databases. (CO5, L6)

**OR**

(b) Develop below plots in R (CO5, L6) Box Whisker plots    b) Scatter plots    c) Pairs plots

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**Title: BIG DATA ANALYTICS USING R LAB**

Course Code: **BCASEP01**

Offered to: **B.C. A**

Domain Subject: **COMPUTER APPLICATIONS**

Semester: **V**

Max. Marks: **50** (CCIA: 10+ SEE: 40)

Practical Hrs. /Week: **3**

Type of the Course: **Skill Enhancement Course** (Elective, Practical), Credits: **02**

**I. Course Outcomes: Students at the successful completion of the course will be able to:**

CO1: Implement simple scripts or programs in R. (PO5)

CO2: Access online resources for R and import new function packages into the R workspace. (PO5, PO7)

CO3: Import, review, manipulate and summarize data-sets in R (PO5, PO7)

CO4: Explore data-sets to create testable hypotheses and identify appropriate statistical tests. (PO5, PO7)

CO5: Create and edit visualizations with R. (PO5, PO7)

**II: Practical (Laboratory) Syllabus: (30 Periods)**

1. Create a vector in R and perform operations on it (arithmetic operations, combining Vectors, retrieving elements of vector, assign names to vector elements).
2. Create integer, complex, logical, character data type objects in R and print their values And their class using print and class functions.
3. Create a matrix of values in R and extract data from matrix. (Ex. Second row third etc.) find transpose of matrix and combine two matrices using Rbind and Cbind functions.
4. Create a list in R and perform operations on it like list slicing, sum and mean functions, head and tail functions and finally delete list using rm() function.
5. Create data frame in R and perform operations on it
6. Write code in R to find out whether a number is prime or not.
7. Print numbers from 1 to 100 using while loop and for loop in R.
8. Find the factorial of a number using recursion in R.
9. Perform arithmetic operations in R using switch case
10. Write a code in R to find out whether the number is Armstrong or not.
11. Program to find Multiplication table from 1 to 10 number input by user.
12. Import data into R from text and excel files using read.table() and read.csv() function.
13. Create a dataset and draw different types of graphics using plot, box plot, histogram, pair plot functions.

14. Create a dataset and draw different types of graphs using bar charts, pie chart functions.
15. Create custom contingency in R and perform operations on it.

### **III. Lab References:**

1. Seema Acharya--Data Analytics using R, McGraw Hill education (India) Private Limited.
2. Big Data Analytics, Introduction to Hadoop, Spark, and Machine-Learning, Raj Kamal, Preeti Saxena, McGraw Hill, 2018

### **Reference Materials on the Web/web-links:**

1. <https://www.wiley.com/enbd/Big+Data,+Big+Analytics:+Emerging+Business+Intelligence+and+Analytic+Trends+for+Today's+Businesses-p-9781118147603>
2. <https://www.wiley.com/en-gb/Big+Data+Analytics%3A+Turning+Big+Data+into+Big+Money-p-9781118147597>





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**BIG DATA ANALYTICS USING R LAB**

Course Code: **BCASEP01**

Offered to: **B.C. A**

Domain Subject: **Computer Applications**

Semester: **V**

Max. Marks: **50** (CCIA: 10+ SEE: 40)

Practical Hrs. /Week: **3**

**Model Paper: Practical**

**Time: Three hours**

**Max. Marks: 40**

	<b>Section A</b>
One Major Experiment (Experiment No : )	<b>15 M</b>
	<b>Section B</b>
One Minor Experiment (Experiment No : )	<b>10 M</b>
	<b>Section C</b>
Practical Record	<b>05 M</b>
	<b>Section D</b>
Viva Voce	<b>10 M</b>

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**Title: Data Analysis using Python**

**Course Code: BCASET02**

**Offered to: B. C. A**

**Domain Subject: Computer Applications**

**Semester – V**

**Max. Marks: 100 (CCIA: 25+ SEE: 75)**

**Theory Hrs. /Week: 3**

**I. Prerequisite:** Knowledge in basic python programming

**Course Objective:** To educate students in basic plotting, modelling and manipulating data using NumPy and Pandas.

**Course Outcomes:** by the end of the course, students will be

CO1: able to understand array handling in NumPy. (PO6, PO7)

CO2: able to know basics of data sets and frames in Pandas. (PO6, PO7)

CO3: able to know about plotting. (PO6, PO7)

CO4: able understand data assembly and handling missing data. (PO6, PO7)

CO5: able to implement data modelling using linear models and stat models.(PO6, PO7)

## **II. Syllabus**

### **Unit I : Introduction to NumPy**

**10 Prds**

Installing Python and NumPy – recommendations, python package management - pip & conda; NumPy Arrays - difference between python lists and NumPy array, What is NumPy array, creating basic array, adding, removing and sorting elements, reshaping array, converting 1d array to 2d array, indexing and slicing, creating array from existing data, creating matrices, getting random numbers getting count and unique numbers, transposing and reshaping a matrix, reverse an array, reshaping multidimensional arrays.

### **Unit II: Pandas**

**10 Prds**

Installing pandas, pandas data frame basics – loading data set, sub setting columns and rows, grouped means, grouped frequency counts, basic plot. The Series – creating a series, series and ndarray, Boolean sub setting series, broadcasting series; The Data frame – creating a data frame, Boolean sub setting data frames, broadcasting data frames; modifying series and data frames – adding additional columns, changing a column directly, dropping values; exporting and importing data – CSV, Excel, pickle.

### **Unit III: Introduction to plotting**

**8 Prds**

Introduction to Matplotlib, statistical graphics using matplotlib – univariate, bivariate, multivariate data; Seaborn - univariate, bivariate, multivariate data; Pandas objects – histogram, density plot, scatter plot, box plot, hexbin plot.

### **Unit IV: Data Manipulation**

**9 Prds**

Data Assembly – introduction, combining data sets, adding rows and columns, concatenate with different indices, merging multiple data sets – one to one, many to one, many to many merging;

Missing data – introduction, NaN value, find and count missing data, cleaning missing data, calculations with missing data.

### **Unit V: Data Modelling**

**8 Prds**

Linear models – introduction, simple linear regression – using stat models, using sklearn, multiple regression – using stat models, using sklearn, using sklearn with categorical variable; keeping index labels from sklearn.

### **III. Web links and Text Books:**

1. <https://numpy.org/doc/stable/user/index.html> (unit 1)
2. Pandas for Everyone (Python data Analysis)-Daniel Y. Chen, Pearson Addison Wesley Data and Analytics series, ©2018. (Unit 2 – 5)

### **Reference Materials on the Web/web-links:**

1. <https://numpy.org/doc/stable/user/index.html>
2. <https://pandas.pydata.org/docs/>

### **IV. Co-Curricular Activities:**

(Co-curricular activities shall not promote copying from textbook or from others work and shall encourage self/independent and group learning)

#### **A. Measurable**

1. Assignments (in writing and doing forms on the aspects of syllabus content and outside the syllabus content. Shall be individual and challenging)
2. Student seminars (on topics of the syllabus and related aspects (individual activity))
3. Quiz (on topics where the content can be compiled by smaller aspects and data (Individuals or groups as teams))
4. Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual participation and contribution of students shall be ensured (team activity))

#### **B. General**

1. Group Discussion
2. Try to solve MCQ's available online.



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**MODEL QUESTION PAPER**  
**Title: Data Analysis using Python**

**Course Code: BCASET02**  
**Domain Subject: Computer Applications**  
**Max. Marks: 75**

**Offered to: B. C. A**  
**Semester – V**  
**Time: 3 Hrs.**

**SECTION – A**

**Answer any FIVE of the following**

**5 x 5 = 25 Marks**

1. Differentiate python lists and NumPy Arrays.(CO1, L4)
2. Develop a program to convert 1d array into 2d array. (CO1, L6)
3. Discuss about loading data set in Pandas. (CO2, L1)
4. Discuss about creating series in Pandas with example.(CO2, L1)
5. Develop a code to demonstrate univariate plotting. (CO3, L6)
6. Discuss the role of matplotlib in plotting data sets. (CO3, L1)
7. Develop a code to concatenate data sets with different indices. (CO3, L6)
8. Differentiate linear regression and multiple regression (CO5, L4)

**SECTION – B**

**Answer ALL of the following**

**5 x 10 = 50 Marks**

9. A) Discuss about indexing and slicing NumPy arrays with examples. (CO1, L1)  
OR  
B) Discuss about creating an array from existing data. (CO1, L1)
10. A) Illustrate sub setting columns and rows in data frame with example. (CO2, L4)  
OR  
B) Illustrate exporting and importing csv and excel data with example. (CO2, L4)
11. A) Discuss about histogram and scatter plot with example. (CO3, L1)  
OR  
B) Discuss about bivariate and multivariate data with example. (CO3, L1)
12. A) Illustrate handling missing data with example. (CO4, L4)  
OR  
B) Illustrate merging multiple data sets with example. (CO4, L4)
13. A) Demonstrate simple linear regression using sklearn model with example. (CO5, L3)  
OR  
B) Demonstrate multiple regression using stats model with example. (CO5, L3)

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**Title: Data Analysis using Python Lab**

**Course Code: BCASEP02**

**Offered to: B. C. A**

**Domain Subject: Computer Applications**

**Semester – V**

**Max. Marks: 50(CCIA: 10+ SEE: 40)**

**Practical Hrs./Week : 3**

**Type of the Course: Skill Enhancement Course (Elective, Practical) Credits: 02**

**I. Prerequisite:** Knowledge in basic python programming, NumPy and Pandas

**Course Objective:** To educate students in basic plotting, modelling and manipulating data using NumPy and Pandas.

**Course Outcomes:** by the end of the course, students will be

CO1: able to understand array handling in NumPy. (PO6, PO7)

CO2: able to know basics of data sets and frames in Pandas. (PO6, PO7)

CO3: able to know about plotting. (PO6, PO7)

CO4: able understand data assembly and handling missing data. (PO6, PO7)

CO5: able to implement data modelling using linear models and stat models.(PO6, PO7)

**II: Practical (Laboratory) Syllabus: (30 Periods)**

1. NumPy Basics:

- a. Write a NumPy program to get the NumPy version and show NumPy build configuration.
- b. Write a NumPy program to test whether none of the elements of a given array is zero.
- c. Write a NumPy program to test whether any of the elements of a given array is non-zero.
- d. Write a NumPy program to test element-wise for Nan, NA of a given array.
- e. Write a NumPy program to test element-wise for complex number, real number of a given array. Also test whether a given number is a scalar type or not.
- f. Write a NumPy program to test whether two arrays are element-wise equal within a tolerance.
- g. Write a NumPy program to create 3 x 3 identity matrix.
- h. Write a NumPy program to generate random numbers from 0 to 1.
- i. Write a NumPy program to sort elements of an array.
- j. Write a NumPy program to convert 1d array into 2d array.
- k. Write a NumPy program to transpose a given matrix.
- l. Write a NumPy program to reverse an array.

m. Write a NumPy program to demonstrate reshaping multidimensional array

2. Pandas:

- a. Write a Pandas code to subset columns.
- b. Write a Pandas code to subset rows.
- c. Write a Pandas code to demonstrate grouped means and frequency count.
- d. Write a Pandas code to demonstrate series and its operations.
- e. Write a Pandas code to demonstrate data frames and its operations.
- f. Write a Pandas code to demonstrate exporting and importing csv, excel data

3. Plotting:

- a. Demonstrate univariate, bi variate and multivariate plots using matplotlib lib
- b. Demonstrate univariate, bi variate and multivariate plots using seaborn
- c. Demonstrate histogram, density plot, scatter plot, box plot, hexbin plot in Pandas.

4. Data Manipulation:

- a. Demonstrate concatenation of data sets.
- b. Demonstrate merging of data set.
- c. Demonstrate finding and counting missing data.
- d. Demonstrate cleaning missing data.

5. Data Modelling:

- a. Demonstrate simple linear regression using statsmodel.
- b. Demonstrate simple linear regression using sklearn.
- c. Demonstrate multiple regressions using statsmodel.
- d. Demonstrate multiple regressions using sklearn.
- e. Demonstrate multiple regressions using stats model with categorical values.

### III. Lab References:

1. <https://numpy.org/doc/stable/user/index.html> (unit 1)
2. Pandas for Everyone (Python data Analysis)- Daniel Y. Chen, Pearson Addison Wesley Data and Analytics series,©2018. (Unit 2 – 5)
3. <https://www.w3resource.com/python-exercises/numpy/index-array.php>



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**MODEL QUESTION PAPER**  
**Title: Data Analysis using Python**

**Course Code: BCASEP02**  
**Domain Subject: Computer Applications**  
**Time: 3 Hrs.**

**Offered to: B. C. A**  
**Semester – V**  
**Max. Marks: 40**

	<b>Section A</b>	
One Major Experiment (Experiment No : )		<b>15 M</b>
	<b>Section B</b>	
One Minor Experiment (Experiment No : )		<b>10 M</b>
	<b>Section C</b>	
Practical Record		<b>05 M</b>
	<b>Section D</b>	
Viva Voce		<b>10 M</b>

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**Title: MOBILE APPLICATION DEVELOPMENT**

Course Code: **BCASET03**

Domain Subject: **Computer Applications**

Max. Marks: **100** (CCIA: 25+ SEE: 75)

Offered to: **B. C. A**

Semester – **V**

Theory Hrs./Week: **3**

Type of the Course: **Skill Enhancement Course** (Elective Theory),

Credits: **03**

**I. Course Outcomes: Students at the successful completion of the course will be able to:**

CO1: Identify basic terms, tools and software related to android systems. (PO5)

CO2: Describe components of IDE, understand features of android development tools. (PO5)

CO3: Describe the layouts and controls and different views available. (PO5, PO7)

CO4: Understand Android system architecture and security model. (PO5)

CO5: Understand the features of services and able to publish android Application. (PO5, PO7)

**II. Syllabus:**

**(Total Theory Periods: 45)**

**Unit-1:**

**(9 periods)**

Introduction to android, open headset Alliance, Android ecosystem, Need of android, Features of android, Tools and Software required for developing an Application, Android architecture.

**Unit-2:**

**(9 periods)**

Operating system, java JDK, Android SDK, Android development tools, Android virtual devices, Steps to install and configure Android studio and sdk.

**Unit-3:**

**(11 periods)**

Control flow, directory structure, Components of a screen, Fundamental UI design, Linear layout, absolute layout, table layout, relative layout, Text view, Edit text, Button image button, radio button, toggle button, Radio group, check box, and progress bar, List view, grid view, image view, scroll view, Time and date picker



#### Unit-4:

(8 periods)

Android platform services, Android system Architecture, Android Security model, Applications development: creating small application.

#### Unit-5

(8 periods)

Introduction of MIT App Inventor, Application Coding, Programming Basics & Dialog, More Programming Basics, Alarm Clock Application, Audio & Video, Drawing Application, File, Game, Device Location, Web Browsing.

### III References/ Text Book/ e-books/websites

#### Text Books:

1. Erik Hellman, “Android Programming–Pushing the Limits”, 1st Edition, Wiley India Pvt Ltd, 2014.
2. App Inventor: create your own Android apps by Wolber, David( David Wayne)

#### Reference Books:

1. Dawn Griffiths and David Griffiths, “Head First Android Development”, 1<sup>st</sup> Edition, O’Reilly SPD Publishers, 2015.
2. JFDi Marzio, “Beginning Android Programming with Android Studio”, 4<sup>th</sup> Edition, Wiley India Pvt Ltd, 2016. ISBN-13: 978-8126565580

#### Web resources:

<https://www.udacity.com/course/developing-android-appsfundamentals--ud853-nd>  
<http://www.appinventor.mit.edu/>

### IV Co-Curricular Activities

(Co-curricular activities shall not promote copying from textbook or from others work and shall encourage self/independent and group learning)

#### Measurable

1. Assignments (in writing and doing forms on the aspects of syllabus content and outside the syllabus content. Shall be individual and challenging)
  2. Student seminars(on topics of the syllabus and related aspects(individual activity))
  3. Quiz (on topics where the content can be compiled by smaller aspects and data(Individuals or groups a steams))
  4. Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual participation and contribution of students shall be ensured (team activity))

#### General

1. Group Discussion
2. Try to solve MCQ’s available online.
3. Others.



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**Model paper**

**Title: Mobile Application Development**

Course Code: **BCASET03**

Offered to: **B. C. A**

Max. Marks: **100**

Time: **3 Hrs.**

**SECTION – A**

**Short Answer Questions (25 Marks: 5 x 5)**

**Answer any Five questions. (At least 1 question should be given from each Unit)**

1. What is the Need of Android?(CO1,L1)
2. Explain the Steps to install and configure Android studio and sdk.(CO2,L2)
3. What are the Components of a screen?(CO3,L1)
4. What are the Android platform services?(CO4,L1)
5. How to write Application Coding?(CO5,L1)
6. Explain image button and radio button with an example.(CO3,L2)
7. Explain Android Security model.(CO4,L2)
8. Explain Web Browsing.(CO5,L2)

**SECTION B (Total: 5 x 10 = 50 Marks)**

**Answer all questions. (Two questions should be given from each unit with internal choice)**

9. (a) Explain Android Architecture. (CO1, L2)

**OR**

(b) Write Features of Android. (CO1, L1)

10. (a) Explain Android development tools. (CO2, L2)

**OR**

(b) Explain Android virtual devices. (CO2, L2)

11. (a) Explain about Linear layout, absolute layout, table layout and relative layout. (CO3,L2)

**OR**

(b) Discuss about List view, grid view, image view, scroll view. (CO3, L6)

12. (a) Create a small application using Android? (CO4, L6)

**OR**

(b) Describe Android system Architecture. (CO5, L6)

13. (a) Explain Audio Video Concepts.(CO5, L2)

**OR**

(b) Develop Alarm clock application. (CO5, L6)

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**Title: MOBILE APPLICATION DEVELOPMENT LAB**

Course Code: **BCASEP03**

Offered to: **B. C. A**

Domain Subject: **COMPUTER APPLICATIONS**

**Semester: V** Max. Marks:

**50** (CCIA: 10+ SEE: 40)

Practical Hrs./Week : **3**

Type of the Course: **Skill Enhancement Course** (Elective, Practical),

Credits: **02**

**I. Course Outcomes: Students at the successful completion of the course will be able to:**

CO1: Understand the android platform.(PO5,PO7)

CO2: Design and implementation of various mobile applications.(PO5,PO7)

**II: Practical (Laboratory) Syllabus:**

**(30 Periods)**

**Lab Exercises**

1. Demonstrate mobile technologies and devices.
2. Demonstrate Android platform and applications overview.
3. Implement User interface design layouts.
4. Working with texts, shapes, buttons and lists.
5. Develop a calculator application.
6. Develop application in android using different views.
7. Implement an application that creates an alarm clock.
8. Develop audio and video drawing application.

**III. Lab References:**

1. Erik Hellman, "Android Programming-Pushing theLimits", 1stEdition, WileyIndiaPvt Ltd, 2014.
2. App Inventor: create your own Android apps by Wolber, David (David Wayne).

**Reference Materials on the Web/web**

1. <https://www.udacity.com/course/developing-android-appsfundamentals--ud853-nd>
2. <http://www.appinventor.mit.edu/>



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**Title: MOBILE APPLICATION DEVELOPMENT LAB**

Course Code: **BCASEP03**

Domain Subject: **Computer Applications**

Max. Marks: **50** (CCIA: 10+ SEE: 40)

Offered to: **B. C. A**

Semester: **V**

Time: **3 Hrs.**

**Model Paper: Practical**

**Time: Three hours**

**Max. Marks: 40**

	<b>Section A</b>
One Major Experiment (Experiment No : )	<b>15 M</b>
	<b>Section B</b>
One Minor Experiment (Experiment No : )	<b>10 M</b>
	<b>Section C</b>
Practical Record	<b>05 M</b>
	<b>Section D</b>
Viva Voce	<b>10 M</b>

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**Title: MULTIMEDIA TOOLS AND APPLICATIONS**

Course Code: **BCASET04**

Domain Subject: **COMPUTER APPLICATIONS**

Max. Marks: **100** (CCIA: 25+ SEE:75)

Offered to: **B. C. A**

Semester – **V**

Theory Hrs./Week: **3**

Type of the Course: **Skill Enhancement Course** (Elective Theory), Credits: **04**

**I. Course Outcomes: Students at the successful completion of the course will be able to:**

CO1: Gain knowledge on the concepts related to Multimedia. **(PO5)**

CO2: Understand the concepts like image data representation and colors modes. **(PO5)**

CO3: Understand the different types of video signals and digital audio. **(PO5)**

CO4: Know about multimedia data compression types and audio compression standards **(PO5)**

CO5: Know about basic video compression techniques. **(PO5, P07)**

**II. Syllabus:**

**(Total Theory Periods: 45)**

**UNIT-I : Introduction to multimedia**

**(8 periods)**

What is Multimedia? , Components of Multimedia System, Multimedia Research Topics and Projects, Multimedia and Hypermedia, Multimedia Authoring metaphors, Multimedia Production, Multimedia Presentation, Some Technical Design Issues, Automatic Authoring.

**UNIT-II: Image Data Representations and color models**

**(9periods)**

Color science Human vision Image data types, **Black & white images**-1-bit images (Binary image), 8-bit (Gray -level images), **Color images**- 24-bit color images, 8-bit color images, Color models.

**UNIT-III: Fundamental concepts in video**

**(10 periods)**

Types of Video Signals- Analog Video, Digital Video, Basics of Digital Audio: What is Sound?, Digitization of Sound, Quantization and Transmission of Audio, Pulse code modulation, Differential coding of audio, Predictive coding, DPCM.

**UNIT-IV: Multimedia Data Compression**

**(9 periods)**

Introduction- Basics of Information Theory, Lossless Compression Algorithms, Fix-Length Coding, Run-length coding, Differential coding, Dictionary-based coding, Variable Length Coding, Shannon-Fano Algorithm, Huffman Coding Algorithm.

Audio Compression standards: Introduction, Psychoacoustics model, MPEG Audio

## **UNIT-V : Basic Video Compression Techniques**

**( 9 periods)**

Introduction to Video compression, Video Compression with Motion Compensation, Video compression standard H.261, Video compression standard MPEG-1

### **III 1. Text Books**

Fundamentals of Multimedia by Ze-Nian Li & Mark S. Drew. Publisher: Prentice Hall

### **2. Reference Books:**

1. An introduction to digital multimedia by Savage, T. M. and Vogel, K. E. 2008.
2. Digital Multimedia by Nigel Chapman & Jenny Chapman. 2009.

### **3. Reference Materials on the Web/web-links:**

<https://www.tutorialspoint.com/multimedia>

<https://ksuit342.wordpress.com/lectuers/>

### **IV Co-Curricular Activities**

(Co-curricular activities shall not promote copying from textbook or from others work and shall encourage self/independent and group learning)

#### **A. Measurable**

1. Assignments (in writing and doing forms on the aspects of syllabus content and outside the syllabus content. Shall be individual and challenging)
2. Student seminars (on topics of the syllabus and related aspects (individual activity))
3. Quiz (on topics where the content can be compiled by smaller aspects and data (Individuals or groups as teams))
4. Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual participation and contribution of students shall be ensured (team activity))

#### **B. General**

1. Group Discussion
2. Others



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**Model paper**

**Title: MULTIMEDIA TOOLS AND APPLICATIONS**

Course Code: **BCASET04**

Offered to: **B. C. A**

Domain Subject: **COMPUTER APPLICATIONS**

Semester – V

Max Marks: 75

Time: 3 Hrs.

**SECTION – A**

**Short Answer Questions (25 Marks: 5 x 5)**

**Answer any FIVE questions. (At least 1 question should be given from each Unit)**

1. What is multimedia? Explain components of multimedia system. (CO1, L1)
2. Discuss multimedia production.(CO1, L6)
3. Explain 8-Bit (gray-level images). (CO2, L2)
4. What is sound? Explain digitization of sound. (CO3, L1)
5. Write about SECAM video. (CO3, L1)
6. Discuss Run-length coding. (CO4, L6)
7. Explain basics of information theory. (CO4, L5)
8. Compare and contrast H.261 and MPEG-1. (CO5, L2)

**SECTION B (Total: 5 x 10 = 50 Marks)**

**Answer all questions. (Two questions should be given from each unit with internal choice)**

9. (a) Discuss in detail about multimedia and hypermedia. (CO1, L6)

**OR**

(b) Explain about multimedia presentation. (CO1, L2)

10. (a) Discuss about 24-bit color images and 8-bit color images. (CO2, L6)

**OR**

(b) Explain Color models in images. (CO2, L2)

11. (a) Discuss about PCM(pulse code modulation). (CO3, L6)

**OR**

(b) Explain High-Definition TV (HDTV). (CO3, L2)

12. (a) Discuss Huffman- coding algorithm. (CO4, L6)

**OR**

(b). Write about MPEG audio compression algorithm. (CO4, L1)

13. (a) Explain video compression based on motion compensation. (CO5, L2)

**OR**

(b) Write about Video compression standard H.261. (CO5, L1)

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**TITLE: MULTIMEDIA TOOLS AND APPLICATIONS LAB**

**Course Code: BCASEP04**

**Offered to: B. C. A**

**Domain Subject: COMPUTER APPLICATIONS**

**Semester: V**

**Max. Marks: 50 (CCIA: 10+ SEE: 40)**

**Practical Hrs./Week : 3**

**Type of the Course: Skill Enhancement Course (Elective, Practical) Credits: 01**

**I. Course Outcomes:**

Students at the successful completion of the course will be able to:

CO1: Create/modify a new image with open source applications such as GIMP. (PO5)

CO2: Manipulate images using graphic tools. (PO5)

CO3: Learn basic layer mask essentials. (PO5)

CO4: Compress audio and video files. (PO5, PO7)

CO5: Create a realistic shadow. (PO5)

**II: Practical (Laboratory) Syllabus: (30 Periods)**

1. Editing images using GIMP
2. Improve the Quality of your Image in GIMP
3. Introduction to Layer Masks.
4. Create an impressive background in GIMP
5. Applying Shadow & Highlight effects in images
6. Black& white and color photo conversion.
8. Using File Seizer Software for Audio compression.
9. Using File seizer Software for Video compression.

**III. Lab References:**

Fundamentals of Multimedia by Ze-Nian Li & Mark S. Drew. Publisher: Prentice Hall

Reference Materials on the Web/web-links

<https://ksuit342.wordpress.com/lectuers/>

<https://www.tutorialspoint.com/multimedia>





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**TITLE: MULTIMEDIA TOOLS AND APPLICATIONS LAB**

**Course Code: BCASEP04**

**Offered to: B. C. A**

**Domain Subject: COMPUTER APPLICATIONS**

**Semester: V**

**Max. Marks: 40**

**Time: 3 Hrs.**

**Type of the Course: Skill Enhancement Course (Elective, Practical) Credits: 01**

**Section A**

One Major Experiment (Experiment No : ) 15 M

**Section B**

One Minor Experiment (Experiment No : ) 10 M

**Section C**

Practical record 05 M Section D Viva Voce 10 M

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**Title: CYBER SECURITY AND MALWARE ANALYSIS**

Course Code: **BCASET05**

Offered to: **B. C. A**

Domain Subject: **COMPUTER APPLICATIONS**

Semester – **V**

Max. Marks: **100** (CCIA: 25+ SEE: 75)

Theory Hrs./Week: **3**

Type of the Course: **Skill Enhancement Course** (Elective Theory),

Credits: **03**

**I. Course Outcomes: Students at the successful completion of the course will be able to:**

CO1: Understand the computer networks, networking tools and cyber security. (PO6, PO7)

CO2: Learn about NIST Cyber Security Framework. (PO6, P07)

CO3: Understand the OWASP Vulnerabilities. (PO6, PO7)

CO4: Implement various Malware analysis tools. (PO6, P07)

CO5: Understand about Information Technology act 2000. (PO6, P07)

**II. Syllabus:**

**(Total Theory Hours: 45)**

UNIT1: Introduction to Networks & cyber security

(9 Periods)

Computer Network Basics, Computer network types, OSI Reference model, TCP/IP Protocol suite, Difference between OSI and TCP/IP, What is cyber, cyber-crime and cyber-security, All Layer wise attacks, Networking devices: router, bridge, switch, server, firewall, How to configure: router, How to create LAN, Network tools, IP scanner, Port scanner, Vulnerability scanner, Command tools—net stack, trace route, lookup, tcp view.

UNIT2: NIST Cyber security framework

(9 periods)

Introduction to the components of the framework, Cyber security Framework Tiers, What is NIST Cyber security framework, Features of NIST Cyber security framework, Functions of NIST Cyber security framework, Turn the NIST Cyber security Framework into Reality/implementing the framework.

UNIT3: OWASP

(9 periods)

What is OWASP? OWASP Top10Vulnerabilities, Injection, Broken Authentication, Sensitive Data Exposure, XML External Entities (XXE), Broken Access Control, Security Misconfiguration, Cross-Site Scripting(XSS), Insecure Deserialization, Using Components with Known Vulnerabilities, nsufficient Logging and Monitoring, OWASP Juice Shop, Web application firewall.

#### UNIT4: MALWARE ANALYSIS

(9 periods)

What is malware, Types of malware, Key loggers, Trojans, Ransom ware, Rootkits, Antivirus, Firewalls, Malware analysis, VMware, How to uses and box, How to create virtual machine, Process explorer, Process monitor, SYS-internals Suite, SOC-security operations controls-Solar winds (study the tools), Network intrusion detection, Wire shark, IDS, IPS, Snort.

#### UNIT5: CYBER SECURITY: Legal Perspectives

(9 periods)

Cybercrime and the legal landscape around the world, IndianITACT2000—Cybercrime and Punishments, Weak areas of ITACT2000, Challenges to Indian law and cybercrime scenario in India, Amendments of the Indian IT Act.

### III References/ Text Book/ e-books/websites

#### TEXT BOOKS:

1. Computer Networks | Fifth Edition | By Pearson (6th Edition) | [Tanenbaum, Feamster & Wetherall](#)
2. Computer Networking | A Top-Down Approach | Sixth Edition | By Pearson | [KuroseJamesF. Ross Keith W.](#)
3. Cyber Security by [Sunit Belapure, Nina Godbole](#)| Wiley Publications
4. TCP/IP Protocol Suite |Mcgraw-hill| Forouzan| Fourth Edition

#### WEB SITE REFERENCES:

1. <https://csrc.nist.gov/Projects/cybersecurity-framework/nist-cybersecurity-framework-a-quick-start-guide>
2. <https://owasp.org/www-project-top-ten/>
3. <https://owasp.org/www-project-juice-shop/>

### IV Co-Curricular Activities

(Co-curricular activities shall not promote copying from textbook or from others work and shall encourage self/independent and group learning)

#### Measurable

5. Assignments (in writing and doing forms on the aspects of syllabus content and outside the syllabus content. Shall be individual and challenging)
6. Student seminars(on topics of the syllabus and related aspects(individual activity))
7. Quiz (on topics where the content can be compiled by smaller aspects and data(Individuals or groups a steams))
8. Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual participation and contribution of students shall be ensured (team activity))

#### General

4. Group Discussion
5. Try to solve MCQ's available online.
6. Others.



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**Model paper**

**Title: CYBER SECURITY AND MALWARE ANALYSIS**

Course Code: **BCASET05**

Offered to: **B. C. A**

Max Marks: 75

Max Time: 3 Hrs.

**SECTION – A**

**Short Answer Questions (25 Marks: 5 x 5)**

**Answer any Five questions. (At least 1 question should be given from each Unit)**

1. Discuss all Layer wise attacks.(CO1,L6)
2. Explain about Cyber, Cyber-Crime and Cyber-Attacks.(CO1,L2)
3. Explain Features of NIST Cyber Security framework.(CO2,L2)
4. Explain Cyber Security framework Tiers.(CO2,L2)
5. Write about Web Application firewalls in OWASP.(CO3,L1)
6. Discuss about Key loggers, Trojans, Rootkits.(CO4,L6)
7. Explain Weak areas of IT ACT 2000.(CO5,L2)
8. Outline amendments of the Indian IT Act.(CO5,L6)

**SECTION B (Total: 5 x 10 = 50 Marks)**

**Answer all questions. (Two questions should be given from each unit with internal choice)**

9(a). Describe in detail TCP/IP Protocol Suite with diagrammatic representation. (CO1, L6)

**OR**

9(b). Explain different types of Network Tools with examples. (CO1, L2)

10(a). Discuss about components of framework and functions of NIST Cyber Security frameworks.(CO2,L6)

**OR**

10(b). Explain how to turn NIST Cyber Security framework into reality framework. (CO2, L6)

11(a). Explain OWASD Juice shop in detail. (CO3, L2)

**OR**

11(b). Explain any 6 OWASP vulnerabilities. (CO3, L2)

12(a). Discuss about different types of Malware analysis in detail. (CO4, L6)

**OR**

12(b). How to detect Network intrusion? Explain.(CO4, L1)

13(a). Explain what are the Challenges are to Indian law and cybercrime scenario in India. (CO5,L2)

**OR**

13(b). Discuss Indian IT-ACT 2000. Explain different Cybercrime and Punishments respectively.(CO5,L6)

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### **Title: CYBER SECURITY AND MALWARE ANALYSYS LAB**

Course Code: **BCASEP05**

Offered to: **B. C. A**

Domain Subject: **COMPUTER APPLICATIONS**

Semester: **V**

Max. Marks: **50** (CCIA: 10+ SEE: 40)

Practical Hrs. /Week: **3**

Type of the Course: **Skill Enhancement Course** (Elective, Practical),

Credits: **02**

#### **I. Course Outcomes: Students at the successful completion of the course will be able to:**

CO1: Implement LAN by using as witch and Router.(PO5)

CO2: Implement the task of creating mail messages by using fake mail id by using the "Fake mailer" website. (PO5)

CO3: Implement port scanning mechanism. (PO5)

CO4: Implement SQL Injection attack. (PO5)

CO5: Implement to access a locked computer. (PO5)

#### **II: Practical (Laboratory) Syllabus:**

**(30 Periods).**

##### **Lab Exercises**

The purpose of this course is to impart practical understanding on Cyber security and protection of electronic systems and information from malware attacks.

1. Configure LAN by using a switch
2. Configure a LAN by using Router
3. Steps to attack a victim computer by using "ProRat" Trojan tool
4. Perform the packet sniffing mechanism by download the "wire shark" tool and extract the packets
5. Perform the task of creating mail messages by using fake email id by using the "fake mailer" website(<https://emkei.cz>)
6. Perform the IP scanning mechanism by using "tracert" and "arp" commands
7. Perform the port scanning mechanism by using NMAP tool
8. Perform an SQL Injection attack and its preventive measure to avoid Injection attack
9. Perform an activity to access a locked computer without knowing the user's password.

#### **III. Lab References:**

1. Computer Networks | Fifth Edition | By Pearson (6th Edition) | [Tanenbaum, Feamster & Wetherall](#)
2. Computer Networking | A Top-Down Approach | Sixth Edition | By Pearson | [KuroseJames F. Ross Keith W.](#)

#### **IV. Reference Materials on the Web/web**

1. <https://csrc.nist.gov/Projects/cybersecurity-framework/nist-cybersecurity-framework-a-quick-start-guide>
2. <https://owasp.org/www-project-top-ten/>



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**Title: CYBER SECURITY AND MALWARE ANALYSYS LAB**

Course Code: **BCASEP05**

Offered to: **B. C. A**

Domain Subject: **Computer Applications**

Semester: **V I**

Max. Marks: **50** (CCIA: 10+ SEE: 40)

Practical Hrs. /Week: **3**

**Model Paper: Practical**

**Time: Three hours**

**Max. Marks: 40**

	<b>Section A</b>
One Major Experiment (Experiment No : )	<b>15 M</b>
	<b>Section B</b>
One Minor Experiment (Experiment No : )	<b>10 M</b>
	<b>Section C</b>
Practical Record	<b>05 M</b>
	<b>Section D</b>
Viva Voce	<b>10 M</b>

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**Title: Cyber Laws**

**Course Code: BCASET06**

**Offered to: B. C. A**

**Domain Subject: Computer Science**

**Semester – V**

**Max. Marks: 100 (CCIA: 25+ SEE: 75)**

**Theory Hrs./Week: 3**

**I. Course Objectives**

1. Enable learners to understand, explore, and acquire a critical understanding of Cyber Law.
2. Develop competencies for dealing with frauds and deceptions (confidence tricks and scams) and other cyber-crimes for example, child pornography etc. that are taking place via the Internet.
3. Make learners conversant with the social and intellectual property issues emerging from
4. Explore the legal and policy developments in various countries to regulate Cyberspace.
5. Develop the understanding of relationship between commerce and cyberspace; and give learners in depth knowledge of information technology act and legal frame work of right to privacy, data security and data protection.

**Course Outcomes**

At the end of the course, students should be able to:

CO1. Critically evaluate ongoing developments in law relating to information technologies.

(PO6, PO7)

CO2. Display an understanding of how these developments relate to one another. (PO6, PO7)

CO3. Examine areas of doctrinal and political debate surrounding rules and theories; (PO6, PO7)

CO4. Evaluate those rules and theories in terms of internal coherence and practical outcomes.

(PO6, PO7)

CO5. Draw on the analysis and evaluation contained in primary and secondary sources. (PO6, PO7)

**II. Syllabus**

**Unit I**

Introduction: Computers and its Impact in Society, Overview of Computer and Web Technology, Need for Cyber Law, Cyber Jurisprudence etal International and Indian Level.

**Unit II**

Cyber laws – international perspectives: UN & International Telecommunications Union (ITU) initiatives, Council of Europe – Budapest convention on cybercrime, Asia pacific economic cooperation (APEC), organization for economic cooperation and development (OECD), World Bank, common wealth of nations.

**Unit III**

Constitutional & Human Rights Issues in Cyberspace: Freedom of Speech and Expression in Cyber space, right to Access Cyberspace – Access to Internet, Right to Privacy, Right to Data

#### **Unit IV**

Cyber Crimes & Legal Framework: Cyber Crimes against Individuals, Institution and State, Hacking, Digital Forgery, Cyber Stalking/Harassment, Cyber Pornography, Identity Theft & Fraud, Cyber terrorism, Cyber Defamation, Different offences under IT Act, 2000.

#### **Unit V**

Cyber Torts: Cyber Defamation, Different Types of Civil Wrong under the IT Act, 2000, Intellectual Property Issues in Cyber Space, Interface with Copyright Law, Interface with Patent Law, Trade marks & Domain Names Related issues

#### **Reference Books:**

1. Chris Reeds & John Angel, Computer Law, OUP, New York, (2007).
2. Justice Yatindra Singh, Cyber Laws, Universal Law Publishing Co, New Delhi,
3. Verman. K, Mittal Raman, Legal Dimensions of Cyber Space, Indian Law Institute, New Delhi.
4. Jonathan Rosenoer, Cyber Law, Springer, New York, (1997).
5. Sudhir Naib, The Information Technology Act, 2005: A Handbook, OUP, New York, (2011)
6. S. R. Bhansali, Technology Act, 2000, University Book House Pvt. Ltd., Jaipur (2003).
7. Vasu Deva, Cyber Crimes and Law Enforcement, Common wealth Publishers, New Delhi, (2003).

#### **IV. Co-Curricular Activities:**

(Co-curricular activities shall not promote copying from textbook or from others work and shall encourage self/independent and group learning)

##### **A. Measurable**

1. Assignments (in writing and doing forms on the aspects of syllabus content and outside the syllabus content. Shall be individual and challenging)
2. Student seminars (on topics of the syllabus and related aspects (individual activity))
3. Quiz (on topics where the content can be compiled by smaller aspects and data (Individuals or groups as teams))
4. Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual participation and contribution of students shall be ensured (team activity))

##### **B. General**

1. Group Discussion
2. Try to solve MCQ's available online.





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*(An Autonomous College under the Jurisdiction of Krishna University)*

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*College with Potential for Excellence*

*ISO9001 – 2015 Certified*

**Title: Cyber Laws**

**Course Code: BCASET06**

**Offered to: B. C. A**

**Domain Subject: Computer Science**

**Semester – V**

**Max. Marks: 75**

**Time: 3 Hrs.**

**SECTION - A**

**Answer any five of the following:**

**5 X 5= 25 MARKS**

1. Discuss the role of firewall while accessing Internet. (CO1, L2)
2. Write about proxy servers and DMZ. (CO1, L6)
3. Write about modems. (CO2, L6)
4. Describe the goals and need of incident response? (CO3, L1)
5. Write a short note on data backup. (CO3, L6)
6. Describe the need of computer logs in information security. (CO4, L1)
7. Briefly write about DoS attacks. (CO5, L6)
8. Discuss about incident handling preparation? (CO5, L2)

**SECTION – B**

**Answer all the following questions**

**5 X 10 = 50 MARKS**

9. (a) Explain about identifying unauthorized devices.(CO1, L1)

OR

(b) Explain about testing the traffic filtering devices. (CO1, L1)

10. (a) Summarize the methodology of troubleshooting. (CO2, L2)

OR

(b) Summarize Incident Handling Team roles and responsibilities. (CO2, L2)

11. (a) Explain about various types of backup techniques. (CO3, L1)

OR

(b) Describe about log management process. (CO3, L1)

12. (a) Explain about configuring windows log. (CO4, L1)

OR

(b) Explain about DoS attacks. (CO4, L1)

13. (a) Summarize detecting malicious code incidents. (CO5, L2)

OR

(b) Summarize mitigating inappropriate usage incident? (CO5, L2)

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**Title: Cyber Laws Lab**

**Course Code: BCASEP06**

**Offered to: B. C. A**

**Domain Subject: Computer Science**

**Semester – V**

**Max. Marks: 50(CCIA: 10+ SEE: 40)**

**Practical Hrs./Week : 3**

**Type of the Course: Skill Enhancement Course (Elective, Practical) Credits: 02**

**I. Course objectives:**

To educate students to implement various basic concepts of cyber forensics.

**Course outcomes:**

By the end of the course, students will be:

1. Able to recover deleted files from hard disk and gather evidences. (PO6, PO7)
2. Able to perform image file conversions. (PO6, PO7)
3. Able to create disk image and disk partitions. (PO6, PO7)
4. Able to analyse a given cybercrime scenario. (PO6, PO7)
5. Able to prepare report on cyber laws violation on any given cybercrime scenario. (PO6, PO7)

**II: Practical (Laboratory) Syllabus: (30 Periods)**

1. Write a program for recovering deleted files from a hard disk.
2. Write a program for gathering evidence.
3. Write a program for viewing files of various formats.
4. Write a program for locating files needed for a forensics investigation.
5. Write a program for performing image and file conversions.
6. Write a program for handling evidence data.
7. Write a program for creating a disk image file of a hard disk partition.
8. Give at least ten cybercrime scenarios to students and make them analyse the scenario and submit report citing cyber laws which are violated.



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**MODEL QUESTION PAPER**

**Title: Cyber Laws Lab**

**Course Code: BCASEP06**

**Offered to: B. C. A**

**Domain Subject: Computer Science**

**Semester – V**

**Max. Marks: 40**

**Practical Hrs. /Week: 3**

**Type of the Course: Skill Enhancement Course (Elective, Practical) Credits: 02**

**Section A**

One Major Experiment (Experiment No : )

**15 M**

**Section B**

One Minor Experiment (Experiment No : )

**10 M**

**Section C**

Practical Record

**05 M**

**Section D**

Viva Voce

**10 M**

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### **Title: MACHINE LEARNING USING PYTHON**

**Course Code: BCASET07**

**Offered to: B. C. A**

**Domain Subject: Computer Science**

**Semester – V**

**Max. Marks: 100 (CCIA: 25+ SEE: 75)**

**Theory Hrs./Week: 3**

#### **I. Course Objectives**

The objective of the course provides the basic concepts and techniques of Machine Learning and helps to use recent machine learning software for solving practical problems. It enables students to gain experience by doing independent study and research.

**Course Outcomes:** At the end of this course, the student will be able to

**CO1:** Identify the characteristics of machine learning (PO6, PO7)

**CO2:** Summarize the Model building and evaluation approaches(PO6, PO7)

**CO3:** Apply Bayesian learning and regression algorithms for real-world Problems(PO6, PO7)

**CO4:** Apply supervised learning algorithms to solve the real-world Problems. (PO6, PO7)

**CO5:** Apply unsupervised learning algorithms for the real world data. (PO6, PO7)

#### **UNIT-I: Introduction to Machine Learning and Preparing to Model**

**Introduction to Machine Learning-**Introduction, What is Human Learning? Types of Human Learning, What is Machine Learning? Types of Machine Learning, Problems Not To Be Solved Using Machine Learning, Applications of Machine Learning.

**Preparing to Model-**Introduction, Machine Learning Activities, Basic Types of Data in Machine Learning, Exploring Structure of Data, Data Quality and Remediation, Data Pre-Processing

#### **UNIT-2: Modeling & Evaluation, Basics of Feature Engineering**

**Modeling & Evaluation-**Introduction, Selecting a Model, Training a Model (for Supervised Learning), Model Representation and Interpretability, Evaluating Performance of a Model.

**Basics of Feature Engineering-**Introduction, Feature Transformation, Feature Subset Selection

#### **UNIT-3: Bayesian Concept Learning and Regression**

**Bayesian Concept Learning** - Introduction, Why Bayesian Methods are Important?, Bayes' Theorem, Bayes' Theorem and Concept Learning, Bayesian Belief Network.

**Regression:** Introduction, Regression Algorithms - Simple linear regression, Multiple linear regression, Polynomial Regression Model, Logistic Regression, Maximum Likelihood Estimation.

#### **UNIT-4: Supervised Learning: Classification, Ensemble Learning**

**Classification**-Introduction, Example of Supervised Learning, Classification Model, Classification Learning Steps, Common Classification Algorithms - k-Nearest Neighbour (kNN), Decision tree, Random forest model, Support vector machines.

**Ensemble Learning**- Boosting, Bagging

#### **UNIT-5: Unsupervised learning**

**Unsupervised Learning**- Introduction, Unsupervised vs Supervised Learning, Application of Unsupervised Learning, Clustering –Clustering as a Machine Learning task, Different types of clustering techniques, Partitioning methods, Hierarchical clustering, Density-based methods: DBSCAN.

**Finding Pattern using Association Rule** - Definition of common terms, Association rule, Apriori algorithm.

#### **III. Text Books:**

1. Subramanian Chandra mouli, Saikat Dutt, Amit Kumar Das, "Machine Learning", Pearson Education India ,1<sup>st</sup>edition.
2. Tom M. Mitchell, "Machine Learning", MGH, 1997.

#### **Reference Books:**

1. ShaiShalev-Shwartz, ShaiBen David, "Understanding Machine Learning: From Theory to Algorithms", Cambridge.
2. Peter Harington, "Machine Learning in Action" , Cengage, 1<sup>st</sup> edition, 2012.
3. Peter Flach, "Machine Learning: The art and science of algorithms that make sense of data", Cambridge university press,2012.
4. Jason Brownlee, "Machine Learning Mastery with Python Understand Your Data, Create Accurate Models and Work Projects End-To-End", Edition: v1.4, 2011.

#### **IV. Co-Curricular Activities:**

(Co-curricular activities shall not promote copying from textbook or from others work and shall encourage self/independent and group learning)

##### **A. Measurable**

1. Assignments (in writing and doing forms on the aspects of syllabus content and outside the syllabus content. Shall be individual and challenging)
2. Student seminars (on topics of the syllabus and related aspects (individual activity))

3. Quiz (on topics where the content can be compiled by smaller aspects and data (Individuals or groups as teams))
4. Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual participation and contribution of students shall be ensured (team activity))

B. General

1. Group Discussion
2. Try to solve MCQ's available online.



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**MODEL QUESTION PAPER**

**Title: MACHINE LEARNING USING PYTHON**

**Course Code: BCASET07**

**Offered to: B. C. A**

**Domain Subject: Computer Science**

**Semester – V**

**Max. Marks: 75**

**Time: 3 Hrs.**

**SECTION - A**

**Answer any *five* of the following:**

**5 X 5= 25 MARKS**

1. Discuss various types of human learning. (CO1, L2)
2. Write about applications of machine learning. (CO1, L6)
3. Write about the role of modelling in machine learning. (CO2, L6)
4. Describe about model training? (CO2, L1)
5. Write a short note on maximum likelihood estimation. (CO3, L6)
6. Describe the need of Bayesian model. (CO3, L1)
7. Briefly write about boosting. (CO4, L6)
8. Discuss about unsupervised and supervised learning.(CO5, L2)

**SECTION – B**

**Answer *all* the following questions**

**5 X 10 = 50 MARKS**

9. (a) Explain about types of machine learning.(CO1, L1)

OR

(b) Explain about data pre-processing. (CO1, L1)

10. (a) Summarize performance evaluation of a model. (CO2, L2)

OR

(b) Summarize feature transformation. (CO2, L2)

11. (a) Explain about polynomial regression model. (CO3, L1)

OR

(b) Describe about Bayes theorem. (CO3, L1)

12. (a) Explain about random forest model with example. (CO4, L1)

OR

(b) Explain about k – nearest neighbour with example. (CO4, L1)

13. (a) Summarize applications of unsupervised learning. (CO5, L2)

OR

(b) Summarize various clustering techniques? (CO5, L2)

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**Title: MACHINE LEARNING USING PYTHON Lab**

**Course Code: BCASEP07**

**Offered to: B. C. A**

**Domain Subject: Computer Science**

**Semester – V**

**Max. Marks: 50(CCIA: 10+ SEE: 40)**

**Practical Hrs. /Week: 3**

**Type of the Course: Skill Enhancement Course (Elective, Practical) Credits: 02**

**I. Course objectives:**

To educate students in implementing various machine learning algorithms.

Course outcomes:

By the end of the course, students will be:

CO1: Able to implement EDA analysis. (PO6, PO7)

CO2: able to perform dimensionality reduction.(PO6, PO7)

CO3: Able to implement classification algorithms. (PO6, PO7)

CO4: Able to implement classification techniques. (PO6, PO7)

CO5: Able to implement Apriori algorithm for clustering. (PO6, PO7)

**II: Practical (Laboratory) Syllabus: (30 Periods)**

1. EDA Analysis
2. Exploring Feature Selection Algorithms
  - Ranking
  - Wrapper methods
3. Dimensionality Reduction-PCA
4. Exploring Model Evolution Parameters.
5. Probabilistic Classification Algorithm
6. Regression Techniques: Linear, Logistic
7. Classification Techniques – Tree Based
8. Classification Techniques- Neural Network.
9. Ensemble Learning
10. Clustering & Apriori Algorithm





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**MODEL QUESTION PAPER**  
**Title: MACHINE LEARNING USING PYTHON Lab**

<b>Course Code: BCASEP07</b>	<b>Offered to: B. C. A</b>
<b>Domain Subject: Computer Science</b>	<b>Semester – V</b>
<b>Max. Marks: 40</b>	<b>Time: 3 Hrs.</b>
<b>Type of the Course: Skill Enhancement Course (Elective, Practical) Credits: 02</b>	
	<b>Section A</b>
One Major Experiment (Experiment No : )	<b>15 M</b>
	<b>Section B</b>
One Minor Experiment (Experiment No : )	<b>10 M</b>
	<b>Section C</b>
Practical Record	<b>05 M</b>
	<b>Section D</b>
Viva Voce	<b>10 M</b>

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### **Title: WEB APPLICATION DEVELOPMENT USING DJANGO**

**Course Code: BCASET08**

**Offered to: B. C. A**

**Domain Subject: Computer Science**

**Semester – V**

**Max. Marks: 100 (CCIA: 25+ SEE: 75)**

**Theory Hrs./Week: 3**

#### **I. Course Objectives**

The objective of the course provides the basic concepts and techniques of Machine Learning and helps to use recent machine learning software for solving practical problems. It enables students to gain experience by doing independent study and research.

**Course Outcomes:** At the end of this course, the student will be able to

**CO1:** Identify the characteristics of machine learning (PO6, PO7)

**CO2:** Summarize the Model building and evaluation approaches(PO6, PO7)

**CO3:** Apply Bayesian learning and regression algorithms for real-world Problems(PO6, PO7)

**CO4:** Apply supervised learning algorithms to solve the real-world Problems. (PO6, PO7)

**CO5:** Apply unsupervised learning algorithms for the real world data. (PO6, PO7)

#### **UNIT-I:**

##### **Introduction to Django**

Why Django, installing Django, initial setup, create an app, views and URL Confs, Hello World!, Git, Bit bucket.

**Pages App:** initial setup, templates, class based views, URLs, extending templates, tests, local vs production, deploy.

#### **UNIT-2:Message Board, Blog App and Forms:**

##### **Message Board App:**

Initial setup, create a database model, activating models, Django admin, Views, Templates, URLs, Adding new posts, tests, Heroku configuration, Heroku deployment.

##### **Blog App:**

Initial setup, database models, admin, URLs, views, templates, static files, individual blog pages, tests.

**Forms:** introduction to forms, update forms, delete view, tests.

### **UNIT-3: User Accounts**

**User Accounts:** Login, Update home page, logout link, sign up, bitbucket, Heroku configuration, Heroku deployment.

**Customer user model:** setup, customer user model, forms, super user.

**User Authentication:** Templates, URLs, Admin.

### **UNIT-4: Bootstrap, passwords and E-Mail**

**Bootstrap:** Pages app, tests, bootstrap, sign in form, next steps.

**Password change and Reset:** password change, customizing password change, password reset, custom templates.

**Emails:** SendGrid, Custom emails.

### **UNIT-5: Newspaper App, Permissions and Comments**

**Newspaper App:** Articles app, URLs and Views, Edit/Delete, Create Page

**Permissions and Authentication:** improved create view, authorization, mixins, Login Required Mixin, update view and delete view.

**Comments:** Model, Admin, Template.

### **III. Text Books:**

1. Subramanian Chandra mouli, Saikat Dutt, Amit Kumar Das, “Machine Learning” ,Pearson Education India ,1<sup>st</sup> edition.
2. Tom M. Mitchell, “Machine Learning’, MGH, 1997.

### **Reference Books:**

1. Shai Shalev-Shwartz, ShaiBen David, “Understanding Machine Learning: From Theory to Algorithms”, Cambridge.
2. Peter Harington, “Machine Learning in Action”, Cengage, 1<sup>st</sup> edition, 2012.  
Peter Flach, “Machine Learning: The art and science of algorithms that make sense of data”, Cambridge university press, 2012.
3. Jason Brownlee, “Machine Learning Mastery with Python Understand Your Data, Create Accurate Models and Work Projects End-To-End”, Edition: v1.4, 2011.

### **IV. Co-Curricular Activities:**

(Co-curricular activities shall not promote copying from textbook or from others work and shall encourage self/independent and group learning)

#### **A. Measurable**

1. Assignments (in writing and doing forms on the aspects of syllabus content and outside the syllabus content. Shall be individual and challenging)
2. Student seminars (on topics of the syllabus and related aspects (individual activity))
3. Quiz (on topics where the content can be compiled by smaller aspects and data (Individuals or groups as teams))
4. Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual participation and contribution of students shall be ensured (team activity))

#### **B. General**

1. Group Discussion

2. Try to solve MCQ's available online.



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**MODEL QUESTION PAPER**

**Title: WEB APPLICATION DEVELOPMENT USING DJANGO**

**Course Code: BCASET08**

**Domain Subject: Computer Science**

**Max. Marks: 75**

**Offered to: B. C. A**

**Semester – V**

**Time: 3 Hrs.**

**SECTION - A**

**Answer any *five* of the following:**

**5 X 5= 25 MARKS**

1. Discuss the need of Django in web development. (CO1, L2)
2. Write about class based views. (CO1, L1)
3. Write about templates in message board app. (CO2, L1)
4. Describe about forms. (CO2, L1)
5. Write a short note on super user. (CO3, L1)
6. Develop Django code to demonstrate user login form. (CO3, L6)
7. Develop Django code to demonstrate password change. (CO4, L6)
8. Develop Django code to demonstrate views. (CO5, L6)

**SECTION – B**

**Answer *all* the following questions**

**5 X 10 = 50 MARKS**

9. (a) Explain about installing Django.(CO1, L1)

OR

(b) Explain about developing and deploying pages app. (CO1, L1)

10. (a) Develop code for designing and deploying message board app . (CO2, L6)

OR

(b) Develop code for designing and deploying blog app. (CO2, L6)

11. (a) Explain about user authentication with example. (CO3, L1)

OR

(b) Describe about customer user model with example. (CO3, L1)

12. (a) Explain about Bootstrap. (CO4, L1)

OR

(b) Explain about custom emails in Django with example. (CO4, L1)

13. (a) Develop Django code to create and deploy newspaper app.(CO5, L2)

OR

(b) Develop Django code to demonstrate comments? (CO5, L2)

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**Title: WEB APPLICATION DEVELOPMENT USING DJANGO Lab**

**Course Code: BCASEP08**

**Offered to: B. C. A**

**Domain Subject: Computer Science**

**Semester – V**

**Max. Marks 50 (CIA: 10 + SEE: 40)**

**Time: 3 Hrs. /Week**

**Type of the Course: Skill Enhancement Course (Elective, Practical) Credits: 02**

**I. Course objectives:**

To educate students in developing e commerce applications.

Course outcomes:

By the end of the course, students will be:

CO1: Able to design home page for an e commerce web application. (PO6, PO7)

CO2: Able to perform validation using PHP. (PO6, PO7)

CO3: Able to design catalogue. (PO6, PO7)

CO4: Able to implement access control mechanisms in web applications. (PO6, PO7)

CO5: Able to design application for any given e-commerce scenario. (PO6, PO7)

**II: Practical (Laboratory) Syllabus: (30 Periods)**

1. Installing djano.
2. Demonstrate pages app.
3. Demonstrate message board app.
4. Demonstrate blog app.
5. Demonstrating forms.
6. Demonstrating user authentication.
7. Demonstrating bootstrap app.
8. Demonstrating password management.
9. Demonstrating comments.
10. Demonstrating permissions.



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**Title: WEB APPLICATION DEVELOPMENT USING DJANGO Lab**

**Course Code: BCASEP08**

**Domain Subject: Computer Science**

**Max. Marks 40**

**Type of the Course: Skill Enhancement Course (Elective, Practical) Credits: 02**

**Offered to: B. C. A**

**Semester – V**

**Time: 3 Hrs.**

	<b>Section A</b>	
One Major Experiment (Experiment No : )		<b>15 M</b>
	<b>Section B</b>	
One Minor Experiment (Experiment No : )		<b>10 M</b>
	<b>Section C</b>	
Practical Record		<b>05 M</b>
	<b>Section D</b>	
Viva Voce		<b>10 M</b>

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**Title: Security Analyst – III**

**Course Code: BCASET09**

**Domain Subject: Computer Science**

**Max. Marks: 100 (CCIA: 25+ SEE: 75)**

**Offered to: B. C. A**

**Semester – V**

**Theory Hrs./Week: 3**

**I. Prerequisite:** Knowledge in Security Analyst I, II.

**Course Objectives:**

1. To introduce managing information security services.
2. To introduce trouble shooting network devices.
3. To introduce response handling, incident response roles and data backup.
4. To introduce computer security logs, and Log management.
5. To introduce handling network security incidents and malicious code incidents.

**Course Outcomes:**

By the end of the course students will have knowledge:

1. Configuring network devices, identifying unauthorized devices, etc.(PO6, PO7)
2. Troubleshooting of network communication, devices and can handle network slowdowns.(PO6, PO7)
3. Handling responses, understand incident response role and responsibilities, handling data backup.(PO6, PO7)
4. Configuring and Analysing Logs, Log management and time synchronization.(PO6, PO7)
5. Network attacks and security incidents, preventing incident and handling malicious code.(PO6, PO7)

**UNIT I Managing Information Security Services**

Configuring Network Devices, Identifying Unauthorized Devices, Testing the Traffic Filtering Devices, Configuring Router, Configuring Modes – Router/Global/Interface/Line/Privilege Exec / ROM /User EXEC, Configuring a banner / Firewall / Bastion Host / VPN Server etc.

**UNIT II Troubleshooting Network Devices and Services**

Introduction & Methodology of Troubleshooting, Troubleshooting of Network Communication – Connectivity - Network Devices – Network Slowdowns – Systems – Modems etc.

**UNIT III Information Security Incident Management & Data Backup**

Information Security Incident Management overview – Handling Response, Incident Response Roles and Responsibilities, Incident Response Process etc.

Data Back Introduction, Types of Data Backup and its Techniques, Developing an Effective Data Backup Strategy and Plan, Security Policy for Back Procedures.

#### **UNIT IV Log Correlation**

Computer Security Logs, Configuring &Analysing Windows Logs, Log Management – Functions & Challenges, Centralized Logging and Architecture, Time Synchronization – NTP / NIST etc.

#### **UNIT V Handling Network Security Incidents**

Network Reconnaissance Incidents, Network Scanning Security Incidents, Network Attacks and Security Incidents, Detecting DoS attack, DoS Response Strategies, Preventing / Stopping a DoS Incident etc.

##### **Handling Malicious Code Incidents**

Incident Handling Preparation, Incident Prevention, Detection of Malicious Code, Containment Strategy, Evidence Gathering and Handling, Eradication and Recovery, Recommendations etc.

### **III.**

#### **Text Books**

1. Managing Information Security Risks, The Octave Approach by Christopher Alberts and Audrey Dorofee
2. “Cryptography and Network Security (4<sup>th</sup> edition) by William Stallings

#### **References:**

1. <https://www.sans.org/reading-room/whitepapers/incident/security-incident-handling-small-organizations-38979>

#### **IV. Co-Curricular Activities:**

(Co-curricular activities shall not promote copying from textbook or from others work and shall encourage self/independent and group learning)

##### **A. Measurable**

1. Assignments (in writing and doing forms on the aspects of syllabus content and outside the syllabus content. Shall be individual and challenging)
2. Student seminars (on topics of the syllabus and related aspects (individual activity))
3. Quiz (on topics where the content can be compiled by smaller aspects and data (Individuals or groups as teams))
4. Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual participation and contribution of students shall be ensured (team activity))

##### **B. General**

1. Group Discussion
2. Try to solve MCQ's available online.





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**MODEL QUESTION PAPER**

**Title: Security Analyst – III**

**Course Code: BCASET09**

**Offered to: B. C. A**

**Domain Subject: Computer Science**

**Semester – V**

**Max. Marks: 75**

**Time: 3 Hrs.**

**SECTION - A**

**Answer any *five* of the following:**

**5 X 5= 25 MARKS**

1. Discuss the role of firewall while accessing Internet. (CO1, L2)
2. Write about proxy servers and DMZ. (CO1, L6)
3. Write about modems. (CO2, L6)
4. Describe the goals and need of incident response? (CO3,L1)
5. Write a short note on data backup. (CO3, L6)
6. Describe the need of computer logs in information security. (CO4, L1)
7. Briefly write about DoS attacks. (CO5, L6)
8. Discuss about incident handling preparation?(CO5, L2)

**SECTION – B**

**Answer *all* the following questions**

**5 X 10 = 50 MARKS**

9. (a) Explain about identifying unauthorized devices.(CO1, L1)

OR

(b) Explain about testing the traffic filtering devices. (CO1, L1)

10. (a) Summarize the methodology of troubleshooting. (CO2, L2)

OR

(b) Summarize Incident Handling Team roles and responsibilities. (CO2, L2)

11. (a) Explain about various types of backup techniques. (CO3, L1)

OR

(b) Describe about log management process. (CO3, L1)

12. (a) Explain about configuring windows log. (CO4, L1)

OR

(b) Explain about DoS attacks. (CO4, L1)

13. (a) Summarize detecting malicious code incidents. (CO5, L2)

OR

(b) Summarize mitigating inappropriate usage incident? (CO5, L2)

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**Title: Cyber Security, Analysis and Reporting Lab**

**Course Code: BCASEP09**

**Offered to: B. C. A**

**Domain Subject: Computer Science**

**Semester – V**

**Max. Marks: 50(CCIA: 10+ SEE: 40)**

**Practical Hrs. /Week: 3**

**Type of the Course: Skill Enhancement Course (Elective, Practical) Credits: 02**

**I. Prerequisite:** Knowledge in SA I, SAII and networking concepts.

**Course Objective:** To educate students in basic plotting, modelling and manipulating data using NumPy and Pandas.

**Course Outcomes:** by the end of the course, students will be

CO1: able to understand array handling in NumPy. (PO6, PO7)

CO2: able to know basics of data sets and frames in Pandas. (PO6, PO7)

CO3: able to know about plotting. (PO6, PO7)

CO4: able understand data assembly and handling missing data. (PO6, PO7)

CO5: able to implement data modelling using linear models and stat models.(PO6, PO7)

**II: Practical (Laboratory) Syllabus: (30 Periods)**

1. Configuring firewall.
2. Study the use of network reconnaissance tools like WHOIS, dig, traceroute, nslookup to gather information about networks and domain registers.
3. Study of packet sniffer tools like wireshark, ethereal, tcpdump etc
4. Download and install nmap. Use it with different options to scan open ports, perform OS fingerprinting, do a ping scan, TCP port scan, UDP port scan, etc.
5. Detect ARP spoofing using open source tool ARPWATCH.
6. Use the Nessus tool to scan the network for vulnerabilities.
7. Implement a code to simulate buffer overflow attack.
8. Install IDS (e.g. SNORT) and study the logs.

**III. Lab References:**

4. [https://www.wireshark.org/docs/wsug\\_html\\_chunked/](https://www.wireshark.org/docs/wsug_html_chunked/)
5. <https://whois.domaintools.com/>
6. <https://whois.domaintools.com/>
7. <https://binaryplant.com/arp-monitor/>
8. <https://www.snort.org/>



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**Title: Cyber Security, Analysis and Reporting Lab**

**Course Code: BCASEP09**

**Offered to: B. C. A**

**Domain Subject: Computer Science**

**Semester – V**

**Max. Marks: 40**

**Time: 3 Hrs.**

**Type of the Course: Skill Enhancement Course (Elective, Practical) Credits: 02**

**Section A**

One Major Experiment (Experiment No : ) **15 M**

**Section B**

One Minor Experiment (Experiment No : ) **10 M**

**Section C**

Practical Record **05 M**

**Section D**

Viva Voce **10 M**

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**Title: Software Testing**

**CourseCode: BCASET10**

**Domain Subject:ComputerScience**

**Marks: 100 (CCIA:25+ SEE: 75)**

**Offered to: B. C. A**

**Semester – V Max.**

**Theory Hrs. /Week:3**

### I. CourseObjectives

1. To discuss bugs and various software testing issues and solutions in software and to learn flow graphs and apply path testing.
2. To learn how to apply transaction and data flow testing techniques.
3. Distinguish various domains.
4. Apply different Paths, Path products and Regular Expressions and logic based testing
5. To learn state graphs, transition testing and graph matrices.

### CourseOutcomes

1. Understand the basic concepts of software testing, flow graphs and path testing (PO6,PO7)
2. Understand transaction and data flow testing techniques(PO6,PO7)
3. Understand various types of domain testing. (PO6,PO7)
4. Understand Paths, Path products and Regular Expressions and logic based testing(PO6,PO7)
5. Select the appropriate tests to regression test your software after changes have been made.(PO6, PO7)

### II. Syllabus

#### UNIT-I

12hours

Introduction: Purpose of testing, Dichotomies, model for testing, consequences of bugs, taxonomy of Bugs.

Flow Graphs and Path testing: Basics concepts of path testing, predicates, path predicates and Achievable paths, path sensitizing, path instrumentation, application of path testing.

#### UNIT-II

12hours

Transaction Flow Testing: Transaction flow, transaction flow testing techniques.

Dataflow testing: Basics of dataflow testing, strategies in dataflow testing, application of dataflow testing.

#### UNIT-III

12hours

Domain Testing: domains and paths, Nice & ugly domains, domain testing, domain and interface testing, domains and testability.

#### UNIT-IV

12hours

Paths, Path products and Regular Expressions: Path products & path expression, reduction procedure, Applications, regular expressions & flow anomaly detection.

Logic Based Testing: Overview, decision tables, path expressions kv charts, specifications.

#### UNIT-V

12hours

State, State Graphs and Transition testing: State graphs, good & bad state graphs state testing, Testability tips.

Graph Matrices and Application: Motivational overview, matrix of graph, relations, power of a matrix, Node reduction algorithm, building tools. (Student should be given an exposure to a tool like J Meter or Win runner.)

### III. Text Book:

1. Software Testing techniques –Baris Beizerm Dreamtech, Secondedition. Reference Books

1. Software Testing Tools – Dr. K.V.K.K. Prasad,Dream tech.
2. Software Testing Principles and Practices by Naresh Chauhan, Oxford UniversityPress
3. The craft of software testing – Brain Matrick, PearsonEducation.
4. Software Testing Techniques – SPD (Oreille) Software Testing in the Real World-Edward Kit, Pearson.

### IV. Co-CurricularActivities:

(Co-curricularactivitiesshallnotpromotecopyingfromtextbookorfromothersworkandshallencourage self/independent and group learning)

#### A. Measurable

1. Assignments (in writing and doing forms on the aspects of syllabuscontent and outside the syllabus content. Shall be individual andchallenging)
2. Student seminars (on topics of the syllabus and related aspects (individualactivity))
3. Quiz (on topics where the content can be compiled by smaller aspects and data (Individuals or groups asteams))
4. Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual participationand contribution of students shall be ensured (team activity))

#### B. General

1. GroupDiscussion
2. Try to solve MCQ's availableonline.



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**MODEL QUESTION PAPER**

**Title: Software Testing**

**CourseCode: BCASET10**

**Domain Subject:ComputerApplications**

**Max.Marks:75**

**Offered to: B. C . A**

**Semester – V**

**Time: 3Hrs.**

**Section-A**

**ANSWER ANYFIVE QUESTIONS**

**5x5M=25M**

1. What is testing? Explain Purpose of testing.(CO1,L1)
2. Explain about Paths predicates and Achievable paths.(CO1,L2)
3. Explain Basics of dataflow testing.(CO2, L2)
4. Write in detail about ordering the strategies in data flow.(CO2,L6)
5. Describe about domain testing. (CO3,L1)
6. Explain restrictions to domain testing.(CO3,L2)
7. Write short note on decision tables. (CO4,L6)
8. Explain about State Graphs with example.(CO5,L2)

**Section-B**

**ANSWER THEFOLLOWINGQUESTIONS**

**5x10M=50M**

9. (A) Explain Dichotomies in software testing in detail.(CO1,L2)  
OR  
(B) Explain about path sensitizing and path instrumentation with example.(CO1,L21)
10. (A) Explain about Transaction flow testing in detail.(CO2,L2)  
OR  
(B) Explain about Dataflow testing strategies in detail. (CO2,L2)
- 11.(A) What is Nice Domain? Summarize different types of Nice domains in detail.(CO3, L2)  
OR  
(B) Explain about Domain and Interface Testing.(CO3, L2)
12. (A). Explain regular expressions and flow anomaly detection in detail.(CO4, L2)  
OR  
(B) Explain about Logic Based Testing in detail.(CO4, L2)
- 13 (A) Explain about State Testing in detail.(CO5,L2)  
OR  
(B) Explain about Node Reduction Algorithm in detail.(CO5, L2)

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**Title: Software Testing Lab**

**CourseCode: BCASEP10**

**Offered to: B. C. A**

**Domain Subject:ComputerScience**

**Semester –V**

**Max. Marks: 50(CCIA: 10+SEE: 40)**

**Practical Hrs. /Week: 3**

**Type of the Course: Skill Enhancement Course (Elective, Practical) Credits:02**

**I. Courseobjectives:**

1. To learn what is a bug and how to test.
2. To learn the flow of graphs and apply path testing.
3. To learn transaction and data flow techniques.
4. To learn various types of domains.
5. To learn how to apply different testing techniques.

**Courseoutcomes:**

- CO1. Understand types of testing and bugs. (PO6, PO7)  
CO2. Understand flow graphs and apply path testing. (PO6, PO7)  
CO3. Apply transaction and data flow techniques. (PO6, PO7) CO4.  
Distinguish various domains. (PO6, PO7)  
CO5. Apply different testing techniques (PO6,PO7)

**II: Practical (Laboratory) Syllabus: (30Periods)**

1. Introduction to win runner testing tool
2. Recording test in context sensitive & analog mode
3. Synchronizing test.
4. Checking GUI objects
5. Checking bitmap objects.
6. Programming test with ts1
7. Creating data driven test
8. Maintaining test script
9. Batch test
10. Project (creating test report)



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**Title: Software Testing Lab**

**CourseCode: BCASEP10**

**Offered to: B. C. A**

**Domain Subject:ComputerScience**

**Semester –V**

**Max.Marks:40**

**Time: 3 Hrs.**

**Type of the Course: Skill Enhancement Course (Elective, Practical) Credits: 02**

	<b>Section A</b>	
One Major Experiment (Experiment No : )		<b>15 M</b>
	<b>Section B</b>	
One Minor Experiment (Experiment No : )		<b>10 M</b>
	<b>Section C</b>	
Practical Record		<b>05 M</b>
	<b>Section D</b>	
Viva Voce		<b>10 M</b>

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**Title: DIGITAL IMAGING**

Course Code: **BCASET11**

Domain Subject: **COMPUTER APPLICATIONS**

Max. Marks: **100** (CCIA: 25+ SEE:75)

Offered to: **B. C. A**

Semester – **V**

Theory Hrs./Week: **3**

Type of the Course: **Skill Enhancement Course** (Elective Theory), Credits: **04**

**I. Course Outcomes: Students at the successful completion of the course will be able to:**

CO1: Gain knowledge about Types of Graphics, Types of Objects, Types of video editing tools **(PO5)**

CO2: Show their skills in editing and altering photographs for through a basic understanding of the tool box.**(PO5)**

CO3: Gain knowledge in using the layers.**(PO5)**

CO4: Gain knowledge in using the selection tools, repair tools.**(PO5)**

CO5: Gain knowledge in using selection tools, applying filters and can show their skills.**(PO5)**

**II. Syllabus:**

**(Total Theory Hours: 45 Periods)**

**UNIT-I**

**(9periods)**

Types of Graphics- Raster vs Vector Graphics ,Types of Objects - Audio formats, Video formats , Image formats , Text document formats, Types of video editing , Different color modes, Image Scanner- Types of Image Scanners

**UNIT-II**

**(8Periods)**

What is GIMP? , GIMP tool box window, Layers Dialog, Tool Options Dialog, Image window, Image window menus

**UNIT-III (10 Periods)**

**Improving Digital Photos** - Opening files, Rescaling saving files, Cropping, Brightening & Darkening , Rotating, Sharpening, and Fixing Red Eye.

**Introduction to layers-** What is layer?, Using layer to add text , Using move tool , Changing colors , Simple effects on layers, Linking layers together , Performing operations on layers, Using layers to copy and paste, Tour of layers dialog

#### **UNIT-IV (9 Periods)**

**Drawing-** Drawing lines and curves , Changing colors and brushes, Erasing , Drawing rectangles, Circles and other shapes, Outlining and filling regions, Filling with patterns and gradients, Importing brushes or gradients or making your own.

**Selection:** Working with selections, Select by color and fuzzy, Select Bezier paths, intelligent scissors tool, Modifying selections with selection modes.

#### **UNIT-V**

**(9 Periods)**

**Erasing and Touching Up:** Dodge and burn tool, Smudging tool , Clone tool , Sharpening using convolve tool, Blurring with Gaussian Blur , Correcting Color Balance, Hue , Saturation , Color balance using curves and levels.

**Filters:**Filters , Blur, Enhance , Distort, Noise Filters.

#### **III References/ Text Book/ e-books/websites**

**Textbook:** Beginning GIMP from Novice to professional by Akkana Peck, Second Edition, A press

**Reference Materials on the Web/web-links:**

<https://www.mygreatlearning.com/gimp/tutorials/gimp-introduction>

#### **IV Co-Curricular Activities**

(Co-curricular activities shall not promote copying from textbook or from others work and shall encourage self/independent and group learning)

##### **A. Measurable**

1. Assignments (in writing and doing forms on the aspects of syllabus content and outside the syllabus content. Shall be individual and challenging)
2. Student seminars (on topics of the syllabus and related aspects (individual activity))
3. Quiz (on topics where the content can be compiled by smaller aspects and data (Individuals or groups as teams))
4. Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual participation and contribution of students shall be ensured (team activity))

##### **B. General**

1. Group Discussion
2. Others



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**Model paper**  
**Title: DIGITAL IMAGING**

Course Code: **BCASET11**

Offered to: **B. C. A**

Domain Subject: **COMPUTER APPLICATIONS**

Semester – **V**

Max Marks: 75

Time: 3Hrs.

**SECTION – A**

**Short Answer Questions (25 Marks: 5 x 5)**

**Answer any Five questions. (At least 1 question should be given from each Unit)**

1. Explain different types of image formats.(CO1,L2)
2. Write short notes on Tool box in GIMP.(CO2, L1)
3. Explain briefly about gradients in GIMP. (CO4, L2)
4. Write short notes on clone tool in GIMP.(CO5,L1)
5. Explain rotating, sharpening in GIMP.(CO3,L2)
6. What is a layer? Explain steps to use layer in GIMP.(CO3, L1)
7. Describe different color modes in GIMP.(CO1,L5)
8. What is GIMP? Who invented GIMP? Write about tool box options in GIMP?(CO2,L1)

**SECTION B (Total: 5 x 10 = 50 Marks)**

**Answer all questions. (Two questions should be given from each unit with internal choice)**

9(a) Describe the various color modes in GIMP with example.( CO1,L5)

**OR**

9(b) What are various types of audio and video formats in GIMP? Explain with example.(CO1,L1)

10(a) Describe image window menu in detail.( CO2, L5)

**OR**

10(b) Explain the window layers dialog in GIMP.(CO2, L2)

11(a) Describe Cropping-Brightening and Darkening in GIMP.(CO3, L5)

**OR**

11(b) Explain the steps to solve a fixed-red eye in GIMP.(CO3,L2)

12(a) Explain the working with selections in GIMP.(CO4, L2)

**OR**

12(b) Write about filling with patterns and gradients.(CO4, L1)

13(a) Describe the steps involved in Dodge, Burn and Smudging tool in GIMP.(CO5,L5)

**OR**

13(b)Write about distort and noise filters in GIMP.(CO5,L1)

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**Title: DIGITAL IMAGING LAB**

Course Code: **BCASEP11**

**Offered to: B. C. A**

Domain Subject: **COMPUTER APPLICATIONS**

Semester: V

Max. Marks: **50** (CCIA: 10+ SEE: 40)

Practical Hrs. /Week: **3**

Type of the Course: **Skill Enhancement Course** (Elective, Practical)

Credits: 01

**I. Course Outcomes: Students at the successful completion of the course will be able to:**

CO1: Students will gain a working knowledge of Photoshop (PO5)

CO2: Student will be able to show their skills in editing and altering photographs for through a basic understanding of the tool bar. (PO5)

CO3: Student will gain knowledge in using the layers. (PO5)

CO4: Student will gain knowledge in using the selection tools, repair tools. (PO5,PO7)

CO5: Student will gain knowledge in using filters and can show their skills. (PO5)

**II: Practical (Laboratory) Syllabus: (30 Periods)**

1. Designing a Visiting card
2. Design Cover page of a book
3. Paper add for calling tenders
4. Passport photo design
5. Design a Pamphlet
6. Brochure designing
7. Titles designing
8. Custom shapes creation
9. Black & white and color photo conversion
10. Image size modification
11. Background changes
12. Texture and patterns designing
13. Filter effects & Eraser effects



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**Title: DIGITAL IMAGING LAB**

Course Code: **BCASEP11**

Domain Subject: **COMPUTER APPLICATIONS**

Max. Marks: **40**

**Offered to: B. C. A**

Semester: **V**

Practical Hrs. /Week: **3**

**Model Paper: Practical**

**Time: Three hours**

**Max. Marks: 40**

	<b>Section A</b>
One Major Experiment (Experiment No : )	<b>15 M</b>
	<b>Section B</b>
One Minor Experiment (Experiment No : )	<b>10 M</b>
	<b>Section C</b>
Practical record	<b>05 M</b>
	<b>Section D</b>
Viva Voce	<b>10 M</b>

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**Title: Computer Networking and PC Troubleshooting**

**Course Code: BCASET12**

**Offered to: B. C . A**

**Domain Subject: Computer Science**

**Semester – V**

**Max. Marks: 100 (CCIA: 25+ SEE:75)**

**Theory Hrs./Week: 3**

**I. Course Objectives**

The objective of the course provides the basic concepts and techniques of Machine Learning and helps to use recent machine learning software for solving practical problems. It enables students to gain experience by doing independent study and research.

**Course Outcomes:** At the end of this course, the student will be able to

- CO1:** Identify the computer peripherals, software and hardware devices. (PO6, PO7)
- CO2:** Describe the basics of networks and networking tools(PO6, PO7)
- CO3:** Describe the Network Addressing and sub-netting (PO6, PO7)
- CO4:** Explains the Networks protocols and management (PO6, PO7)
- CO5:** Identifies Basic Network administrator roles(PO6, PO7)

**UNIT-I: Introduction to computer hardware**

Introduction & Definition of Computer: Block Diagram of computer , Classification of computer, Characteristics of Computers , Types of Languages and language translators. History and Generation of computers, Memory - Bits, Bytes, KB, MB, GB, TB, PB, EB, ZB, YB, Brontope byte, Geeope Byte. Etc IEC Units: kibi, mebi, gibi, tebi, pebi, exbi, zebi, yobi, Computer Software, Types of Software with Ex. (System/Application/Utility S/W, Computer Hardware- Intro. to Hardware components of computer, Components and its parts, Identifying the Important Hardware Components of PC.- CPU, Motherboard, RAM, HDD, ODD, SMPS, K/B, Mouse, Monitor (CRT,LCD,LED) etc, SMPS: About SMPS, Types of SMPS , Power stored in UPS , Components and Circuits inside the SMPS Unit, UPS (Uninterrupted Power Supply): Types of UPS (Offline/Line Interactive & Online) , Working Principle of each type of UPS. , Connecting, Maintenance and Troubleshooting.

## **UNIT-2 Computer management and servicing**

Assembling and disassembling PCs, Introduction to BIOS / CMOS Setup, POST (Power On Self Test): Introduction to BIOS/CMOS Setup, POST (Power On Self-Test, Demonstration of BIOS/CMOS Configuration (Date, Time, Enable/Disable Devices). Dual BIOS Feature , BIOS/CMOS Setup, Booting Sequence/Boot Order, Introduction to Operating System: Definition and types of Operating Systems – MS Dos, Windows 9x/XP/Vista/7/8, Linux, MAC OS, Android etc. , Process of Booting the Operating System. , Win XP/Win 7. Activation and Automatic Updating procedures. Computer Management: Computer Management, Disk

Management, Defragmentation, Services and Applications, local Users and Groups, Advanced System Settings Device Manager, Task Manager, Windows Registry, Partitioning, Partitioning of Hard Drive - Primary, Extended, Logical partitions using Partition Tools.

## **UNIT-3 Overview of Networking**

Overview of Networking, Classification of Networks–LAN, MAN, WAN, Hardware and Software Components, Wi-Fi, Bluetooth, Network Communication Standards., NETWORKING MODEL -OSI Reference Model, TCP/IP Reference Model , LAN Cables, Connectors, wireless network adapter , Wireless network adapter, Functions of LAN Tools: Anti-Magnetic mat, Anti-Magnetic Gloves , Crimping Tool , Cable Tester , Cutter, Loop back plug , Toner probe , Punch down tool , Protocol analyser, Multi meter, Network Topologies : Bus , Ring , Star , Mesh , Hybrid Topologies

## **UNIT- 4 Network Addressing and sub-netting**

Network Addressing. TCP/IP Addressing Scheme, Components of IP Address and classes, Sub-netting, Internet Protocol Addressing's - IPv4 ,IPv6 , Classful addressing and classless addressing .

## **UNIT-5 Networks protocols and management**

protocols in computer networks , Hyper Text Transfer Protocol(HTTP), File Transfer Protocol(FTP), Simple Mail Transfer Protocol(SMTP), address Resolution Protocol(ARP), Reverse Address Resolution Protocol(RARP) , Telnet, ICMP, Simple Network Management Protocol(SNMP) , DHCP, DNS , Network Management., Network Monitoring and Troubleshooting., Remote Monitoring (RMON).

### **Text Book:**

1. “Introduction to Data Communications and Networking”, B. Forouzan, Tata McGraw Hill
2. “Computer Networks”, Tanenbaum, PHI,
3. PC AND CLONES Hardware, Troubleshooting and Maintenance B. Govindarajalu, Tata McGraw-Hill Publication

**Reference Books:**

1. PC Troubleshooting and Repair Stephen J. Bigelow Dream tech Press, New Delhi
2. “Data and Computer Communications”, Stallings, PHI,
3. “Data Communication”, William Schewber, McGrawHill,1987
4. IT essential V7 companion guide – Cisco Networking Academy 2020
5. Upgrading and repairing PCs(22nd edition) – Scott Mueller – 2015

**IV. Co-Curricular Activities:**

(Co-curricular activities shall not promote copying from textbook or from others work and shall encourage self/independent and group learning)

**A. Measurable**

1. Assignments (in writing and doing forms on the aspects of syllabus content and outside the syllabus content. Shall be individual and challenging)
2. Student seminars (on topics of the syllabus and related aspects (individual activity))
3. Quiz (on topics where the content can be compiled by smaller aspects and data(Individuals or groups as teams))
4. Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual participation and contribution of students shall be ensured (team activity))

**B. General**

1. Group Discussion
2. Try to solve MCQ's available online.





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**MODEL QUESTION PAPER**  
**Title: Computer Networking and PC Troubleshooting**

**Course Code: BCASET12**  
**Domain Subject: Computer Science**  
**Max. Marks: 75**

**Offered to: B. C. A**  
**Semester – V**  
**Time: 3 Hrs.**

**SECTION - A**

**Answer any *five* of the following:**

**5 X 5= 25 MARKS**

1. Write about applications of computers (CO1, L1)
2. Write about UPS. (CO1, L1)
3. Write about POST. (CO2, L1)
4. Describe about disk partition. (CO2, L1)
5. Write a short note on cable tester. (CO3, L1)
6. Describe about protocol analyser. (CO3, L1)
7. Briefly write about sub netting. (CO4, L6)
8. Discuss about HTTP (CO5, L2)

**SECTION – B**

**Answer *all* the following questions**

**5 X 10 = 50 MARKS**

9. (a) Explain about block diagram of computer.(CO1, L1)  
OR  
(b) Explain about generations of computers. (CO1, L1)
10. (a) Summarize the process of dis assembling PC. (CO2, L2)  
OR  
(b) Summarize the process of assembling PC. (CO2, L2)
11. (a) Explain about various types of networks. (CO3, L1)  
OR  
(b) Describe about network topologies. (CO3, L1)
12. (a) Explain about IPV4 addressing (CO4, L1)  
OR  
(b) Explain about types of addressing. (CO4, L1)
13. (a) Summarize network protocols. (CO5, L2)  
OR  
(b) Summarize network monitoring and troubleshooting? (CO5, L2)

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**Title: Computer Networking and PC Troubleshooting Lab**

**Course Code: BCASEP12**

**Offered to: B. C. A**

**Domain Subject: Computer Science**

**Semester – V**

**Max. Marks: 50(CCIA: 10+ SEE: 40)**

**Practical Hrs. /Week: 3**

**Type of the Course: Skill Enhancement Course (Elective, Practical) Credits: 02**

**I.**

**Course objectives:**

To train the officials to acquire basic knowledge in computer hardware and peripherals for installation, PC assembly, trouble shooting and maintenance including system management and its backup and to undertake disaster prevention, a basic knowledge of TCP/IP networks work group, internet and intranet.

**Outcomes:**

The student will able to know the Basic of Computer assembling and trouble shooting. This course will provide the brief knowledge of Computer networking and trouble shooting

**II: Practical (Laboratory) Syllabus: (30 Periods)**

1. Hardware installation and configuration
2. PC Debugging, troubleshooting and basic preventive maintenance
3. Assembling and Disassembling of a Computer System
4. Preparation of Boot disk or USB drive (demo)
5. Software installation and Configuration with CD/DVD or USB drive
6. Installation of commonly used software (Office Suites, Virus Scanners & Utilities)
7. Printer Installation & Print Test Page (Demo)
8. Installation of Web cam and tools like zoom/ Edx /Microsoft teams (optional) for online class
9. Identifying network components and devices (hub, Switch and router)
10. Cables – Coaxial and UTP and its connectors/Jacks and preparation of a patch cord
11. Networking Basic and Configuration
12. Run All Types of Network Troubleshooting Commands  
(Ipconfig, ping, tracerouteetc)
13. installation and configuring the proxy server for internet access
14. Exercise on Setting of particular IP address (static) to an existing terminal system
15. Exercise on Installation of network operating system

16. Exercise on Configuration of DHCP and DNS.
17. Exercise on File/Folder accessing rights for sharing and printer sharing
  
18. Exercise on remote desktop
  
19. Exercise on setting up of VPN on network
20. Design a network with Cisco Packet tracer 8.0 ( freely downloadable)
  - a. Simple network with one server with five desktops (configure static IP addresses)
  - b. Adding and removing network cards in a PC or server
  - c. Design a Network with one DHCP server with 5 desktops  
(Try exercises 13,16 and 17 using Cisco packet tracer)

**Tools required for PC assembling and software installation**

1. Multimeter - 1Rs 500/ basic version

Or

Digital voltage tester – 1 Rs 150 (taparia)

2. Earth checking plug – 1 Rs 350 (Mx)
3. Mother board diagnosis card -1 Rs 400/-
4. SMPS power supply tester - 1 Rs 400/-
5. Screw driver kit – 4 No's Rs 40 each
6. External CD/DVD writer – 1 Rs 2000/-
6. Media for operating system (CD/DVD) or USB drive  
(Try with trial versions for windows) or Ubuntu desktop (Linux)

Note: Un used old desktops can be used for installation

**Tools Required for Network**

1. RJ45 crimp tool – 1 Rs 250/- basic model
2. Cable tester - 1 Rs 350/-
3. Rj45 jacks - 100 no's Rs 250(ordinary) - consumables
4. UTP cable - 10 mts for each class Rs 20 per metre - consumables



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**Title: Computer Networking and PC Troubleshooting Lab**

**Course Code: BCASEP12**

**Offered to: B. C. A**

**Domain Subject: Computer Science**

**Semester – V**

**Max. Marks: 40**

**Time: 3Hrs**

**Type of the Course: Skill Enhancement Course (Elective, Practical) Credits: 02**

	<b>Section A</b>	
One Major Experiment (Experiment No : )		<b>15 M</b>
	<b>Section B</b>	
One Minor Experiment (Experiment No : )		<b>10 M</b>
	<b>Section C</b>	
Practical Record		<b>05 M</b>
	<b>Section D</b>	
Viva Voce		<b>10 M</b>

**####**



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**Title: OBJECT ORIENTED ANALYSIS AND DESIGN**

**Course Code: BCASET13**

**Offered to: B. C. A**

**Domain Subject: Computer Science**

**Semester – V**

**Max. Marks: 100 (CCIA: 25+ SEE:75)**

**Theory Hrs./Week: 3**

## **I.**

Course Objectives

1. To provide a sound understanding of the fundamental concepts and historical of the model. Evolution.
2. To facilitate a mastery of the notation and process of object-oriented analysis and

Course Outcomes

By the end of the course, student will be able to:

- CO1: Have Knowledge in evolution and foundations of OO Model and its elements. (P06, P07)
- CO2: Identify relationship between classes and objects. (PO6, PO7)
- CO3: Know importance of classification and can identify classes and objects. (PO6, PO7)
- CO4: Have basic knowledge of UML. (PO6, PO7)
- CO5: Knowledge in syntax and semantics of UML. (PO6, PO7)

## **II. Syllabus**

### **UNIT I:**

The Object Model-The Evolution of the Object Model: The generations of programming languages, The topology of Programming languages. Foundations of the Object Model: Object Oriented Analysis, Object Oriented design, Object Oriented Programming. Elements of the Object Model: Programming Paradigm (programming style), The Major and Minor Elements of the Object Models, Abstraction, Encapsulation, Modularity, Hierarchy (single inheritance, multiple inheritance, Aggregation), Static and Dynamic Typing, Concurrency, Persistence.

### **UNIT II:**

Classes and Objects-The Nature of an Object: What is and what is not an Object, State, Behavior, and Identity. Relationships among Objects: Links, Aggregation. The Nature of a Class: Interface and Implementation, Class Lifecycle. Relationships among Classes: Association: Semantic

Dependencies, Multiplicity, Inheritance, Polymorphism, Aggregation, Dependencies. The Interplay of Classes and Objects: Relationship between Classes and Objects, On Building Quality Classes and Objects: Measuring the Quality of an Abstraction, Choosing Operations, Choosing Relationships, Choosing Implementations.

### **UNIT III:**

Classification-The Importance of Proper Classification: The Difficulty of Classification, The Incremental and Iterative Nature of Classification. Identifying classes and Objects: Classical and Modern Approaches. Object Oriented Analysis: Classical Approaches, Behavior Analysis, Domain Analysis, Use Case Analysis, CRC Cards, Informal English Description, Structured Analysis. Key Abstractions and Mechanisms: Identifying Key Abstractions: Refining Key Abstractions, Naming Key Abstractions. Identifying Mechanisms.

### **UNIT IV:**

The Unified Modeling Language: Diagram Taxonomy: Structure Diagrams, Behavior Diagrams. The Use of Diagrams in Practice: Conceptual, Logical and Physical Models, The Role of Tools. The Syntax and Semantics of the UML: The Package Diagrams, Component Diagrams, Deployment Diagrams, Use Case Diagrams.

### **UNIT V:**

The Syntax and Semantics of the UML: Activity Diagrams, Class Diagrams, Sequence Diagrams, Interaction Diagrams, Composite Structure Diagrams, State Machine Diagrams, Timing Diagrams, Object Diagrams, Communication Diagrams.

### **III. Text Book:**

Object-Oriented Analysis and Design with Applications, 3rd Edition, By: Robert A. Maksimchuk, Bobbi J. Young, Grady Booch, Jim Conallen, Michael W. Engel, Kelli A. Houston, Pearson education.

Reference Books

1. James Rumbaugh, Jacobson and Booch, Unified Modeling Language reference manual, PHI.
2. Ali Bahrami, Object oriented system development-using the unified modeling language, Tata McGraw Hill international edition, computer science series.

### **IV. Co-Curricular Activities:**

(Co-curricular activities shall not promote copying from textbook or from others work and shall encourage self/independent and group learning)

#### **A. Measurable**

1. Assignments (in writing and doing forms on the aspects of syllabus content and outside the syllabus content. Shall be individual and challenging)

2. Student seminars (on topics of the syllabus and related aspects (individual activity))
3. Quiz (on topics where the content can be compiled by smaller aspects and data (Individuals or groups as teams))
4. Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual participation and contribution of students shall be ensured (team activity))

**B. General**

1. Group Discussion
2. Try to solve MCQ's available online.



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**MODEL QUESTION PAPER**

**Title: OBJECT ORIENTED ANALYSIS AND DESIGN**

**Course Code: BCASET13**

**Offered to: B. C. A**

**Domain Subject: Computer Science**

**Semester – V**

**Max. Marks: 75**

**Time: 3 Hrs.**

**SECTION - A**

**Answer any *five* of the following:**

**5 X 5= 25 MARKS**

1. Discuss the need of OOAD. (CO1, L2)
2. Write about concurrency. (CO1, L1)
3. Write about semantic reption ships. (CO2, L1)
4. Describe the relationship between classes and objects.(CO2,L1)
5. Describe about importance of proper classification. (CO3, L1)
6. Describe the need of identifying mechanisms. (CO3, L1)
7. Briefly write about use case diagrams. (CO5, L6)
8. Discuss about communication diagrams.(CO5, L2)

**SECTION – B**

**Answer *all* the following questions**

**5 X 10 = 50 MARKS**

9. (a) Explain about static and dynamic typing.(CO1, L1)  
OR  
(b) Explain about topologies of programming language. (CO1, L1)
10. (a) Summarize relationships among classes. (CO2, L2)  
OR  
(b) Summarize relationships between classes and objects. (CO2, L2)
11. (a) Explain about various types of classification techniques. (CO3, L1)  
OR  
(b) Describe about structured analysis. (CO3, L1)
12. (a) Explain about deployment diagram. (CO4, L1)  
OR  
(b) Explain about component diagram. (CO4, L1)
13. (a) Explain about state machine diagram. (CO5, L1)  
OR  
(b) Explain about timing diagram. (CO5, L1)

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**Title: OBJECT ORIENTED ANALYSIS AND DESIGN LAB**

**Course Code: BCASEP13**

**Offered to: B. C. A**

**Domain Subject: Computer Science**

**Semester – V**

**Max. Marks: 50(CCIA: 10+ SEE: 40)**

**Practical Hrs. /Week: 3**

**Type of the Course: Skill Enhancement Course (Elective, Practical) Credits: 02**

**I. Course objectives:**

To demonstrate various UML diagrams

**Course outcomes:**

By the end of the course, students will be

1. Able to demonstrate class diagram and activity diagrams (PO6, PO7)
2. Able to identify use cases and develop use case diagrams(PO6, PO7)
3. Able to demonstrate state machine, sequence diagrams for given cases.(PO6, PO7)
4. Able to demonstrate composite structure diagram for given cases.(PO6, PO7)
5. Able to demonstrate object and communication diagrams for given cases(PO6, PO7)

**II: Practical (Laboratory) Syllabus: (30 Periods)**

1. Demonstrate Package Diagram for Hydroponics Gardening system.
2. Demonstrate Component Diagram for the Environmental.
3. Demonstrate Deployment Diagram for Environmental control system.
4. Identify Use Cases and develop the Use Case Diagram for Hydroponics Gardening.
5. Demonstrate Activity Diagram for Hydroponics Gardening system.
6. Demonstrate class diagram for the environmental control system.
7. Demonstrate squence diagram for the environmental control system.
8. Demonstrate sequence diagram for removing and returning books from library system.
9. Demonstrate use case diagram for returning book with fine in library system.
10. Draw the State Machine Diagram for the Duration Timer.
11. Draw the interaction diagram of library system.
12. Draw composite structure diagram for the Hydroponics Gardening system's water tank.
13. Draw Timing Diagram for a valve object that is controlled to fill the Water storage tank object in Hydroponics Gardening system.
14. Demonstrate object diagram of library system.
15. Draw the Communication Diagram for the Hydroponics Gardening system.



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**Title: OBJECT ORIENTED ANALYSIS AND DESIGN LAB**

**Course Code: BCASEP13**

**Domain Subject: Computer Science**

**Max. Marks: 40**

**Offered to: B. C. A**

**Semester – V**

**Time: 3 Hrs.**

**Type of the Course: Skill Enhancement Course (Elective, Practical) Credits: 02**

**Section A**

One Major Experiment (Experiment No : ) **15 M**

**Section B**

One Minor Experiment (Experiment No : ) **10 M**

**Section C**

Practical Record **05 M**

**Section D**

Viva Voce **10 M**

**####**



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**Title: DESIGN OF OBJECT ORIENTED APPLICATIONS**

**Course Code: BCASET14**

**Offered to: B. C. A**

**Domain Subject: Computer Science**

**Semester – V**

**Max. Marks: 100 (CCIA: 25+ SEE: 75)**

**Theory Hrs./Week: 3**

**I. Course Objectives**

To teach the realistic application of object-oriented analysis and design within a variety of problem domain.

**Course Outcomes**

By the end of the course, student will be able to:

CO1: Have Knowledge in micro and macro process. (PO6, PO7)

CO2: Have Knowledge in management planning, quality assurance and metrics along with documentation of object oriented development. (PO6, PO7)

CO3: Have Knowledge in system architecture. (PO6, PO7)

CO4: Basic knowledge in AI and Data Acquisition. (PO6, PO7)

CO5: Knowledge in applications of Object Oriented Design. (PO6, PO7)

**II. Syllabus**

**UNIT I:**

Process-First Principles: Traits of Successful Projects: Strong Architectural Vision, Iterative and Incremental Lifecycle. Toward a Rational Development Process, the Macro Process: The Software Development Lifecycle, Overview, The Macro Process Content Dimension-Disciplines, The Macro Process Time Dimension-Milestones and Phases, The Macro Process Time Dimension-Iterations, Release Planning. The Micro Process: The Analysis and Design Process, Overview, Level of Abstraction, Activities, Products, The Micro Process and Level of Abstraction, Identifying Elements, Defining Elements of Collaborations, Defining Element Relationships, Detailing Element Semantics.

**UNIT II:**

Pragmatics-Management Planning: Risk Management, Task Planning, Development Review.

Staffing: Resource Allocation, Development Team Roles. Release Management: Configuration Management and Version Control, Integration, Testing. Reuse: Elements of Reuse, Institutionalizing Reuse. Quality Assurance and Metrics: Software Quality, Object-Oriented Metrics. Documentation: Development Legacy, Documentation Contents. Tools: Kinds of Tools, Organizational Implementations. Special Topics: Domain-Specific Issues, Adopting Object-Oriented Technology. The Benefits and Risks of Object-Oriented Development: The Benefits of Object Oriented Development, The Risk of Object Oriented Development.

### **UNIT III:**

System Architecture: Satellite-Based Navigation: Inception, Elaboration, And Construction, Post-Transition. Control System: Traffic Management: Inception, Elaboration, And Construction, Post-Transition.

### **UNIT IV:**

Artificial Intelligence: Cryptanalysis: Inception, Elaboration, Construction, Post-Transition. Data Acquisition: Weather Monitoring station: Inception, Elaboration, Construction, Post-Transition.

### **UNIT V:**

Web Application: Vacation Tracking System: Inception, Elaboration, Construction, Transition and Post-Transition. Object-Oriented Programming Languages: Language Evolution, Smalltalk, C++, Java.III.

### **III. Text Book:**

Object-Oriented Analysis and Design with Applications, 3rd Edition, By: Robert A. Maksimchuk, Bobbi J. Young, Grady Booch, Jim Conallen, Michael W. Engel, Kelli A. Houston, Pearson education.

### **Reference Books**

1. Grady Booch, Object Oriented Analysis and Design with Applications, 2nd Edition, Pearson education 1999.
2. Jacobson ed al., The Unified Software Development Process, A W 1999.
3. Tom Pender, UML Bible, John Wiley and sons.

### **IV. Co-Curricular Activities:**

(Co-curricular activities shall not promote copying from textbook or from others work and shall encourage self/independent and group learning)

#### **A. Measurable**

1. Assignments (in writing and doing forms on the aspects of syllabus content and outside the syllabus content. Shall be individual and challenging)

2. Student seminars (on topics of the syllabus and related aspects (individual activity))
3. Quiz (on topics where the content can be compiled by smaller aspects and data (Individuals or groups as teams))
4. Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual participation and contribution of students shall be ensured (team activity))

**B. General**

1. Group Discussion
2. Try to solve MCQ's available online.



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**MODEL QUESTION PAPER**

**Title: DESIGN OF OBJECT ORIENTED APPLICATIONS**

**Course Code: BCASET14**

**Offered to: B. C. A**

**Domain Subject: Computer Science**

**Semester – V**

**Max. Marks: 75**

**Time: 3 Hrs.**

**SECTION - A**

**Answer any *five* of the following:**

**5 X 5= 25 MARKS**

1. Discuss traits of successful projects. (CO1, L2)
2. Write about incremental life cycle. (CO1, L1)
3. Write about risk management. (CO2, L1)
4. Describe domain specific issues. (CO2,L1)
5. Write a short note on inception. (CO3, L6)
6. Describe the need of traffic management. (CO3, L1)
7. Briefly write about post transition. (CO4, L6)
8. Discuss about language evolution.(CO5, L2)

**SECTION – B**

**Answer *all*the following questions**

**5 X 10 = 50 MARKS**

9. (a) Explain about the analysis and design process.(CO1, L1)

OR

(b) Explain about element relationships. (CO1, L1)

10. (a) Summarize quality assurance and metrics. (CO2, L2)

OR

(b) Summarize benefits and issues of object oriented development. (CO2, L2)

11. (a) Explain about post transition phase of satellite navigation system. (CO3, L1)

OR

(b) Describe about traffic management. (CO3, L1)

12. (a) Explain about cryptanalysis. (CO4, L1)

OR

(b) Explain about data aquisition. (CO4, L1)

13. (a) Summarize various phases of vacation tracking systems. (CO5, L2)

OR

(b) Summarize various object oriented programming languages. (CO5, L2)

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**Title: DESIGN OF OBJECT ORIENTED APPLICATIONS LAB**

**Course Code: BCASEP14**

**Offered to: B. C. A**

**Domain Subject: Computer Science**

**Semester – V**

**Max. Marks: 50(CCIA: 10+ SEE: 40)**

**Practical Hrs./Week : 3**

**Type of the Course: Skill Enhancement Course (Elective, Practical) Credits: 02**

**I. Course objectives:**

To solve a realistic application of object-oriented analysis and design within a variety of problem domain.

**Course outcomes:**

By the end of the course, students will be able to develop a mini project for a given case study. (PO6, PO7)

**II: Practical (Laboratory) Syllabus: (30 Periods)**

1. Develop a mini project for Satellite-Based Navigation.
2. Develop a mini project for Traffic Management.
3. Develop a mini project for Cryptanalysis.
4. Develop a mini project for Weather Monitoring Station.
5. Develop a mini project for Vacation Tracking System.



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**Title: DESIGN OF OBJECT ORIENTED APPLICATIONS Lab**  
**Course Code: BCASEP14** **Offered to: B. C. A**

**Domain Subject: Computer Science** **Semester – V**

**Max. Marks: 40** **Time: 3 Hrs.**

**Type of the Course: Skill Enhancement Course (Elective, Practical) Credits: 02**

**Section A**

One Major Experiment (Experiment No : ) **15 M**

**Section B**

One Minor Experiment (Experiment No : ) **10 M**

**Section C**

Practical Record **05 M**

**Section D**

Viva Voce **10 M**

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**Title: E – COMMERCE APPLICATION DEVELOPMENT**

**Course Code: BCASET15**

**Offered to: B. C . A**

**Domain Subject: Computer Science**

**Semester – V**

**Max. Marks: 100 (CCIA: 25+ SEE:75)**

**Theory Hrs./Week: 3**

**I. Course Objectives**

To educate students in ecommerce and ecommerce applications.

**Course Outcomes**

Upon successful completion of the course, a student will be able to:

CO1: To apply in an integrative and summative fashion the students' knowledge in all fields of business studies by drafting a website presence plan. (PO6, PO7)

CO2: To understand the factors needed in order to be a successful in ecommerce (PO6, PO7)

CO3: To gain the skills to bring together knowledge gathered about the different components of building a web presence (PO6, PO7)

CO4: To critically think about problems and issues that might pop up during the establishment of the web presence (PO6, PO7)

CO5: To apply Word Press as a content management system (CMS), Plan their website by choosing colour schemes, fonts, layouts, and more . (PO6, PO7)

**II. Syllabus**

**Unit-1: (10h)**

Introduction to E- commerce: Meaning and concept – E- commerce , E- commerce v/s Traditional Commerce , E- Business & E- Commerce – History of E- Commerce , EDI – Importance, features & benefits of E- Commerce , Impacts, Challenges & Limitations of E- Commerce

**Unit-2: (12h)**

Business models of E – Commerce: Business to Business , Business to customers ,Customers to Customers , Business to Government , Business to Employee , Influencing factors of successful E– Commerce , Architectural framework of Electronic Commerce , Web based E Commerce Architecture. Internet Commerce

**Unit-3: (12h)**

Electronic data Interchange , EDI Technology ,EDI- Communications , EDI Agreements , E– Commerce payment system. Digital Economy

**Unit -4: (13h)**

A Page on the web - HTML Basics , Client Side scripting -JAVA SCRIPT basics , Server side Scripting- PHP basics.

**Unit-5: (13h)**

Logging in to Your Word press Site , word press dash board , creating your first post , adding photos and images , creating hyper link , adding categories and tags

**III. Textbooks:**

1. Turban, Rainer, and Potter, Introduction to E-Commerce, second edition, 2003
2. H. M. Deitel, P. J. Deitel and T. R. Nieto, E-Business and E-Commerce: How to Programe, Prentice hall, 2001
3. WordPress All-in-One For Dummies -written by Lisa Sabin Wilson with contributions by Michael Torbert, Andrea Rennick, Cory Miller, and Kevin Palmer

**Reference Books:**

1. Elias. M. Awad, "Electronic Commerce", Prentice-Hall of India Pvt Ltd.
2. Ravi Kalakota, Andrew B. Whinston, "Electronic Commerce-A Manager's guide", Addison-Wesley
3. <https://w3cschools.com>
4. David Whiteley, E-Commerce: Strategy, Technologies and Applications, Tata McGraw Hill.

**IV. Co-Curricular Activities:**

(Co-curricular activities shall not promote copying from textbook or from others work and shall encourage self/independent and group learning)

**A. Measurable**

1. Assignments (in writing and doing forms on the aspects of syllabus content and outside the syllabus content. Shall be individual and challenging)

2. Student seminars (on topics of the syllabus and related aspects (individual activity))
3. Quiz (on topics where the content can be compiled by smaller aspects and data (Individuals or groups as teams))
4. Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual participation and contribution of students shall be ensured (team activity))

B. General

1. Group Discussion
2. Try to solve MCQ's available online.



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**MODEL QUESTION PAPER**

**Title: E – COMMERCE APPLICATION DEVELOPMENT**

**Course Code: BCASET15**

**Offered to: B. C . A**

**Domain Subject: Computer Science**

**Semester – V**

**Max. Marks: 75**

**Time: 3 Hrs.**

**SECTION - A**

**Answer any *five* of the following:**

**5 X 5= 25 MARKS**

1. Differentiate e commerce vs. traditional commerce. (CO1, L4)
2. Write about limitations of e commerce (CO1, L6)
3. Write about B2C. (CO2, L1)
4. Describe about C2C model (CO2,L1)
5. Write a short note on EDI. (CO3, L1)
6. Describe the need of digital economy. (CO3, L1)
7. Briefly write about CSS. (CO4, L1)
8. Discuss about the need of word press. (CO5, L2)

**SECTION – B**

**Answer *all* the following questions**

**5 X 10 = 50 MARKS**

9. (a) Explain about challenges of E - Commerce.(CO1, L1)

OR

(b) Explain about features and benefits of E - Commerce. (CO1, L1)

10. (a) Summarize the influencing factors of successful E - Commerce. (CO2, L2)

OR

(b) Summarize B2B, B2G Models. (CO2, L2)

11. (a) Explain about EDI communication. (CO3, L1)

OR

(b) Describe about E – Commerce payment System. (CO3, L1)

12. (a) Explain about various HTML tags. (CO4, L1)

OR

(b) Explain about server side scripting with example. (CO4, L1)

13. (a) Explain about adding categories and tags in word press. (CO5, L2)

OR

(b) Explain about adding photos and images in word press. (CO5, L2)



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**Title: E – COMMERCE APPLICATION DEVELOPMENT Lab**

**Course Code: BCASEP15**

**Offered to: B. C. A**

**Domain Subject: Computer Science**

**Semester – V**

**Max. Marks: 50(CCIA: 10+ SEE: 40)**

**Practical Hrs. /Week: 3**

**Type of the Course: Skill Enhancement Course (Elective, Practical) Credits: 02**

**I. Course objectives:**

To educate students in developing e commerce applications.

Course outcomes:

By the end of the course, students will be:

CO1: Able to design home page for an e commerce web application. (PO6, PO7)

CO2: Able to perform validation using PHP. (PO6, PO7)

CO3: Able to design catalogue. (PO6, PO7)

CO4: Able to implement access control mechanisms in web applications. (PO6, PO7)

CO5: Able to design application for any given e-commerce scenario. (PO6, PO7)

**II: Practical (Laboratory) Syllabus: (30 Periods)**

(Since, the proposed SECs are connected to Computer Programming/Software Tools and Skill enhancement, the students need to get exposure on the syllabus content by practicing on the computer even though there is no formal assignment of credits and laboratory hours for practical sessions. So, as part of the Co-curricular activities and continuous assessment, students should be engaged in practicing on computer for at least 30 hours per semester.)

**Case study of e –commerce**

1. Home page design of web site
2. Validation using PHP
3. Implement Catalogue design
4. Implement Access control mechanism (eg: username and password)
5. Case study on business model of online E-Commerce store

**Note:** The list of experiments need not be restricted to the above list. Detailed list of Programming/software tool based exercises can be prepared by the concerned faculty members.



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**Title: E – COMMERCE APPLICATION DEVELOPMENT Lab**

**Course Code: BCASEP15**

**Offered to: B. C. A**

**Domain Subject: Computer Science**

**Semester – V**

**Max. Marks: 50(CCIA: 10+ SEE: 40)**

**Practical Hrs./Week : 3**

**Type of the Course: Skill Enhancement Course (Elective, Practical) Credits: 02**

**Section A**

One Major Experiment (Experiment No : ) **15 M**

**Section B**

One Minor Experiment (Experiment No : ) **10 M**

**Section C**

Practical Record **05 M**

**Section D**

Viva Voce **10 M**

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**Title: REAL TIME GOVERNANCE SYSTEM (RTGS)**

**Course Code: BCASET16**

**Offered to: B. C . A**

**Domain Subject: Computer Science**

**Semester – V**

**Max. Marks: 100 (CCIA: 25+ SEE:75)**

**Theory Hrs./Week: 3**

### **I. Course Objectives**

To educate students in terms of e governance, its infrastructure and implementation.

#### **Course Outcomes**

Upon successful completion of this course, students will have the knowledge and skills to

CO1: Understand the terms regarding Governance, E-Governance and RTGS (PO6, PO7)

CO2: Learn about E-Governance Infrastructure (PO6, PO7)

CO3: Understand the E-Governance implementation in several countries (PO6, PO7)

CO4: Understand the E-Governance implementation in several Indian states (PO6, PO7)

CO5: Understand the applications of RTG (PO6, PO7)

### **II. Syllabus**

#### **UNIT 1: Introduction to E-Governance 12hrs**

Government, Governance and Good Governance, What is E-Governance or Electronic Governance? E-Government and E-Governance: A conceptual Analysis , Objectives , Components , application domains , four phase model , implementing E-Governance ,issues while implementing E-Governance , Opportunities and challenges . Types of E-Governance , What is Real-Time Governance (RTG) , Real Time Governance Society (RTGS)

## **UNIT 2: E-Governance Infrastructure 14hrs**

Data Systems infrastructure , Executive Information Systems , Management Information Systems , Knowledge Management Systems , Transaction Processing Systems . Legal Infrastructural preparedness , IT Act 2000 , Challenges to Indian law and cybercrime scenario in India , Amendments of the Indian IT Act . Institutional Infrastructural preparedness , Internet , intranet , extranet • Human Infrastructural preparedness , Top-level management , Middle-level management , Low-level management • Technological Infrastructural preparedness , Information and communications technology , Data Warehousing , Cloud Computing.

## **UNIT 3: E-Governance: Country Experience 12hrs**

INDIA ,US, UK ,AUSTRALIA , DUBAI

## **UNIT 4: E-Governance in India 12hrs**

Andhra Pradesh, Karnataka, Kerala , Uttar Pradesh , Madhya Pradesh , West Bengal ,Gujarat

UNIT 5: Latest Applications in Real Time Governance 10hrs

Agriculture ,Rural Development ,Health care ,Education ,Tourism , Commerce and Trade

### **III Textbooks:**

1. E-Governance: concepts and case studies| CSR Prabhu| Prentice-Hall|
2. E-Governance| Niranjani, Sanhari Mishra | Himalaya Publishing House

### **Website References:**

1. <http://www.egov4dev.org/success/case/>
2. <https://vikaspedia.in/e-governance/resources-for-vles>
3. <https://altametrics.com/en/information-systems/information-system-types.html>
4. <https://core.ap.gov.in/CMDashBoard/Index.aspx>

### **IV. Co-Curricular Activities:**

(Co-curricular activities shall not promote copying from textbook or from others work and shall encourage self/independent and group learning)

#### **A. Measurable**

1. Assignments (in writing and doing forms on the aspects of syllabus content and outside the syllabus content. Shall be individual and challenging)
2. Student seminars (on topics of the syllabus and related aspects (individual activity))
3. Quiz (on topics where the content can be compiled by smaller aspects and data)



(Individuals or groups as teams))

4. Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual participation and contribution of students shall be ensured (team activity)

B. General

1. Group Discussion

2. Try to solve MCQ's available online.



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**MODEL QUESTION PAPER**  
**Title: REAL TIME GOVERNANCE SYSTEM (RTGS)**

**Course Code: BCASET16**  
**Domain Subject: Computer Science**  
**Max. Marks: 75**

**Offered to: B. C . A**  
**Semester – V**  
**Time: 3 Hrs.**

**SECTION - A**

**Answer any *five* of the following:**

**5 X 5= 25 MARKS**

1. Discuss the need of RTGS. (CO1, L2)
2. Write about e - governance. (CO1, L1)
3. Write about MIS. (CO2, L6)
4. Describe the goals of e – governance. (CO2,L1)
5. Write a short note on cloud computing. (CO2, L1)
6. Write a short note on e – governance in US. (CO3, L1)
7. Describe implementation of e – governance in Gujarat. (CO4, L1)
8. Discuss about applications of RTGS.(CO5, L2)

**SECTION – B**

**Answer *all*the following questions**

**5 X 10 = 50 MARKS**

9. (a) Explain about types of e governance. (CO1, L1)  
OR  
(b) Explain about objectives and components of e governance. (CO1, L1)
10. (a) Explain about Indian IT ACT 2000 (CO2, L1)  
OR  
(b) Explain about various levels of management. (CO2, L1)
11. (a) Explain about E – governance policy of India. (CO3, L1)  
OR  
(b) Explain about E – governance policy of Australia. (CO3, L1)
12. (a) Explain about E – Governance policy of Andhra Pradesh. (CO4, L1)  
OR  
(b) Explain about E – Governance policy of Kerala. (CO4, L1)
13. (a) Explain the role of real time governance in agriculture sector. (CO5, L1)  
OR  
(b) Explain the role of real time governance in health sector. (CO5, L2)

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**Title: REAL TIME GOVERNANCE SYSTEM (RTGS) Lab**

**Course Code: BCASEP16**

**Offered to: B. C. A**

**Domain Subject: Computer Science**

**Semester – V**

**Max. Marks: 50(CCIA: 10+ SEE: 40)**

**Practical Hrs. /Week: 3**

**Type of the Course: Skill Enhancement Course (Elective, Practical) Credits: 02**

**I. Course objectives:**

To educate students in developing e commerce applications.

**Course outcomes:**

By the end of the course, students will be:

CO1: Able to design home page for an e commerce web application. (PO6, PO7)

CO2: Able to perform validation using PHP. (PO6, PO7)

CO3: Able to design catalogue. (PO6, PO7)

CO4: Able to implement access control mechanisms in web applications. (PO6, PO7)

CO5: Able to design application for any given e-commerce scenario. (PO6, PO7)

**II: Practical (Laboratory) Syllabus: (30 Periods)**

(Since, the proposed SECs are connected to Computer Programming/Software Tools and Skill enhancement, the students need to get exposure on the syllabus content by practicing on the computer even though there is no formal assignment of credits and laboratory hours for practical sessions. So, as part of the Co-curricular activities and continuous assessment, students should be engaged in practicing on computer for at least 15 hours per semester.)

Note: Here the students have to gather the details in computer lab by surfing several websites & Google Search Engines and submit the report to the class/lab instructor before leaving the lab.

1. Write a Report on the role of Nationwide Networking in E-Governance
2. Write a Report on SETU: A Citizen Facilitation Centre in India, regarding its successful or failure journey.
3. Write a Report on National Cyber Security Policy, how it is useful to Indian citizens.
4. Write a Report on mee-seva/Village Secretariat/Ward secretariat, a new paradigm in citizen services.
5. Write a Report on how Andhra Pradesh is implementing RTGS in Agriculture.
6. Write a Report on how Andhra Pradesh is implementing RTGS in social welfare schemes
7. Write a Report on how Andhra Pradesh is implementing RTGS in waste lands, agricultural lands and house properties.
8. Write a Report on Electronic Birth Registration in any one state of our country.

Note: The list of experiments need not be restricted to the above list. Detailed list of Programming/software tool based exercises can be prepared by the concerned faculty members.



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**Title: REAL TIME GOVERNANCE SYSTEM (RTGS) Lab**  
**Course Code: BCASEP16** **Offered to: B. C. A**  
**Domain Subject: Computer Science** **Semester – V**  
**Max. Marks: 40** **Time: 3Hrs.**

**Type of the Course: Skill Enhancement Course (Elective, Practical) Credits: 02**

**Section A**

One Major Experiment (Experiment No : ) **15 M**

**Section B**

One Minor Experiment (Experiment No : ) **10 M**

**Section C**

Practical Record **05 M**

**Section D**

Viva Voce **10 M**

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**Title: INTERNET OF THINGS**

Course Code: **BCASET17**

Offered to: **B. C. A**

Domain Subject: **COMPUTER SCIENCE**

Semester – **V**

Max. Marks: **100** (CCIA: 25+ SEE:75)

Theory Hrs./Week: **3**

Type of the Course: **Skill Enhancement Course** (Elective Theory), Credits: **03**

**I. Course Outcomes: Students at the successful completion of the course will be able to:**

CO1: Understand architecture and applications of IoT systems.(PO5)

CO2: Gain knowledge of various development boards used for IoT.(PO5)

CO3: Understand various Wireless Technologies used in IoT.(PO5)

CO4: Learn how to use various sensors and actuators for design of IoT.(PO7)

CO5: Learn how to connect various things to Internet and develop simple IOT Devices.(PO7)

**II. Syllabus:**

**(Total Theory periods: 45)**

**UNIT-I**

**(8Periods)**

Fundamentals of IoT: Introduction, Definitions & Characteristics of IoT, IoT Architectures, Physical & Logical Design of IoT, Enabling Technologies in IoT, History of IoT, About Things in IoT, The Identifiers in IoT, About the Internet in IoT, IoT frameworks, IoT and M2M.

Applications of IoT: Home Automation, Smart Cities, Energy, Retail Management, Logistics, Agriculture, Health and Lifestyle, Industrial IoT, Legal challenges, IoT design Ethics, IoT in Environmental Protection.

**UNIT-II**

**(10 Periods)**

Sensors Networks: Definition, Types of Sensors, Types of Actuators, Examples and Working, IoT Development Boards: Arduino IDE and Board Types, Rasp berry Pi Development Kit, RFID Principles and components, Wireless Sensor Networks: History and Context, The node, Connecting nodes, Networking Nodes, WSN and IoT.

**UNIT-III**

**( 9 Periods)**

Wireless Technologies for IoT: WPAN Technologies for IoT: IEEE802.15.4, Zig bee, HART, NFC, Z-

Wave, BLE, Bacnet And Modbus. IP Based Protocols for IoT IPv6, LowPAN, LoRA ,RPL, REST, AMPQ, CoAP, MQTT. Edge connectivity and protocols.

#### **UNIT-IV**

**(9 Periods)**

Arduino Simulation Environment: Arduino Uno Architecture, Setting up the IDE, Writing Arduino Software, Arduino Libraries, Basics of Embedded C programming for Arduino, Interfacing LED, push button and buzzer with Arduino, Interfacing Arduino with LCD.

Sensor & Actuators with Arduino: Overview of Sensors working, Analog and Digital Sensors, Interfacing of Temperature, Humidity, Motion, Light and Gas Sensors with Arduino, Interfacing of Actuators with Arduino, Interfacing of Relay Switch and Servo Motor with Arduino.

#### **UNIT-V**

**(9 Periods)**

Developing IOT's: Implementation of IoT with Arduino, Connecting and using various IoT Cloud Based Platforms such as Blynk, Things peak, AWS IoT, Google Cloud IoT Core etc. Cloud Computing, Fog Computing, Privacy and Security Issues in IoT.

### **III Text Book/References**

1. Internet of Things - A Hands-on Approach, Arshdeep Bahga and Vijay Madiseti, Universities Press, 2015, ISBN: 9788173719547
2. Vijay Madiseti and Arshdeep Bahga, "Internet of Things (A Hands-on Approach)", 1st Edition, VPT, 2014
3. Daniel Minoli,—"Building the Internet of Things with IPv6 and MIPv6: The Evolving World of M2M Communications", ISBN: 978-1-118-47347-4, Willy Publications
4. Pethuru Raj and Anupama C. Raman, "The Internet of Things: Enabling Technologies, Platforms, and Use Cases", CRC Press
5. Open source software/learning websites
  - a. [http://www.cse.wustl.edu/~jain/cse570-15/ftp/iot\\_prot/index.html](http://www.cse.wustl.edu/~jain/cse570-15/ftp/iot_prot/index.html)
  - b. Contiki (Open source IoT operating system)
  - c. Arduroid (open source IoT project)
  - d. IoT Toolkit (smart object API gateway service reference implementation)

Reference Materials on the Web/web-links:

1. <https://github.com/connectIoT/iottoolkit>
2. <https://github.com/connectIoT/iottoolkit> <https://www.arduino.cc/>
3. [https://onlinecourses.nptel.ac.in/noc17\\_cs22/course](https://onlinecourses.nptel.ac.in/noc17_cs22/course)
4. <https://blynk.io> (Mobile app)

#### **IV Co-Curricular Activities**

(Co-curricular activities shall not promote copying from textbook or from others work and shall encourage self/independent and group learning)

##### Measurable

9. Assignments (in writing and doing forms on the aspects of syllabus content and outside the syllabus content. Shall be individual and challenging)
  10. Student seminars(on topics of the syllabus and related aspects(individual activity))
  11. Quiz (on topics where the content can be compiled by smaller aspects and data(Individuals or groups a steams))
  12. Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual participation and contribution of students shall be ensured (team activity))

##### General

7. Group Discussion
8. Try to solve MCQ's available online.
9. Others.



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**Model paper**

**Title: INTERNET OF THINGS**

Course Code: **BCASET17**

Offered to: **B. C. A**

Domain Subject: **COMPUTER SCIENCE**

Semester – **V**

Max. Marks: **100** (CCIA: 25+ SEE:75)

Theory Hrs./Week: **3**

**SECTION – A**

**Short Answer Questions (25 Marks: 5 x 5)**

**Answer any Five questions. (At least 1 question should be given from each Unit)**

- 1) Define IOT and write characteristics of IOT.(CO1,L1)
- 2) Differentiate IOT and M2M.(CO1,L4)
- 3) Define Actuator and explain about it.(CO2,L1)
- 4) Compare WSN and IOT.(CO2,L4)
- 5) Explain about wireless technology Zigbee.(CO3,L2)
- 6) Explain about light and gas sensors.(CO4,L2)
- 7) Write short note on Fog Computing.(CO5,L1)
- 8) What is use of AWS IOT?(CO5,L1)

**SECTION B (Total: 5 x 10 = 50 Marks)**

**Answer all questions. (Two questions should be given from each unit with internal choice)**

9 (a) Explain IOT architecture with neat diagram.(CO1,L2)

**OR**

9(b) Discuss about Applications of IOT.(CO1,L6)

10(a) List various types of sensors in IOT and explain any 3 of them.(CO2,L2)

**OR**

10(b) List RFID components and explain them..(CO2,L2)

11(a) Write names of wireless technologies used in IOT and describe any 2 of them.(CO3,L2)

**OR**

11(b) Compare and Contrast MQTT and CoAP protocols.(CO3,L4)

12(a) Explain Arduino Uno Architecture.(CO4,L2)

**OR**

12(b) Construct steps for Interfacing Arduino with LCD and explain them.(CO4,L3)

13(a) Discuss about Privacy and security issues in IOT.(CO5,L6)

**OR**

13(b) Write code to Design any App of your choice using Thingspeak.(CO5,L6)

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**Title: INTERNET OF THINGS LAB**

Course Code: **BCASEP17**

Offered to: **B. C. A**

Domain Subject: **COMPUTER SCIENCE**

Semester: **V**

Max. Marks: **50** (CCIA: 10+ SEE: 40)

Practical Hrs. /Week: **3**

Type of the Course: **Skill Enhancement Course** (Elective, Practical),

Credits: **02**

**I. Course Outcomes: Students at the successful completion of the course will be able to:**

CO1: Acquire the skills to design a small IoT device. (PO5)

CO2: Connect various sensors, actuators, etc. to Arduino board. (PO5)

CO3: Connect the things to Internet. (PO5)

CO4: Design a small mobile app to control the sensors. (PO5, PO7)

CO5: Deploy a simple IoT device. (PO5, PO7)

**II: Practical (Laboratory) Syllabus: (30 Periods)**

1. Understanding Arduino UNO Board and Components
2. Installing and work with Arduino IDE
3. Blinking LED sketch with Arduino
4. Simulation of 4-Way Traffic Light with Arduino
5. Using Pulse Width Modulation
6. LEDF Sketch and Button Sketch
7. Analog Input Sketch (Bar Graph with LEDs and Potentiometer)
8. Digital Read Serial Sketch (Working with DHT/IR/Gas or Any other Sensor)
9. Working with Adafruit Libraries in Arduino
10. Spinning a DC Motor and Motor Speed Control Sketch
11. Working with Shields
12. Design APP using Blink App or ThingSpeak API and connect it LED bulb.
13. Design APP Using Blink App and Connect to Temperature, magnetic Sensors.

**II. Lab References:**

1. Internet of Things - A Hands-on Approach, Arshdeep Bahga and Vijay Madisetti, Universities Press, 2015, ISBN: 9788173719547
2. Vijay Madisetti and Arshdeep Bahga, "Internet of Things (A Hands-on Approach)", 1st Edition, VPT, 2014
3. Daniel Minoli,—"Building the Internet of Things with IPv6 and MIPv6: The Evolving World of M2M Communications", ISBN: 978-1-118-47347-4, Wiley Publications

**Reference Materials on the Web/web-links:**

1. <https://github.com/connectIOT/iottoolkit><https://www.arduino.cc/>
2. [https://onlinecourses.nptel.ac.in/noc17\\_cs22/course](https://onlinecourses.nptel.ac.in/noc17_cs22/course)
3. <https://blynk.io> (Mobile app)



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**Model Question Paper**  
**Title: INTERNET OF THINGS LAB**

Course Code: **BCASEP17**

Offered to: **B. C. A**

Domain Subject: **COMPUTER APPLICATION**

Semester: **V**

Max. Marks: **40**

Time: **3 Hrs.**

**Model Paper: Practical**

**Time: Three hours**

**Max. Marks: 40**

**Section A**

One Major Experiment (Experiment No : ) **15 M**

**Section B**

One Minor Experiment (Experiment No : ) **10 M**

**Section C**

Practical Record **05 M**

**Section D**

Viva Voce **10 M**

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**Title: WEB APPLICATIONS DEVELOPMENT USING PHP AND MYSQL**

Course Code: **BCASET18**

Domain Subject: **COMPUTER SCIENCE**

Max. Marks: **100** (CCIA: 25+ SEE:75)

Offered to: **BCA**

Semester – **V**

Theory Hrs./Week: **3**

Type of the Course: **Skill Enhancement Course** (Elective Theory), Credits: **03**

**I. Course Outcomes: Students at the successful completion of the course will be able to:**

CO1: Learn basic structure and key concepts in PHP, Control statements and functions concept and related programs (PO5)

CO2: Know What is an Array concept related programs, What is an Object, various objects, Formatting strings, Date and time and related programs (PO5)

CO3: Learn importance of Forms, Combining HTML with PHP code. Importance of Cookies and Sessions related programs of forms cookies and sessions. (PO5)

CO4: Know importance of File concept in PHP how to Create, Open, Read and write data in file related programs, Knowing about Image creation, drawing, and modification image (PO7)

CO5: Know about Database concept of MySQL, Connection, Creation of Database, Table adding Record into it related programs (PO7)

**II. Syllabus:**

**(Total Theory Periods: 45)**

**UNIT-I**

**(10 Periods)**

**The Building blocks of PHP :** Variables, Data Types, Operators and Expressions, Constants.

**Flow Control Functions in PHP:** Switching Flow, Loops, Code Blocks and Browser Output.

**Working with Functions:** What is function? ,Calling functions, Functions, Returning the values from User-Defined Functions, Variable Scope.

## UNIT-II

(8Periods)

**Working with Arrays** What are Arrays?, Creating Arrays, **Working with Objects** Creating Objects, Object Inheritance, **Working with Strings, Dates and Time**-Formatting strings with PHP, Investigating Strings with PHP, Manipulating Strings with PHP, Using Date and Time Functions in PHP.

## UNIT-III

(10 Periods)

**Working with Forms**-Creating Forms, Accessing Form Input with User defined Arrays, Combining HTML and PHP code on a single Page, **Working with Cookies and User Sessions**-Introducing Cookies, Setting a Cookie with PHP, Session Function Overview, Starting a Session, Working with session variables

## UNIT-IV

(8 Periods)

**Working with Files and Directories:** Creating and Deleting Files, Opening a File for Writing, Reading or Appending, Reading from File, Writing or Appending to a File. **Working with Images** - Understanding the Image-Creation Process, Drawing a New Image , Modifying Existing Images ,Image Creation from User Input.

## UNIT-V

(9 Periods)

**Interacting with MySQL using PHP** -MySQL versus MySQLi Functions, Connecting to MySQL with PHP, Working with MySQL Data, **Creating an Online Address Book** -Planning and Creating Database Tables, Creating Menu, Creating Record, Addition Mechanism, Viewing Records, Creating the Record Deletion Mechanism, Adding Sub-entities to a Record.

### I. Textbooks and References

1. Julie C. Meloni, SAMS Teach yourself PHP MySQL and Apache, Pearson Education(2007).
2. Steven Holzner, PHP: The Complete Reference, McGraw-Hill
3. RobinNixon, LearningPHP,MySQL,JavaScript,CSS&HTML5,ThirdEditionO'reilly,2014
4. XueBai Michael Ekedahl, The web warrior guide to Web Programming, Thomson(2006).
5. Web resources:
  - e. <http://www.codecademy.com/tracks/php>
  - f. <http://www.w3schools.com/PHP>
  - g. <http://www.tutorialpoint.com>

### II. Co-Curricular Activities:

**a) Mandatory:**(Training of students by teacher in field related skills:(lab: 10+field: 05):

1. **For Teacher:** Field related training of students by the teacher in laboratory/field for not less than 15 hours on demonstrating various **interactive and dynamic websites** available online, addressing the students on identifying the case study to build an interactive and database driven

website, forms to be used in website, database to be maintained, reports to be produced,etc.

2. **For Student:** Students shall (individually) search online and visit any of the agencies like malls, hotels, super bazaars, etc. where there is a need for an interactive and database driven website and submit a hand-written Fieldwork/ Project work Report not exceeding 10 pages.

Example: Choosing a firm or business to develop a website, identifying forms to be placed in the websites, back end databases to be maintained and reports to be generated and placed in the websites.

3. Max marks for Fieldwork/Project work/Project work/Project work/Project work/Project work Report: 05.

4. Suggested Format for Fieldwork/Project work/Project work/Project work/Project work:  
*Title page, student details, index page, details of place or websites visited, structure of the website and acknowledgements.*

5. Unit tests(IE).

#### **b) Suggested Co-Curricular Activities**

1. Arrange expert lectures by IT experts working professionally in the area of web content development

2. Assignments (in writing or implementing contents related to syllabus or outside the syllabus. Shall be individual and challenging)

3. Seminars, Group discussions, Quiz, Debates etc.(on related topics).

4. Preparation by students on best websites.

5. Arrange a web page development competition among small groups of students.



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**Model paper**

**Title: WEB APPLICATIONS DEVELOPMENT USING PHP AND MYSQL**

Course Code: **BCASET18**

Offered to: **BCA**

Domain Subject: **COMPUTER SCIENCE**

Semester – **V**

**SECTION – A**

**Short Answer Questions**

**(25 Marks: 5 x 5)**

**Answer any Five questions. (At least 1 question should be given from each Unit)**

- 9) Define Structure of PHP.(CO1,L1)
- 10) Differentiate Conditional statement and Looping statement with syntax.(CO1,L4)
- 11) Define Array concept explain about it.(CO2,L1)
- 12) Compare Array with Object creation.(CO2,L4)
- 13) Explain about Cookies concept.(CO3,L2)
- 14) Explain about Image creation.(CO4,L2)
- 15) Write short note onMysqli.(CO5,L1)
- 16) What is use of Select query with on syntax and example?(CO5,L1)

**SECTION B**

**(Total: 5 x 10 = 50 Marks)**

**Answer all questions. (Two questions should be given from each unit with internal choice)**

9(a) Explain about Control Statements.(CO1,L2)

**OR**

9(b) Discuss about Function define,Call and return value with example.(CO1,L6)

10(a) List various types of Formatting strings explain them.(CO2,L2)

**OR**

10(b) Define Array function with example..( CO2,L1)

11(a) Write names of Form objects explain them with example.(CO3,L2)

**OR**

11(b) Compare and Contrast Session and Cookies.(CO3,L4)

12(a) Explain File concept about file creation, Open file, Write file and Delete file with example(CO4,L2)

**OR**

12(b) Construct steps for Interfacing complete image concept explain them with one example.(CO4,L3)

13(a) Discuss about DDL commands and DML commands in Mysqli with syntaxes(CO5,L6)

**OR**

13(b) Write code to Create table of Employee by adding any four columns with example.(CO5,L6)

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**Title: WEB APPLICATIONS DEVELOPMENT USING PHP AND MYSQL Lab**

Course Code: **BCASEP18**

Domain Subject: **COMPUTER SCIENCE**

Max. Marks: **50** (CCIA: 10+ SEE: 40)

Offered to: **BCA**

Semester – **V**

Practical Hrs. /Week: **2**

**Model Paper: Practical**

**Time: Three hours**

**Max. Marks: 40**

**Section A**

One Major Experiment (Experiment No : ) **15 M**

**Section B**

One Minor Experiment (Experiment No : ) **10 M**

**Section C**

Practical Record **05 M**

**Section D**

Viva Voce **10 M**

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<b>COMPUTER SCIENCE</b>	<b>CGST12A</b>	<b>2022-2023</b>	<b>B.Sc. (CSCS)</b>
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**OPERATING SYSTEMS**

**Total: 60 Hrs.**

**Year of Introduction: 2022**

**Year of offering: 2022**

**Year of Revision: 2022**

**Percentage of Revision: - 40%**

**Semester: I**

**Credits: 4**

**Hours Taught: 60 hrs. Per Semester**

**Max.Time:3 Hrs**

**Course Objectives:**

1. Learn about Overview of Computer hardware and Operating Systems.
2. Learn basics about Process management.
3. Learn about Memory management
4. Learn about Storage management
5. Learn about Linux, Windows Client and Windows Server OS Operations.

Course Outcome No	Upon successful completion of this course, students should have the knowledge and skills to:	Program Outcome No
CO1	Understand the Computer hardware and operating systems basics	PO7
CO2	Understand the concept of Process management.	PO7
CO3	Understand the concepts of Memory management	PO7
CO4	Understand the concepts of Storage management	PO7
CO5	Understand and know about Linux, Windows Client and Windows Server OS	PO1

**Unit I :Introduction to Operating Systems**

**12 periods**

- **Computer Basics:** Definition of a Computer - Characteristics and Applications of Computers – Block Diagram of a Digital Computer – Classification of Computers based on size and working



- **Hardware Basics:** Central Processing Unit – I/O Devices-Memory Devices- Secondary storage devices
- **Operating System Basics:** OS Definition, Functions, OS as a Resource Manager, Types of OS, Evolution of OS, Operating System Operations, Operating System Services, User Operating System Interface, System Calls, Types of System Calls.

### **Unit II:Process Management**

**12 periods**

Basic Concepts, Process Scheduling, Operations on Processes, Inter-process Communication, Scheduling Criteria, Scheduling Algorithms, Multiple Processor Scheduling

### **Unit III: Memory Management**

**12 periods**

Memory Management Strategies, Swapping, Contiguous Memory Allocation, Paging, Segmentation, Virtual Memory Management, Demand Paging, Page Replacement Techniques and Algorithms

### **Unit IV: Storage Management**

**12 periods**

File Concept, Access Methods, Directory Structure, Protection, Implementing File Systems, File System Structure, Directory Implementation, Allocation Methods, Free Space Management, Efficiency and Performance, Recovery

### **Unit V : Operating Systems**

**12 periods**

- **Introduction to Linux:** Versions, Components, Features; Installation of Linux OS, Managing Directories, Managing Files
- **Introduction to Windows:** Versions, GUI Components, Features; Installation of Client OS and Server OS, Installation of Roles and Features, Managing Users and Groups, Managing Devices and Printers, Storage Management, Managing and Monitoring of Server, Backup & Restoration

### **Text Book**

SilberschatzGalving Gange,2008, Operating System Concepts,6<sup>th</sup>edn, Wiley India (P) Ltd.,New Delhi

- Operating System Concepts, Seventh Edition by Abraham Silberschatz, Peter Baer Galvin and Greg Gagne (2009) [[PDF](#)]
- Windows 10 All-in-One For Dummies By Woody Leonhard, CiprianRusen (2021) [[PDF](#)]

### **Reference Books**

- [Operating Systems - Silberschatz, Galvin](#)
- [Operating System – Neso Academy](#)

### **Web Resources**

[https://www.tutorialspoint.com/computer\\_fundamentals/index.htm](https://www.tutorialspoint.com/computer_fundamentals/index.htm)

[https://www.tutorialspoint.com/operating\\_system/index.htm](https://www.tutorialspoint.com/operating_system/index.htm)

[https://www.tutorialspoint.com/windows\\_server\\_2012/index.htm](https://www.tutorialspoint.com/windows_server_2012/index.htm)

### **RECOMMENDED CONTINUOUS ASSESSMENT METHODS:**

Some of the following suggested assessment methodologies could be adopted;

1. The oral and written examinations (Scheduled and surprise tests),
2. Closed-book and open-book tests,
3. Programming exercises,
4. Practical assignments and laboratory reports,
5. Observation of practical skills,
6. Individual and group project reports.
7. Efficient delivery using seminar presentations,
8. Viva voce interviews.
9. Computerized adaptive testing, literature surveys and evaluations,
10. Peers and self-assessment, outputs form individual and collaborative work.



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**TITLE: OPERATING SYSTEMS MODEL PAPER**

**COURSE CODE: CGST12A**

**Max. Marks: 75M**

**CLASS: I B.Sc. (CSCS)**

**Semester -I**

**Time: 3 Hours**

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**Answer any FIVE questions**

5\*5=25M

1. Write about Components of Computer. (CO1, L1)
2. Write about Central Processing Unit (CO1, L2)
3. Explain the operations in Processes. (CO2, L2)
4. Write about multiprocessor scheduling. (CO2, L1)
5. What is meant by paging? (CO3, L2)
6. Explain how to protect a File. (CO4, L2)
7. What are server roles on Windows Server 2016? (CO5, L2)

**Answer all the questions**

5\*10=50M

9.(a) Explain various Applications of Computers. (CO1, L2)

OR

(b) Explain about various types of an operating System. (CO1, L2)

10.(a) Explain about Scheduling Algorithms. (CO2, L2)

OR

(b) Write about CPU Scheduling. (CO2, L2)

11.(a) Explain various Memory management strategies. (CO3, L2)

OR

(b) Explain about Page Replacement Techniques and Algorithms (CO3, L2)

12.(a) Explain various File Access Methods. (CO4, L2)

OR

(b) Write about File Allocation Methods and Free Space Management (CO4, L2)

13. (a) Demonstrate the steps to be followed for Windows Client OS installation (CO5, L2)

OR

(b) Explain the steps to be followed to configure DHCP. (CO5, L2)

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<b>COMPUTER SCIENCE</b>	<b>CGSP12A</b>	<b>2022-2023</b>	<b>B.Sc. (CSCS)</b>
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**SEMESTER – I**

**Credits: 1**

**OPERATING SYSTEMS LAB**

<b>COURSE OUTCOME NO</b>	Upon successful completion of this course, students should have the knowledge and skills to:	<b>PROGRAM OUTCOME NO</b>
CO1	Installation of Linux OS	PO7
CO2	Installation of Windows Client OS	PO7
CO3	Managing Windows Client OS	PO1
CO4	Installation of Windows Server OS	PO7
CO5	Managing Windows Server OS	PO1

**Exercises**

**1. Installation of Linux OS (CentOS)**

- Explain the steps to Install the Linux OS
- Demonstrate Working with Directories in Linux (*pwd, cd, absolute and relative paths, ls, mkdir, rmdir, file, touch, rm, cp, mv, rename, head, tail, cat, tac, more, less, strings, chmod*)
- Demonstrate Working with Files in Linux (*ps, top, kill, pkill, bg, fg, grep, locate, find, date, cal, uptime, whoami, finger, uname, man, df, du, free, whereis, which*)

**2. Installation of Windows Client OS**

- Explain the steps to Install the Client OS
- Install a Virtual Machine with Windows Client OS

**3. Managing Windows Client OS**

- Explain the steps to Create Users and Groups
- Demonstrate the usage of Devices and Printers

- Demonstrate the usage of Disk Management Console
- 4. Installation of Windows Server OS**
  - Explain the steps to Install the Server OS
  - Install a Virtual Machine with Windows Server OS
- 5. Managing Windows Server OS**
  - Demonstrate how to Install Roles and Features
  - Demonstrate the Usage of Server Storage Management
  - Explain the various Management and Monitoring requirements
  - Explain the Backup Types and steps to take Backups

### **Faculty & Student Resources:**

- **Lab Requirements – Linux**
  - [CentOS Linux ISO](#)
- **Lab Requirements - Windows**
  - [Windows 10 Evaluation – 90 Days](#)
  - [Windows Server 2019 Evaluation – 180 Days](#)
  - [Windows Server 2016 Evaluation – 180 Days](#)
- **CentOS Linux**
  - [Installation Guide](#)
  - [CentOS Overview](#)
  - [Basic CentOS Linux Commands](#)
  - [File and Folder Management](#)
- **Windows 10**
  - [Windows 10 – Tutorials Point](#)
  - [Windows 10 Tutorial](#)
- **Windows Server 2016**
  - [Windows Server – Channel 9](#)
  - [Windows Server Administration for Beginners](#)
  - [Windows Server 2016 Tutorial Step by Step Full](#)
  - [Windows Server 2016 Administration Full Course](#)
  - [Windows Server deployment, configuration, and administration](#)

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**IT INFRASTRUCTURE MANAGEMENT**

<b>Offered to:</b> B.Sc.(CSCS)	<b>Course Code:</b> CSCT31A
<b>Course Type:</b> Core (Theory)	<b>Course:</b> ITINFRASTRUCTURE MANAGEMENT
<b>Year of Introduction:</b> 2022	<b>Year of offering:</b> 2022
<b>Year of Revision:</b> 2022	<b>Percentage of Revision:</b> - 30%
<b>Semester:</b> III	<b>Credits:</b> 4
<b>Hours Taught:</b> 60 hrs. Per Semester	<b>Max.Time:</b> 3 Hrs

**Course Prerequisites (if any):** Basic knowledge in computers and Windows 10 concepts.

**Course Description:**

This course enables students to gain a fundamental knowledge regarding infrastructure management using Windows Server.

**Course Objectives:**

1. To educate student in various deployment techniques of Windows 10 and Configuring devices and drivers.
2. To educate students in MS SCCM, SCOM basic concepts.
3. To educate students in Agent deployment and monitoring concepts in operations manager.

**Course Outcomes:** At the end of this course, students should be able to:

**CO1:** Perform post installation configuration task and configure devices and drivers. (PO5, PO7)

**CO2:** Manage content of SCCM in configuration manager its features and capabilities (PO5, PO7)

**CO3:** Understand basic concepts of Application Management, Operating System Deployment, protection and Troubleshooting SCCM (PO5, PO7)

**CO4:** Understand the SCOM Features and Capabilities. (PO5, PO7)

**CO5:** Create rules for monitoring and gain knowledge in operations manager reporting along with Creating Reports using SCOM Reporting. (PO5, PO7)

<b>Syllabus</b>		
<b>Unit</b>	<b>Learning Units</b>	<b>Lecture Hours</b>
I	<b>Introducing Windows 10:</b> Introducing Windows 10, Overview of Deploying Windows 10, Configure Devices and Drivers, Perform Post installation Configuration Tasks, Managing Apps in Windows	10
II	<b>Introduction to SCCM:</b> System Center Configuration Manager Overview, SCCM Features and Capabilities, SCCM Setup & Installation, Configuration Manager Basics, Deploying SCCM Client, User and Device Collections in SCCM	14
III	<b>Managing Systems with SCCM</b> Application Management using SCCM, Operating System Deployment using SCCM, Endpoint Protection using SCCM, Troubleshooting SCCM Server, Troubleshooting SCCM Clients, Creating Reports using SCCM Reports	12
IV	<b>Introduction to SCOM</b> System Center Operations Manager Overview, SCOM Features and Capabilities, SCOM Setup & Installation, Operations Manager Basics, Deploying SCOM Clients, Management Packs in SCOM	12
V	<b>Monitoring Systems with SCOM</b> Managing & Administering SCOM Environment, Managing Alerts using SCOM, Creating Custom Management Packs and Alerts, Troubleshooting SCOM Server, Troubleshooting SCOM Clients, Creating Reports using SCOM Reporting	12

<b>Reference Text Books:</b>			
	<b>Author</b>	<b>Title</b>	<b>Publisher</b>
1	Woody Leonhard, CiprianRusen	Windows 10 All-in-One For Dummies(2021)	John Wiley & Sons, Inc.,
2	Kerrie Meyler, Gerry Hampson, Saud Al-Mishari, Greg Ramsey,	System Center Configuration Manager Cur Unleashed(2018)	Pearson

	Kenneth van Surksum, Michael Gottlieb Wiles		
3	Kevin Greene	Getting Started with Microsoft System Center Operations Manager(2016)	Packt Publishing

**Course Delivery method:** Face-to-face / Blended

**Course has focus on:** Employability, Skill Development

**Websites of Interest:** <https://support.microsoft.com/en-gb/windows>

**Co-curricular Activities:** Certification Courses, Quiz, Seminars, Group Discussions.





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**IT INFRASTRUCTURE MANAGEMENT**  
**MODEL QUESTION PAPER FOR SEM END EXAMINATION**

**CLASS:** B.Sc. (CSCS)

**Max. Marks:** 75M

**Course Code:** CGST31A

**Min. Pass:** 30M

**Semester:** III

**Time:** 3 Hours

**Section-A**

**ANSWER ANY FIVE QUESTIONS**

**5x5M=25M**

1. Explain about installing a printer in Windows 10.(CO1, L1)
2. Explain about the need of SCCM. (CO2,L1)
3. Write about features of configuration manager. (CO2,L6)
4. Explain the need of operations manager. (CO3, L1)
5. Summarize basic concepts of operations manager. (CO3,L2)
6. Explain about the need of SCOM (CO4,L1)
7. Summarize deploying SCOM clients. (CO4, L2)
8. Explain about custom alerts in SCOM. (CO5, L1)

**Section-B**

**ANSWER THE FOLLOWING QUESTIONS**

**5x10M=50M**

9. (A) Categorize and explain Windows 10 deployment methods. (CO1, L4)  
OR  
(B) Illustrate managing Apps in Windows 10. (CO1, L4)
10. (A) Explain about SCCM client deployment. (CO2, L1)  
OR  
(B) Explain about maintaining and monitoring System Center 2012 Configuration Manager. (CO2, L1)
11. (A) Explain about end point protection using SCCM. (CO3, L1)  
OR  
(B) Explain about creating reports using SCCM. (CO3, L1)
12. (A) Explain about SCOM setup and installation. (CO4, L1)  
OR  
(B) Define Management Pack. Give an overview of management packs. (CO4, L1)
13. (A) Illustrate creating reports in operations manager. (CO5, L1).  
OR  
(B) Describe about managing alerts using SCOM. (CO5, L1).

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**IT INFRASTRUCTURE MANAGEMENT LAB**

**Offered to:** B.Sc. (CSCS)

**Course Code:** CGSP31A

**Course Type:** Core (Practical)

**Course:** IT INFRASTRUCTURE MANAGEMENT LAB

**Year of Introduction:** 2022

**Year of offering:** 2022

**Year of Revision:** 2022

**Percentage of Revision:** - 30%

**Semester:** III

**Credits:** 1

**Hours Taught:** 30 hrs. Per Semester

**Max.Time:** 2 Hours

**Course Prerequisites (if any):** Basic knowledge in computers and Windows 10 concepts.

**Course Description:**

This course enables students to gain a fundamental knowledge regarding infrastructure management using Windows 10.

**Course Objectives:**

1. To educate student in various deployment techniques of Windows 10 and Configuring devices and drivers.
2. To educate students in MS SCCM, SCOM basic concepts.
3. To educate students in Agent deployment and monitoring concepts in operations manager.

**Course Outcomes:** At the end of this course, students should be able to:

**CO1:** Perform post installation configuration task and configure devices and drivers. (PO5, PO7)

**CO2:** Manage content in configuration manager and maintaining and monitoring system center 2012 configuration manager. (PO5, PO7)

**CO3:** Understand basic concepts of operations manager and its system requirements along with installing SQL server, operations and web console. (PO5, PO7)

**CO4:** Understand Agent and Agent less managed systems and gain fundamental knowledge in management packs. (PO5, PO7)

**CO5:** Create rules for monitoring and gain knowledge in operations manager reporting along with disaster recovery. (PO5, PO7)

**LAB LIST**

1. Windows 10
  - a. Explain the Deployment Overview of Windows 10
2. System Center Configuration Manager (SCCM)
  - a. Installation of SCCM Server
  - b. Deployment of SCCM Agents

- c. Explain the OS and Software Deployment using SCCM
  - d. Generate Reports for SCCM
3. System Center Operations Manager (SCOM)
- a. Installation of SCOM Server
  - b. Deployment of SCOM Agents
  - c. Explain the Deployment and Customization of Management Packs in SCOM
  - d. Create Alerts and Notifications using SCOM
  - e. Generate Reports for SCOM

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Course Code: **CGSSET01**

Offered to: **B.Sc. (CSCS)**

Domain Subject: **Computer Science**

Semester – **V**

Max. Marks: **100** (CCIA: 25+ SEE:75)

Theory Hrs./Week: **5**

**Course 16A: IT Infrastructure Library**

Type of the Course: **Skill Enhancement Course** (Elective Theory), Credits: **03**

**I. Course Outcomes: Students at the successful completion of the course will be able to:**

CO1: Understanding the concept of ITIL 4(PO6,PO7)

CO2:To Know the Key Concepts of Service Management (PO6,PO7)

CO3: To know about Dimension Model of IT Service Management (PO6,PO7)

CO4:Understanding the concept of ITIL Service Value System(PO6,PO7)

CO5:To implement ITIL Management Practices(PO6,PO7)

**II. Syllabus:**

**(Total Theory Hours: 45)**

**Unit I :Introduction to ITIL 4**

IT Service Management in the modern world, About ITIL v4, The structure and benefits of the ITIL v4 Framework

**Unit II:Key Concepts of Service Management**

Value and Value Co-Creation, Stakeholders, Products and Services, Service Relationships and Value

**Unit III**

**ITIL 4: Dimension Model of IT Service Management**

Organization & People; Information & Technology; Partners & Suppliers; Value Streams & Processes, External factors

#### **Unit IV:ITIL Service Value System**

Service Value System (SVS) Overview; Opportunity, demand, and Value; Guiding Principles; Governance; Service Value Chain (SVC); Continual Improvement; Practices

#### **Unit V :ITIL Management Practices**

General Management Practices; Service Management Practices; Technical Management Practices

### **III References/ Text Book/ e-books/websites**

ITIL For Beginners: The Complete Beginner's Guide to ITIL by Clyde Bank Technology

#### **Reference Materials on the Web/web-links:**

#### **Faculty & Student Resources:**

- ITIL Foundation v4 Edition - [PDF](#)
- ITIL For Beginners: The Complete Beginner's Guide to ITIL - [PDF](#)
- ITIL for Dummies - [PDF](#)

### **IV Co-Curricular Activities**

(Co-curricular activities shall not promote copying from textbook or from others work and shall encourage self/independent and group learning)

#### **Measurable**

13. Assignments (in writing and doing forms on the aspects of syllabus content and outside the syllabus content. Shall be individual and challenging)
  14. Student seminars(on topics of the syllabus and related aspects(individual activity))
  15. Quiz (on topics where the content can be compiled by smaller aspects and data(Individuals or groups a steams))
  16. Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual participation and contribution of students shall be ensured (team activity))

#### **General**

10. Group Discussion
11. Try to solve MCQ's available online.
12. Others.



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**Model paper for IT Infrastructure Library**

**Course Code: CGSSET01**

**Offered to B.Sc. (CSCS)**

**SECTION – A**

**Short Answer Questions (25 Marks: 5 x 5)**

**Answer any Five questions. (At least 1 question should be given from each Unit)**

1. Explain briefly about ITIL 4. {CO1, L2}
2. Write about the structure of ITIL 4. {CO1, L6}
3. Explain the key concepts of service management. {CO2, L2}
4. Write about stake holders of service management in ITIL. {CO2, L6}
5. Write about four dimensions of service management. {CO3, L6}
6. What is value streams involved in delivering the agreed outputs of the service? {CO3, L6}
7. Write a short note on service value system. {CO4, L6}
8. Explain ITIL management practices. {CO5, L2}

**SECTION B (Total: 5 x 10 = 50 Marks)**

**Answer all questions. (Two questions should be given from each unit with internal choice)**

- 9(a) Explain IT Service Management in the modern world. {CO1, L2}
- OR**
- 9(b) Write about the structure and benefits of the ITIL v4 Framework. {CO1, L6}
- 10(a) Write about key concepts of service management of ITIL v4 Framework. {CO2, L6}
- OR**
- 10(b) Explain Stakeholders, Products and Services {CO2, L2}
- 11(a) Write about Information & Technology in Dimension Model of IT Service Management. {CO3, L6}
- OR**
- 11(b) what are the Value Streams & Processes, External factors that effects IT service management. {CO3, L1}
- 12(a) Write about General Management Practices in ITIL management practices. {CO4, L6}
- OR**
- 12(b) Write about Service Value Chain System in ITIL Management. {CO4, L6}
- 13(a) List and explain the ITIL management practices. {CO5, L1}
- OR**
- 13(b) Explain Technical Management Practices. {CO5, L2}



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Course Code: **CGSSET02**

Offered to: **B.Sc. (CSCS)**

Domain Subject: **Computer Science**

Semester – **V**

Max. Marks: **100** (CCIA: 25+ SEE:75)

Theory Hrs./Week: **3**

### **Course 17A: CLIENT RELATIONSHIP MANAGEMENT**

Type of the Course: **Skill Enhancement Course** (Elective Theory), Credits: **03**

**I. Course Outcomes: Students at the successful completion of the course will be able to:**

CO1: Understanding the interface of Service Now (PO6, PO7)

CO2: To Know how to Customization of UI (PO6, PO7)

CO3: Understanding Data and Relationships (PO6, PO7)

CO4: Understanding the Tasks and Workflows, UI and Data Policies (PO6, PO7)

CO5: Learn User Administration, Security and Scripting (PO6, PO7)

**II. Syllabus:** (Total Theory Hours: 45)

#### **Unit I**

**The Interface** - Versions, Frames, Important application menus and modules, Content Frame, UI Settings and Personalization

**Lists and Forms** – List V2 versus List V3, Lists and Tables, Forms

#### **Unit II**

**UI Customization** – Branding your Instance, Custom Themes, UI-Impacting System Properties, Configuring Service Portal UI, Creating a Custom Homepage, Styling Pages and Widgets, Setting up the War Room page, Styling the CMS

#### **Unit III**

**Understanding Data and Relationships** – One to many relationships in ServiceNow, many to many relationships in ServiceNow, Enforcing one to one relationships, Defining Custom Relationships, Database table inheritance

## Unit IV

**Tasks and Workflows** –Important Task fields, Journals, and the activity formatter, Extending the task table, Workflows, SLAs, Approvals, Assignment, Creating Task fields

**UI and Data Policies** –UI Policies, Reverse if false, Scripting in UI policies, UI Policy Order, Data Policies, Converting between data and UI Policies, Data Policies versus ACLs

## Unit V

**Administration and Security** –Users, Groups and Roles, Emails and Notifications, User Preferences, ACLs – Security Rules

**Introduction to Scripting** –Client-side versus Server-side APIs, Where scripting is supported, Integrated development environment

## III References/ Text Book/ e-books/websites

- Learning ServiceNow: administration and development on the Now platform, for powerful IT automation by Tom Woodfuff
- ServiceNow Basics: User Training – (PDF shared separately)

### Reference Materials on the Web/web-links:

## Faculty & Student Resources:

- **Creating Account in ServiceNow** – [Registration Page](#)
  - With an Account you will have access to:
    - Watch bite-sized videos instantly
    - Experience a live, in-depth demo
    - Get hands-on with a free developer instance
- **ServiceNow Trainings**
  - [ServiceNow Essentials](#)
  - [ServiceNow User Interface](#)
  - [ServiceNow Fundamentals Simulator](#)
  - [ServiceNow System Administrator Training](#)

## IV Co-Curricular Activities

(Co-curricular activities shall not promote copying from textbook or from others work and shall encourage self/independent and group learning)

### Measurable

17. Assignments (in writing and doing forms on the aspects of syllabus content and outside the syllabus content. Shall be individual and challenging)
18. Student seminars(on topics of the syllabus and related aspects(individual activity))



19. Quiz (on topics where the content can be compiled by smaller aspects and data(Individuals or groups a steams))
20. Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual participation and contribution of students shall be ensured (team activity))

#### General

13. Group Discussion
14. Try to solve MCQ's available online.
15. Others.



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**CLIENT RELATIONSHIPMANAGEMENT**  
**SEMESTER END MODELQUESTIONPAPER**

**COURSECODE: CGSSET02**

**Max.Marks:75M**

**CLASS:B.Sc.(CSCS)**

**Semester: V**

**Section-A**

**Answeranyfivequestions.5\*5=25M**

1. Explain about Versions and Frames(CO1, L2)
2. Define the List V2 versus List V3(CO1,L6)
3. What are the UI-Impacting System Properties?(CO2,L3)
4. Explain Creating a Custom Homepage(CO2,L2)
5. What is One to many relationships in Service Now(CO3, L3)
6. Define many to many relationships in Service Now(CO3, L6)
7. What is Important Task fields? (CO4,L3)
8. Explain Users, Groups and Roles(CO5, L3)

**Section-B**

**ANSWERTHEFOLLOWINGQUESTIONS**

**5x10M=50M**

9. (A)What are Content Frame, UI Settings and Personalization?(CO1,L3)  
OR  
(B)Explain UI Settings and Personalization(CO1,L2)
- 10.(A)Explain Configuring Service Portal UI,(CO2, L2)  
OR  
(B) What are Setting up the War Room page?(CO2,L3)
11. (A)How to create Enforcing one to one relationships?(CO3,L3)  
OR  
(B)Explain about Database table inheritance.(CO3,L2)
12. (A)Explain UI Policies, Reverse if false. (CO4, L2)  
OR  
(B)How to Converting between data and UI Policies?(CO4,L2)
13. (A)What is Client-side versus Server-side APIs?(CO5, L3)  
OR  
(B)Explain the Integrated development environment.(CO5, L2)

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Course Code: **CGSSEP02** Offered to: **B.Sc. (CSCS)**  
Domain Subject: **Computer Science** Semester: **V**  
Max. Marks: **50** (CCIA: 10+ SEE: 40) Practical Hrs./Week : **3**

**CLIENT RELATIONSHIP MANAGEMENT LAB**

Type of the Course: **Skill Enhancement Course** (Elective, Practical), Credits: **02**

**I. Course Outcomes: Students at the successful completion of the course will be able to:**

CO1:Knowhow basic navigation in Service Now(PO6)

CO2:Learn Searching in Service Now is done(PO6)

CO3:Learn how to Manage Records in Lists(PO6)

CO4:Understand Lists(PO6)

CO5:Learn to Manage Records in Forms(PO6)

**II: Practical (Laboratory) Syllabus: (30 Periods):**

1. Basic Navigation
  - a. Navigation and the User Interface
  - b. Navigating Applications
  - c. Introduction to Searching
2. Managing Records in Lists
  - a. Using Lists
  - b. Finding Information in Lists
  - c. Using Filters and Breadcrumbs
  - d. Editing Lists
  - e. Creating Personal Lists
3. Managing Records in Forms
  - a. Forms

**III. Lab References:**

Refer ServiceNow Basics: User Training PDF for Step-by-Step Procedures for the above Lab Exercises



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Course Code: **CGSSEP02**

Offered to: **B.Sc. CSCS**

**CLIENT RELATIONSHIP MANAGEMENT LAB**

**(Model Paper)**

Domain Subject: **Computer Science**

Semester: **V**

Max. Marks: **50** (CCIA: 10+ SEE: 40)

Practical Hrs./Week : **3**

**Model Paper: Practical**

**Time: Three hours**

**Max. Marks: 40**

**Section A**

One Major Experiment (Experiment No : ) **15 M**

**Section B**

One Minor Experiment (Experiment No : ) **10 M**

**Section C**

Practical Record **05 M**

**Section D**

Viva Voce **10 M**

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**MOBILE APPLICATION DEVELOPMENT**

Course Code: **CGSSET03**

Offered to: **B.Sc. CSCS**

Domain Subject: **Computer Applications**

Semester – **V**

Max. Marks: **100** (CCIA: 25+ SEE:75)

Theory Hrs./Week: **3**

Type of the Course: **Skill Enhancement Course** (Elective Theory), Credits: **03**

**II. Course Outcomes: Students at the successful completion of the course will be able to:**

CO1: Identify basic terms, tools and software related to android systems.(PO5)

CO2: Describe components of IDE, understand features of android development tools.(PO5)

CO3: Describe the layouts and controls and different views available.(PO5,PO7)

CO4: Understand Android system architecture and security model.(PO5)

CO5: Understand the features of services and able to publish android Application.(PO5,PO7)

**II. Syllabus:**

**(Total Theory Periods: 45)**

**Unit-1:**

**(9 periods)**

Introduction to android, Open headset Alliance, Android ecosystem, Need of android, Features of android, Tools and Software required For developing an Application, Android architecture.

**Unit-2:**

**(9 periods)**

Operating system, javaJDK, Android SDK, Android development tools, Android virtual devices, Steps to install and configure Android studio and sdk.

**Unit-3:**

**(11 periods)**

Control flow, directory structure, Components of a screen, Fundamental UI design, Linear layout, absolute layout, table layout, relative layout, Text view, Edit text, Button image button, radio button, toggle button, Radio group, check box, and progress bar, List view, grid view, image view, scroll view, Time and date picker

Unit-4: (8 periods)  
Android platform services, Android system Architecture, Android Security model, Applications development: creating small application.

Unit-5 (8 periods)  
Introduction of MIT App Inventor, Application Coding, Programming Basics & Dialog, More Programming Basics, Alarm Clock Application, Audio & Video, Drawing Application, File, Game, Device Location, Web Browsing.

### III References/ Text Book/ e-books/websites

#### Text Books:

3. Erik Hellman, "Android Programming–Pushing theLimits", 1st Edition, Wiley India Pvt Ltd, 2014.
4. App Inventor: create your own Android apps by Wolber, David (David Wayne)

#### Reference Books:

3. Dawn Griffiths and David Griffiths, "Head First Android Development", 1st Edition, O'Reilly SPDP publishers, 2015.
4. JFDiMarzio, "Beginning Android Programming with Android Studio", 4th Edition, Wiley India Pvt Ltd, 2016. ISBN-13: 978-8126565580

#### Web resources:

<https://www.udacity.com/course/developing-android-apps-fundamentals--ud853-nd>  
<http://www.appinventor.mit.edu/>

### IV Co-Curricular Activities

(Co-curricular activities shall not promote copying from textbook or from others work and shall encourage self/independent and group learning)

#### Measurable

21. Assignments (in writing and doing forms on the aspects of syllabus content and outside the syllabus content. Shall be individual and challenging)
  22. Student seminars (on topics of the syllabus and related aspects (individual activity))
  23. Quiz (on topics where the content can be compiled by smaller aspects and data (Individuals or groups a steams))
  24. Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual participation and contribution of students shall be ensured (team activity))

#### General

16. Group Discussion
17. Try to solve MCQ's available online.
18. Others.



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**Model paper**

Course Code: **CGSSET03**

Offered to: **B.Sc. CSCS**

**Title of the Course: Mobile Application Development**

**SECTION – A**

**Short Answer Questions (25 Marks: 5 x 5)**

**Answer any Five questions. (At least 1 question should be given from each Unit)**

14. What is the Need of Android?(CO1,L1)
15. Explain the Steps to install and configure Android studio and sdk.(CO2,L2)
16. What are the Components of a screen?(CO3,L1)
17. What are the Android platform services?(CO4,L1)
18. How to write Application Coding?(CO5,L1)
19. Explain image button and radio button with an example.(CO3,L2)
20. Explain Android Security model.(CO4,L2)
21. Explain Web Browsing.(CO5,L2)

**SECTION B (Total: 5 x 10 = 50 Marks)**

**Answer all questions. (Two questions should be given from each unit with internal choice)**

9(a) Explain Android Architecture.(CO1,L2)

**OR**

9(b) Write Features of Android.(CO1,L1)

10(a) Explain Android development tools.(CO2,L2)

**OR**

10(b) Explain Android virtual devices.(CO2,L2)

11(a) Explain about Linear layout, absolute layout, table layout and relative layout.(CO3,L2)

**OR**

11(b) Discuss about Listview, grid view, image view, scroll view.(CO3,L6)

12(a) How to create a small application using Android Application?(CO4,L6)

**OR**

12(b) Describe Android system Architecture.(CO5,L6)

13.(a) Explain Audio Video Concepts.(CO5,L2)

**OR**

13(b) Develop Alarm clock application. (CO5,L6)

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Course Code: **CGSSEP03**

Offered to: **B.Sc. CSCS**

Domain Subject: **COMPUTER APPLICATIONS**

**Semester: V**

Max. Marks: **50** (CCIA: 10+ SEE: 40)

Practical Hrs./Week : **3**

### **MOBILE APPLICATION DEVELOPMENT LAB**

Type of the Course: **Skill Enhancement Course** (Elective, Practical),

Credits: **02**

#### **II. Course Outcomes: Students at the successful completion of the course will be able to:**

CO1: Understand the android platform.(PO5,PO7)

CO2: Design and implementation of various mobile applications.(PO5,PO7)

#### **II: Practical (Laboratory) Syllabus:**

**(30 Periods)**

#### **Lab Exercises**

1. Demonstrate mobile technologies and devices.
2. Demonstrate Android platform and applications overview.
3. Implement User interface design layouts.
4. Working with texts, shapes, buttons and lists.
5. Develop a calculator application.
6. Develop application in android using different views.
7. Implement an application that creates a alarm clock.
8. Develop audio and video drawing application.

#### **III. Lab References:**

1. Erik Hellman, “Android Programming–Pushing theLimits”, 1stEdition, WileyIndiaPvt Ltd,2014.

2. App Inventor: create your own Android apps by Wolber,David (DavidWayne).

#### **Reference Materials on the Web/web**

3. <https://www.udacity.com/course/developing-android-appsfundamentals--ud853-nd>

4. <http://www.appinventor.mit.edu/>





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Course Code:CGSSEP03

Domain Subject: **Computer Applications**

Semester: V

Max. Marks: **50** (CCIA: 10+ SEE: 40)

Practical Hrs./Week : **3**

**Model Paper: Practicals**

**Time: Three hours**

**Max. Marks: 40**

	<b>Section A</b>
One Major Experiment (Experiment No : )	<b>15 M</b>
	<b>Section B</b>
One Minor Experiment (Experiment No : )	<b>10 M</b>
	<b>Section C</b>
Practical Record	<b>05 M</b>
	<b>Section D</b>
Viva Voce	<b>10 M</b>

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Course Code: **CGSSET04**

Offered to: **B.Sc. CSCS**

Domain Subject: **COMPUTER APPLICATIONS**

Semester – **V**

Max. Marks: **100** (CCIA: 25+ SEE:75)

Theory Hrs./Week: **3**

**CYBER SECURITY AND MALWARE ANALYSIS**

Type of the Course: **Skill Enhancement Course** (Elective Theory), Credits: **03**

**I. Course Outcomes: Students at the successful completion of the course will be able to:**

CO1: Understand the computer networks, networking tools and cyber security.(PO6,PO7)

CO2: Learn about NIST Cyber Security Framework.(PO6,P07)

CO3: Understand the OWASP Vulnerabilities.(PO6, PO7)

CO4: Implement various Malware analysistools.(PO6,P07)

CO5: Understand about Information Technologyact2000.(PO6,P07)

**II. Syllabus:**

**(Total Theory Hours: 45)**

**UNIT1: Introduction to Networks & cyber security**

**(9 Periods)**

Computer Network Basics, Computer network types, OSI Reference model, TCP/IP Protocol suite, Difference between OSI and TCP/IP, What is cyber, cyber-crime and cyber-security, All Layerwise attacks, Networking devices: router, bridge, switch, server, firewall, How to configure: router, How to create LAN, Network tools, IP scanner, Port scanner, Vulnerability scanner, Command tools--netstack, trace route, lookup, tcp view.

**UNIT2: NIST Cyber security framework**

**(9 periods)**

Introduction to the components of the framework, Cyber security Framework Tiers, What is NIST Cyber security framework, Features of NIST Cyber security framework, Functions of NIST Cyber security framework, Turn the NIST Cyber security Framework into Reality/implementing the framework.

### UNIT3:OWASP

(9 periods)

What is OWASP? OWASP Top10Vulnerabilities, Injection, Broken Authentication, Sensitive Data Exposure, XML External Entities (XXE), Broken Access Control, Security Misconfiguration, Cross-Site Scripting(XSS), Insecure Deserialization, Using Components with Known Vulnerabilities, Insufficient Logging and Monitoring, OWASP Juice Shop, Web application firewall.

### UNIT4:MALWARE ANALYSIS

(9 periods)

What is malware, Types of malware, Key loggers, Trojans, Ransom ware, Rootkits, Antivirus, Firewalls, Malware analysis, VMware, How to uses and box, How to create virtual machine, Process explorer, Process monitor, SYS-internals Suite, SOC-security operations controls-Solar winds (study the tools), Network intrusion detection, Wire shark, IDS, IPS, Snort.

### UNIT5:CYBER SECURITY: Legal Perspectives

(9 periods)

Cybercrime and the legal landscape around the world, IndianITACT2000—Cybercrime and Punishments, Weak areas of ITACT2000, Challenges to Indian law and cybercrime scenario in India, Amendments of the Indian IT Act.

## III References/ Text Book/ e-books/websites

### TEXTBOOKS:

5. Computer Networks | Fifth Edition | By Pearson (6th Edition) | [Tanenbaum, Feamster & Wetherall](#)
6. Computer Networking | A Top-Down Approach | Sixth Edition | By Pearson | [KuroseJamesF. Ross Keith W.](#)
7. Cyber Securityby[SunitBelapure,NinaGodbole](#)|WileyPublications
8. TCP/IP Protocol Suite |McGraw-Hill| Forouzan| FourthEdition

### WEBSITEREFERENCES:

4. <https://csrc.nist.gov/Projects/cybersecurity-framework/nist-cybersecurity-framework-a-quick-start-guide>
5. <https://owasp.org/www-project-top-ten/>
6. <https://owasp.org/www-project-juice-shop/>

## IV Co-Curricular Activities

(Co-curricular activities shall not promote copying from textbook or from others work and shall encourage self/independent and group learning)

### Measurable

25. Assignments (in writing and doing forms on the aspects of syllabus content and outside the

syllabus content. Shall be individual and challenging)

26. Student seminars(on topics of the syllabus and related aspects(individual activity))
27. Quiz (on topics where the content can be compiled by smaller aspects and data(Individuals or groups a steams))
28. Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual participation and contribution of students shall be ensured (team activity)

#### General

19. Group Discussion
20. Try to solve MCQ's available online.
21. Others.



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**Model paper**

Course Code: **CGSSET04**

Offered to: **B.Sc. CSCS**

**Title of the Course: CYBER SECURITY AND MALWARE ANALYSIS**

**SECTION – A**

**Short Answer Questions (25 Marks: 5 x 5)**

**Answer any Five questions. (At least 1 question should be given from each Unit)**

9. Discuss all Layer wise attacks.(CO1,L6)
10. Explain about Cyber, Cyber-Crime and Cyber-Attacks.(CO1,L2)
11. Explain Features of NIST Cyber Security framework.(CO2,L2)
12. Explain Cyber Security framework Tiers.(CO2,L2)
13. Write about Web Application firewalls in OWASP.(CO3,L1)
14. Discuss about Key loggers, Trojans, Rootkits.(CO4,L6)
15. Explain Weak areas of IT ACT 2000.(CO5,L2)
16. Outline amendments of the Indian IT Act.(CO5,L6)

**SECTION B (Total: 5 x 10 = 50 Marks)**

**Answer all questions. (Two questions should be given from each unit with internal choice)**

9(a). Describe in detail TCP/IP Protocol Suite with diagrammatic representation.(CO1,L6)

**OR**

9(b). Explain different types of Network Tools with examples.(CO1,L2)

10(a). Discuss about components of framework and functions of NIST Cyber Security frameworks.(CO2,L6)

**OR**

10(b). Explain how to turn NIST Cyber Security framework into reality framework. (CO2,L6)

11(a). Explain OWASD Juice shop in detail. (CO3,L2)

**OR**

11(b). Explain any 6 OWASP vulnerabilities.(CO3,L2)

12(a). Discuss about different types of Malware analysis in detail. (CO4,L6)

**OR**

12(b). How to detect Network intrusion? Explain. (CO4,L1)

13(a). Explain what are the Challenges are to Indian law and cybercrime scenario in India. (CO5,L2)

**OR**

13(b). Discuss Indian IT-ACT 2000. Explain different Cybercrime and Punishments respectively.(CO5,L6)

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Course Code: **CGSSEP04**

Offered to: **B.Sc. CSCS**

Domain Subject: **COMPUTER APPLICATIONS**

Semester:V

Max. Marks: **50** (CCIA: 10+ SEE: 40)

Practical Hrs./Week : **3**

**CYBER SECURITY AND MALWARE ANALYSYS LAB**

Type of the Course: **Skill Enhancement Course** (Elective, Practical),

Credits: 02

**I. Course Outcomes: Students at the successful completion of the course will be able to:**

CO1: Implement LAN by using as witch and Router.(PO5)

CO2: Implement the task of creating mail messages by using fake mail id by using the "fake mailer" website.(PO5)

CO3: Implement port scanning mechanism.(PO5)

CO4: Implement SQL Injection attack.(PO5)

CO5: Implement to access a locked computer.(PO5)

**II: Practical (Laboratory) Syllabus:**

**(30 Periods).**

**Lab Exercises**

The purpose of this course is to impart practical understanding on Cyber security and protection of electronic systems and information from malware attacks.

10. Configure LAN by using a switch
11. Configure a LAN by using Router
12. Steps to attack a victim computer by using "ProRat" Trojan tool
13. Perform the packet sniffing mechanism by download the "wire shark" tool and extract the packets
14. Perform the task of creating mail messages by using fake email id by using the "fake mailer" website(<https://emkei.cz>)
15. Perform the IP scanning mechanism by using "tracert" and "arp" commands
16. Perform the port scanning mechanism by using NMAP tool
17. Perform an SQL Injection attack and its preventive measure to avoid Injection attack
18. Perform an activity to access a locked computer without knowing the user's password.

**III. Lab References:**

3. Computer Networks | Fifth Edition | By Pearson (6th Edition) [Tanenbaum, Feamster](#)

&Wetherall

4. Computer Networking | A Top-Down Approach | Sixth Edition | By Pearson | [KuroseJamesF.](#)  
[Ross Keith W.](#)

#### **IV.Reference Materials on the Web/web**

3. <https://csrc.nist.gov/Projects/cybersecurity-framework/nist-cybersecurity-framework-a-quick-start-guide>
4. <https://owasp.org/www-project-top-ten/>



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Course Code: **CGSSEP04**

Offered to: **B.Sc. CSCS**

Domain Subject: **Computer Applications**

Semester: **V**

Max. Marks: **50** (CCIA: 10+ SEE: 40)

Practical Hrs./Week : **3**

**Cyber Security and Malware Analysis Lab**

**Model Paper: Practicals**

**Time: Three hours**

**Max. Marks: 40**

	<b>Section A</b>
One Major Experiment (Experiment No : )	<b>15 M</b>
	<b>Section B</b>
One Minor Experiment (Experiment No : )	<b>10 M</b>
	<b>Section C</b>
Practical Record	<b>05 M</b>
	<b>Section D</b>
Viva Voce	<b>10 M</b>

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Course Code: **CGSSET05**

Offered to: **B.Sc. CSCS**

Domain Subject: **COMPUTER SCIENCE**

Semester – **V**

Max. Marks: **100** (CCIA: 25+ SEE:75)

Theory Hrs./Week: **3**

**DATA SCIENCE**

Type of the Course: **Skill Enhancement Course** (Elective Theory),

Credits: **03**

**I. Course Outcomes:** Students at the successful completion of the course will be able to:

CO1: Analyze the data and their type to build programs using lists and tuples in Python.(PO5)

CO2: Understand the concept of getting data, cleaning and manipulating data(PO5)

CO3: Be capable of understanding the concepts of K-Nearest Neighbors, Naïve Baye's.(PO5,PO7)

CO4: Understand the concepts of Simple, Multiple & Logistic regressions.(PO5,PO7)

CO5: Acquire knowledge on Decision Trees and Neural Networks.(PO5,PO7)

**II. Syllabus**

**(Total Theory periods: 45)**

**UNIT - I**

**(8 hours)**

**Introduction:** The Ascendance of Data, What is Data Science?, Finding key Connectors- Data Scientists You May Know, Salaries and Experience - Paid Accounts ,Topics of Interest, Onward.

**Python:** Getting Python, The Zen of Python, Whitespace Formatting, Modules , Arithmetic, Functions, Strings, Exceptions, Lists, Tuples, Dictionaries, Sets, Control Flow, Truthiness, Sorting, List Comprehensions

**Visualizing Data :** Matplotlib, Bar charts, Line charts ,Scatterplots

**UNIT - II** (10 hours)

**Getting Data:** stdin and stdout, Reading Files – The Basics of Text Files, Delimited Files, Scraping the Web - HTML and the parsing Thereof, Example: O'Reilly Books about Data, Using APIs – JSON (and XML), Using an Unauthenticated API, Finding APIs.

**Working with Data :** Exploring Your Data, Exploring One-Dimensional Data, Two Dimensions Many Dimensions, Cleaning and Munging, Manipulating Data, Rescaling, Dimensionality Reduction.

**UNIT - III**

**(10 hours)**

**Machine Learning:** Modeling, What Is Machine Learning? Over fitting and under fitting,

Correctness, The Bias-Variance Trade-off, Feature Extraction and Selection.

**K-Nearest Neighbors:** The Model, Example: Favorite Languages, The Curse of Dimensionality.

**Naive Bayes :** A Really Dumb Spam Filter, A More Sophisticated Spam Filter, Implementation, Testing Our Model.

#### UNIT - IV

(9 hours)

**Simple Linear Regression:** The Model, Using Gradient Descent, Maximum Likelihood Estimation.

**Multiple Regression:** The Model, Further Assumptions of the Least Squares Model, Fitting the Model, Interpreting the Model, Goodness of F.

**Logistic Regression:** The Problem, the Logistic Function, Applying the Model, Goodness of Fit Support Vector Machines.

#### UNIT - V

(8 hours)

**Decision Trees:** What Is a Decision Tree? Entropy, the Entropy of a Partition, Creating a Decision Tree, Putting It All Together, Random Forests.

**Neural Networks:** Perceptron, Feed-Forward Neul Networks and Back propagation, Example: Defeating a CAPTCHA.

### III. References/ Text Book/ e-books/websites

#### Text Books:

1. Data Science from Scratch by Joel Grus O'ReillyMedia
2. Wes McKinney, "Python for Data Analysis: Data Wrangling with Pandas, NumPy, and IPython", O'Reilly, 2nd Edition, 2018.

#### Reference Books:

1. Jake VanderPlas, "Python Data Science Handbook: Essential Tools for Working with Data", O'Reilly, 2017.

#### Webresources:

- a. <https://www.edx.org/course/analyzing-data-with-python>
- b. [http://math.ecnu.edu.cn/~lfzhou/seminar/\[Joel\\_Grus\]\\_Data\\_Science\\_from\\_Scratch\\_First\\_Princ.pdf](http://math.ecnu.edu.cn/~lfzhou/seminar/[Joel_Grus]_Data_Science_from_Scratch_First_Princ.pdf)

### IV Co-Curricular Activities

(Co-curricular activities shall not promote copying from textbook or from others work and shall encourage self/independent and group learning)

#### Measurable

29. Assignments (in writing and doing forms on the aspects of syllabus content and outside the syllabus content. Shall be individual and challenging)
  30. Student seminars (on topics of the syllabus and related aspects (individual activity))

31. Quiz (on topics where the content can be compiled by smaller aspects and data(Individuals or groups a steams))
32. Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual participation and contribution of students shall be ensured (team activity))

#### General

22. Group Discussion
23. Try to solve MCQ's available online.
24. Others.



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**Model paper Data Science**

Course Code: **CGSSET05**

Offered to: **B.Sc. CSCS**

**SECTION – A**

**Short Answer Questions (25 Marks: 5 x 5)**

**Answer any Five questions. (At least 1 question should be given from each Unit)**

1. What is Data Science? Explain key connectors in data science? (CO1, L1)
2. Explain a) stdin b) stdout with examples? (CO2, L2)
3. Explain briefly about the concept of reading files? (CO3, L2)
4. Explain Simple Linear Regression using Gradient Descent? (CO4, L2)
5. Explain briefly about Logistic Regression? (CO5, L2)
6. Explain a) Lists b) Tuples c) Dictionaries in Python? (CO1, L2)
7. Explain in detail about Manipulating data? (CO3, L2)
8. Explain the concept of Random Forests? (CO5, L2)

**SECTION B (Total: 5 x 10 = 50 Marks)**

**Answer all questions. (Two questions should be given from each unit with internal choice)**

9. (A) Explain in detail about Visualizing Data? (CO<sub>1</sub>, L2)  
(OR)  
(B) Explain the concept of functions and strings in python with example? (CO1, L2)
10. (A) Explain the concept of reading files? (CO3, L2)  
(OR)  
(B) Explain about Exploring One-Dimensional and Two- Dimensional data? (CO3, L2)
11. (A) Explain Machine learning with over fitting and under fitting in detail? (CO3, L2).  
(OR)  
(B) Explain K- Nearest Neighbors Model with an example? (CO4, L2)
12. (A) Explain Maximum Likelihood Estimation with example? (CO4, L2)  
(OR)  
(B) Explain in detail about Multiple Regression Model? (CO4, L2)
13. (A) Explain in detail about the concept of Decision Trees? (CO5, L2)  
(OR)  
(B) Explain the concept of Neural Networks with an example? (CO5, L2)

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Course Code: **CGSSEP05**

Offered to: **B.Sc. CSCS**

Domain Subject: **COMPUTER SCIENCE**

Semester: V

Max. Marks: **50** (CCIA: 10+ SEE: 40)

Practical Hrs./Week : **3**

### **Data Science LAB**

Type of the Course: **Skill Enhancement Course** (Elective, Practical),

Credits: 02

#### **I. Course Outcomes: Students at the successful completion of the course will be able to:**

CO1: Implement the programs to get the required data, process it and present the outputs using Python language.(PO5)

CO2: Execute statistical analyses with Open-source Python software.(PO5)

CO3: Apply data science solutions to real world problems.(PO5)

CO4: Implement Plot Distribution Curve in Python.(PO5)

CO5: Implement rainfall data importing of some location with the help of packages available in R Studio and plot a chart of your choice.(PO5)

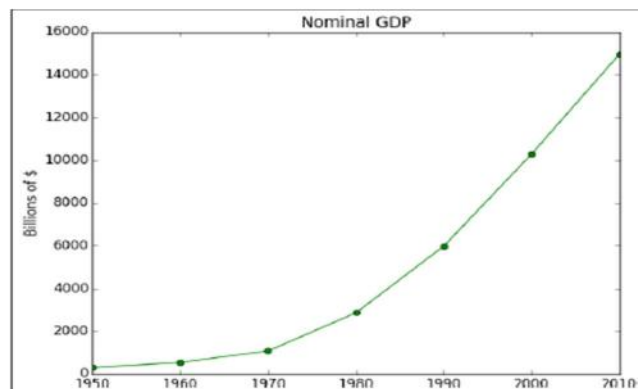
#### **II: Practical (Laboratory) Syllabus:**

**(30 Periods).**

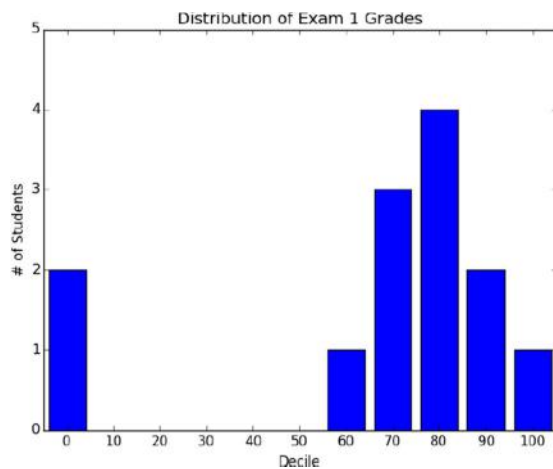
### **LAB EXERCISES**

#### **II. Practical (Laboratory) Syllabus: (30hrs.)**

1. Write a Python program to create a line chart for values of year and GDP as given below



2. Write a Python program to create a bar chart to display number of students secured different grading as given below



3. Write a Python program to create a time series chart by taking one year month wise stock data in a CSV file
4. Write a Python program to plot distribution curve
5. Import a CSV file and perform various Statistical and Comparison operations on rows/columns. Write a python program to plot a graph of people with pulse rate pvs. height h. The values of P and H are to be entered by the user.
6. Import rainfall data of some location with the help of packages available in R Studio and plot a chart of your choice.

### Lab References:

1. Data Science from Scratch by Joel Grus O'ReillyMedia
2. Wes McKinney, "Python for Data Analysis: Data Wrangling with Pandas, NumPy, and IPython", O'Reilly, 2nd Edition, 2018.

### Reference Materials on the Web/web

- a. <https://swcarpentry.github.io/python-novice-gapminder/09-plotting/index.html/>
- b. <https://www.geeksforgeeks.org/visualize-data-from-csv-file-in-python/>



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Course Code: **CGSSEP05**

Offered to: **B.Sc. CSCS**

**Title: Data Science Lab (Model Paper)**

Domain Subject: **Computer Science**

Semester: **V**

Max. Marks: **50** (CCIA: 10+ SEE: 40)

Practical Hrs./Week : **3**

**Model Paper: Practicals**

**Time: Three hours**

**Max. Marks: 40**

**Section A**

One Major Experiment (Experiment No : ) **15 M**

**Section B**

One Minor Experiment (Experiment No : ) **10 M**

**Section C**

Practical Record **05 M**

**Section D**

Viva Voce **10 M**

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Course Code: **CGSSET06**

Offered to: **B.Sc. CSCS**

Domain Subject: **COMPUTER SCIENCE**

Semester – **V**

Max. Marks: **100** (CCIA: 25+ SEE:75)

Theory Hrs./Week: **3**

**PYTHON FOR DATASCIENCE**

Type of the Course: **Skill Enhancement Course** (Elective Theory), Credits: **03**

**I. Course Outcomes: Students at the successful completion of the course will be able to:**

CO1:Identify the need for data science and solve basic problems using Python built-in data types and their methods.(PO5)

CO2:Design an application with user-defined modules and packages using OOP concepts.(PO5)

CO3:Deploy efficient storage and data operations using NumPy arrays.(PO5)

CO4:Apply powerful data manipulations using Pandas.(PO5)

CO5:Do data pre-processing and visualization using Pandas.(PO5,PO7)

**II. Syllabus:**

**(Total Theory periods: 45)**

**UNIT- I**

**( 8 periods)**

Basics of python programming-Features of Python, History of Python, Literal constants, Data Types, Input Operation, Reserved words, Operators and Expressions, Other Data Types, Lists, Dictionary, Type Conversion.

**UNIT-II**

**(10 periods)**



Decision Control Statements- Selection/conditional branching statements, Basic Loop Structures/Iterative Statements, Functions and Modules-Introduction, Function Definition, Function Call, Modules- Packages in Python, Python strings Revisited, Introduction, Built in String methods and functions, File Handling-Introduction, Opening and closing Files, Reading and writing Files, Directory Methods

#### **UNIT –III**

(10 periods)

Classes and Objects- Introduction, Classes and Objects, Class method and self argument, The init() method(the class constructor), Inheritance- Introduction, Inheriting classes in python, Types of Inheritance, Error and Exception Handling-Introduction to errors and exceptions, Handling Exceptions, Multiple except blocks, NumPy Basics- Arrays and Vectorized Computation, The NumPy nd array, Creating ndarrays, Data Types for ndarrays, Arithmetic with NumPy Arrays, Basic Indexing and Slicing, Boolean Indexing, Transposing Arrays and Swapping Axes.

#### **UNIT –IV**

(8 periods)

Universal Functions: Fast Element, Wise Array Functions, Mathematical and Statistical Methods, Sorting, Unique and Other Set Logic, Introduction to pandas Data Structures-Series, Data Frame and Essential Functionality, Dropping Entries- Indexing, Selection, and Filtering, Function Application and Mapping, Sorting and Ranking.

#### **UNIT –V**

(9 periods)

Summarizing and Computing Descriptive Statistics, Unique Values, Value Counts, and Membership, Reading and Writing Data in Text Format, Data Cleaning and Preparation: Handling Missing Data, Data Transformation: Removing Duplicates, Transforming Data Using a Function or Mapping, Replacing Values, Detecting and Filtering Outliers, String Manipulation- Vectorized String Functions in pandas.

### **III References/ Text Book/ e-books/websites**

#### **Text Books:**

- 1.Reema thareja—Python Programming using problem solving approach, Oxford Publication
- 2.Wes McKinney, “Python for Data Analysis: Data Wrangling with Pandas, NumPy, and IPython”, O’Reilly, 2nd Edition, 2018.

#### **Reference Books:**

- 1.Jake Vander Plas, “Python Data Science Handbook: Essential Tools for Working with
- 2.Data”, O’Reilly, 2017.

3. Wesley J. Chun, “Core Python Programming”, Prentice Hall, 2006.

4. Mark Lutz, “Learning Python”, O’Reilly, 4th Edition, 2009.

#### Reference Materials on the Web/web-links:

- a. <https://www.edx.org/course/python-basics-for-data-science>
- b. <https://www.edx.org/course/analyzing-data-with-python>
- c. <https://www.coursera.org/learn/python-plotting?specialization=data-science-python>
- d. <https://www.programmer-books.com/introducing-data-science-pdf/>

#### IV. Co-Curricular Activities:

- a) **Mandatory:** (Training of students by teacher in field related skills: (lab:10 + field: 05):
1. **For Teacher:** Field related training of students by the teacher in laboratory/field for not less than 15 hours on collecting the data, analyzing the data and presenting the data using Python language with some real time data.
  2. **For Student:** Students shall (individually) visit any of the agencies like Agriculture dept, statistical cell, irrigation department, Ground water department, CPO office, Rural Water Supply and Sanitation department etc or search online to get real time data like Aids database, weather forecasting database, social networking data, etc and identify any one database, implement and present the necessary charts in Python language and submit a hand-written Fieldwork/Project work/Project work/Project work/Project work Report not exceeding 10 pages. Example: Identifying a database, get the data, present the data in required charts and to predict the future instances if possible.
  3. Max marks for Fieldwork/Project work/Project work/Project work/Project work Report: 05.
  4. Suggested Format for Fieldwork/Project work: Title page, student details, index page, and details of place visited, observations, method of data collection, database identified, and implementation in Python language, other findings and acknowledgements.
  5. Unit tests (IE).

b) Suggested Co-Curricular Activities

1. Training of students by related industrial experts.
2. Assignments
3. Seminars, Group discussions, Quiz, Debates etc. (on related topics).
4. Presentation by students on the topics within and outside the syllabus.



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**Model paper**

Course Code: CGSSET06

Offered to: B.Sc. CSCS

**Title of the Course: PYTHON FOR DATASCIENCE**

**SECTION – A**

**Short Answer Questions (25 Marks: 5 x 5)**

**Answer any Five questions. (At least 1 question should be given from each Unit)**

- 1) State any four applications where python is more popular(CO1,L1)
- 2) List out the main differences between lists and tuples.(CO1,L2)
- 3) What are the uses of File object?(CO2,L1)
- 4) Explain about different Logical operators in python with appropriate examples. (CO2,L2)
- 5) Differentiate between an error and exception(CO3,L3)
- 6) Explain the basic functionality of math( ) function.(CO2,L2)
- 7) Write Array Functions(CO4,L1)
- 8) How to read and write data in text format(CO5,L4)

**SECTION B (Total: 5 x 10 = 50 Marks)**

**Answer all questions. (Two questions should be given from each unit with internal choice)**

9(a). Write in brief about the applications of Python.(CO1,L1)

**OR**

9(b). Explain Various data types in python with Examples(CO2,L2)

10(a). List different conditional statements in python with appropriate examples.(CO2,L2)

**OR**

10(b). Explain the following file built-in functions and method with clear syntax, description and illustration: a) open ( ) b) file ( ) c) seek ( ) d) tell ( ) e)read ( )(CO3,L2)

11(a) How does try-except statement work? Demonstrate with an example python code. (CO3,L4)

**OR**

11(b) Explain NumPy arrays with suitable example(CO3,L2)

12(a) Write Briefly Pandas Data structure(CO4,L1)

**OR**

12(b) Write a python program to read data from CSV files using pandas(CO4,L1)

13(a) How to remove duplicates from data transformation(CO5,L4)

**OR**

13(b) Explain Python for Data Visualization(CO5,L2).

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**Course Code: CGSSEP06**

Offered to: **B.Sc.CSCS**

Domain Subject: **PYTHON FOR DATA SCIENCE LAB** Semester: **V**

Max. Marks: **50** (CCIA: 10+ SEE: 40) Practical Hrs./Week : **3**

Type of the Course: **Data Science for python** (Elective, Practical) Credits: **02**

**I. Course Outcomes: Students at the successful completion of the course will be able to:**

CO1: Understand the basic concepts of python programs and perform List, Tuple and Dictionary (PO5,PO7)

CO2: Understand the program of functions (PO6, PO7)

CO3: Able to Understand file handling **techniques**. (PO6,PO7)

CO4: Understand concepts of OOPS (PO6, PO7)

CO5: Able to Solving of data frames (PO6, PO7)

**II: Practical (Laboratory) Syllabus: (30 Periods)**

1. Perform Creation, indexing, slicing, concatenation and repetition operations on Python built-in data types: Strings, List, Tuples, Dictionary
2. Apply Python built-in data types: List, Tuples, Dictionary and their methods to solve any given problem.
3. Handle numerical operations using math and random number functions
4. Create user-defined functions with different types of function arguments.
5. Create packages and import modules from packages.
6. Perform File manipulations- open, close, read, write, append and copy from one file to another.
7. Write a program for Handle Exceptions using Python Built-in Exceptions
8. Write a program to implement OOP concepts

9. Create NumPy arrays from Python Data Structures, Intrinsic NumPy objects and Random Functions.
10. Manipulation of NumPy arrays- Indexing, Slicing, Reshaping, Joining and Splitting.
11. Computation on NumPy arrays using Universal Functions and Mathematical methods.
12. Load an image file and do crop and flip operation using NumPy Indexing.
13. Create Pandas Series and Data Frame from various inputs.
  
14. Import any CSV file to Pandas Data Frame and perform the following:
  - (a) Visualize the first and last 10 records
  - (b) Get the shape, index and column details
  - (c) Select/Delete the records (rows)/columns based on conditions.
  - (d) Perform ranking and sorting operations.
  
  - (e) Do required statistical operations on the given columns.
  - (f) Find the count and uniqueness of the given categorical values.
  - (g) Rename single/multiple columns
  
- 15(a). Import any CSV file to Pandas Data Frame and perform the following:
  - (a) Handle missing data by detecting and dropping/ filling missing values.
  - (b) Transform data using apply () and map() method.
  - (c) Detect and filter outliers.
  - (d) Perform Vectorized String operations on Pandas Series.

### **III. Lab References:**

Wesley J. Chun, “Core Python Programming”, Prentice Hall, 2006. Jake VanderPlas, “Python Data Science Handbook: Essential Tools for Working with Data”, O’Reilly, 2017.

#### **Reference Materials on the Web/web-links:**

- a. <https://www.coursera.org/learn/python-plotting?specialization=data-science-python>
- b. <https://www.programmer-books.com/introducing-data-science-pdf/>



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**Course Code: CGSSEP06**

Offered to: **B.Sc.CSCS**

Domain Subject: **PYTHON FOR DATA SCIENCE** Semester: **V**

Max. Marks: **40**

Time: 3Hrs

**Model Paper: Practicals**

**Time: Three hours**

**Max. Marks: 40**

**Section A**

One Major Experiment (Experiment No : ) **15 M**

**Section B**

One Minor Experiment (Experiment No : ) **10 M**

**Section C**

Practical Record **05 M**

**Section D**

Viva Voce **10 M**

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Course Code: **CGSSET07**

Offered to: **B.Sc.CSCS**

Domain Subject: **Computer Science**

Semester :**V**

Max. Marks: **100** (CCIA: 25+ SEE:75)

Theory Hrs./Week: **3**

**WEB INTERFACE DESIGNING TECHNOLOGIES**

Type of the Course: **Skill Enhancement Course** (Elective Theory), Credits: **03**

**I. Course Outcomes: Students at the successful completion of the course will be able to:**

CO1: Understand web application and static web page using Html. (PO5)

CO2: Gain knowledge about various designing of style sheets. (PO5)

CO3: Demonstrate skills regarding creation of an interface to dynamic website. (PO7)

CO4: Gain knowledge about various advantages of XML and validating schema (PO5)

CO5: Learn how to install word press and gain the knowledge of installing various plugins to use in their websites. (PO5, PO7)

**II. Syllabus:**

**(Total Theory Periods: 45)**

**UNIT-I :Web Designing, HTML**

**(9 Periods)**

**Web Designing:** Introduction To Web Designing, Difference Between Web Applications And Desktop Applications.

**HTML:** Introduction To HTML, Introduction To HTML, Headings, Paragraphs Styles &Colors, HTML Formatting, Quotations, Comments, Hyperlinks, Lists, Using colors and images, Tables, Multimedia Objects - Video, Audio, Plugins, You Tube, Frames, Forms

**UNIT-II :CSS, HTML API'S**

**(10Periods)**

**CSS:** Introduction, Using Styles, Simple Examples, Defining Your Own Styles, Properties and Values in Styles, Style Sheets, Formatting blocks of information, Layers, CSS Combinators, Pseudo Class, Pseudo Elements, Opacity, ToolTips, Image Gallery, CSS Forms, CSS Counters, CSS Responsive.

**HTML API'S:** Geo location, Drag/drop, local storage, HTML SSE

**UNIT-III :Client side Validation (9 Periods)**

**Introduction to JavaScript :** What Is DHTML?, Java Script – Basics, Variables, String Manipulations,MathematicalFunctions,Statements,Operators,Arrays,Functions.

**Objects in JavaScript** –Data and Objects In JavaScript, Regular Expressions, Exception Handling

**DHTML with JavaScript :**Data Validation, Opening a New Window, Messages and Confirmations, The Status Bar, Different Frames, Rollover Buttons, Moving Images

**UNIT-IV:XML (9 periods)**

**XML:** Introduction to xml, How to write a xml document, Elements and attributes, Comments in xml, Namespace in xml, Xmlcss, Advantages of xml, Uses of xml, xml schema, data types, simple types, complex types ,Validating DTD,XSD.

**UNIT-V: Word press (8 Periods)**

Introduction to word press, servers like wamp, bitnami e.tc, installing and configuring word press, understanding admin panel, working with posts and pages, using editor, text formatting with shortcuts, working with media-Adding, editing, deleting media elements, working with widgets, menus.

**III Text Book/ references / e-books/websites**

1. Chris Bates, Web Programming Building Internet Applications, Second Edition, Wiley (2007)
2. Web technologies by A. A. Puntambekar
3. Web Technologies by N. P. Gopalan, Eastern Economy Edition, 2<sup>nd</sup> edition
4. Paul S. Wang Sanda S. Katila, an Introduction to Web Design plus Programming, Thomson (2007).
5. Head First HTML and CSS, Elisabeth Robson, Eric Freeman, O'Reilly Media Inc.
6. An Introduction to HTML and JavaScript: for Scientists and Engineers, David R. Brooks. Springer, 2007
7. Schaum's Easy Outline HTML, David Mercer, Mcgraw Hill Professional.



8. Word press for Beginners, Dr.Andy Williams.
9. Professional word press, Brad Williams, David damstra, Hanstern.
10. Web resources:
  - a. <http://www.codecademy.com/tracks/web>
  - b. <http://www.w3schools.com>
  - c. <https://www.w3schools.in/wordpress-tutorial/>
  - d. <http://www.homeandlearn.co.uk>

#### **IV Co-Curricular Activities**

(Co-curricular activities shall not promote copying from textbook or from others work and shall encourage self/independent and group learning)

##### **Measurable**

33. Assignments (in writing and doing forms on the aspects of syllabus content and outside the syllabus content. Shall be individual and challenging)
  34. Student seminars(on topics of the syllabus and related aspects(individual activity))
  35. Quiz (on topics where the content can be compiled by smaller aspects and data(Individuals or groups a steams))
  36. Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual participation and contribution of students shall be ensured (team activity))

##### **General**

25. Group Discussion
26. Try to solve MCQ's available online.
27. Others.



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**Model paper**

Course Code: CGSSET07

Offered to: B.Sc.CSCS

**Title of the Course:WEB INTERFACE DESIGNING TECHNOLOGIES**  
**SECTION – A**

**Short Answer Questions (25 Marks: 5 x 5)**

**Answer any Five questions. (At least 1 question should be given from each Unit)**

1. What is HTML? Explain features and structure of HTML program with example (CO1,L1)
2. What is layer? How are they described with HTML code?(CO1,L1)
3. Explain hyperlinks in HTML.(CO2,L5)
4. What is java script? Explain the features, advantages and disadvantages of java script(CO3,L1)
5. Explain the moving images with java script(CO3,L5)
6. What are the elements and attributes used in XML(CO4,L1)
7. Define and explain namespace in XML(CO4,L1)
8. Explain text formatting in word Press.(CO5,L5)

**SECTION B (Total: 5 x 10 = 50 Marks)**

**Answer all questions. (Two questions should be given from each unit with internal choice)**

9(a) what is list? Explain various types of lists in HTML.(CO1,L1)

**OR**

9(b) Explain Frames and forms in HTML(CO1,L2)

10(a) Define CSS, Explain various styles sheets in HTML(CO2,L1)

**OR**

10(b). Explain HTML APIs.(CO1,L2)

11(a) What is DHTML? Explain about various string and mathematical functions(CO3,L2)

**OR**

11(b) Explain Exception handling and rollover buttons in java script(CO3,L2)

12(a) what are the advantages of using XMLand CSS? How to validate XML schema.(CO4,L1)

**OR**

12(b) Explain about DTD in XML (CO4,L2)

13(a) What is admin panel, what are the steps involved in working with post and pages (CO5,L1)

**OR**

13(b) Explain how we can add, edit and deleting media elements in word press(CO5,L2)

**@@@@**



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Course Code: **CGSSEP07**

Domain Subject: **COMPUTER SCIENCE**

Semester: **V**

Max. Marks: **50** (CCIA: 10+ SEE: 40)

Practical Hrs./Week : **3**

**WEB INTERFACE DESIGNING TECHNOLOGIES LAB**

Type of the Course: **Skill Enhancement Course** (Elective, Practical),

Credits: 02

**I. Course Outcomes: Students at the successful completion of the course will be able to:**

CO1: Create a basic website with the help of HTML and CSS.(PO5)

CO2: Acquire the skill of installing word press and various plugins of Word press.(PO5)

CO3: Create a static website with the help of Word press..(PO5,PO7)

CO4: Create an interface for a dynamic website.(PO5,PO7)

CO5: Apply various themes for their websites using Word press.(PO7)

**II. Practical (Laboratory) Syllabus: (30 periods)**

**HTML and CSS:**

1. Create an HTML document with the following formatting options:

(a) Bold, (b) Italics, (c) Underline, (d) Headings (Using H1 to H6 heading styles), (e) Font (Type, Size and Color), (f) Background (Colored background/Image in background), (g) Paragraph, (h) Line Break, (i) Horizontal Rule, (j) Pre tag

2. Create an HTML document which consists of:

(a) Ordered List (b) Unordered List (c) Nested List (d) Image

3. Create a form using HTML which has the following types of controls:

(a) Text Box (b) Option/radio buttons (c) Check boxes (d) Reset and Submit buttons

4. Embed a calendar object in your web page.

5. Create an applet that accepts two numbers and perform all the arithmetic operations on them.
6. Create nested table to store your curriculum with image.
7. Create a form that accepts the information from the subscriber of a mailing system.
8. Create a help file as follows:



9. Write a html program including style sheets.
10. Write a html program to layers of information in web page.
11. Develop a Java script to determine whether the given number is a “PERFECT NUMBER “or not.
12. Develop a Java script to generate “ARMSTRONG NUMBERS” between the ranges 1 to 100.
13. Write a java script that reads an integer and displays whether it is a prime number or not.
14. Write a java script which accepts the text in lower case and displays the text in upper case
15. Write a java script program for user name and password validation using on click event.

**Word press:**

16. Installation and configuration of word press.
17. Create five pages on COVID – 19 and link them to the home page.
18. Add an external video link with size 640 X 360.
19. Create a user and assign a role to him.
20. Create a login page to word press using custom links

**III. Lab References:**

1. Web technologies by A. A. Puntambekar

2. Web Technologies by N. P. Gopalan, Eastern Economy Edition, 2<sup>nd</sup> edition
3. Word press for Beginners, Dr. Andy Williams.
4. Professional word press, Brad Williams, David damstra, Hanstern.

**Reference Materials on the Web/web-links:**

11. [https://onlinecourses.nptel.ac.in/noc17\\_cs22/course](https://onlinecourses.nptel.ac.in/noc17_cs22/course)
2. <http://www.codecademy.com/tracks/web>
3. <http://www.w3schools.com>
4. <https://www.w3schools.in/wordpress-tutorial/>



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Course Code: **CGSSEP07**

Domain Subject: **Computer Science**

Max. Marks: **50** (CCIA: 10+ SEE: 40)

Semester: V

Practical Hrs./Week : **3**

**Model Paper: Practicals**

**Time: Three hours**

**Max. Marks: 40**

**Section A**

One Major Experiment (Experiment No : ) **15 M**

**Section B**

One Minor Experiment (Experiment No : ) **10 M**

**Section C**

Practical Record **05 M**

**Section D**

Viva Voce **10 M**

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Course Code: **CGSSET08**

Offered to: **B.Sc. CSCS**

Domain Subject: **COMPUTER SCIENCE**

Semester – **V**

Max. Marks: **100** (CCIA: 25+ SEE:75)

Theory Hrs./Week: **3**

**WEB APPLICATIONS DEVELOPMENT USING PHP AND MYSQL**

Type of the Course: **Skill Enhancement Course** (Elective Theory), Credits: **03**

**I. Course Outcomes: Students at the successful completion of the course will be able to:**

CO1: Learn basic structure and key concepts in PHP, Control statements and functions concept and related programs (PO5)

CO2: Know What is an Array concept related programs, What is an Object, various objects, Formatting strings, Date and time and related programs (PO5)

CO3: Learn importance of Forms, Combining HTML with PHP code. Importance of Cookies and Sessions related programs of forms cookies and sessions. (PO5)

CO4: Know importance of File concept in PHP how to Create, Open, Read and write data in file related programs, Knowing about Image creation, drawing, and modification image (PO7)

CO5: Know about Database concept of MySQL, Connection, Creation of Database, Table adding Record into it related programs (PO7)

**II. Syllabus:**

**(Total Theory Periods: 45)**

**UNIT-I**

**(10 Periods)**

**The Building blocks of PHP: Variables, Data Types, Operators and Expressions, Constants.**

**Flow Control Functions in PHP: Switching Flow, Loops, Code Blocks and Browser Output. Working with Functions: What is function? ,Calling functions, Functions, Returning the values from User-Defined Functions, Variable Scope.**

## UNIT-II

(8Periods)

**Working with Arrays** What are Arrays?, Creating Arrays, **Working with Objects** Creating Objects, Object Inheritance, **Working with Strings, Dates and Time**-Formatting strings with PHP, Investigating Strings with PHP, Manipulating Strings with PHP, Using Date and Time Functions in PHP.

## UNIT-III

(10 Periods)

**Working with Forms**-Creating Forms, Accessing Form Input with User defined Arrays, Combining HTML and PHP code on a single Page, **Working with Cookies and User Sessions**-Introducing Cookies, Setting a Cookie with PHP, Session Function Overview, Starting a Session, Working with session variables

## UNIT-IV

(8 Periods)

**Working with Files and Directories:** Creating and Deleting Files, Opening a File for Writing, Reading or Appending, Reading from File, Writing or Appending to a File. **Working with Images** - Understanding the Image-Creation Process, Drawing a New Image, Modifying Existing Images, Image Creation from User Input.

## UNIT-V

(9 Periods)

**Interacting with MySQL using PHP** -MySQL versus MySQLi Functions, Connecting to MySQL with PHP ,Working with MySQL Data, **Creating an Online Address Book** -Planning and Creating Database Tables, Creating Menu, Creating Record, Addition Mechanism, Viewing Records, Creating the Record Deletion Mechanism, Adding Sub-entities to a Record.

### III. Textbooks and References

1. Julie C. Meloni, SAMS Teach yourself PHP MySQL and Apache, Pearson Education(2007).
2. Steven Holzner, PHP: The Complete Reference, McGraw-Hill
3. RobinNixon, LearningPHP,MySQL,JavaScript,CSS&HTML5,ThirdEditionO'reilly,2014
4. XueBai Michael Ekedahl, The web warrior guide to Web Programming, Thomson(2006).
5. Web resources:
  - e. <http://www.codecademy.com/tracks/php>
  - f. <http://www.w3schools.com/PHP>
  - g. <http://www.tutorialpoint.com>

### IV. Co-Curricular Activities:



**c) Mandatory:***(Training of students by teacher in field related skills:(lab: 10+field: 05):*

6. **For Teacher:** Field related training of students by the teacher in laboratory/field for not less than 15 hours on demonstrating various **interactive and dynamic websites** available online, addressing the students on identifying the case study to build an interactive and database driven website, forms to be used in website, database to be maintained, reports to be produced, etc.

7. **For Student:** Students shall (individually) search online and visit any of the agencies like malls, hotels, super bazaars, etc. where there is a need for an interactive and database driven web site and submit a hand-written Fieldwork / Project work. Project work Report not exceeding 10 pages. Example: Choosing a firm or business to develop a website, identifying forms to be placed in the websites, back end databases to be maintained and reports to be generated and placed in the websites.

8. Max marks for Fieldwork/Project work/Project work/Project work/Project work/Project work Report: 05.

9. Suggested Format for Fieldwork/Project work/Project work/Project work/Project work:  
*Title page, student details, index page, details of place or websites visited, structure of the website and acknowledgements.*

10. Unit tests(IE).

#### **d) Suggested Co-Curricular Activities**

6. Arrange expert lectures by IT experts working professionally in the area of web content development

7. Assignments (in writing or implementing contents related to syllabus or outside the syllabus. Shall be individual and challenging)

8. Seminars, Group discussions, Quiz, Debates etc.(on related topics).

9. Preparation by students on best websites.

10. Arrange a web page development competition among small groups of students.



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**Model paper**

**Course Code: CGSSET08**

Offered to: **B.Sc. CSCS**

Title of the Course: **Web Applications Development using PHP & MYSQL**

**SECTION – A**

**Short Answer Questions**

**(25 Marks: 5 x 5)**

**Answer any Five questions. (At least 1 question should be given from each Unit)**

- 17) Define Structure of PHP.(CO1,L1)
- 18) Differentiate Conditional statement and Looping statement with syntax.(CO1,L4)
- 19) Define Array concept explain about it.(CO2,L1)
- 20) Compare Array with Object creation.(CO2,L4)
- 21) Explain about Cookies concept.(CO3,L2)
- 22) Explain about Image creation.(CO4,L2)
- 23) Write short note onMysqli.(CO5,L1)
- 24) What is use of Select query with on syntax and example?(CO5,L1)

**SECTION B**

**(Total: 5 x 10 = 50 Marks)**

**Answer all questions. (Two questions should be given from each unit with internal choice)**

9(a) Explain about Control Statements.(CO1,L2)

**OR**

9(b) Discuss about Function define,Call and return value with example.(CO1,L6)

10(a) List various types of Formatting strings explain them.(CO2,L2)

**OR**

10(b) Define Array function with example..( CO2,L1)

11(a) Write names of Form objects explain them with example.(CO3,L2)

**OR**

11(b) Compare and Contrast Session and Cookies.(CO3,L4)

12(a) Explain File concept about file creation, Open file, Write file and Delete file with example(CO4,L2)

**OR**

12(b) Construct steps for Interfacing complete image concept explain them with one example.(CO4,L3)

13(a) Discuss about DDL commands and DML commands in Mysqli with syntaxes(CO5,L6)

**OR**

13(b) Write code to Create table of Employee by adding any four columns with example.(CO5,L6)

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Title of the Course: **Web Applications Development using PHP & MYSQL LAB**

Course Code: **CGSSEP08**

Offered to:**B.Sc. CSCS**

Domain Subject: **COMPUTER SCIENCE**

Semester: V

Max. Marks: **50** (CCIA: 10+ SEE: 40)

Practical Hrs./Week : **2**

**Web Applications Development using PHP & MYSQL LAB**

### PRACTICAL SYLLABUS

Type of the Course: **Skill Enhancement Course** (Elective, Practical),

Credits: 02

**I. Course Outcomes: Students at the successful completion of the course will be able to:**

CO1:Learn and implement basic programs in PHP, Control statements and functions concept (PO5)

CO2:Implement Basic programs in Object, various objects, Formatting strings, Date and time (PO5)

CO3: Learn and implement important programs of Forms, Combining HTML with PHP code. Importance of Cookies and Sessions..(PO5)

CO4: Implement programs on Files concept in PHP and on Image creation, drawing, and modification image (P05 & PO7)

CO5:implement Database programs on MySQLi, Connection, Creation of Database, Table adding Record into it related programs (PO7)

**II: Practical (Laboratory) Syllabus: (30 Periods):** At least 8 Practical's.

1. Write a PHP program to Display "Hello"
2. Write a PHP Program to display today's date.
3. Write a PHP program to display Fibonacci series.
4. Write a PHP Program to read the employee details.
5. Write a PHP program to prepare the student marks list.
6. Write a PHP program to generate the multiplication of two matrices.

7. Create student registration form using text box, check box, radio button, select, submit button. And display user inserted value in new PHP page.
8. Create Website Registration Form using text box, check box, radio button, select, submit button. And display user inserted value in the new PHP page.
9. Write a PHP script to demonstrate passing variables with cookies.
10. Write a program to keep track of how many times a visitor has loaded the page.
11. Write a PHP application to add, Modify, delete and fetch the rows in a Table.
12. Develop a PHP application to implement the following Operations
  - a. Registration of Users.
  - b. Insert the details of the Users.
  - c. Modify the Details.
  - d. Transaction Maintenance.
    - i. No of times Logged in
    - ii. Time Spent on each login.
    - iii. Restrict the user for three trials only.
    - iv. Delete the user if he spent more than 100 Hrs of transaction.
13. Write a PHP script to connect to the MySQL server from your website.
14. Write a program to read customer information like cust-no, cust-name, item purchased, and mob-no, from customer table and display all this information in table format on the output screen.
15. Write a program to edit the name of a customer to “Kiran” with cust-no =1, and to delete record with cust-no=3.
16. Write a program to read employee information like emp-no, emp-name, designation and salary from the EMP table and display all this information using table format in your website.
17. Create a dynamic web site using PHP and MySQL.

## I. Textbooks and References

1. Julie C. Meloni, SAMS Teach yourself PHP MySQL and Apache, Pearson Education(2007).
2. Steven Holzner, PHP: The Complete Reference, McGraw-Hill
3. RobinNixon, LearningPHP,MySQL,JavaScript,CSS&HTML5,ThirdEditionO'reilly,2014
4. XueBai Michael Ekedahl, The web warrior guide to Web Programming, Thomson(2006).
5. Web resources:
  - e. <http://www.codecademy.com/tracks/php>
  - f. <http://www.w3schools.com/PHP>
  - g. <http://www.tutorialpoint.com>



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Course Code:**CGSSEP08**

Offered to: **B.Sc. CSCS**

Domain Subject: **COMPUTER SCIENCE**

Semester: V

Max. Marks: **50** (CCIA: 10+ SEE: 40)

Practical Hrs./Week : **2**

**Model Paper: Practicals**

**Time: Three hours**

**Max. Marks: 40**

**Section A**

One Major Experiment (Experiment No : ) **15 M**

**Section B**

One Minor Experiment (Experiment No : ) **10 M**

**Section C**

Practical Record **05 M**

**Section D**

Viva Voce **10 M**

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Course Code: **CGSSET09** Offered to: **B.Sc. (CSCS)**  
Domain Subject: **Computer Science** Semester – **V**  
Max. Marks: **100** (CCIA: 25+ SEE:75) Theory Hrs./Week: **3**

**INTRODUCTION TO DIGITAL TECHNOLOGY**

Type of the Course: **Skill Enhancement Course** (Elective Theory), Credits: **03**

**I. Course Outcomes: Students at the successful completion of the course will be able to:**

CO1: Know about Digital primer(PO6,PO7)

CO2: Understand Digital for Industries(PO6,PO7)

CO3: Learn Auto matix – Art of RPA- Introduction(PO6,PO7)

CO4: Know about Automation Any where(PO6,PO7)

CO5: Know about Bots(PO6,PO7)

**II. Syllabus: (Total Theory Hours: 45)**

**Unit I**

**Digital Primer** - Why is Digital Different?- Digital Metaphors On Cloud 9-A Small Intro to Big Data- Social Media & Digital Marketing-Artificial Intelligence-Unchain the Block chain-Internet of Everything-Immersive Technology.

**Unit II**

**Digital for Industries**-Manufacturing and Hi-tech-Banking and Financial Services-Insurance and Healthcare-Retail-Travel & Hospitality-Communications, Media & Information Services and Government.

**Unit III**

**Automatix – Art of RPA-Introduction** - Setting the Context-RPA Prelude-RPA Demystified-RPA vs BPM RPA Implementations-RPA in Industries-RPA Tools-Automatix

#### **Unit IV**

**Automation Anywhere**-Getting Started with AA Enterprise-Exploring AA Enterprise-AA Enterprise – Architecture.

#### **Unit V**

Knowing the Bots-More About Task Bots- AA Enterprise - Assess your Learning, All About Recorders, Designers, Meta Bots, Cognitive RPA

### **III References/ Text Book/ e-books/websites**

- Getting started with RPA using Automation Anywhere: Automate your day-to-day Business Processes using Automation Anywhere (English Edition) by Vaibhav Srivastava
- Robotic Process Automation Projects: Build Real-world RPA Solutions Using UiPath and Automation Anywhere by Arun Kumar Asokan and Nandan Mullakara

#### **Reference Materials on the Web/web-links:**

#### **Faculty & Student Resources:**

- Automation Anywhere: [Getting Started with Robotic Process Automation \(RPA\)](#)
- Automation Anywhere: [Citizen Developer Basics](#)
- Automation Anywhere: [Tips And Tricks \(Beginner\)](#)
- [YouTube: Automation Anywhere Full Course - Simplilearn](#)
- Automation Anywhere Community Edition ([Download Link](#))

### **IV Co-Curricular Activities**

(Co-curricular activities shall not promote copying from textbook or from others work and shall encourage self/independent and group learning)

#### **Measurable**

1. Assignments (in writing and doing forms on the aspects of syllabus content and outside the syllabus content. Shall be individual and challenging)
2. Student seminars(on topics of the syllabus and related aspects(individual activity))
3. Quiz (on topics where the content can be compiled by smaller aspects and data(Individuals or groups a steams))
4. Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual participation and contribution of students shall be ensured

(team activity)

## General

1. Group Discussion
2. Try to solve MCQ's available online.
3. Others.





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**MODEL QUESTION PAPER**  
**COURSE CODE: CGSSET09      TITLE OF PAPER: Introduction to Digital Technology**

**CLASS / GROUP: B.Sc(CSCS)**

**SEMESTER: V**

**Time: 3 Hrs.**

**Max. Marks: 75**

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**SECTION – A**

**ANSWER ANY FIVE QUESTIONS**

**5 X 5 =25 M.**

1. What are the key properties of big data? (CO1, L2)
2. Explain about IOT deployments. (CO1,L2)
3. Describe Hi-tech banking. (CO2,L2)
4. Differentiate between RPA and BPM.(CO3,L2)
5. What is meant by RPA prelude? (CO3,L2)
6. Discuss about Automation anywhere. (CO4,L3)
7. Explain about AA recorders.(CO5,L2)
8. Explain about cognitive RPA.(CO5,L2)

**SECTION – B**

**ANSWER ALL THE QUESTIONS**

**5 X 10 =50 M.**

9. a) How to solve a big data problem? Explain. (CO1,L2)  
(Or)  
b) Define AI. What are the basic requirements to build AI(CO1,L2)
10. a) How the financial services are provided through digital technology?(CO2,L2)  
(or)  
b) How the media is helpful to provide information services? (CO2,L3)
11. a) What are the different types of RPA tools available? Explain. (CO3,L3)  
(or)  
b) Explain the role of RPA in industries. (CO3,L2)
12. a) Describe the architecture of Automation Anywhere. (CO4,L2)  
(or)  
b) How to explore Automation Anywhere enterprise? (CO4,L2)
13. a) Explain about Taskbots. (CO5, L2)  
(or)  
b) Explain about Automation Anywhere designers.(CO5,L2)

**@@@@**



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*College with Potential for Excellence*  
*ISO9001 – 2015 Certified*

Course Code: **CGSSEP09**

Offered to: **B.Sc. (CSCS)**

Domain Subject: **Computer Science**

Semester: **V**

Max. Marks: **50** (CCIA: 10+ SEE: 40)

Practical Hrs./Week : **3**

**INTRODUCTION TO DIGITAL TECHNOLOGY LAB**

Type of the Course: **Skill Enhancement Course** (Elective, Practical),

Credits: 02

**I. Course Outcomes: Students at the successful completion of the course will be able to:**

CO1:Understand the fundamental concepts of digital technology

CO2:Familiarize the principles of Artificial Intelligence, Block chain technology

CO3:Recognize the use of Digital technology in various Industries

CO4:Understand the principles of Automatix, Automation Anywhere

CO5:Create bots and understand its various types

**II: Practical (Laboratory) Syllabus: (30 Periods):**

**Automatix (RPA), Automation Anywhere**

1. Creating bots for automatic software installation
2. Creating bots for automatic software patch installation
3. Creating bots for file transfer
4. Creating bots for automatic file backup

**III. Reference Materials on the Web/web-links:**

- [YouTube: Automation Anywhere Full Course - Simplilearn](#)



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Course Code: **CGSSEP09**

Offered to: **B.Sc. (CSCS)**

Domain Subject: **Computer Science**

Semester: **V**

Max. Marks: **50** (CCIA: 10+ SEE: 40)

Practical Hrs./Week : **3**

**Model Paper: INTRODUCTION TO DIGITAL TECHNOLOGY LAB**

**Time: Three hours**

**Max. Marks: 40**

**Section A**

One Major Experiment

**15 M**

5. Creating bots for automatic software installation

**Section B**

Two Minor Experiment

**15 M**

1. Creating bots for file transfer
2. Creating bots for automatic file backup

**Section C**

Practical Record + Viva Voce

**10 M**

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Course Code: **CGSSET10**

Offered to: **B.Sc. (CSCS)**

Domain Subject: **Computer Science**

Semester – **V**

Max. Marks: **100** (CCIA: 25+ SEE:75)

Theory Hrs./Week: **3**

### **SOFTWARE ENGINEERING AND TESTING**

Type of the Course: **Skill Enhancement Course** (Elective Theory), Credits: **03**

**I. Course Outcomes: Students at the successful completion of the course will be able to:**

CO1:Understand the Selenium Basics concepts(PO6,PO7)

CO2:Know about Selenium Web Driver (PO6,PO7)

CO3:Understand Selenium Framework (PO6,PO7)

CO4:Learn how TestNG works(PO6,PO7)

CO5:Learn Advanced concepts in Selenium (PO6,PO7)

**II. Syllabus:**

**(Total Theory Hours: 45)**

#### **Unit I : Selenium Basics**

Software Testing, Automation Testing, Introduction to Selenium and its Components, Selenium IDE Features, Selenium Download and Installation, Creating Scripts using Firebug and Its Installation, Locator Types

#### **Unit II: Selenium WebDriver**

Selenium WebDriver Installation with Eclipse, Handling Dropdowns, Explicit and Implicit Wait, Handling Alerts/Pop-ups, Handling Web Tables, Frames, Dynamic Elements, Robot API, AutoIT

#### **Unit III : Selenium Framework**

**Test Automation Framework:** Introduction, Benefits of Automation Framework, Types of Automation framework

#### **Unit IV**

Introduction to TestNG, TestNG Framework, TestNG installation, TestNG Annotations and Listeners, TestNG Example, TestNG Process Execution: Batch, Controlled Batch & Parallel

#### **Unit V : Advance Selenium**

Selenium Grid: Introduction, Usage of Selenium Grid, Grid1.0 vs Grid2.0, Selenium Grid architecture, How to setup Selenium Grid using command line, designing test scripts that can run on the Grid, Using Desired Capabilities Object, Using Remote Web Driver Object, Running a sample Test Case on the Grid

#### **III References/ Text Book/ e-books/websites**

- Test Automation using Selenium WebDriver with Java: Step by Step Guide by Navneesh Garg
- Absolute Beginner Java 4 Selenium Web driver: Come Learn How to Program for Automation Testing by Rex Allen Jones II

#### **Reference Materials on the Web/web-links:**

<https://www.softwaretestingmaterial.com/types-test-automation-frameworks/>  
<https://www.guru99.com/introduction-to-selenium-grid.html#6>

#### **Faculty & Student Resources:**

- [YouTube: Selenium Video Tutorials](#)
- [YouTube: Selenium Full Course](#) – Simplilearn
- [YouTube: Selenium Full Course](#) – Edureka!
- [Sample Selenium Assignments/Exercises 1](#)
- [Sample Selenium Assignments/Exercises 2](#)
- [Sample Selenium Assignments/Exercises 3](#)



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**Model paper**  
**Course Code: CGSSET10**                      **Offered to B.Sc. (CSCS)**  
**Title of the Course: SOFTWARE ENGINEERING AND TESTING**

**SECTION – A**

**Short Answer Questions (25 Marks: 5 x 5)**

**Answer any Five questions. (At least 1 question should be given from each Unit)**

1. What is meant by Software testing?(CO,L1)
2. What is Automation Testing?(CO,L1)
3. What is Selenium WebDriver?(CO,L1)
4. Explain Explicit and Implicit Wait. (CO,L2)
5. What are the benefits of Automation Framework?(CO,L1)
6. Define TestNG?(CO,L1)
7. What is Annotation in TestNG?(CO,L1)
8. When to use Selenium Grid?(CO,L1)

**SECTION B (Total: 5 x 10 = 50 Marks)**

**Answer all questions. (Two questions should be given from each unit with internal choice)**

9(a) Explain Selenium Components in detail.(CO,L2)

**OR**

9(b) Explain Selenium IDE Features.(CO,L2)

10(a) Explain Implicit Wait with a program.(CO,L2)

**OR**

10(b) Explain how to Handling Web Tables with an example.(CO,L2)

11(a) Explain about Robot API.(CO,L2)

**OR**

11(b) What is Selenium framework?(CO,L1)

12(a) What are TestNG Listeners and list out ITest Listener interface?(CO,L1)

**OR**

12(b) Explain TestNG Annotations and there benefits.(CO,L2)

13(a) Explain how to Set Up Selenium Grid using Command Line.(CO,L2)

**OR**

13(b) What is Selenium Grid and differentiate between Grid1.0 vs Grid2.0?(CO,L1)

**@@@@**



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Course Code: **CGSSEP10** Offered to: **B.Sc. (CSCS)**  
Domain Subject: **Computer Science** Semester: **V**  
Max. Marks: **50** (CCIA: 10+ SEE: 40) Practical Hrs./Week : **3**

**SOFTWARE ENGINEERING AND TESTING LAB**

Type of the Course: **Skill Enhancement Course** (Elective, Practical), Credits: **02**

**I. Course Outcomes: Students at the successful completion of the course will be able to:**

- CO1: Learn how to use Chrome Driver (PO6,PO7)
- CO2: Know about how to create browser instance (PO6,PO7)
- CO3: Understand how to search and print contents in the list (PO6,PO7)
- CO4: Learn how use quit() method.(PO6,PO7)
- CO5: Learn about generic method (PO6,PO7)

**II: Practical (Laboratory) Syllabus: (30 Periods):** At least 8 Practical.

1. Write a script to open google.com and verify that title is Google and verify that it is redirected to google.co.in
2. Write a script to open google.co.in using chrome browser (Chrome Driver)
3. Write a script to open google.co.in using internet explorer (Internet Explorer Driver)
4. Write a script to create browser instance based on browser name
5. Write a script to search for specified option in the listbox
6. Write a script to print the content of list in sorted order.
7. Write a script to print all the options. For duplicates add entry only once. Use HashSet.
8. Write a script to close all the browsers without using quit() method.
9. Write generic method in selenium to handle all locators and return web element for any locator.
10. Write generic method in selenium to handle all locators containing dynamic wait and return web element for any locator.

**III. Lab References:**

<https://www.guru99.com/selenium-tutorial.html>

<https://www.javatpoint.com/selenium-tutorial>

**Web-links:** <https://youtu.be/Tu61E5mHv18>



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Course Code: **SECCGSP09**

Offered to: **B.Sc. (CSCS)**

Domain Subject: **Computer Science**

Semester: **V**

Max. Marks: **50** (CCIA: 10+ SEE: 40)

Practical Hrs./Week : **3**

**Model Paper: SOFTWARE ENGINEERING AND TESTING LAB**

**Time: Three hours**

**Max. Marks: 40**

**Section A**

One Major Experiment

**15 M**

11. Write generic method in selenium to handle all locators containing dynamic wait and return web element for any locator.

**Section B**

Two Minor Experiment

**15 M**

1. Write a script to open google.co.in using chrome browser (Chrome Driver)
2. Write a script to open google.co.in using internet explorer (Internet Explorer Driver)

**Section D**

Practical Record + Viva Voce

**10 M**

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Course Code: **CGSSET11**

Offered to: **B.Sc CSCS**

Domain Subject: **COMPUTER APPLICATIONS** Semester – V

Max. Marks: **100** (CCIA: 25+ SEE:75) Theory Hrs./Week: **3**

### **MULTIMEDIA TOOLS AND APPLICATIONS**

Type of the Course: **Skill Enhancement Course** (Elective Theory), Credits: **04**

**I. Course Outcomes: Students at the successful completion of the course will be able to:**

CO1: Gain knowledge on the concepts related to Multimedia.(**PO5**)

CO2: Understand the concepts like image data representation and color modes.(**PO5**)

CO3: Understand the different types of video signals and digital audio.(**PO5**)

CO4: Know about multimedia data compression types and audio compression standards (**PO5**)

CO5: Know about basic video compression techniques.(**PO5,P07**)

**II. Syllabus:**

**(Total Theory Periods: 45)**

**UNIT-I: Introduction to multimedia**

**(8 periods)**

What is Multimedia? , Components of Multimedia System, Multimedia Research Topics and Projects, Multimedia and Hypermedia, Multimedia Authoring metaphors, Multimedia Production, Multimedia Presentation, Some Technical Design Issues, Automatic Authoring.

**UNIT-II: Image Data Representations and color models**

**(9periods)**

Color science Human vision Image data types, **Black & white images**-1-bit images (Binary image), 8-bit (Gray -level images), **Color images**- 24-bit color images, 8-bit color images, Color models.

**UNIT-III: Fundamental concepts in video(10 periods)**

Types of Video Signals- Analog Video, Digital Video, Basics of Digital Audio: What is Sound?, Digitization of Sound, Quantization and Transmission of Audio, Pulse code modulation, Differential coding of audio, Predictive coding, DPCM.

**UNIT-IV: Multimedia Data Compression (9 periods)**

Introduction- Basics of Information Theory, Lossless Compression Algorithms, Fix-Length Coding, Run-length coding, Differential coding, Dictionary-based coding, Variable Length Coding, Shannon-Fano Algorithm, Huffman Coding Algorithm.

Audio Compression standards: Introduction, Psychoacoustics model, MPEG Audio

## **UNIT-V : Basic Video Compression Techniques( 9 periods)**

Introduction to Video compression, Video Compression with Motion Compensation, Video compression standard H.261, Video compression standard MPEG-1

### **III 1. Text Books**

Fundamentals of Multimedia by Ze-Nian Li & Mark S. Drew. Publisher: Prentice Hall

### **2. Reference Books:**

1. An introduction to digital multimedia by Savage, T. M. and Vogel, K. E. 2008.
2. Digital Multimedia by Nigel Chapman & Jenny Chapman. 2009.

### **3. Reference Materials on the Web/web-links:**

<https://www.tutorialspoint.com/multimedia>

<https://ksuit342.wordpress.com/lectuers/>

### **IV Co-Curricular Activities**

(Co-curricular activities shall not promote copying from textbook or from others work and shall encourage self/independent and group learning)

#### **A. Measurable**

1. Assignments (in writing and doing forms on the aspects of syllabus content and outside the syllabus content. Shall be individual and challenging)
2. Student seminars (on topics of the syllabus and related aspects (individual activity))
3. Quiz (on topics where the content can be compiled by smaller aspects and data (Individuals or groups as teams))
4. Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual participation and contribution of students shall be ensured (team activity))

#### **B. General**

1. Group Discussion
2. Others



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**Model paper**

Course Code: CGSSET11

Offered to: B.Sc CSCS

**Title of the Course: Multimedia Tools and Applications**

**SECTION – A**

**Short Answer Questions (25 Marks: 5 x 5)**

**Answer any FIVE questions. (At least 1 question should be given from each Unit)**

1. What is multimedia? Explain components of multimedia system. (CO1, L1)
2. Discuss multimedia production.(CO1, L6)
3. Explain 8-Bit(gray-level images).(CO2,L2)
4. What is sound? Explain digitization of sound. (CO3, L1)
5. Write about SECAM video. (CO3 , L1)
6. Discuss Run-length coding. (CO4, L6)
7. Explain basics of information theory. (CO4, L5)
8. Compare and contrast H.261 and MPEG-1. (CO5, L2)

**SECTION B (Total: 5 x 10 = 50 Marks)**

**Answer all questions. (Two questions should be given from each unit with internal choice)**

9(a) Discuss in detail about multimedia and hypermedia. (CO1, L6)

**OR**

9(b) Explain about multimedia presentation. (CO1, L2)

10(a) Discuss about 24-bit color images and 8-bit color images. (CO2, L6)

**OR**

10(b) Explain Color models in images. (CO2, L2)

11(a) Discuss about PCM (pulse code modulation). (CO3, L6)

**OR**

11(b) Explain High-Definition TV (HDTV). (CO3, L2)

12(a) Discuss Huffman- coding algorithm. (CO4, L6)

**OR**

12(b) Write about MPEG audio compression algorithm. (CO4, L1)

13(a) Explain video compression based on motion compensation. (CO5, L2)

**OR**

13(b) Write about Video compression standard H.261. (CO5,L1)

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**TITLE: MULTIMEDIA TOOLS AND APPLICATIONS LAB**

**Course Code: CGSSEP11**

**Offered to: B.Sc. CSCS**

**Domain Subject: COMPUTER APPLICATIONS**

**Semester: V**

**Max. Marks: 50 (CCIA: 10+ SEE: 40)**

**Practical Hrs./Week : 3**

**Type of the Course: Skill Enhancement Course (Elective, Practical) Credits: 01**

**I. Course Outcomes:**

Students at the successful completion of the course will be able to:

CO1: Create/modify a new image with open source applications such as GIMP. (PO5)

CO2: Manipulate images using graphic tools. (PO5)

CO3: Learn basic layer mask essentials. (PO5)

CO4: Compress audio and video files. (PO5, PO7)

CO5: Create a realistic shadow. (PO5)

**II: Practical (Laboratory) Syllabus: (30 Periods)**

1. Editing images using GIMP
2. Improve the Quality of your Image in GIMP
3. Introduction to Layer Masks.
4. Create an impressive background in GIMP
5. Applying Shadow & Highlight effects in images
6. Black& white and color photo conversion.
8. Using File Seizer Software for Audio compression.
9. Using File seizer Software for Video compression.

**III. Lab References:**

Fundamentals of Multimedia by Ze-Nian Li & Mark S. Drew. Publisher: Prentice Hall

Reference Materials on the Web/web-links

<https://ksuit342.wordpress.com/lectuers/>

<https://www.tutorialspoint.com/multimedia>



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**TITLE: MULTIMEDIA TOOLS AND APPLICATIONS LAB**

**Course Code: CGSSEP11**

**Offered to: B.Sc. CSCS**

**Domain Subject: COMPUTER APPLICATIONS**

**Semester: V**

**Max. Marks: 40**

**Time: 3 Hrs**

**Type of the Course: Skill Enhancement Course (Elective, Practical) Credits: 01**

**Section A**

One Major Experiment (Experiment No : ) 15 M

**Section B**

One Minor Experiment (Experiment No : ) 10 M

**Section C**

Practical record 05 M Section D Viva Voce 10 M

**####**



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Course Code: **CGSSET12**

Offered to: **B. Sc (CSCS)**

Domain Subject: **COMPUTER APPLICATIONS**

Semester – **V**

Max. Marks: **100** (CCIA: 25+ SEE:75)

Theory Hrs./Week: **3**

### **DIGITAL IMAGING**

Type of the Course: **Skill Enhancement Course** (Elective Theory), Credits: **04**

**I. Course Outcomes: Students at the successful completion of the course will be able to:**

CO1: Gain knowledge about Types of Graphics, Types of Objects, Types of video editing tools **(PO5)**

CO2: Show their skills in editing and altering photographs for through a basic understanding of the tool box.**(PO5)**

CO3: Gain knowledge in using the layers.**(PO5)**

CO4: Gain knowledge in using the selection tools, repair tools.**(PO5)**

CO5: Gain knowledge in using selection tools, applying filters and can show their skills.**(PO5)**

**II. Syllabus:**

**(Total Theory Hours: 45 Periods)**

**UNIT-I**

**(9periods)**

Types of Graphics- Raster vs Vector Graphics ,Types of Objects - Audio formats, Video formats , Image formats , Text document formats, Types of video editing , Different color modes, Image Scanner-Types of Image Scanners

**UNIT-II**

**(8Periods)**

What is GIMP? , GIMP tool box window, Layers Dialog, Tool Options Dialog, Image window,. Image window menus

**UNIT-III ( 10 Periods)**

**Improving Digital Photos** - Opening files, Rescaling saving files, Cropping, Brightening & Darkening 1 Rotating, Sharpening, and Fixing Red Eye.

**Introduction to layers-** What is layer?, Using layer to add text , Using move tool , Changing colors , Simple effects on layers, Linking layers together , Performing operations on layers, Using layers to copy and paste, Tour of layers dialog

#### **UNIT-IV(9 Periods)**

**Drawing-** Drawing lines and curves , Changing colors and brushes, Erasing , Drawing rectangles, Circles and other shapes, Outlining and filling regions, Filling with patterns and gradients, Importing brushes or gradients or making your own.

**Selection:** Working with selections, Select by color and fuzzy, Select Bezier paths, intelligent scissors tool, Modifying selections with selection modes.

#### **UNIT-V**

**(9 Periods)**

**Erasing and Touching Up:** Dodge and burn tool, Smudging tool , Clone tool , Sharpening using convolve tool, Blurring with Gaussian Blur , Correcting Color Balance, Hue , Saturation , Color balance using curves and levels.

**Filters:**Filters , Blur, Enhance , Distort, Noise Filters.

#### **III References/ Text Book/ e-books/websites**

**Textbook:** Beginning GIMP from Novice to professional by Akkana Peck, Second Edition, A press

**Reference Materials on the Web/web-links:**

<https://www.mygreatlearning.com/gimp/tutorials/gimp-introduction>

#### **IV Co-Curricular Activities**

(Co-curricular activities shall not promote copying from textbook or from others work and shall encourage self/independent and group learning)

##### **A. Measurable**

1. Assignments (in writing and doing forms on the aspects of syllabus content and outside the syllabus content. Shall be individual and challenging)
2. Student seminars (on topics of the syllabus and related aspects (individual activity))
3. Quiz (on topics where the content can be compiled by smaller aspects and data (Individuals or groups as teams))
4. Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual participation and contribution of students shall be ensured (team activity))

##### **B. General**

1. Group Discussion
2. Others



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**Model paper**

Course Code: CGSSET12

Offered to: B.Sc CSCS

**Title of the Course: Digital Imaging**

**SECTION – A**

**Short Answer Questions (25 Marks: 5 x 5)**

**Answer any Five questions. (At least 1 question should be given from each Unit)**

1. Explain different types of image formats.(CO1,L2)
2. Write short notes on Tool box in GIMP.(CO2, L1)
3. Explain briefly about gradients in GIMP. (CO4, L2)
4. Write short notes on clone tool in GIMP.(CO5,L1)
5. Explain rotating, sharpening in GIMP.(CO3,L2)
6. What is a layer? Explain steps to use layer in GIMP.(CO3, L1)
7. Describe different color modes in GIMP.(CO1,L5)
8. What is GIMP? Who invented GIMP? Write about tool box options in GIMP?(CO2,L1)

**SECTION B (Total: 5 x 10 = 50 Marks)**

**Answer all questions. (Two questions should be given from each unit with internal choice)**

9(a) Describe the various color modes in GIMP with example.( CO1,L5)

**OR**

9(b) What are various types of audio and video formats in GIMP? Explain with example.(CO1,L1)

10(a) Describe image window menu in detail.( CO2, L5)

**OR**

10(b) Explain the window layers dialog in GIMP.(CO2, L2)

11(a) Describe Cropping-Brightening and Darkening in GIMP.(CO3, L5)

**OR**

11(b) Explain the steps to solve a fixed-red eye in GIMP.(CO3,L2)

12(a) Explain the working with selections in GIMP.(CO4, L2)

**OR**

12(b) Write about filling with patterns and gradients.(CO4, L1)

13(a) Describe the steps involved in Dodge, Burn and Smudging tool in GIMP.(CO5,L5)

**OR**

13(b)Write about distort and noise filters in GIMP.(CO5,L1)

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Course Code: **CGSSEP12**

**Offered to: B.Sc CSCS**

Domain Subject: **COMPUTER APPLICATIONS**

Semester: V

Max. Marks: **50** (CCIA: 10+ SEE: 40)

Practical Hrs./Week : **3**

### **DIGITAL IMAGING LAB**

Type of the Course: **Skill Enhancement Course** (Elective, Practical)

Credits: 01

**I. Course Outcomes: Students at the successful completion of the course will be able to:**

CO1: Students will gain a working knowledge of Photoshop (PO5)

CO2: Student will be able to show their skills in editing and altering photographs for through a basic understanding of the tool bar. (PO5)

CO3: Student will gain knowledge in using the layers. (PO5)

CO4: Student will gain knowledge in using the selection tools, repair tools.(PO5,PO7)

CO5: Student will gain knowledge in using filters and can show their skills. (PO5)

**II: Practical (Laboratory) Syllabus: (30 Periods)**

1. Designing a Visiting card
2. Design Cover page of a book
3. Paper add for calling tenders
4. Passport photo design
5. Design a Pamphlet
6. Brochure designing
7. Titles designing
8. Custom shapes creation
9. Black & white and color photo conversion
10. Image size modification
11. Background changes
12. Texture and patterns designing
13. Filter effects & Eraser effects



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Course Code: **CGSSEP12**

**Offered to: B.Sc CSCS**

Domain Subject: **COMPUTER APPLICATIONS**

Semester: **V**

Max. Marks: **50** (CCIA: 10+ SEE: 40)

Practical Hrs./Week : **3**

**DIGITAL IMAGING LAB**

**Model Paper: Practicals**

**Time: Three hours**

**Max. Marks: 40**

	<b>Section A</b>
One Major Experiment (Experiment No : )	<b>15 M</b>
	<b>Section B</b>
One Minor Experiment (Experiment No : )	<b>10 M</b>
	<b>Section C</b>
Practical record	<b>05 M</b>
	<b>Section D</b>
Viva Voce	<b>10 M</b>

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*College with Potential for Excellence*  
*ISO9001 – 2015 Certified*

Course Code: **CGSSET13**

Offered to: **B. Sc. (CSCS)**

Domain Subject: **COMPUTER APPLICATIONS**

Semester – V

Max. Marks: **100** (CCIA: 25+ SEE: 75)

Theory Hrs. /Week: **3**

**BIGDATA ANALYTICS USING R**

Type of the Course: **Skill Enhancement Course** (Elective Theory), Credits: **03**

**I. Course Outcomes: Students at the successful completion of the course will be able to:**

CO1: Understand data and classification of digital data. (PO5)

CO2: Gain knowledge of technologies used in big data Analytics. (PO5, PO7)

CO3: Understand basics of R and control structures in R. (PO5)

CO4: Load data into R objects and manipulate them as needed. (PO5)

CO5: Create and edit visualizations with R (PO7)

**II. Syllabus:**

**(Total periods: 45)**

**UNIT – I**

**(8 periods)**

**Introduction to Big data:** What is data, Classification of Digital Data-Structured Unstructured, semi-structured data, Characteristics of data, Evaluation of big data, Definition and challenges of big data, what is big data and why to use big data?

**UNIT – II**

**(10 periods)**

**Big data Analytics:** What is and isn't big data analytics? Classification of analytics, Importance of big data analytics, Technologies needed to meet challenges of big data, data science, Data scientist.

**UNIT – III**

**(9 periods)**

**Introduction to R and getting started with R:** What is R? Why R? Advantages of R over other programming languages, Data types in R - logical, numeric, integer, character, double, Complex, raw, coercion, ls () command, Expressions, Variables and functions, control structures, Array, Matrix, Vectors, Factors, R packages

#### **UNIT – IV**

**(10 periods)**

**Exploring data in R**– Data frames-data frame access, Ordering data frames, functions for data frames dim(), nrow(), ncol(), str(), summary(), names(), head(), tail(), edit(), Load data frames—reading from .CSV files, Sub setting data frames, reading from tab separated value files, Reading from tables, merging data frames

#### **UNIT – V**

**(8 periods)**

**Data Visualization using R:** Reading and getting data into R (External Data), Using CSV files, XML files, Web Data, JSON files, Databases, Excel files, Working with R Charts and Graphs: Histograms, Boxplots, Bar Charts, Line Graphs, Scatterplots, Pie Chart

#### **Textbooks:**

1. Seema Acharya--Data Analytics using R, McGraw Hill education (India) Private Limited.
2. Big Data Analytics, Introduction to Hadoop, Spark, and Machine-Learning, Raj Kamal, Preeti Saxena, McGraw Hill, 2018

#### **Reference Books:**

1. Seema Acharya, Subhashini Chellappan --- Big Data and Analytics second edition, Wiley
2. Big Data, Big Analytics: Emerging Business intelligence and Analytic trends for Today's Business, Michael Minnelli, Michelle Chambers, and Ambiga Dhiraj, John Wiley & Sons, 2013
3. An Introduction to R, Notes on R: A Programming Environment for Data Analysis and Graphics. W. N. Venables, D.M. Smith and the R Development Core Team

#### **IV. RECOMMENDED CO-CURRICULAR ACTIVITIES:**

(Co-curricular activities shall not promote copying from textbook or from others work and shall encourage self/independent and group learning)

##### **A. Measurable**

1. Assignments (in writing and doing forms on the aspects of syllabus content and outside the syllabus content. Shall be individual and challenging)
2. Student seminars (on topics of the syllabus and related aspects (individual activity))
3. Quiz (on topics where the content can be compiled by smaller aspects and data (Individuals or groups as teams))

4. Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual participation and contribution of students shall be ensured (team activity

**B. General**

1. Group Discussion
2. Try to solve MCQ's available online.
3. Others



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**Model Question Paper**

**Title of the Course: BIGDATA ANALYTICS USING R**

Course Code: **CGSSET13**

Offered to: **B. Sc. (CSCS)**

**Max Marks: 75**

**Time: 3 Hrs.**

**SECTION – A**

**Short Answer Questions (25 Marks: 5 x 5)**

**Answer any Five questions. (At least 1 question should be given from each Unit)**

1. What is big data and why to use a big data? (CO1, L1)
2. What is big data analytics? (CO2, L1)
3. Explain ls () command in R. (CO3, L2)
4. Explain about functions in R? (CO3, L1)
5. Write a short note on charts. (CO5, L1)
6. Develop R script to load data into data frames from files. (CO4, L6)
7. Develop bar chart in R. (CO4, L6)
8. Write about the control structures in R with examples. (CO3, L1)

**SECTION B (Total: 5 x 10 = 50 Marks)**

**Answer all questions. (Two questions should be given from each unit with internal choice)**

9(a) Give Classification of Digital Data and explain it. (CO1, L2)

**OR**

(b) Explain Characteristics of Data with an example. (CO1, L2)

10. (a) Write about Importance of big Data Analytics. (CO2, L1)

**OR**

(b) Explain Classification of Analytics. (CO2, L2)

11(a) Write about the Data types in Explain with examples. (CO3, L1)

**OR**

(b) Construct Vector in R and explain various operations on it. (CO3, L3)

12. (a) What are the data frames? Write its significance in R-Language. (CO4, L1)

**OR**

(b) Demonstrate various functions used in data frames. (CO4, L2)

13(a) Build a code in R for reading and getting data into R from databases. (CO5, L6)

**OR**

(b) Develop below plots in R (CO5, L6) Box Whisker plots    b) Scatter plots    c) Pairs plots



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Course Code: **CGSSEP13**

Offered to: **B. Sc (CSCS)**

Domain Subject: **COMPUTER APPLICATIONS**

Semester: **V**

Max. Marks: **50** (CCIA: 10+ SEE: 40)

Practical Hrs. /Week: **3**

**BIG DATA ANALYTICS USING R LAB**

Type of the Course: **Skill Enhancement Course** (Elective, Practical),

Credits: **02**

**I. Course Outcomes: Students at the successful completion of the course will be able to:**

CO1: Implement simple scripts or programs in R. (PO5)

CO2: Access online resources for R and import new function packages into the R workspace. (PO5, PO7)

CO3: Import, review, manipulate and summarize data-sets in R (PO5, PO7)

CO4: Explore data-sets to create testable hypotheses and identify appropriate statistical tests. (PO5, PO7)

CO5: Create and edit visualizations with R. (PO5, PO7)

**II: Practical (Laboratory) Syllabus: (30 Periods)**

4. Create a vector in R and perform operations on it (arithmetic operations, combining Vectors, retrieving elements of vector, assign names to vector elements).

5. Create integer, complex, logical, character data type objects in R and print their values And their class using print and class functions.

6. Create a matrix of values in R and extract data from matrix. (Ex. Second row third etc.) find transpose of matrix and combine two matrices using Rbind and Cbind functions.

4. Create a list in R and perform operations on it like list slicing, sum and mean functions, head and tail functions and finally delete list using rm() function.

5. Create data frame in R and perform operations on it

6. Write code in R to find out whether a number is prime or not.

7. Print numbers from 1 to 100 using while loop and for loop in R.

8. Find the factorial of a number using recursion in R.
9. Perform arithmetic operations in R using switch case
10. Write a code in R to find out whether the number is Armstrong or not.
11. Program to find Multiplication table from 1 to 10 number input by user.
12. Import data into R from text and excel files using read.table() and read.csv() function.
13. Create a dataset and draw different types of graphics using plot, box plot, histogram, pair plot functions.
  
14. Create a dataset and draw different types of graphs using bar charts, pie chart functions.
15. Create custom contingency in R and perform operations on it.

### **III. Lab References:**

1. Seema Acharya--Data Analytics using R, McGraw Hill education (India) Private Limited.
2. Big Data Analytics, Introduction to Hadoop, Spark, and Machine-Learning, Raj kamal, PreetiSaxena, McGraw Hill, 2018

### **Reference Materials on the Web/web-links:**

1. <https://www.wiley.com/enbd/Big+Data,+Big+Analytics:+Emerging+Business+Intelligence+and+Analytic+Trends+for+Today's+Businesses-p-9781118147603>
2. <https://www.wiley.com/en-gb/Big+Data+Analytics%3A+Turning+Big+Data+into+Big+Money-p-9781118147597>





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**BIG DATA ANALYTICS USING R LAB**

Course Code: **CGSSEP13**

Offered to: **B. Sc (CSCS)**

Domain Subject: **Computer Applications**

Semester: V

Max. Marks: **50** (CCIA: 10+ SEE: 40)

Practical Hrs./Week : **3**

**Model Paper: Practical**

**Time: Three hours**

**Max. Marks: 40**

	<b>Section A</b>
One Major Experiment (Experiment No : )	<b>15 M</b>
	<b>Section B</b>
One Minor Experiment (Experiment No : )	<b>10 M</b>
	<b>Section C</b>
Practical Record	<b>05 M</b>
	<b>Section D</b>
Viva Voce	<b>10 M</b>

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Course Code: **CGSSET14**

Offered to: **B.Sc. (CSCS)**

Domain Subject: **COMPUTER APPLICATIONS**

Semester – **V**

Max. Marks: **100** (CCIA: 25+ SEE:75)

Theory Hrs./Week: **3**

**DATASCIENCE USING PYTHON**

Type of the Course: **Skill Enhancement Course** (Elective Theory), Credits: **03**

**I. Course Outcomes: Students at the successful completion of the course will be able to:**

CO1: Understand the need and importance of data science.(PO5,PO7)

CO2: Understand basic concepts of python and implementing control structures in python.(PO5)

CO3: Implement strings and other data structures in python (PO5,PO7)

CO4: Learn and Implement functions and modules in python.(PO5)

CO5: Learn and Implement data cleaning and plotting using pandas.(PO5,PO7)

**II. Syllabus:** (Total Theory Periods: **45**)

**UNIT-I :INTRODUCTION TO DATA SCIENCE(9 periods)**

Data science and its importance, Advantages of data science, The process of data science , Responsibilities of a data scientist, Qualifications of data scientists, Would you be a good data scientist?, Why to use python for data science?

**UNIT-II :INTRODUCTION TO PYTHON (9 periods)**

What is python?, Features of python, History of python, Writing and executing the python program,

Basic syntax, Variables, Keywords, Data types , Operators, Indentation, Control Structures-Conditional statements—If, If-else, Nested if-else, Looping statements—For, While, Nested Loops, Break, Continue, Pass

### **UNIT-III STRINGS AND DATA STRUCTURES (9 periods)**

Strings - definition, accessing, slicing and basic operations, Lists - introduction, accessing list, operations, working with lists, functions and methods, Tuples - introduction, accessing tuple, operations, Dictionaries- introduction, accessing values in dictionaries, working with dictionaries.

### **UNIT-IV:FUNCTIONS AND MODULES (9 periods)**

Functions- Defining a function, Calling a function, Types of functions, Function arguments, Local and global variables, Lambda and recursive functions, Modules---Math, Random, OS, Date and Time

### **UNIT-V:PANDAS (9 periods)**

What is Pandas?, Series, Data Frame, Read CSV Files, Analyzing Data Frames, Data Correlations, Data Cleaning---Empty cells, Data in wrong format, Wrong data, Duplicates, Pandas Plotting-- plot () method, bar plot, hist plot, box plot, area plot, scatter plot, pie plot

#### **III Prescribed Books:**

1. Steven cooper--- Data Science from Scratch, Kindle edition
2. Reema thareja—Python Programming using problem solving approach, Oxford Publication

#### **Reference Books:**

- 1.Wes McKinney--- Python for Data Analysis ,O'REILLY

#### **IV Co-Curricular Activities**

(Co-curricular activities shall not promote copying from textbook or from others work and shall encourage self/independent and group learning)

#### **Measurable**

37. Assignments (in writing and doing forms on the aspects of syllabus content and outside the syllabus content. Shall be individual and challenging)
  38. Student seminars(on topics of the syllabus and related aspects(individual activity))
  39. Quiz (on topics where the content can be compiled by smaller aspects and data(Individuals or groups a steams))
  40. Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual participation and contribution of students shall be ensured (team activity)

#### **General**

28. Group Discussion
29. Try to solve MCQ's available online.
30. Others.



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**Model paper Data Science Using Python**

Course Code: CGSSET14

Offered to: B.Sc. (CSCS)

**SECTION – A**

**Short Answer Questions (25 Marks: 5 x 5)**

**Answer any Five questions. (At least 1 question should be given from each Unit)**

1. Write advantages of data science. (CO1, L1)
2. What are the qualifications of data scientist? (CO1, L2)
3. Explain about the history of python.(CO2, L1)
4. Explain about a) Keywords b) Variables in python.(CO2, L1)
- 5.Explain about string operations in python.(CO3, L1)
6. Explain about the date and time module in python.(CO4, L1)
7. Explain about the local and global variables in python.(CO4, L1)
8. What is data cleaning? Explain about duplicates in pandas.(CO5, L1)

**SECTION B (Total: 5 x 10 = 50 Marks)**

**Answer all questions. (Two questions should be given from each unit with internal choice)**

9. (a) What is Data Science? Explain the Responsibilities of a data scientist.(CO1, L2)

**OR**

9. (b) Explain the use of python for data science?(CO1, L1)

10. (a) Explain different types of conditional statements with examples.(CO2, L1)

**OR**

10. (b) Explain different types of Looping statements with examples.(CO2, L1)

11. (a) What is a list? Explain different operations of lists with examples in python. (CO3, L2)

**OR**

11. (b)What is a Dictionary? Explain accessing values in it with examples in python (CO3, L2)

12. (a) Explain Function definition, calling & different types in python with example.(CO4, L1)

**OR**

12. (b) Explain about random and math module in python with an example.(CO4, L1)

13. (a) What is a data frame? Illustrate the concept of analysing the data frames.(CO5, L2)

**OR**

13. (b) Explain different types of plotting techniques in pandas with examples.(CO5, L1)

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Course Code: **CGSSEP14**

Offered to: **B.Sc. (CSCS)**

Domain Subject: **COMPUTER APPLICATIONS**

Semester: V

Max. Marks: **50** (CCIA: 10+ SEE: 40)

Practical Hrs./Week : **3**

**DATASCIENCE USING PYTHON LAB**

Type of the Course: **Skill Enhancement Course** (Elective, Practical),

Credits: 02

**I. Course Outcomes: Students at the successful completion of the course will be able to:**

CO1: Implement simple programs in basics of python.(PO5)

CO2: Implement control structures in python.(PO5)

CO3: Implement data structures like strings, list, tuples, dictionaries in python.(PO5,PO7)

CO4: Implementation of data frames, data cleaning and plotting in pandas.(PO5,PO7)

**II: Practical (Laboratory) Syllabus: (30 Periods)**

1. Python Program to Find the Square Root
2. Python Program to Swap Two Variables
3. Python Program to Generate a Random Number
4. Python Program to Check if a Number is Odd or Even
5. Python Program to Find the Largest Among Four Numbers
6. Python Program to Check Prime Number
7. Python Program to Display the multiplication Table
8. Python Program to Print the Fibonacci sequence
9. Python Program to Check Armstrong Number
10. Python Program to Find the Sum of Natural Numbers
11. Python Program to Make a Simple Calculator
12. Python Program to Find Factorial of Number Using Recursion

13. Python Program to Add Two Matrices
14. Python Program to Multiply Two Matrices
15. Python Program to Check Whether a String is Palindrome or Not
16. Python Program to perform operations on strings.
17. Python Program to create a list and perform operations on its contents.
18. Python Program to perform operations on tuples.
19. Python Program to create a dictionary and print its content.
20. Python program to import data from CSV file using pandas.
21. Python program to demonstrate plots

### **III. Lab References:**

1. Reemathareja—Python Programming using problem solving approach, Oxford Publication

### **Reference Materials on the Web/web-links:**

1. <https://www.w3schools.com/python/>
2. <https://www.geeksforgeeks.org/python-basics/>



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Course Code: **CGSSEP14**

Offered to: **B.Sc. (CSCS)**

Domain Subject: **Computer Applications**

Semester: **V**

Max. Marks: **50** (CCIA: 10+ SEE: 40)

Practical Hrs./Week : **3**

**Model Paper: Practicals**

**Time: Three hours**

**Max. Marks: 40**

**Section A**

One Major Experiment (Experiment No : ) **15 M**

**Section B**

One Minor Experiment (Experiment No : ) **10 M**

**Section C**

Practical Record **05 M**

**Section D**

Viva Voce **10 M**

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Course Code: **CGSSET15**

Offered to: **B.Sc.(CSCS)**

Domain Subject: **COMPUTER SCIENCE**

Semester – **V**

Max. Marks: **100** (CCIA: 25+ SEE:75)

Theory Hrs./Week: **3**

**INTERNET OF THINGS**

Type of the Course: **Skill Enhancement Course** (Elective Theory), Credits: **03**

**I. Course Outcomes: Students at the successful completion of the course will be able to:**

CO1:Understand architecture and applications of IoT systems.(PO5)

CO2:Gain knowledge of various development boards used for IoT.(PO5)

CO3:Understand various Wireless Technologies used in IoT.(PO5)

CO4:Learn how to use various sensors and actuators for design of IoT.(PO7)

CO5:Learn how to connect various things to Internet and develop simple IOT Devices.(PO7)

**II. Syllabus:** (Total Theory periods: **45**)

**UNIT-I** (8Periods)

Fundamentals of IoT: Introduction, Definitions & Characteristics of IoT, IoT Architectures, Physical & Logical Design of IoT, Enabling Technologies in IoT, History of IoT, About Things in IoT, The Identifiers in IoT, About the Internet in IoT, IoT frameworks, IoT andM2M.

Applications of IoT: Home Automation, Smart Cities, Energy, Retail Management, Logistics, Agriculture, Health and Lifestyle, Industrial IoT, Legal challenges, IoT design Ethics, IoT in Environmental Protection.

**UNIT-II** (10 Periods)



Sensors Networks: Definition, Types of Sensors, Types of Actuators, Examples and Working, IoT Development Boards: Arduino IDE and Board Types, Rasp berri Pi Development Kit, RFID Principles and components, Wireless Sensor Networks: History and Context, The node, Connecting nodes, Networking Nodes, WSN and IoT.

### **UNIT-III**

**( 9 Periods)**

Wireless Technologies for IoT: WPAN Technologies for IoT: IEEE 802.15.4, Zigbee, HART, NFC, Z-Wave, BLE, Bacnet and Modbus. IP Based Protocols for IoT IPv6, 6LoWPAN, LoRA, RPL, REST, AMQP, CoAP, MQTT. Edge connectivity and protocols.

### **UNIT-IV**

**(9 Periods)**

Arduino Simulation Environment: Arduino Uno Architecture, Setting up the IDE, Writing Arduino Software, Arduino Libraries, Basics of Embedded C programming for Arduino, Interfacing LED, push button and buzzer with Arduino, Interfacing Arduino with LCD.

Sensor & Actuators with Arduino: Overview of Sensors working, Analog and Digital Sensors, Interfacing of Temperature, Humidity, Motion, Light and Gas Sensors with Arduino, Interfacing of Actuators with Arduino, Interfacing of Relay Switch and Servo Motor with Arduino.

### **UNIT-V**

**(9 Periods)**

Developing IOT's: Implementation of IoT with Arduino, Connecting and using various IoT Cloud Based Platforms such as Blynk, Things peak, AWS IoT, Google Cloud IoT Core etc. Cloud Computing, Fog Computing, Privacy and Security Issues in IoT.

### **III Text Book/References**

6. Internet of Things - A Hands-on Approach, Arshdeep Bahga and Vijay Madiseti ,Universities Press, 2015, ISBN: 9788173719547
7. Vijay Madiseti and Arshdeep Bahga, "Internet of Things (A Hands-on Approach)", 1st Edition, VPT, 2014
8. Daniel Minoli,—"Building the Internet of Things with IPv6 and MIPv6: The Evolving World of M2M Communications", ISBN: 978-1-118-47347-4, Wiley Publications
9. Pethuru Raj and Anupama C. Raman, "The Internet of Things: Enabling Technologies, Platforms, and Use Cases", CRC Press
10. Open source software/learning websites
  - a. [http://www.cse.wustl.edu/~jain/cse570-15/ftp/iot\\_prot/index.html](http://www.cse.wustl.edu/~jain/cse570-15/ftp/iot_prot/index.html)
  - b. Contiki (Open source IoT operating system)
  - c. Arduroid (open source IoT project)
  - d. IoT Toolkit (smart object API gateway service reference implementation)

Reference Materials on the Web/web-links:

5. <https://github.com/connectIOT/iottoolkit>
6. <https://github.com/connectIOT/iottoolkithttps://www.arduino.cc/>
7. [https://onlinecourses.nptel.ac.in/noc17\\_cs22/course](https://onlinecourses.nptel.ac.in/noc17_cs22/course)
8. <https://blynk.io>(Mobileapp)

#### **IV IV Co-Curricular Activities**

(Co-curricular activities shall not promote copying from textbook or from others work and shall encourage self/independent and group learning)

##### Measurable

41. Assignments (in writing and doing forms on the aspects of syllabus content and outside the syllabus content. Shall be individual and challenging)
  42. Student seminars(on topics of the syllabus and related aspects(individual activity))
  43. Quiz (on topics where the content can be compiled by smaller aspects and data(Individuals or groups a steams))
  44. Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual participation and contribution of students shall be ensured (team activity))

##### General

31. Group Discussion
32. Try to solve MCQ's available online.
33. Others.



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**Model paper**

**Course Code: CGSSET15**

Offered to: **B.Sc. (CSCS)**

**Title of the Course: Internet Of Things**

**SECTION – A**

**Short Answer Questions (25 Marks: 5 x 5)**

**Answer any Five questions. (At least 1 question should be given from each Unit)**

1. Define IOT and write characteristics of IOT.(CO1,L1)
2. Differentiate IOT and M2M.(CO1,L4)
3. Define Actuator and explain about it.(CO2,L1)
4. Compare WSN and IOT.(CO2,L4)
5. Explain about wireless technology Zigbee.(CO3,L2)
6. Explain about light and gas sensors.(CO4,L2)
7. Write short note on Fog Computing.(CO5,L1)
8. What is use of AWS IOT?(CO5,L1)

**SECTION B (Total: 5 x 10 = 50 Marks)**

**Answer all questions. (Two questions should be given from each unit with internal choice)**

9 (a) Explain IOT architecture with neat diagram.(CO1,L2)

**OR**

9(b) Discuss about Applications of IOT.(CO1,L6)

10(a) List various types of sensors in IOT and explain any 3 of them.(CO2,L2)

**OR**

10(b) List RFID components and explain them..(CO2,L2)

11(a) Write names of wireless technologies used in IOT and describe any 2 of them.(CO3,L2)

**OR**

11(b) Compare and Contrast MQTT and CoAP protocols.(CO3,L4)

12(a) Explain Arduino Uno Architecture.(CO4,L2)

**OR**

12(b) Construct steps for Interfacing Arduino with LCD and explain them.(CO4,L3)

13(a) Discuss about Privacy and security issues in IOT.(CO5,L6)

**OR**

13(b) Write code to Design any App of your choice using Thingspeak.(CO5,L6)

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Course Code: **CGSSEP15**

Offered to: **B.Sc.(CSCS)**

Domain Subject: **COMPUTER SCIENCE**

Semester: **V**

Max. Marks: **50** (CCIA: 10+ SEE: 40)

Practical Hrs./Week : **3**

**INTERNET OF THINGS LAB**

Type of the Course: **Skill Enhancement Course** (Elective, Practical),

Credits: **02**

**I. Course Outcomes: Students at the successful completion of the course will be able to:**

CO1: Acquire the skills to design a small IoT device.(PO5)

CO2: Connect various sensors, actuators ,etcto Arduino board.(PO5)

CO3:Connect the things to Internet.(PO5)

CO4:Design as mall mobile app to control the sensors.(PO5,PO7)

CO5:Deploy as imple IoT device.(PO5,PO7)

**II: Practical (Laboratory) Syllabus: (30 Periods)**

14. Understanding ArduinoUNO Board and Components

15. Installing and work with Arduino IDE

16. Blinking LED sketch with Arduino

17. Simulationof4- WayTrafficLightwithArduino

18. Using Pulse Width Modulation

19. LED Fade Sketchand Button Sketch

20. Analog Input Sketch(Bar Graph with LEDs and Potentio metre)

21. Digital Read Serial Sketch (Working with DHT/IR/Gas or Anyother Sensor)

22. Working with Adafruit Libraries in Arduino

23. Spinning a DC Motorand Motor Speed Control Sketch

24. Working with Shields

25. Design APP using Blink Appor Things peak API and connecti to LED bulb.

26. Design APP Using Blink Appand Connectto Temperature, magnetic Sensors.

**II. Lab References:**

4. Internet of Things - A Hands-on Approach, Arshdeep Bahga and Vijay Madiseti, Universities Press, 2015, ISBN: 9788173719547

5. Vijay Madiseti and Arshdeep Bahga, "Internet of Things (A Hands-on Approach)", 1stEdition, VPT, 2014

6. DanielMinoli,—“BuildingtheInternetofThingswithIPv6andMIPv6:TheEvolvingWorldo fM2MCommunications”,ISBN:978-1-118-47347-4,WillyPublications

**Reference Materials on the Web/web-links:**

4. <https://github.com/connectIoT/iottoolkit><https://www.arduino.cc/>

5. [https://onlinecourses.nptel.ac.in/noc17\\_cs22/course](https://onlinecourses.nptel.ac.in/noc17_cs22/course)

6. <https://blynk.io>(Mobileapp)



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**Model Question Paper**

Course Code: **CGSSEP15**

Offered to: **B.Sc(CSCS)**

**Title: Internet of Things Lab**

Domain Subject: **Computer Science**

Semester: **V**

Max. Marks: **40**

Time: **3 Hrs**

**Model Paper: Practicals**

**Time: Three hours**

**Max. Marks: 40**

**Section A**

One Major Experiment (Experiment No : ) **15 M**

**Section B**

One Minor Experiment (Experiment No : ) **10 M**

**Section C**

Practical Record **05 M**

**Section D**

Viva Voce **10 M**

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Course Code: **CGSSET16**

Offered to: **B.Sc.CSCS**

Domain Subject: **COMPUTER SCIENCE**

Semester – **V**

Max. Marks: **100** (CCIA: 25+ SEE:75)

Theory Hrs./Week: **3**

**APPLICATION DEVELOPMENT USING PYTHON**

Type of the Course: **Skill Enhancement Course** (Elective Theory),

Credits: **03**

**I. Course Outcomes: Students at the successful completion of the course will be able to:**

CO1: Understand basics of python and write applications using strings, tuples, lists, sets.(PO5,PO7)

CO2: Understand and use exceptions and packages for different applications.(PO5,PO7)

CO3:Create, run and manipulate Python Programs using threads and Regular Expressions.(PO5,PO7)

CO4:Apply concepts of Python programming in various fields related to IOT, Web Services and Databases in Python.(PO5,PO7)

CO5: write applications in python to perform various database operations.(PO5,PO7)

**II. Syllabus:**

**(Total Theory Periods: 45)**

**UNIT-I**

**(9 Periods)**

**Python basics, Objects-** Python Objects, Standard Types, Other Built-in Types, InternalTypes,StandardTypeOperators,StandardTypeBuilt-inFunctions,

**Sequences-**Strings, Lists, and Tuples, Mapping and SetTypes.

**Numbers-**Introduction to Numbers, Integers, Floating Point Real Numbers, Complex Numbers, Operators, Related Modules.

**UNIT-II**

**(10 Periods)**

**Files:** File Objects, File Built-in Function [ open() ], File Built-in Methods, File Built-in Attributes, Command-line Arguments, File System, File Execution, Persistent Storage Modules, Related Modules.

**Exceptions:** Exceptions in Python, Detecting and Handling Exceptions, Context Management,

Exceptions as Strings, Raising Exceptions, Assertions, Standard Exceptions, Creating Exceptions.

**Modules:** Modules and Files, Namespaces, Importing Modules, Importing Module Attributes, Module Built-in Functions, Packages.

### UNIT-III

( 8 Periods)

**Regular Expressions:** Introduction, Special Symbols and Characters, Resand Python Multithreaded Programming: Introduction, Threads and Processes, Python, Threads, and the Global Interpreter Lock, Thread Module, Threading Module.

### UNIT-IV

(10 Periods)

**GUI Programming:** Introduction, Tkinter and Python Programming, Brief Tour of Other GUIs, Related Modules and Other GUIs.

**Web Programming:** Introduction, Web Surfing with Python, Creating Simple Web Clients, Advanced WebClients,CGI-HelpingServersProcessClientData,BuildingCGIApplication,Web (HTTP) Servers.

### UNIT-V

(8 Periods)

**Database Programming:** Introduction, Python Database Application Programmer's Interface (DBAPI), Object Relational Managers(ORMs).

## III Text Book/References

11. Core Python Programming , WesleyJ. Chun, Second Edition, Pearson.
12. Think Python, Allen Downey, Green Tea Press.
13. Introduction to Python, Kenneth A. Lambert, Cengage.
14. Python Programming: A Modern Approach, Vamsi Kurama, Pearson.
15. Learning Python, Mark Lutz, O'Really.

Reference Materials on the Web/web-links:

9. <https://www.tutorialspoint.com/python/index.htm>
10. <https://www.w3schools.com/python/>

## IV Co-Curricular Activities

(Co-curricular activities shall not promote copying from textbook or from others work and shall encourage self/independent and group learning)

Measurable

45. Assignments (in writing and doing forms on the aspects of syllabus content and outside the

syllabus content. Shall be individual and challenging)

46. Student seminars(on topics of the syllabus and related aspects(individual activity))
47. Quiz (on topics where the content can be compiled by smaller aspects and data(Individuals or groups a steams))
48. Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual participation and contribution of students shall be ensured (team activity)

#### General

34. Group Discussion
35. Try to solve MCQ's available online.
36. Others.





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**Model paper**

Course Code: **CGSSET16**

Offered to: **B.Sc. CSCS**

**Title of the Course: Application Development Using Python**

**SECTION – A**

**Short Answer Questions (25 Marks: 5 x 5)**

**Answer any Five questions. (At least 1 question should be given from each Unit)**

- 25) Give classification of various built in datatypes in python .(CO1,L2)
- 26) Compare tuples and sets in python.(CO1,L4)
- 27) What is need of assertions in python? Give simple example.(CO2,L1)
- 28) Write program in python to demonstrate Command Line arguments.(CO2,L5)
- 29) Write 5 special symbols used in python and their purpose.(CO3,L1)
- 30) Write short note on web surfing with python.(CO4,L1)
- 31) Why do we use Global Interpreter lock in Python?(CO5,L1)
- 32) What is need and use of Object Relational managers in python?(CO5,L1)

**SECTION B (Total: 5 x 10 = 50 Marks)**

**Answer all questions. (Two questions should be given from each unit with internal choice)**

9 (a) Write names of ten built in functions in python and explain them.(CO1,L2)

**OR**

9(b) Create a list in python and apply five list methods on it.(CO1,L6)

10(a) Create a program in python to demonstrate exception handling.(CO2,L6)

**OR**

10(b) Develop a program in python for user defined module creation and importing.(CO2,L6)

11(a) Develop multithreaded program in python.(CO3,L6)

**OR**

11(b) Explain about threading module with an example program.(CO3,L2)

12(a) Discuss with steps building CGI application in Python.(CO4,L6)

**OR**

12(b) Explain with example creating simple web client in python.(CO4,L6)

13(a) Explain about Python database Application programmers interface.(CO5,L2)

**OR**

13(b) Create database application in python to insert and delete student records.(CO5,L6).

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Course Code: **CGSSEP16**

Domain Subject: **COMPUTER SCIENCE**

Semester: **V**

Max. Marks: **50** (CCIA: 10+ SEE: 40)

Practical Hrs./Week : **3**

**APPLICATION DEVELOPMENT USING PYTHON LAB**

Type of the Course: **Skill Enhancement Course** (Elective, Practical),

Credits: 02

**I. Course Outcomes: Students at the successful completion of the course will be able to:**

CO1:Acquire the skills to write simple programs in python.(PO5,PO7)

CO2:Implement programs related to various data structures like lists, sets etc. .(PO5,PO7)

CO3:Implement programs related to files.(PO5,PO7)

CO4:Implement Exception handling programs in python.(PO5,PO7)

CO5:Implement programs to insert, delete, display data in databases.(PO5,PO7)

**II: Practical (Laboratory) Syllabus: (30 Periods)**

1. Write a menu driven program to convert the given temperature from Fahrenheit to Celsius and vice versa depending upon user's choice.
2. Write a python program to calculate total marks, percentage and grade of a student. Marks obtained in each of the three subjects are to be input by the user. Assign grades according to the following criteria:
  - Grade A: Percentage $\geq$ 80
  - Grade B: Percentage $\geq$ 70 and  $<$ 80
  - Grade C: Percentage $\geq$ 60 and  $<$ 70
  - Grade D: Percentage $\geq$ 40 and  $<$ 60
  - Grade E: Percentage $<$ 40
3. Write a python program to display the first n terms of Fibonacci series.
4. Write a python program to calculate the sum and product of two compatible matrices.

5. Write a function that takes a character and returns True if it is a vowel and False otherwise.
6. Write a menu-driven program to create mathematical 3D objects
  - I. curve
  - II. sphere
  - III. cone
  - IV. arrow
  - V. ring
  - VI. Cylinder.
7. Write a python program to read n integers and display them as a histogram.
8. Write a python program to display sine, cosine, polynomial and exponential curves.
9. Write a python program to plot a graph of people with pulse rate p vs. height h. The value of P and H are to be entered by the user.
10. Write a python program to calculate the mass m in a chemical reaction. The mass m (in gms) disintegrates according to the formula  $m=60/(t+2)$ , where t is the time in hours. Sketch a graph for t vs. m, where  $t \geq 0$ .
11. A population of 1000 bacteria is introduced into a nutrient medium. The population p grows as follows:  

$$P(t) = (15000(1+t)) / (15+e)$$
12. Where the time t is measured in hours. WAP to determine the size of the population at given time t and plot a graph for P vs t or the specified time interval.
13. Input initial velocity and acceleration, and plot the following graphs depicting equations of motion:
  - I. Velocity wr t time ( $v=u+at$ )
  - II. Distance wr t time ( $s=u*t+0.5*a*t*t$ )
  - III. distance wr velocity ( $s=(v*v-u*u)/2*a$ )
14. Write a program that takes two lists and returns True if they have at least one common member.
15. Write a Python program to print a specified list after removing the 0th, 2nd, 4th and 5th elements.
16. Write a program to implement exception handling.
17. Try to configure the widget with various options like: `bg="green"`, `family="times"`, `size=20`.
18. Write a Python program to read last 5 lines of a file.

19. Design a simple database application that stores there cords and retrieve the same
20. Design a database application to search the specified ecord from thed atabase.
21. Design a database eapplicati onto that allows the user to add, delete and modify the records.

### **III. Lab References:**

1. Core Python Programming, WesleyJ. Chun, Second Edition, Pearson.
2. Think Python, Allen Downey, Green Tea Press.

### **Reference Materials on the Web/web-links:**

11. <https://www.tutorialspoint.com/python/index.htm>
12. <https://www.w3schools.com/python/>



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**APPLICATION DEVELOPMENT USING PYTHON LAB**

Course Code: **CGSSEP16**

Offered to: **B.Sc.CSCS**

Domain Subject: **Computer Science**

Semester: **V**

Max. Marks: **50** (CCIA: 10+ SEE: 40)

Practical Hrs./Week : **3**

**Model Paper: Practicals**

**Time: Three hours**

**Max. Marks: 40**

**Section A**

One Major Experiment (Experiment No : ) **15 M**

**Section B**

One Minor Experiment (Experiment No : ) **10 M**

**Section C**

Practical Record **05 M**

**Section D**

Viva Voce **10 M**

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Course Code: **CGSSET17**

Offered to: **B.Sc. (CSCS)**

Domain Subject: **Computer Science**

Semester – **V**

Max. Marks: **100** (CCIA: 25+ SEE:75)

Theory Hrs./Week: **5**

**IT COGNITION AND PROBLEM SOLVING**

Type of the Course: **Skill Enhancement Course** (Elective Theory), Credits: **03**

**I. Course Outcomes: Students at the successful completion of the course will be able to:**

CO1: Understand what Cognition is all about.(PO6,PO7)

CO2: Know about Perceptual Processes (PO6,PO7)

CO3: Know about Working Memory (PO6,PO7)

CO4: Understood Problem Solving, Reasoning and Decision Making (PO6,PO7)

CO5: Know about Future Skills (PO6,PO7)

**II. Syllabus:**

**(Total Theory Hours: 45)**

**Unit I**

**Introduction to Cognition:** Meaning cognitive processes, Development of cognitive psychology: Structuralism, Functionalism, Behaviorism, Memory Research, Gestalt psychology, Emergence of cognitive psychology, Information Processing, Connectionism, Alternate approaches to cognitive psychology, Research Methods in Cognitive Psychology.

**Unit II**

**Perceptual Processes:** Object Recognition- theories of object recognition, Bottom-Up and Top-Down Processing, Face Perception, Change Blindness. Attention: Divided attention, Selective Attention, Visual attention and auditory attention. Consciousness: Varieties, Subliminal Perception. Visual Perception - Perceptual Organizational Processes, Multisensory interaction and Integration – Synthesis, Comparing the senses, Perception and Action.

**Unit III**

**Memory- Working Memory:** Research on Working Memory, Factors affecting the capacity of working Memory, Baddeley's Working Memory Approach. Long Term Memory: Encoding and Retrieval in Long Term Memory, Autobiographical Memory. Memory Strategies: Practice, Mnemonics using Imagery, Mnemonics using organization, The Multimodal Approach, Improving Prospective Memory. Meta cognition :Meta memory, TOT, Meta comprehension.

## Unit IV

**Problem Solving, Reasoning and Decision Making:** VUCA World Problem Solving – Types of problem, Understanding the problem, Problem-Solving Approaches, Factors that influence Problem Solving, creativity, Reasoning – Inductive and Deductive Reasoning Decision Making – Heuristics in decision making – representativeness, availability and Anchoring and adjustment. The framing effect, Overconfidence in decisions, The Hindsight Bias.

## Unit V

**Future Skills:** Critical thinking, Adaptive thinking, Cognitive Load Management, Design thinking, Virtual Collaboration and Cultural Sensitivity

### III References/ Text Book/ e-books/websites

1. Matlin M.W. (2003) 'Cognition' 5th Edition, Wiley Publication.
2. Riegler, B.R., Reigler, G.L. (2008), Cognitive Psychology – Applying the Science of Mind. 2nd Edition, Pearson Education.
3. Benjafield J G (2007). 'Cognition' 3rd Edition.Oxford University Press.
4. Goldstein B.E.(2008) 'Cognitive Psychology' 2nd Edition, Wadsworth.

### IV Co-Curricular Activities

(Co-curricular activities shall not promote copying from textbook or from others work and shall encourage self/independent and group learning)

#### Measurable

49. Assignments (in writing and doing forms on the aspects of syllabus content and outside the syllabus content. Shall be individual and challenging)
  50. Student seminars(on topics of the syllabus and related aspects(individual activity))
  51. Quiz (on topics where the content can be compiled by smaller aspects and data(Individuals or groups a steams))
  52. Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual participation and contribution of students shall be ensured (team activity))

#### General

37. Group Discussion
38. Try to solve MCQ's available online.
39. Others.



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Course Code: CGSSET17  
Domain Subject: **Computer Science**  
Max. Marks:75

Offered to: **B.Sc. (CSCS)**  
Semester – V  
Time: 3 Hrs.

### IT COGNITION AND PROBLEM SOLVING MODEL PAPER

#### Section-A

**ANSWER ANY FIVE QUESTIONS** **5x5M=25M**

1. Explain about the need of cognitive process. (CO1, L1)
2. Explain about bottom up processing. (CO2,L1)
3. Write about face perception. (CO2,L1)
4. Explain about Meta memory. (CO3, L1)
5. Explain about Meta comprehension. (CO3,L1)
6. Explain about the impact of over confidence in decisions. (CO4,L1)
7. Summarize hindsight bias. (CO4, L2)
8. Explain about adaptive thinking. (CO5, L1)

#### Section-B

**ANSWER THE FOLLOWING QUESTIONS** **5x10M=50M**

9. (A) Categorize and explain development of cognitive psychology. (CO1, L4)  
OR  
(B) Illustrate alternative approaches to cognitive psychology. (CO1, L4)
10. (A) Explain about visual attention. (CO2, L1)  
OR  
(B) Explain about subliminal perception. (CO2, L1)
11. (A) Explain about factors affecting the capacity of working memory. (CO3, L1)  
OR  
(B) Explain about encoding and retrieval in long term memory. (CO3, L1)
12. (A) Explain about factors that influence problem solving. (CO4, L1)  
OR  
(B) Define decision making. Give an overview of inductive decision making. (CO4, L1)
13. (A) Illustrate critical thinking. (CO5, L1).  
OR  
(B) Describe about cognitive load management. (CO5, L1).

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Course Code: **CSCSET01**

Offered to: **B.Sc. (MSCS, MPCS, MECS)**

Domain Subject: **COMPUTER SCIENCE**

Semester – V/VI

Max. Marks: **100** (CCIA: 25+ SEE:75)

Theory Hrs./Week: **3**

**Course 6A: DATA SCIENCE**

Type of the Course: **Skill Enhancement Course** (Elective Theory),

Credits: **03**

**I. Course Outcomes:** Students at the successful completion of the course will be able to:

CO1: Analyze the data and their type to build programs using lists and tuples in Python.(PO5)

CO2: Understand the concept of getting data, cleaning and manipulating data(PO5)

CO3: Be capable of understanding the concepts of K-Nearest Neighbors, Naïve Baye's.(PO5,PO7)

CO4: Understand the concepts of Simple, Multiple & Logistic regressions.(PO5,PO7)

CO5: Acquire knowledge on Decision Trees and Neural Networks.(PO5,PO7)

**II. Syllabus**

**(Total Theory periods: 45)**

**UNIT - I**

(8 hours)

**Introduction:** The Ascendance of Data, What is Data Science?, Finding key Connectors- Data Scientists You May Know, Salaries and Experience - Paid Accounts ,Topics of Interest, Onward.

**Python:** Getting Python, The Zen of Python, Whitespace Formatting, Modules , Arithmetic,

Functions, Strings, Exceptions, Lists, Tuples, Dictionaries, Sets, Control Flow, Truthiness, Sorting, List Comprehensions

**Visualizing Data** : Matplotlib, Bar charts, Line charts ,Scatterplots

## UNIT - II (10 hours)

**Getting Data**: stdin and stdout, Reading Files – The Basics of Text Files, Delimited Files, Scraping the Web - HTML and the parsing Thereof, Example: O'Reilly Books about Data, Using APIs – JSON (and XML), Using an Unauthenticated API, Finding APIs.

**Working with Data** : Exploring Your Data, Exploring One-Dimensional Data, Two Dimensions Many Dimensions, Cleaning and Munging, Manipulating Data, Rescaling, Dimensionality Reduction.

## UNIT - III (10 hours)

**Machine Learning**: Modeling, What Is Machine Learning? Over fitting and under fitting, Correctness, The Bias-Variance Trade-off, Feature Extraction and Selection.

**K-Nearest Neighbors**: The Model, Example: Favourite Languages, The Curse of Dimensionality.

**Naive Bayes**: A Really Dumb Spam Filter, A More Sophisticated Spam Filter, Implementation, Testing Our Model.

## UNIT - IV (9 hours)

**Simple Linear Regression**: The Model, Using Gradient Descent, Maximum Likelihood Estimation.

**Multiple Regressions**: The Model, Further Assumptions of the Least Squares Model, Fitting the Model, Interpreting the Model, Goodness of F.

**Logistic Regression**: The Problem, the Logistic Function, Applying the Model, Goodness of Fit Support Vector Machines.

## UNIT - V (8 hours)

**Decision Trees**: What Is a Decision Tree? Entropy the Entropy of a Partition, Creating a Decision Tree, Putting It All Together, Random Forests.

**Neural Networks**: Perceptron, Feed-Forward Neul Networks and Back propagation, Example: Defeating a CAPTCHA.

### III. References/ Text Book/ e-books/websites

#### Text Books:

7. Data Science from Scratch by Joel Grus O'ReillyMedia
8. Wes McKinney, "Python for Data Analysis: Data Wrangling with Pandas, NumPy, and IPython", O'Reilly, 2nd Edition, 2018.

#### Reference Books:

2. Jake Vander Plas, "Python Data Science Handbook: Essential Tools for Working with Data", O'Reilly, 2017.

#### Webresources:

- a. <https://www.edx.org/course/analyzing-data-with-python>
- b. [http://math.ecnu.edu.cn/~lfzhou/seminar/\[Joel\\_Grus\]\\_Data\\_Science\\_from\\_Scratch\\_First\\_Princ.pdf](http://math.ecnu.edu.cn/~lfzhou/seminar/[Joel_Grus]_Data_Science_from_Scratch_First_Princ.pdf)

### IV. Co-Curricular Activities

(Co-curricular activities shall not promote copying from textbook or from others work and shall encourage self/independent and group learning)

#### A. Measurable

1. Assignments (in writing and doing forms on the aspects of syllabus content and outside the syllabus content. Shall be individual and challenging)
2. Student seminars (on topics of the syllabus and related aspects (individual activity))
3. Quiz (on topics where the content can be compiled by smaller aspects and data (Individuals or groups as teams))
4. Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual participation and contribution of students shall be ensured (team activity))

#### B. General

1. Group Discussion
2. Others



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**Model paper**

**Course Code: CSCSET01**

Offered to: **B.Sc. (MSCS,MPCS, MECS,)**

**Title of the Course: Data Science**

**SECTION – A**

**Short Answer Questions (25 Marks: 5 x 5)**

**Answer any Five questions. (At least 1 question should be given from each Unit)**

9. What is Data Science? Explain key connectors in data science? (CO1, L1)
10. Explain a) stdin b) stdout with examples? (CO2, L2)
11. Explain briefly about the concept of reading files? (CO3, L2)
12. Explain Simple Linear Regression using Gradient Descent? (CO4, L2)
13. Explain briefly about Logistic Regression? (CO5, L2)
14. Explain a) Lists b) Tuples c) Dictionaries in Python? (CO1, L2)
15. Explain in detail about Manipulating data? (CO3, L2)
16. Explain the concept of Random Forests? (CO5, L2)

**SECTION B (Total: 5 x 10 = 50 Marks)**

**Answer all questions. (Two questions should be given from each unit with internal choice)**

10. (A) Explain in detail about Visualizing Data? (CO<sub>1</sub>, L2)  
(OR)  
(B) Explain the concept of functions and strings in python with example? (CO1, L2)
11. (A) Explain the concept of reading files? (CO3, L2)  
(OR)  
(B) Explain about Exploring One-Dimensional and Two- Dimensional data? (CO3, L2)
12. (A) Explain Machine learning with overfitting and underfitting in detail? (CO3, L2).  
(OR)  
(B) Explain K- Nearest Neighbors Model with an example? (CO4, L2)
13. (A) Explain Maximum Likelihood Estimation with example? (CO4, L2)  
(OR)  
(B) Explain in detail about Multiple Regression Model? (CO4, L2)
14. (A) Explain in detail about the concept of Decision Trees? (CO5, L2)  
(OR)  
(B) Explain the concept of Neural Networks with an example? (CO5, L2)

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Course Code: **CSCSEP01** Offered to: **B.Sc. (MPCS, MECS)**  
Domain Subject: **COMPUTER SCIENCE** Semester: V/VI  
Max. Marks: **50** (CCIA: 10+ SEE: 40) Practical Hrs./Week : **3**

**Course 6A: Data Science LAB**

Type of the Course: **Skill Enhancement Course** (Elective, Practical), Credits: 02

**I. Course Outcomes: Students at the successful completion of the course will be able to:**

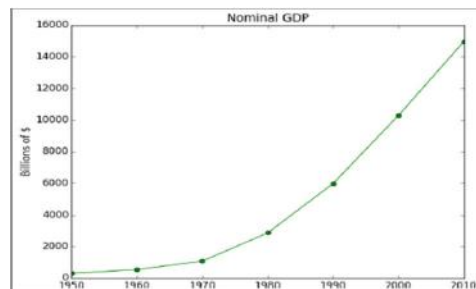
- CO1: Implement the programs to get the required data, process it and present the outputs using Python language. (PO5)
- CO2: Execute statistical analyses with Open-source Python software. (PO5)
- CO3: Apply data science solutions to real world problems. (PO5)
- CO4: Implement Plot Distribution Curve in Python. (PO5)
- CO5: Implement rainfall data importing of some location with the help of packages available in R Studio and plot a chart of your choice. (PO5)

**II: Practical (Laboratory) Syllabus: (30 Periods).**

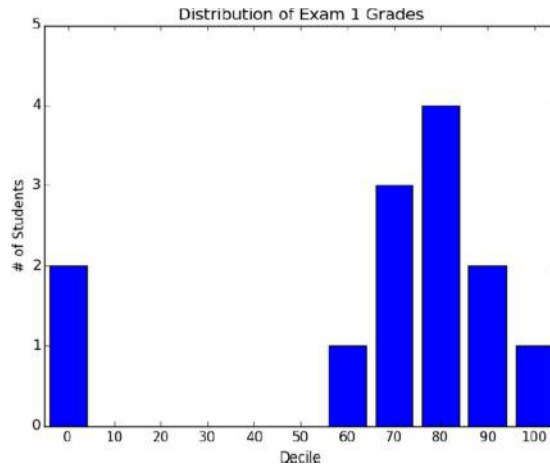
**LAB EXERCISES**

**III. Practical (Laboratory) Syllabus: (30hrs.)**

1. Write a Python program to create a line chart for values of year and GDP as given below



2. Write a Python program to create a bar chart to display number of students secured different grading as given below



3. Write a Python program to create a time series chart by taking one year month wise stock data in a CSV file
4. Write a Python program to plot distribution curve
5. Import a CSV file and perform various Statistical and Comparison operations on rows/columns. Write a python program to plot a graph of people with pulse rate pvs. height h. The values of P and H are to be entered by the user.
6. Import rainfall data of some location with the help of packages available in R Studio and plot a chart of your choice.

### Lab References:

3. Data Science from Scratch by Joel Grus O'Reilly Media
4. Wes McKinney, "Python for Data Analysis: Data Wrangling with Pandas, NumPy, and IPython", O'Reilly, 2nd Edition, 2018.

### Reference Materials on the Web/web

- a. <https://swcarpentry.github.io/python-novice-gapminder/09-plotting/index.html/>
- b. <https://www.geeksforgeeks.org/visualize-data-from-csv-file-in-python/>



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Course Code: **CSCSEP01**

Offered to: **B.Sc. (MSCS,MPCS,MECS,CSCS)**

**Title: Data Science Lab (Model Paper)**

Domain Subject: **Computer Science**

Semester: **V/VI**

Max. Marks: **50** (CCIA: 10+ SEE: 40)

Practical Hrs./Week : **3**

**Model Paper: Practicals**

**Time: Three hours**

**Max. Marks: 40**

**Section A**

One Major Experiment (Experiment No : ) **15 M**

**Section B**

One Minor Experiment (Experiment No : ) **10 M**

**Section C**

Practical Record **05 M**

**Section D**

Viva Voce **10 M**

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Course Code: **CSCSET02** Offered to: **B.Sc. (MSCS, MPCS, MECS)**  
Domain Subject: **COMPUTER SCIENCE** Semester – **V/VI**

Max. Marks: **100** (CCIA: 25+ SEE:75) Theory Hrs./Week: **3**

**Course 7A: PYTHON FOR DATASCIENCE**

Type of the Course: **Skill Enhancement Course** (Elective Theory), Credits: **03**

**I. Course Outcomes: Students at the successful completion of the course will be able to:**

- CO1: Identify the need for data science and solve basic problems using Python built-in data types and their methods.(PO5)  
CO2: Design an application with user-defined modules and packages using OOP concepts.(PO5)  
CO3: Deploy efficient storage and data operations using NumPy arrays.(PO5)  
CO4: Apply powerful data manipulations using Pandas.(PO5)  
CO5: Do data pre-processing and visualization using Pandas.(PO5,PO7)

**II. Syllabus: (Total Theory periods: 45)**

**UNIT- I ( 8 periods)**

Basics of python programming-Features of Python, History of Python, Literal constants, Data Types, Input Operation, Reserved words, Operators and Expressions, Other Data Types, Lists, Dictionary, Type Conversion.

**UNIT-II (10 periods)**

Decision Control Statements- Selection/conditional branching statements, Basic Loop Structures/Iterative Statements, Functions and Modules-Introduction, Function Definition, Function Call, Modules- Packages in Python, Python strings Revisited, Introduction, Built in String methods and functions, File Handling-Introduction, Opening and closing Files, Reading and writing Files, Directory Methods

**UNIT -III (10 periods)**

Classes and Objects- Introduction, Classes and Objects, Class method and self-argument, The init() method(the class constructor), Inheritance- Introduction, Inheriting classes in python, Types of



Inheritance, Error and Exception Handling-Introduction to errors and exceptions, Handling Exceptions, Multiple except blocks, NumPy Basics- Arrays and Vectorized Computation, The NumPy ndarray, Creating ndarrays, Data Types for ndarrays, Arithmetic with NumPy Arrays, Basic Indexing and Slicing, Boolean Indexing, Transposing Arrays and Swapping Axes.

**UNIT –IV** (8 periods)

Universal Functions: Fast Element, Wise Array Functions, Mathematical and Statistical Methods, Sorting, Unique and Other Set Logic, Introduction to pandas Data Structures-Series, Data Frame and Essential Functionality, Dropping Entries- Indexing, Selection, and Filtering, Function Application and Mapping, Sorting and Ranking.

**UNIT –V** (9 periods)

Summarizing and Computing Descriptive Statistics, Unique Values, Value Counts, and Membership, Reading and Writing Data in Text Format, Data Cleaning and Preparation: Handling Missing Data, Data Transformation: Removing Duplicates, Transforming Data Using a Function or Mapping, Replacing Values, Detecting and Filtering Outliers, String Manipulation- Vectorized String Functions in pandas.

**III References/ Text Book/ e-books/websites**

**Text Books:**

1. Reema thareja—Python Programming using problem solving approach, Oxford Publication
2. Wes McKinney, “Python for Data Analysis: Data Wrangling with Pandas, NumPy, and IPython”, O’Reilly, 2nd Edition, 2018.

**Reference Books:**

1. Jake VanderPlas, “Python Data Science Handbook: Essential Tools for Working with 2.Data”, O’Reilly, 2017.
3. Wesley J. Chun, “Core Python Programming”, Prentice Hall, 2006.
4. Mark Lutz, “Learning Python”, O’Reilly, 4th Edition, 2009.

**Reference Materials on the Web/web-links:**

- e. <https://www.edx.org/course/python-basics-for-data-science>
- f. <https://www.edx.org/course/analyzing-data-with-python>
- g. <https://www.coursera.org/learn/python-plotting?specialization=data-science-python>
- h. <https://www.programmer-books.com/introducing-data-science-pdf/>

**IV. Co-Curricular Activities:**

- c) **Mandatory:** (Training of students by teacher in field related skills: (lab:10 + field: 05):
  6. **For Teacher:** Field related training of students by the teacher in laboratory/field for not less than 15 hours on collecting the data, analyzing the data and presenting the data using Python language with some real time data.

7. **For Student:** Students shall (individually) visit any of the agencies like Agriculture dept, statistical cell, irrigation department, Ground water department, CPO office, Rural Water Supply and Sanitation department etc or search online to get real time data like Aids database, weather forecasting database, social networking data, etc and identify any one database, implement and present the necessary charts in Python language and submit a hand- written Fieldwork/Project work/Project work/Project work/Project work Report not exceeding 10 pages. Example: Identifying a database, get the data, present the data in required charts and to predict the future instances if possible.
8. Max marks for Fieldwork/Project work/Project work/Project work/Project work Report: 05.
9. Suggested Format for Fieldwork/Project work: Title page, student details, index page, and details of place visited, observations, method of data collection, database identified, and implementation in Python language, other findings and acknowledgements.
10. Unit tests (IE).

**d) Suggested Co-Curricular Activities**

5. Training of students by related industrial experts.
6. Assignments
7. Seminars, Group discussions, Quiz, Debates etc. (on related topics).
8. Presentation by students on the topics within and outside the syllabus.



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**Model paper**

**Course Code: CSCSET02** Offered to: **B.Sc.(MSCS, MPCS, MECS)**

**Title of the Course: PYTHON FOR DATASCIENCE**

**SECTION – A**

**Short Answer Questions (25 Marks: 5 x 5)**

**Answer any Five questions. (At least 1 question should be given from each Unit)**

1. State any four applications where python is more popular(CO1,L1)
2. List out the main differences between lists and tuples.(CO1,L2)
3. What are the uses of File object?(CO2,L1)
4. Explain about different Logical operators in python with appropriate examples. (CO2,L2)
5. Differentiate between an error and exception(CO3,L3)
6. Explain the basic functionality of math( ) function.(CO2,L2)
7. Write Array Functions(CO4,L1)
8. How to read and write data in text format(CO5,L4)

**SECTION B (Total: 5 x 10 = 50 Marks)**

**Answer all questions. (Two questions should be given from each unit with internal choice)**

9(a). Write in brief about the applications of Python.(CO1,L1)

**OR**

9(b). Explain Various data types in python with Examples (CO2,L2)

10(a). List different conditional statements in python with appropriate examples.(CO2,L2)

**OR**

10(b). Explain the following file built-in functions and method with clear syntax, description and illustration: a) open ( ) b) file ( ) c) seek ( ) d) tell ( ) e)read ( )(CO3,L2)

11(a) How does try-except statement work? Demonstrate with an example python code. (CO3,L4)

**OR**

11(b) Explain NumPy arrays with suitable example(CO3,L2)

12(a) Write Briefly Pandas Data structure(CO4,L1)

**OR**

12(b) Write a python program to read data from CSV files using pandas(CO4,L1)

13(a) How to remove duplicates from data transformation(CO5,L4)

**OR**

13(b) Explain Python for Data Visualisation(CO5,L2).

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**Course Code: CSCSEP02** Offered to: **(B.Sc.(MSCS,MPCS,MECS,CSCS)**  
Domain Subject: **COMPUTER SCIENCE** Semester: **V/VI**  
Max. Marks: **50** (CCIA: 10+ SEE: 40) Practical Hrs./Week : **3**

**Course 7A: PYTHON FOR DATA SCIENCE LAB**

Type of the Course: **Skill Enhancement Course** (Elective, Practical), Credits: 02

**I. Course Outcomes: Students at the successful completion of the course will be able to:**

- CO1: Understand the basic concepts of python programs and perform List, Tuple and Dictionary (PO5, PO7)
- CO2: Understand the program of functions (PO5, PO7)
- CO3: Able to Understand file handling **techniques**. (PO5, PO7)
- CO4: Understand concepts of OOPS (PO5, PO7)
- CO5: Able to Solving of data frames (PO5, PO7)

**II: Practical (Laboratory) Syllabus: (30 Periods)**

15. Perform Creation, indexing, slicing, concatenation and repetition operations on Python built-in data types: Strings, List, Tuples, Dictionary
16. Apply Python built-in data types: List, Tuples, Dictionary and their methods to solve any given problem.
17. Handle numerical operations using math and random number functions
18. Create user-defined functions with different types of function arguments.
19. Create packages and import modules from packages.
20. Perform File manipulations- open, close, read, write, append and copy from one file to another.

21. Write a program for Handle Exceptions using Python Built-in Exceptions
  22. Write a program to implement OOP concepts
  23. Create NumPy arrays from Python Data Structures, Intrinsic NumPy objects and Random Functions.
  24. Manipulation of NumPy arrays- Indexing, Slicing, Reshaping, Joining and Splitting.
  25. Computation on NumPy arrays using Universal Functions and Mathematical methods.
  26. Load an image file and do crop and flip operation using NumPy Indexing.
  27. Create Pandas Series and Data Frame from various inputs.
- 
28. Import any CSV file to Pandas Data Frame and perform the following:
    - (h) Visualize the first and last 10 records
    - (i) Get the shape, index and column details
    - (j) Select/Delete the records (rows)/columns based on conditions.
    - (k) Perform ranking and sorting operations.
    - (l) Do required statistical operations on the given columns.
    - (m) Find the count and uniqueness of the given categorical values.
    - (n) Rename single/multiple columns
- 
- 15(a). Import any CSV file to Pandas Data Frame and perform the following:
    - (e) Handle missing data by detecting and dropping/ filling missing values.
    - (f) Transform data using apply () and map() method.
    - (g) Detect and filter outliers.
    - (h) Perform Vectorized String operations on Pandas Series.

### III. Lab References:

Wesley J. Chun, “Core Python Programming”, Prentice Hall, 2006. Jake VanderPlas, “Python Data Science Handbook: Essential Tools for Working with Data”, O’Reilly, 2017.

#### Reference Materials on the Web/web-links:

- c. <https://www.coursera.org/learn/python-plotting?specialization=data-science-python>
- d. <https://www.programmer-books.com/introducing-data-science-pdf/>



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**Course Code: CSCSEP02**

Offered to: **B.Sc. (MSCS, MPCS, MECS)**

**Title: PYTHON FOR DATA SCIENCE LAB(Model Paper)**

Domain Subject: **Computer Science**

Semester: V/VI

Max. Marks: **40**

Time: 3Hrs

**Model Paper: Practicals**

**Time: Three hours**

**Max. Marks: 40**

**Section A**

One Major Experiment (Experiment No : ) **15 M**

**Section B**

One Minor Experiment (Experiment No : ) **10 M**

**Section C**

Practical Record **05 M**

**Section D**

Viva Voce **10 M**

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Course Code:**CSCSET03**

Offered to: **B.Sc.(MSCS, MPCS, MECS)**

Domain Subject: **Computer Science**

Semester: **V/VI**

Max. Marks: **100** (CCIA: 25+ SEE:75)

Theory Hrs./Week: **3**

**Course 6B: WEB INTERFACE DESIGNING TECHNOLOGIES**

Type of the Course: **Skill Enhancement Course** (Elective Theory), Credits: **03**

**I. Course Outcomes: Students at the successful completion of the course will be able to:**

CO1: Understand web application and static web page using Html. (PO5)

CO2: Gain knowledge about various designing of style sheets. (PO5)

CO3: Demonstrate skills regarding creation of an interface to dynamic website.(PO7)

CO4: Gain knowledge about various advantages of XML and validating schema(PO5)

CO5: Learn how to install word press and gain the knowledge of installing various plugins to use in their websites. (PO5,PO7)

**II. Syllabus:**

**(Total Theory Periods: 45)**

**UNIT-I :Web Designing, HTML**

**(9 Periods)**

**Web Designing:** Introduction To Web Designing, Difference Between Web Applications And Desktop Applications.

**HTML:** Introduction To HTML, Introduction To HTML, Headings, Paragraphs Styles & Colors, HTML Formatting, Quotations, Comments, Hyperlinks, Lists, Using colors and images, Tables, Multimedia Objects - Video, Audio, Plugins, You Tube, Frames, Forms

## **UNIT-II :CSS, HTML API'S**

**(10Periods)**

**CSS:** Introduction, Using Styles, Simple Examples, Defining Your Own Styles, Properties and Values in Styles, Style Sheets, Formatting blocks of information, Layers, CSS Combinators, Pseudo Class, Pseudo Elements, Opacity, ToolTips, Image Gallery, CSS Forms, CSS Counters, CSS Responsive.

**HTML API'S:** Geolocation, Drag/drop, local storage, HTML SSE

## **UNIT-III : Client side Validation**

**(9 Periods)**

**Introduction to Java Script :** What Is DHTML? JavaScript – Basics, Variables, String Manipulations, Mathematical Functions, Statements, Operators, Arrays, Functions.

**Objects in JavaScript** –Data and Objects In JavaScript, Regular Expressions, Exception Handling

**DHTML with JavaScript :**Data Validation, Opening a New Window, Messages and Confirmations, The Status Bar, Different Frames, Rollover Buttons, Moving Images

## **UNIT-IV: XML**

**(9 periods)**

**XML:** Introduction to xml, How to write a xml document, Elements and attributes, Comments in xml, Namespace in xml, Xmlcss, Advantages of xml, Uses of xml, xml schema, data types, simple types, complex types ,Validating DTD,XSD.

## **UNIT-V: Word press**

**(8 Periods)**

Introduction to word press, servers like wamp, bitnami e.tc, installing and configuring word press, understanding admin panel, working with posts and pages, using editor, text formatting with shortcuts, working with media-Adding, editing, deleting media elements, working with widgets, menus.

## **III Text Book/ references / e-books/websites**

1. Chris Bates, Web Programming Building Internet Applications, Second Edition, Wiley (2007)
2. Web technologies by A. A. Puntambekar
3. Web Technologies by N. P. Gopalan, Eastern Economy Edition, 2<sup>nd</sup> edition
4. Paul S.Wang Sanda S. Katila, an Introduction to Web Design plus Programming, Thomson (2007).
5. Head First HTML and CSS, Elisabeth Robson, Eric Freeman, O'Reilly Media Inc.
6. An Introduction to HTML and JavaScript: for Scientists and Engineers, David R. Brooks. Springer, 2007
7. Schaum's Easy Outline HTML, David Mercer, Mcgraw Hill Professional.



8. Word press for Beginners, Dr.Andy Williams.
9. Professional word press, Brad Williams, David damstra, Hanstern.
10. Web resources:
  - a. <http://www.codecademy.com/tracks/web>
  - b. <http://www.w3schools.com>
  - c. <https://www.w3schools.in/wordpress-tutorial/>
  - d. <http://www.homeandlearn.co.uk>

#### **IV Co-Curricular Activities**

(Co-curricular activities shall not promote copying from textbook or from others work and shall encourage self/independent and group learning)

##### **A. Measurable**

1. Assignments (in writing and doing forms on the aspects of syllabus content and outside the syllabus content. Shall be individual and challenging)
2. Student seminars (on topics of the syllabus and related aspects (individual activity))
3. Quiz (on topics where the content can be compiled by smaller aspects and data (Individuals or groups as teams))
4. Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual participation and contribution of students shall be ensured (team activity))

##### **B. General**

1. Group Discussion
2. Others



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**Model paper**

Course Code: CSCSET03

Offered to: B.Sc. (MSCS, MPCS, MECS)

**Title of the Course: WEB INTERFACE DESIGNING TECHNOLOGIES**

**SECTION – A**

**Short Answer Questions (25 Marks: 5 x 5)**

**Answer any Five questions. (At least 1 question should be given from each Unit)**

- 1.What is HTML? Explain features and structure of HTML program with example(CO1,L1)
2. What is layer? How are they described with HTML code?(CO1,L1)
- 3.Explain hyperlinks in HTML.(CO2,L5)
- 4.What is java script? Explain the features ,advantages and disadvantages of java script(CO3,L1)
5. Explain the moving images with java script(CO3,L5)
6. What are the elements and attributes used in XML(CO4,L1)
7. Define and explain namespace in XML(CO4,L1)
8. Explain text formatting in word Press.(CO5,L5)

**SECTION B (Total: 5 x 10 = 50 Marks)**

**Answer all questions. (Two questions should be given from each unit with internal choice)**

9(a) What is list? Explain various types of lists in HTML.(CO1,L1)

**OR**

9(b) Explain Frames and forms in HTML(CO1,L2)

10(a)Define CSS, Explain various styles sheets in HTML(CO2,L1)

**OR**

10 (b). Explain HTML APIs.(CO1,L2)

11(a) What is DHTML? Explain about various string and mathematical functions(CO3,L2)

**OR**

11(b) Explain Exception handling and rollover buttons in java script(CO3,L2)

12(a) What are the advantages of using XMLand CSS? How to validate XML schema.(CO4,L1)

**OR**

12(b) Explain about DTD in XML(CO4,L2)

13(a) What is admin panel, what are the steps involved in working with post and pages (CO5,L1)

**OR**

13(b) Explain how we can add, edit and deleting media elements in word press(CO5,L2)

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Course Code: **CSCSEP03** Offered to: **B.Sc.(MSCS, MPCS, MECS)**  
Domain Subject: **COMPUTER SCIENCE** Semester: V/VI  
Max. Marks: **50** (CCIA: 10+ SEE: 40) Practical Hrs./Week : **3**

**Course 6B: WEB INTERFACE DESIGNING TECHNOLOGIES LAB**

Type of the Course: **Skill Enhancement Course** (Elective, Practical), Credits: 02

**I. Course Outcomes: Students at the successful completion of the course will be able to:**

- CO1: Create a basic website with the help of HTML and CSS.(PO5)
- CO2: Acquire the skill of installing word press and various plugins of Word press.(PO5)
- CO3: Create a static website with the help of Word press..(PO5,PO7)
- CO4: Create an interface for a dynamic website.(PO5,PO7)
- CO5: Apply various themes for their websites using Word press.(PO7)

**II. Practical (Laboratory) Syllabus: (30 periods)**

**HTML and CSS:**

1. Create an HTML document with the following formatting options:

- (a) Bold, (b) Italics, (c) Underline, (d) Headings (Using H1 to H6 heading styles), (e) Font (Type, Size and Color), (f) Background (Colored background/Image in background), (g) Paragraph, (h) Line Break, (i) Horizontal Rule, (j) Pre tag

2. Create an HTML document which consists of:

- (a) Ordered List (b) Unordered List (c) Nested List (d) Image

3. Create a form using HTML which has the following types of controls:

- (a) Text Box (b) Option/radio buttons (c) Check boxes (d) Reset and Submit buttons

4. Embed a calendar object in your web page.
5. Create an applet that accepts two numbers and perform all the arithmetic operations on them.
6. Create nested table to store your curriculum with image.
7. Create a form that accepts the information from the subscriber of a mailing system.
8. Create a help file as follows:



9. Write a html program including style sheets.
10. Write a html program to layers of information in web page.
11. Develop a Java script to determine whether the given number is a “PERFECT NUMBER “or not.
12. Develop a Java script to generate “ARMSTRONG NUMBERS” between the ranges 1 to 100.
13. Write a java script that reads an integer and displays whether it is a prime number or not.
14. Write a java script which accepts the text in lower case and displays the text in upper case
15. Write a java script program for user name and password validation using on click event.

#### **Word press:**

16. Installation and configuration of word press.
17. Create five pages on COVID – 19 and link them to the home page.
18. Add an external video link with size 640 X 360.
19. Create a user and assign a role to him.
20. Create a login page to word press using custom links

#### **III. Lab References:**

1. Web technologies by A.A.Puntambekar
2. Web Technologies by N.P.Gopalan, Eastern Economy Edition, 2<sup>nd</sup> edition
3. Word press for Beginners, Dr.Andy Williams.
4. Professional word press, Brad Williams, David damstra, Hanstern.

**Reference Materials on the Web/web-links:**

12. [https://onlinecourses.nptel.ac.in/noc17\\_cs22/course](https://onlinecourses.nptel.ac.in/noc17_cs22/course)
2. <http://www.codecademy.com/tracks/web>
3. <http://www.w3schools.com>
4. <https://www.w3schools.in/wordpress-tutorial/>



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Course Code: **CSCSEP03**

Offered to: **B.Sc.(MSCS, MPCS, MECS)**

**Title: WEB INTERFACE DESIGNING TECHNOLOGIES LAB (Model Paper)**

Domain Subject: **Computer Science**

Semester: V /VI

Max. Marks: **50** (CCIA: 10+ SEE: 40)

Practical Hrs./Week : **3**

**Model Paper: Practicals**

**Time: Three hours**

**Max. Marks: 40**

**Section A**

One Major Experiment (Experiment No : ) **15 M**

**Section B**

One Minor Experiment (Experiment No : ) **10 M**

**Section C**

Practical Record **05 M**

**Section D**

Viva Voce **10 M**

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Course Code: **CSCSET04** Offered to: **B.Sc. (MSCS, MPCS, MECS)**  
Domain Subject: **COMPUTER SCIENCE** Semester – V/VI  
Max. Marks: **100** (CCIA: 25+ SEE:75) Theory Hrs./Week: **3**

**Course 7B:WEB APPLICATIONS DEVELOPMENT USING PHP AND MYSQL**

Type of the Course: **Skill Enhancement Course** (Elective Theory), Credits: **03**

**I. Course Outcomes: Students at the successful completion of the course will be able to:**

CO1: Learn basic structure and key concepts in PHP, Control statements and functions concept and related programs (PO5)

CO2: Know What is an Array concept related programs, What is an Object, various objects, Formatting strings, Date and time and related programs (PO5)

CO3: Learn importance of Forms, Combining HTML with PHP code. Importance of Cookies and Sessions related programs of forms cookies and sessions. (PO5)

CO4:Know importance of File concept in PHP how to Create, Open, Read and write data in file related programs, Knowing about Image creation, drawing, and modification image (PO7)

CO5:Know about Database concept of MySQL, Connection, Creation of Database, Table adding Record into it related programs (PO7)

**II. Syllabus:**

**(Total Theory Periods: 45)**

**UNIT-I**

**(10 Periods)**

**The Building blocks of PHP :** Variables, DataTypes, Operators and Expressions, Constants.

**Flow Control Functions in PHP:** Switching Flow, Loops, Code Blocks and Browser Output. **Working with Functions:** What is function? Calling functions, Functions, Returning the values from User-Defined Functions, Variable Scope.

**UNIT-II**

**(8Periods)**

**Working with Arrays** What are Arrays?, Creating Arrays, **Working with Objects** Creating Objects, Object Inheritance, **Working with Strings, Dates and Time**-Formatting strings with PHP, Investigating Strings with PHP, Manipulating Strings with PHP, Using Date and Time Functions in PHP.

### UNIT-III

(10 Periods)

**Working with Forms**-Creating Forms, Accessing Form Input with User defined Arrays, Combining HTML and PHP code on a single Page, **Working with Cookies and User Sessions**-Introducing Cookies, Setting a Cookie with PHP, Session Function Overview, Starting a Session, Working with session variables

### UNIT-IV

(8 Periods)

**Working with Files and Directories:** Creating and Deleting Files, Opening a File for Writing, Reading or Appending, Reading from File, Writing or Appending to a File. **Working with Images** - Understanding the Image-Creation Process, Drawing a New Image , Modifying Existing Images ,Image Creation from User Input.

### UNIT-V

(9 Periods)

**Interacting with MySQL using PHP** -MySQL versus MySQLi Functions, Connecting to MySQL with PHP , Working with MySQL Data, **Creating an Online Address Book** -Planning and Creating Database Tables, Creating Menu, Creating Record, Addition Mechanism, Viewing Records, Creating the Record Deletion Mechanism, Adding Sub-entities to a Record.

#### V. Textbooks and References

1. Julie C. Meloni, SAMS Teach yourself PHP MySQL and Apache, Pearson Education(2007).
2. Steven Holzner, PHP: The Complete Reference, McGraw-Hill
3. RobinNixon, LearningPHP,MySQL,JavaScript,CSS&HTML5,ThirdEditionO'reilly,2014
4. XueBai Michael Ekedahl, The web warrior guide to Web Programming, Thomson(2006).
5. Web resources:
  - e. <http://www.codecademy.com/tracks/php>
  - f. <http://www.w3schools.com/PHP>
  - g. <http://www.tutorialpoint.com>

#### VI. Co-Curricular Activities:

**e) Mandatory:**(*Training of students by teacher in field related skills:(lab: 10+field: 05):*)

- 11.**For Teacher:** Field related training of students by the teacher in laboratory/field for not less than 15 hours on demonstrating various **interactive and dynamic websites** available online, addressing the students on identifying the case study to build an interactive and database driven website, forms to be used in website, database to be maintained, reports to be produced, etc.
- 12.**For Student:** Students shall (individually) search online and visit any of the agencies like



malls, hotels, super bazaars, etc. where there is a need for an interactive and database driven website and submit a hand-written Fieldwork/Project work/Project work/Project work/Project work Report not exceeding 10 pages. Example: Choosing a firm or business to develop a website, identifying forms to be placed in the websites, back end databases to be maintained and reports to be generated and placed in the websites.

13. Max marks for Fieldwork/Project work/Project work/Project work/Project work/Project work Report: 05.

14. Suggested Format for Fieldwork/Project work/Project work/Project work/Project work: *Title page, student details, index page, details of place or websites visited, structure of the website and acknowledgements.*

15. Unit tests (IE).

#### **f) Suggested Co-Curricular Activities**

11. Arrange expert lectures by IT experts working professionally in the area of web content development

12. Assignments (in writing or implementing contents related to syllabus or outside the syllabus. Shall be individual and challenging)

13. Seminars, Group discussions, Quiz, Debates etc. (on related topics).

14. Preparation by students on best websites.

15. Arrange a web page development competition among small groups of students.



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**Model paper**  
Course Code: CSCSET04 Offered to: B.Sc. (MSCS, MPCS, MECS)

Title of the Course: Web Applications Development using PHP & MYSQL

**SECTION – A**

**Short Answer Questions**

(25 Marks: 5 x 5)

**Answer any Five questions. (At least 1 question should be given from each Unit)**

1. Define Structure of PHP.(CO1,L1)
2. Differentiate Conditional statement and Looping statement with syntax.(CO1,L4)
3. Define Array concept explain about it.(CO2,L1)
4. Compare Array with Object creation.(CO2,L4)
5. Explain about Cookies concept.(CO3,L2)
6. Explain about Image creation.(CO4,L2)
7. Write short note onMysqli.(CO5,L1)
8. What is use of Select query with on syntax and example?(CO5,L1)

**SECTION B**

(Total: 5 x 10 = 50 Marks)

**Answer all questions. (Two questions should be given from each unit with internal choice)**

9(a) Explain about Control Statements.(CO1,L2)

**OR**

9(b) Discuss about Function define, Call and return value with example.(CO1,L6)

10(a) List various types of Formatting strings explain them.(CO2,L2)

**OR**

10(b) Define Array function with example..( CO2,L1)

11(a) Write names of Form objects explain them with example.(CO3,L2)

**OR**

11(b) Compare and Contrast Session and Cookies.(CO3,L4)

12(a) Explain File concept about file creation, Open file, Write file and Delete file with example(CO4,L2)

**OR**

12(b) Construct steps for Interfacing complete image concept explain them with one example.(CO4,L3)

13(a) Discuss about DDL commands and DML commands in Mysqli with syntaxes(CO5,L6)

**OR**

13(b) Write code to Create table of Employee by adding any four columns with example.(CO5,L6)

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**Course Code: CSCSEP04**                      **Offered to: B.Sc.(MSCS, MPCS, MECS)**  
Domain Subject: **COMPUTER SCIENCE**                      Semester: V/VI  
Max. Marks: **50** (CCIA: 10+ SEE: 40)                      Practical Hrs./Week : **2**

Course 7B: Web Applications Development using PHP & MYSQL LAB

**PRACTICAL SYLLABUS**

Type of the Course: **Skill Enhancement Course** (Elective, Practical),                      Credits: 02

**I. Course Outcomes: Students at the successful completion of the course will be able to:**

CO1: Learn and implement basic programs in PHP, Control statements and functions concept (PO5)

CO2: Implement Basic programs in Object, various objects, Formatting strings, Date and time (PO5)

CO3: Learn and implement important programs of Forms, Combining HTML with PHP code. Importance of Cookies and Sessions..(PO5)

CO4: Implement programs on Files concept in PHP and on Image creation, drawing, and modification image (P05 & PO7)

CO5: implement Database programs on MySQLi, Connection, Creation of Database, Table adding Record into it related programs (PO7)

**II: Practical (Laboratory) Syllabus: (30 Periods):** At least 8 Practical's.

18. Write a PHP program to Display "Hello"

19. Write a PHP Program to display today's date.

20. Write a PHP program to display Fibonacci series.

21. Write a PHP Program to read the employee details.

22. Write a PHP program to prepare the student marks list.

23. Write a PHP program to generate the multiplication of two matrices.

24. Create student registration form using text box, check box, radio button, select, submit button. And display user inserted value in new PHP page.

25. Create Website Registration Form using text box, check box, radio button, select, submit button. And display user inserted value in the new PHP page.

26. Write a PHP script to demonstrate passing variables with cookies.

27. Write a program to keep track of how many times a visitor has loaded the page.

28. Write a PHP application to add, Modify, delete and fetch the rows in a Table.
29. Develop a PHP application to implement the following Operations
  - a. Registration of Users.
  - b. Insert the details of the Users.
  - c. Modify the Details.
  - d. Transaction Maintenance.
    - i. No of times Logged in
    - ii. Time Spent on each login.
    - iii. Restrict the user for three trials only.
    - iv. Delete the user if he spent more than 100 Hrs of transaction.
30. Write a PHP script to connect to the MySQL server from your website.
31. Write a program to read customer information like cust-no, cust-name, item purchased, and mob-no, from customer table and display all this information in table format on the output screen.
32. Write a program to edit the name of a customer to “Kiran” with cust-no =1, and to delete record with cust-no=3.
33. Write a program to read employee information like emp-no, emp-name, designation and salary from the EMP table and display all this information using table format in your website.
34. Create a dynamic web site using PHP and MySQL.

## II. Textbooks and References

1. Julie C. Meloni, SAMS Teach yourself PHP MySQL and Apache, Pearson Education(2007).
2. Steven Holzner, PHP: The Complete Reference, McGraw-Hill
3. RobinNixon, LearningPHP,MySQL,JavaScript,CSS&HTML5,ThirdEditionO'reilly,2014
4. XueBai Michael Ekedahl, The web warrior guide to Web Programming, Thomson(2006).
5. Web resources:
  - e. <http://www.codecademy.com/tracks/php>
  - f. <http://www.w3schools.com/PHP>
  - g. <http://www.tutorialpoint.com>



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Course Code: **CSCSEP04**

Offered to: **B.Sc.(MSCS, MPCS, MECS)**

Domain Subject: **COMPUTER SCIENCE**

Semester: V /VI

Title: **Web Applications Development using PHP & MYSQL LAB (Model Paper)**

Max. Marks: **50** (CCIA: 10+ SEE: 40)

Practical Hrs./Week : **2**

**Model Paper: Practicals**

**Time: Three hours**

**Max. Marks: 40**

**Section A**

One Major Experiment (Experiment No : ) **15 M**

**Section B**

One Minor Experiment (Experiment No : ) **10 M**

**Section C**

Practical Record **05 M**

**Section D**

Viva Voce **10 M**

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Course Code: **CSCSET05** Offered to: **B.Sc. (MSCS, MPCS, MECS)**  
Domain Subject: **COMPUTER SCIENCE** Semester – **V / VI**  
Max. Marks: **100** (CCIA: 25+ SEE:75) Theory Hrs./Week: **3**

**Course 6C: INTERNET OF THINGS**

Type of the Course: **Skill Enhancement Course** (Elective Theory), Credits: **03**

**I. Course Outcomes: Students at the successful completion of the course will be able to:**

CO1: Understand architecture and applications of IoT systems.(PO5)

CO2: Gain knowledge of various development boards used for IoT.(PO5)

CO3: Understand various Wireless Technologies used in IoT.(PO5)

CO4: Learn how to use various sensors and actuators for design of IoT.(PO7)

CO5: Learn how to connect various things to Internet and develop simple IOT Devices.(PO7)

**II. Syllabus:**

**(Total Theory periods: 45)**

**UNIT-I**

**(8Periods)**

Fundamentals of IoT: Introduction, Definitions & Characteristics of IoT, IoT Architectures, Physical & Logical Design of IoT, Enabling Technologies in IoT, History of IoT, About Things in IoT, The Identifiers in IoT, About the Internet in IoT, IoT frameworks, IoT and M2M.

Applications of IoT: Home Automation, SmartCities, Energy, Retail Management Logistics, Agriculture, Health and Lifestyle, Industrial IoT, Legal challenges, IoT design Ethics, IoT in Environmental Protection.

**UNIT-II**

**(10 Periods)**

Sensors Networks: Definition, Types of Sensors, Types of Actuators, Examples and Working, IoT Development Boards: Arduino IDE and Board Types, Raspberri Pi Development Kit, RFID Principles and components, Wireless Sensor Networks: History and Context, The node, Connecting nodes, Networking Nodes, WSN and IoT.

**UNIT-III**

**( 9 Periods)**

Wireless Technologies for IoT: WPAN Technologies for IoT: IEEE802.15.4, Zigbee, HART,NFC,Z-Wave, BLE, Bacnet And Modbus. IP Based Protocols for IoT IPv6, 6LowPAN, LoRA, RPL, REST, AMPQ, CoAP, MQTT. Edge connectivity and protocols.

#### **UNIT-IV**

**(9 Periods)**

Arduino Simulation Environment: Arduino Uno Architecture, Setting up the IDE, Writing Arduino Software, Arduino Libraries, Basics of Embedded C programming for Arduino, Interfacing LED, push button and buzzer with Arduino, Interfacing Arduino with LCD.

Sensor & Actuators with Arduino: Overview of Sensors working, Analog and Digital Sensors, Interfacing of Temperature, Humidity, Motion, Light and Gas Sensors with Arduino, Interfacing of Actuators with Arduino, Interfacing of Relay Switch and Servo Motor with Arduino.

#### **UNIT-V**

**(9 Periods)**

Developing IOT's: Implementation of IoT with Arduino, Connecting and using various IoT Cloud Based Platforms such as Blynk, Thingspeak, AWS IoT, Google Cloud IoT Core etc. Cloud Computing, Fog Computing, Privacy and Security Issues in IoT.

#### **III Text Book/References**

16. Internet of Things - A Hands-on Approach, Arshdeep Bahga and Vijay Madiseti, Universities Press, 2015, ISBN: 9788173719547
17. Vijay Madiseti and Arshdeep Bahga, "Internet of Things (A Hands-on Approach)", 1st Edition, VPT, 2014
18. Daniel Minoli,—"Building the Internet of Things with IPv6 and MIPv6: The Evolving World of M2M Communications", ISBN: 978-1-118-47347-4, Wiley Publications
19. Pethuru Raj and Anupama C. Raman, "The Internet of Things: Enabling Technologies, Platforms, and Use Cases", CRC Press
20. Open source software / learning websites
  - a. [http://www.cse.wustl.edu/~jain/cse570-15/ftp/iot\\_prot/index.html](http://www.cse.wustl.edu/~jain/cse570-15/ftp/iot_prot/index.html)
  - b. Contiki (Open source IoT operating system)
  - c. Arduroid (open source IoT project)
  - d. IoT Toolkit (smart object API gateway service reference implementation)

Reference Materials on the Web/web-links:

13. <https://github.com/connectIOT/iottoolkit>
14. <https://github.com/connectIOT/iottoolkit><https://www.arduino.cc/>
15. [https://onlinecourses.nptel.ac.in/noc17\\_cs22/course](https://onlinecourses.nptel.ac.in/noc17_cs22/course)
16. <https://blynk.io> (Mobile app)

#### **IV Co-Curricular Activities**

(Co-curricular activities shall not promote copying from textbook or from others work and shall encourage self/independent and group learning)

**A. Measurable**

1. Assignments (in writing and doing forms on the aspects of syllabus content and outside the syllabus content. Shall be individual and challenging)
2. Student seminars (on topics of the syllabus and related aspects (individual activity))
3. Quiz (on topics where the content can be compiled by smaller aspects and data (Individuals or groups as teams))
4. Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual participation and contribution of students shall be ensured (team activity))

**B. General**

1. Group Discussion
2. Others





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**Model paper**

**Course Code: CSCSET05**

Offered to: **B.Sc. (MSCS, MPCS, MECS)**

**Title of the Course: Internet Of Things**

**SECTION – A**

**Short Answer Questions (25 Marks: 5 x 5)**

**Answer any Five questions. (At least 1 question should be given from each Unit)**

1. Define IOT and write characteristics of IOT.(CO1,L1)
2. Differentiate IOT and M2M.(CO1,L4)
3. Define Actuator and explain about it.(CO2,L1)
4. Compare WSN and IOT.(CO2,L4)
5. Explain about wireless technology Zigbee. (CO3,L2)
6. Explain about light and gas sensors.(CO4,L2)
7. Write short note on Fog Computing.(CO5,L1)
8. What is use of AWS IOT?(CO5,L1)

**SECTION B (Total: 5 x 10 = 50 Marks)**

**Answer all questions. (Two questions should be given from each unit with internal choice)**

9 (a) Explain IOT architecture with neat diagram.(CO1,L2)

**OR**

9(b) Discuss about Applications of IOT.(CO1,L6)

10(a) List various types of sensors in IOT and explain any 3 of them.(CO2,L2)

**OR**

10(b) List RFID components and explain them..(CO2,L2)

11(a) Write names of wireless technologies used in IOT and describe any 2 of them.(CO3,L2)

**OR**

11(b) Compare and Contrast MQTT and CoAP protocols.(CO3,L4)

12(a) Explain Arduino Uno Architecture.(CO4,L2)

**OR**

12(b) Construct steps for Interfacing Arduino with LCD and explain them.(CO4,L3)

13(a) Discuss about Privacy and security issues in IOT.(CO5,L6)

**OR**

13(b) Write code to Design any App of your choice using Thingspeak.(CO5,L6)

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Course Code: **CSCSEP05** Offered to: **B.Sc. (MSCS, MPCS, MECS)**

Domain Subject: **COMPUTER SCIENCE** Semester: V/VI

Max. Marks: **50** (CCIA: 10+ SEE: 40) Practical Hrs./Week : **3**

### **Course 6C: INTERNET OF THINGS LAB**

Type of the Course: **Skill Enhancement Course** (Elective, Practical), Credits: 02

**I. Course Outcomes: Students at the successful completion of the course will be able to:**

CO1: Acquire the skills to design a Small IoTdevice.(PO5)

CO2: Connect various sensors, actuators, etc to Arduino board.(PO5)

CO3: Connect the things to Internet.(PO5)

CO4: Design a small mobile app to control the sensors.(PO5,PO7)

CO5: Deploy a simple IoT device.(PO5,PO7)

#### **II: Practical (Laboratory) Syllabus: (30 Periods)**

27. Understanding Arduino UNO Board and Components
28. Installing and work with Arduino IDE
29. Blinking LED sketch with Arduino
30. Simulationof4-WayTrafficLightwithArduino
31. Using Pulse Width Modulation
32. LED Fade Sketch and Button Sketch
33. Analog Input Sketch (Bar Graph with LEDs and Potentiometre)
34. Digital Read Serial Sketch (Working with DHT/IR/Gas or Any other Sensor)
35. Working with A dafruit Libraries in Arduino
36. Spinning a DC Motor and Motor Speed Control Sketch
37. Working with Shields
38. Design APP using Blink App or Thing speak API and connect it LED bulb.
39. Design APP Using Blink App and Connect to Temperature, magnetic Sensors.

#### **II. Lab References:**

7. Internet of Things - A Hands-on Approach, Arshdeep Bahga and Vijay Madiseti, Universities Press, 2015, ISBN: 9788173719547
8. Vijay Madiseti and Arshdeep Bahga, "Internet of Things (A Hands-onApproach)", 1stEdition, VPT, 2014
9. Daniel Minoli, —"Building the Internet of Things with IPv6 and MIPv6: The Evolving World of M2M Communications", ISBN:978-1-118-47347-4, WillyPublications

#### **Reference Materials on the Web/web-links:**

7. <https://github.com/connectIOT/iottoolkithttps://www.arduino.cc/>
8. [https://onlinecourses.nptel.ac.in/noc17\\_cs22/course](https://onlinecourses.nptel.ac.in/noc17_cs22/course)
9. <https://blynk.io>(Mobileapp)



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**Model Question PAper**

Course Code: **CSCSEP05**

Offered to: **B.Sc (MSCS,MPCS, MECS)**

**Title: Internet of Things Lab**

Domain Subject: **Computer Science**

Semester: **V /VI**

Max. Marks: **40**

Time: **3 Hrs**

**Model Paper: Practicals**

**Time: Three hours**

**Max. Marks: 40**

**Section A**

One Major Experiment (Experiment No : ) **15 M**

**Section B**

One Minor Experiment (Experiment No : ) **10 M**

**Section C**

Practical Record **05 M**

**Section D**

Viva Voce **10 M**

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Course Code: **CSCSET06**

Offered to: **B.Sc.( MSCS, MPCS, MECS**

Domain Subject: **COMPUTER SCIENCE**

Semester – **V/VI**

Max. Marks: **100** (CCIA: 25+ SEE:75)

Theory Hrs./Week: **3**

### Course 7C: APPLICATION DEVELOPMENT USING PYTHON

Type of the Course: **Skill Enhancement Course** (Elective Theory), Credits: **03**

**I. Course Outcomes: Students at the successful completion of the course will be able to:**

CO1: Understand basics of python and write applications using strings, tuples, lists, sets.(PO5,PO7)

CO2: Understand and use exceptions and packages for different applications.(PO5,PO7)

CO3: Create, run and manipulate Python Programs using threads and Regular Expressions.(PO5,PO7)

CO4: Apply concepts of Python programming in various fields related to IOT, Web Services and Databases in Python.(PO5,PO7)

CO5: write applications in python to perform various database operations.(PO5,PO7)

**II. Syllabus:** (Total Theory Periods: 45)

**UNIT-I** (9

Periods)

**Python basics, Objects-** Python Objects, Standard Types, Other Built-in Types, InternalTypes,StandardTypeOperators,StandardTypeBuilt-inFunctions,

**Sequences-**Strings, Lists and Tuples, Mapping and SetTypes.

**Numbers-**Introduction to Numbers, Integers, Floating Point Real Numbers, Complex Numbers, Operators, Related Modules.

**UNIT-II** (10 Periods)

**Files:** File Objects, File Built-in Function [ open() ], File Built-in Methods, File Built-in Attributes, Command-line Arguments, File System, File Execution, Persistent Storage Modules, Related Modules.

**Exceptions:** Exceptions in Python, Detecting and Handling Exceptions, Context Management, Exceptions as Strings, Raising Exceptions, Assertions, Standard Exceptions, Creating Exceptions.

**Modules:** Modules and Files, Namespaces, Importing Modules, Importing Module Attributes, Module Built-in Functions, Packages.

### UNIT-III

( 8

#### Periods)

**Regular Expressions:** Introduction, Special Symbols and Characters,  
Python Multithreaded Programming: Introduction, Threads and Processes, Python, Threads, and  
the Global Interpreter Lock, Thread Module, Threading Module.

### UNIT-IV

(10

#### Periods)

**GUI Programming:** Introduction, Tkinter and Python Programming, Brief Tour of Other GUIs,  
Related Modules and Other GUIs.

**Web Programming:** Introduction, Web Surfing with Python, Creating Simple Web Clients,  
Advanced WebClients,CGI-HelpingServersProcessClientData,BuildingCGIApplication,Web  
(HTTP) Servers.

### UNIT-V

(8

#### Periods)

**Database Programming:** introduction ,Python Database Application Programmer's Interface  
(DBAPI), Object Relational Managers(ORMs).

### III Text Book/References

21. Core Python Programming, WesleyJ. Chun, Second Edition, Pearson.
22. Think Python, Allen Downey, Green Tea Press.
23. Introduction to Python, KennethA. Lambert, Cengage.
24. Python Programming: A Modern Approach, Vamsi Kurama, Pearson.
25. Learning Python, Mark Lutz, O' Really.

#### Reference Materials on the Web/web-links:

17. <https://www.tutorialspoint.com/python/index.htm>
18. <https://www.w3schools.com/python/>

### IV

#### Co-Curricular Activities

#### Co-Curricular Activities

(Co-curricular activities shall not promote copying from textbook or from others work and shall encourage self/independent and group learning)

##### A. Measurable

1. Assignments (in writing and doing forms on the aspects of syllabus content and outside the syllabus content. Shall be individual and challenging)
2. Student seminars (on topics of the syllabus and related aspects (individual activity))
3. Quiz (on topics where the content can be compiled by smaller aspects and data (Individuals or groups as teams))
4. Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual participation and contribution of students shall be ensured (team activity))

##### B. General

1. Group Discussion
2. Others



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**Model paper**

**Course Code: CSCSET06**

**Offered to: B.Sc. (MSCS,MPCS,MECS)**

**Title of the Course: Application Development Using Python**

**SECTION – A**

**Short Answer Questions (25 Marks: 5 x 5)**

**Answer any Five questions. (At least 1 question should be given from each Unit)**

- 33) Give classification of various built in datatypes in python .(CO1,L2)
- 34) Compare tuples and sets in python.(CO1,L4)
- 35) What is need of assertions in python? Give simple example.(CO2,L1)
- 36) Write program in python to demonstrate Command Line arguments.(CO2,L5)
- 37) Write 5 special symbols used in python and their purpose.(CO3,L1)
- 38) Write short note on web surfing with python.(CO4,L1)
- 39) Why do we use Global Interpreter lock in Python?(CO5,L1)
- 40) What is need and use of Object Relational managers in python?(CO5,L1)

**SECTION B (Total: 5 x 10 = 50 Marks)**

**Answer all questions. (Two questions should be given from each unit with internal choice)**

9 (a) Write names of ten built in functions in python and explain them.(CO1,L2)

**OR**

9(b) Create a list in python and apply five list methods on it.(CO1,L6)

10(a) Create a program in python to demonstrate exception handling.(CO2,L6)

**OR**

10(b) Develop a program in python for user defined module creation and importing.(CO2,L6)

11(a) Develop multithreaded program in python.(CO3,L6)

**OR**

11(b) Explain about threading module with an example program.(CO3,L2)

12(a) Discuss with steps building CGI application in Python.(CO4,L6)

**OR**

12(b) Explain with example creating simple web client in python.(CO4,L6)

13(a) Explain about Python database Application programmers interface.(CO5,L2)

**OR**

13(b) Create database application in python to insert and delete student records.(CO5,L6).

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Course Code: **CSCSEP06**

Offered to: **B.Sc.(MSCS, MPCS, MECS)**

Domain Subject: **COMPUTER SCIENCE**

Semester: **V/VI**

Max. Marks: **50** (CCIA: 10+ SEE: 40)

Practical Hrs./Week : **3**

**Course 7C: APPLICATION DEVELOPMENT USING PYTHON LAB**

Type of the Course: **Skill Enhancement Course** (Elective, Practical),

Credits: 02

**I. Course Outcomes: Students at the successful completion of the course will be able to:**

CO1: Acquire the skills to write simple programs in python.(PO5,PO7)

CO2: Implement programs related to various data structures like lists, sets etc. .(PO5,PO7)

CO3: Implement programs related to files.(PO5,PO7)

CO4: Implement Exception handling programs in python.(PO5,PO7)

CO5: Implement programs to insert, delete, display data in databases.(PO5,PO7)

**II: Practical (Laboratory) Syllabus: (30 Periods)**

22. Write a menu driven program to convert the given temperature from Fahrenheit to Celsius and vice versa depending upon user's choice.
23. Write a python program to calculate total marks, percentage and grade of a student. Marks obtained in each of the three subjects are to be input by the user. Assign grades according to the following criteria:
  - GradeA: Percentage $\geq$ 80
  - Grade B: Percentage $\geq$ 70 and  $<$ 80
  - Grade C: Percentage $\geq$ 60 and  $<$ 70
  - Grade D: Percentage $\geq$ 40 and  $<$ 60
  - GradeE: Percentage $<$ 40
24. Write a python program to display the first n terms of Fibonacci series.

25. Write a python program to calculate the sum and product of two compatible matrices.
26. Write a function that takes a character and returns True if it is a vowel and False otherwise.
27. Write a menu-driven program to create mathematical 3D objects
  - I. curve
  - II. sphere
  - III. cone
  - IV. arrow
  - V. ring
  - VI. Cylinder.
28. Write a python program to read n integers and display the a histogram.
29. Write a python program to display sine, cosine, polynomial and exponential curves.
30. Write a python program to plot a graph of people with pulse rate p vs. height h. The values of P and H are to be entered by the user.
31. Write a python program to calculate the mass m in a chemical reaction. The mass m (in gms) disintegrates according to the formula  $m=60/(t+2)$ , where t is the time in hours. Sketch a graph for t vs. m, where  $t \geq 0$ .
32. A population of 1000 bacteria is introduced into a nutrient medium. The population p grows as follows:  

$$P(t) = (15000(1+t)) / (15+e)$$
33. Where the time t is measured in hours. WAP to determine the size of the population at given time t and plot a graph for P vs t for the specified time interval.
34. Input initial velocity and acceleration, and plot the following graphs depicting equations of motion:
  - I. Velocity wrt time ( $v=u+at$ )
  - II. Distance wrt time ( $s=u*t+0.5*a*t*t$ )
  - III. Distance wrt velocity ( $s=(v*v-u*u)/2*a$ )
35. Write a program that takes two lists and returns True if they have at least one common member.
36. Write a Python program to print a specified list after removing the 0th, 2nd, 4th and 5th elements.
37. Write a program to implement exception handling.
38. Try to configure the widget with various options like: `bg="green"`, `family="times"`, `size=20`.



39. Write a Python program to read last 5linesofafile.
40. Design a simple database application that stores the records and retrieve the same
41. Design a database application to search the specified record from the database.
42. Design a database application that allows the user to add, Delete and modify the records.

### **III. Lab References:**

3. Core Python Programming, WesleyJ. Chun, Second Edition, Pearson.
4. Think Python, Allen Downey, Green TeaPress.

### **Reference Materials on the Web/web-links:**

19. <https://www.tutorialspoint.com/python/index.htm>
20. <https://www.w3schools.com/python/>



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**Title: APPLICATION DEVELOPMENT USING PYTHON LAB**

Course Code: **CSCSEP06**

Domain Subject: **Computer Science**

Max. Marks: **50** (CCIA: 10+ SEE: 40)

Offered to: **B.Sc.(MSCS, MPCS, MECS)**

Semester: **V/VI**

Practical Hrs./Week : **3**

**Model Paper: Practicals**

**Time: Three hours**

**Max. Marks: 40**

**Section A**

One Major Experiment (Experiment No : ) **15 M**

**Section B**

One Minor Experiment (Experiment No : ) **10 M**

**Section C**

Practical Record **05 M**

**Section D**

Viva Voce **10 M**

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Course Code: CASSET01

Domain Subject: **COMPUTER APPLICATIONS**

Max. Marks: **100** (CCIA: 25+ SEE: 75)

Offered to: **B.Sc. (CAME, CAMS)**

Semester – V/VI

Theory Hrs. /Week: **3**

**BIGDATA ANALYTICS USING R**

Type of the Course: **Skill Enhancement Course** (Elective Theory),

Credits: **03**

**I. Course Outcomes: Students at the successful completion of the course will be able to:**

CO1: Understand data and classification of digital data. (PO5)

CO2: Gain knowledge of technologies used in big data Analytics. (PO5, PO7)

CO3: Understand basics of R and control structures in R. (PO5)

CO4: Load data into R objects and manipulate them as needed. (PO5)

CO5: Create and edit visualizations with R (PO7)

**II. Syllabus:**

**(Total periods: 45)**

**UNIT – I**

**(8 periods)**

**Introduction to Big data:** What is data, Classification of Digital Data-Structured Unstructured, semi-structured data, Characteristics of data, Evaluation of big data, Definition and challenges of big data, what is big data and why to use big data?

**UNIT – II**

**(10 periods)**

**Big data Analytics:** What is and isn't big data analytics? Classification of analytics, Importance of big data analytics, Technologies needed to meet challenges of big data, data science, Data scientist.

### **UNIT – III**

**(9 periods)**

**Introduction to R and getting started with R:** What is R? Why R? Advantages of R over other programming languages, Data types in R - logical, numeric, integer, character, double, Complex, raw, coercion, ls () command, Expressions, Variables and functions, control structures, Array, Matrix, Vectors, Factors, R packages

### **UNIT – IV**

**(10 periods)**

**Exploring data in R–** Data frames-data frame access, Ordering data frames, functions for data frames dim(), nrow(), ncol(), str(), summary(), names(), head(), tail(), edit(), Load data frames—reading from .CSV files, Sub setting data frames, reading from tab separated value files, Reading from tables, merging data frames

### **UNIT – V**

**(8 periods)**

**Data Visualization using R:** Reading and getting data into R (External Data),Using CSV files, XML files, Web Data, JSON files, Databases, Excel files,Working with R Charts and Graphs: Histograms, Boxplots, Bar Charts, Line Graphs, Scatterplots, Pie Chart

#### **Textbooks:**

1. Seema Acharya--Data Analytics using R, McGraw Hill education (India) Private Limited.
2. Big Data Analytics, Introduction to Hadoop, Spark, and Machine-Learning, Raj Kamal, PreetiSaxena, McGraw Hill, 2018

#### **Reference Books:**

1. Seema Acharya, Subhashini Chellappan --- Big Data and Analytics second edition, Wiley
2. Big Data, Big Analytics: Emerging Business intelligence and Analytic trends for Today's Business, Michael Minnelli, Michelle Chambers, and Ambiga Dhiraj, John Wiley & Sons, 2013
3. An Introduction to R, Notes on R: A Programming Environment for Data Analysis and Graphics. W. N. Venables, D.M. Smith and the R Development Core Team

#### **IV. RECOMMENDED CO-CURRICULAR ACTIVITIES:**

(Co-curricular activities shall not promote copying from textbook or from others work and shall encourage self/independent and group learning)

**A. Measurable**

1. Assignments (in writing and doing forms on the aspects of syllabus content and outside the syllabus content. Shall be individual and challenging)
2. Student seminars (on topics of the syllabus and related aspects (individual activity))
3. Quiz (on topics where the content can be compiled by smaller aspects and data (Individuals or groups as teams))
4. Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual participation and contribution of students shall be ensured (team activity)

**B. General**

1. Group Discussion
2. Try to solve MCQ's available online.
3. Others



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**Model Question Paper**

**Title of the Course: BIGDATA ANALYTICS USING R**

**Course Code: CASSET01**

**Offered To: B.Sc. (CAME, CAMS)**

**Max Marks: 75**

**Time: 3 Hrs.**

**SECTION – A**

**Short Answer Questions (25 Marks: 5 x 5)**

**Answer any Five questions. (At least 1 question should be given from each Unit)**

1. What is big data and why to use a big data? (CO1, L1)
2. What is big data analytics? (CO2, L1)
3. Explain ls () command in R. (CO3, L2)
4. Explain about functions in R? (CO3, L1)
5. Write a short note on charts. (CO5, L1)
6. Develop R script to load data into data frames from files. (CO4, L6)
7. Develop bar chart in R. (CO4, L6)
8. Write about the control structures in R with examples. (CO3, L1)

**SECTION B (Total: 5 x 10 = 50 Marks)**

**Answer all questions. (Two questions should be given from each unit with internal choice)**

9(a) Give Classification of Digital Data and explain it. (CO1, L2)

**OR**

(b) Explain Characteristics of Data with an example. (CO1, L2)

10. (a) Write about Importance of big Data Analytics. (CO2, L1)

**OR**

(b) Explain Classification of Analytics. (CO2, L2)

11(a) Write about the Data types in Explain with examples. (CO3, L1)

**OR**

(b) Construct Vector in R and explain various operations on it. (CO3, L3)

12. (a) What are the data frames? Write its significance in R-Language. (CO4, L1)

**OR**

(b) Demonstrate various functions used in data frames. (CO4, L2)

13(a) Build a code in R for reading and getting data into R from databases. (CO5, L6)

**OR**

(b) Develop below plots in R (CO5, L6) Box Whisker plots b) Scatter plots c) Pairs

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Course Code: **CASSEP01**

Offered to: **B.Sc.(CAME,CAMS)**

Domain Subject: **COMPUTER APPLICATIONS**

Semester: V/VI

Max. Marks: **50** (CCIA: 10+ SEE: 40)

Practical Hrs. /Week: **3**

**Course 6A: BIG DATA ANALYTICS USING R LAB**

Type of the Course: **Skill Enhancement Course** (Elective, Practical), Credits: 02

**I. Course Outcomes: Students at the successful completion of the course will be able to:**

CO1: Implement simple scripts or programs in R. (PO5)

CO2: Access online resources for R and import new function packages into the R workspace. (PO5, PO7)

CO3: Import, review, manipulate and summarize data-sets in R (PO5, PO7)

CO4: Explore data-sets to create testable hypotheses and identify appropriate statistical tests. (PO5, PO7)

CO5: Create and edit visualizations with R. (PO5, PO7)

**II: Practical (Laboratory) Syllabus: (30 Periods)**

7. Create a vector in R and perform operations on it (arithmetic operations, combining Vectors, retrieving elements of vector, assign names to vector elements).

8. Create integer, complex, logical, character data type objects in R and print their values And their class using print and class functions.

9. Create a matrix of values in R and extract data from matrix. (Ex. Second row third etc.) Find transpose of matrix and combine two matrices using Rbind and Cbind functions.

4. Create a list in R and perform operations on it like list slicing, sum and mean functions, Head and tail functions and finally delete list using rm() function.

5. Create data frame in R and perform operations on it

6. Write code in R to find out whether a number is prime or not.

7. Print numbers from 1 to 100 using while loop and for loop in R.
8. Find the factorial of a number using recursion in R.
9. Perform arithmetic operations in R using switch case
10. Write a code in R to find out whether the number is Armstrong or not.
11. Program to find Multiplication table from 1 to 10 number input by user.
12. Import data into R from text and excel files using read.table() and read.csv() function.
13. Create a dataset and draw different types of graphics using plot, box plot, histogram, pair plot functions.
  
14. Create a dataset and draw different types of graphs using bar charts, pie chart functions.
15. Create custom contingency in R and perform operations on it.

### **III. Lab References:**

1. Seema Acharya--Data Analytics using R, McGraw Hill education (India) Private Limited.
2. Big Data Analytics, Introduction to Hadoop, Spark, and Machine-Learning, Raj kamal, Preeti Saxena, McGraw Hill, 2018

### **Reference Materials on the Web/web-links:**

1. <https://www.wiley.com/enbd/Big+Data,+Big+Analytics:+Emerging+Business+Intelligence+and+Analytic+Trends+for+Today's+Businesses-p-9781118147603>
2. <https://www.wiley.com/en-gb/Big+Data+Analytics%3A+Turning+Big+Data+into+Big+Money-p-9781118147597>





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**Course 6A: BIG DATA ANALYTICS USING R LAB**

Course Code: **CASSEP01**

Domain Subject: **Computer Applications**

Max. Marks: **50** (CCIA: 10+ SEE: 40)

Offered to: **B.Sc. (CAME, CAMS)**

Semester: V/VI

Practical Hrs. / Week : **3**

**Model Paper: Practical**

**Time: Three hours**

**Max. Marks: 40**

	<b>Section A</b>
One Major Experiment (Experiment No : )	<b>15 M</b>
	<b>Section B</b>
One Minor Experiment (Experiment No : )	<b>10 M</b>
	<b>Section C</b>
Practical Record	<b>05 M</b>
	<b>Section D</b>
Viva Voce	<b>10 M</b>

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Course Code: **CASSET02** Offered to: **B.Sc. (CAME, CAMS)**  
Domain Subject: **COMPUTER APPLICATIONS** Semester – **V/VI**  
Max. Marks: **100** (CCIA: 25+ SEE:75) Theory Hrs./Week: **3**

**Course 7A: DATASCIENCE USING PYTHON**

Type of the Course: **Skill Enhancement Course** (Elective Theory), Credits: **03**

**I. Course Outcomes: Students at the successful completion of the course will be able to:**

- CO1: Understand the need and importance of data science. (PO5, PO7)  
CO2: Understand basic concepts of python and implementing control structures in python. (PO5)  
CO3: Implement strings and other data structures in python (PO5, PO7)  
CO4: Learn and Implement functions and modules in python. (PO5)  
CO5: Learn and Implement data cleaning and plotting using pandas. (PO5, PO7)

**II. Syllabus:** (Total Theory Periods: 45)

**UNIT-I : INTRODUCTION TODATA SCIENCE(9 periods)**

Data science and its importance, Advantages of data science, The process of data science, Responsibilities of a data scientist, Qualifications of data scientists, Would you be a good data scientist?, Why to use python for data science?

**UNIT-II : INTRODUCTION TO PYTHON (9 periods)**

What is python?, Features of python, History of python, Writing and executing the python program, Basic syntax, Variables, Keywords, Data types , Operators, Indentation, Control Structures-Conditional statements—If, If-else, Nested if-else, Looping statements—For, While, Nested Loops, Break, Continue, Pass

**UNIT-III STRINGS AND DATA STRUCTURES (9 periods)**

Strings - definition, accessing, slicing and basic operations, Lists - introduction, accessing list,

operations, working with lists, functions and methods, Tuples - introduction, accessing tuple, operations, Dictionaries- introduction, accessing values in dictionaries, working with dictionaries.

#### **UNIT-IV:FUNCTIONS AND MODULES**

**(9 periods)**

Functions- Defining a function, Calling a function, Types of functions, Function arguments, Local and global variables, Lambda and recursive functions, Modules---Math, Random, OS, Date and Time

#### **UNIT-V: PANDAS**

**(9 periods)**

What is Pandas?, Series, Data Frame, Read CSV Files, Analyzing Data Frames, Data Correlations, Data Cleaning---Empty cells, Data in wrong format, Wrong data, Duplicates, Pandas Plotting-- plot () method, bar plot, hist plot, box plot, area plot, scatter plot, pie plot

#### **III Prescribed Books:**

1. Steven cooper--- Data Science from Scratch, Kindle edition
2. Reema thareja—Python Programming using problem solving approach, Oxford Publication

#### **Reference Books:**

- 1.Wes McKinney--- Python for Data Analysis ,O'REILLY

#### **IV Co-Curricular Activities**

(Co-curricular activities shall no promote copying from text book or from others work and shall encourage self /independent and group learning)

#### **Measurable**

53. Assignments (in writing and doing forms on the aspects of syllabus content and outside the syllabus content. Shall be individual and challenging)
  54. Student seminars (on topics of the syllabus and related aspects (individual activity))
  55. Quiz (on topics where the content can be compiled by smaller aspects and data(Individuals or groups a steams))
  56. Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual participation and contribution of students shall been ensured (team activity)

#### **General**

40. Group Discussion
41. Try to solve MCQ's available online.
42. Others.



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**Model paper**

**Course Code: CASSET02**

**Offered to: (B.Sc. (CAME,CAMS))**

**Title of the Course: Data Science Using Python**

**SECTION – A**

**Short Answer Questions (25 Marks: 5 x 5)**

**Answer any Five questions. (At least 1 question should be given from each Unit)**

1. Write advantages of data science. (CO1, L1)
2. What are the qualifications of data scientist? (CO1, L2)
3. Explain about the history of python.(CO2, L1)
4. Explain about a) Keywords b) Variables in python.(CO2, L1)
5. Explain about string operations in python.(CO3, L1)
6. Explain about the date and time module in python.(CO4, L1)
7. Explain about the local and global variables in python.(CO4, L1)
8. What is data cleaning? Explain about duplicates in pandas.(CO5, L1)

**SECTION B (Total: 5 x 10 = 50 Marks)**

**Answer all questions. (Two questions should be given from each unit with internal choice)**

9. (a) What is Data Science? Explain the Responsibilities of a data scientist.(CO1, L2)

**OR**

9. (b) Explain the use of python for data science?(CO1, L1)

10. (a) Explain different types of conditional statements with examples.(CO2, L1)

**OR**

10. (b) Explain different types of Looping statements with examples.(CO2, L1)

11. (a) What is a list? Explain different operations of lists with examples in python. (CO3, L2)

**OR**

11. (b)What is a Dictionary? Explain accessing values in it with examples in python (CO3, L2)

12. (a) Explain Function definition, calling & different types in python with example.(CO4, L1)

**OR**

12. (b) Explain about random and math module in python with an example.(CO4, L1)

13. (a) What is a data frame? Illustrate the concept of analysing the data frames.(CO5, L2)

**OR**

13. (b) Explain different types of plotting techniques in pandas with examples.(CO5, L1)

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Course Code: **CASSEP02**

Domain Subject: **COMPUTER APPLICATIONS**

Max. Marks: **50** (CCIA: 10+ SEE: 40)

Offered to: **(B.Sc. (CAME, CAMS))**

Semester: V /VI

Practical Hrs./Week : **3**

### **Course 7A: DATASCIENCE USING PYTHON LAB**

Type of the Course: **Skill Enhancement Course** (Elective, Practical),

Credits: 02

**I. Course Outcomes: Students at the successful completion of the course will be able to:**

CO1: Implement simple programs in basics of python. (PO5)

CO2: Implement control structures in python. (PO5)

CO3: Implement data structures like strings, list, tuples, and dictionaries in python. (PO5, PO7)

CO4: Implementation of data frames, data cleaning and plotting in pandas. (PO5, PO7)

**II: Practical (Laboratory) Syllabus: (30 Periods)**

1. Python Program to Find the Square Root
2. Python Program to Swap Two Variables
3. Python Program to Generate a Random Number
4. Python Program to check if a Number is odd or even
5. Python Program to Find the Largest Among Four Numbers
6. Python Program to Check Prime Number
7. Python Program to Display the multiplication Table
8. Python Program to Print the Fibonacci sequence
9. Python Program to Check Armstrong Number
10. Python Program to Find the Sum of Natural Numbers
11. Python Program to Make a Simple Calculator
12. Python Program to Find Factorial of Number Using Recursion
13. Python Program to Add Two Matrices
14. Python Program to Multiply Two Matrices
15. Python Program to Check Whether a String is Palindrome or Not

16. Python Program to perform operations on strings.
17. Python Program to create a list and perform operations on its contents.
18. Python Program to perform operations on tuples.
19. Python Program to create a dictionary and print its content.
20. Python program to import data from CSV file using pandas.
21. Python program to demonstrate plots

### **III. Lab References:**

2. Reema thareja—Python Programming using problem solving approach, Oxford Publication

### **Reference Materials on the Web/web-links:**

1. <https://www.w3schools.com/python/>
2. <https://www.geeksforgeeks.org/python-basics/>



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Course Code: **CASSEP02**

Offered to: **(B.Sc. (CAME, CAMS))**

**Title: DATASCIENCE USING PYTHON LAB (Model Paper)**

Domain Subject: **Computer Applications**

Semester: **V/VI**

Max. Marks: **50** (CCIA: 10+ SEE: 40)

Practical Hrs./Week : **3**

**Model Paper: Practicals**

**Time: Three hours**

**Max. Marks: 40**

**Section A**

One Major Experiment (Experiment No : ) **15 M**

**Section B**

One Minor Experiment (Experiment No : ) **10 M**

**Section C**

Practical Record **05 M**

**Section D**

Viva Voce **10 M**

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Course Code: **CASSET03**

Domain Subject: **Computer Applications**

Max. Marks: **100** (CCIA: 25+ SEE: 75)

Offered to: **(B.Sc. (CAME, CAMS))**

Semester – **V/ VI**

Theory Hrs./Week: **3**

### **Course 6B: MOBILE APPLICATION DEVELOPMENT**

Type of the Course: **Skill Enhancement Course** (Elective Theory),

Credits: **03**

**III. Course Outcomes: Students at the successful completion of the course will be able to:**

CO1: Identify basic terms, tools and software related to android systems. (PO5)

CO2: Describe components of IDE, understand features of android development tools. (PO5)

CO3: Describe the layouts and controls and different views available. (PO5, PO7)

CO4: Understand Android system architecture and security model. (PO5)

CO5: Understand the features of services and able to publish android Application. (PO5, PO7)

### **II. Syllabus:**

**(Total Theory Periods: 45)**

#### **Unit-1:**

**(9 periods)**

Introduction to android, open headset Alliance, Android ecosystem, Need of android, Features of android, Tools and Software required for developing an Application, Android architecture.

#### **Unit-2:**

**(9 periods)**

Operating system, java JDK, Android SDK, Android development tools, Android virtual devices, Steps to install and configure Android studio and sdk.

#### **Unit-3:**

**(11 periods)**

Control flow, directory structure, Components of a screen, Fundamental UI design, Linear layout, absolute layout, table layout, relative layout, Text view, Edit text, Button image button, radio button, toggle button, Radio group, check box, and progress bar, List view, grid



view, image view, scroll view, Time and date picker

#### Unit-4:

(8 periods)

Android platform services, Android system Architecture, Android Security model, Applications development: creating small application.

#### Unit-5

(8 periods)

Introduction of MIT App Inventor, Application Coding, Programming Basics & Dialog, More Programming Basics, Alarm Clock Application, Audio & Video, Drawing Application, File, Game, Device Location, Web Browsing.

### III References/ Text Book/ e-books/websites

#### Text Books:

5. Erik Hellman, “Android Programming–Pushing the Limits”, 1st Edition, Wiley India Pvt Ltd, 2014.
6. App Inventor: create your own Android apps by Wolber, David (David Wayne)

#### Reference Books:

5. Dawn Griffiths and David Griffiths, “Head First Android Development”, 1st Edition, O’Reilly SPD Publishers, 2015.
6. JFDiMarzio, “Beginning Android Programming with Android Studio”, 4th Edition, Wiley India Pvt Ltd, 2016. ISBN-13: 978-8126565580

#### Web resources:

<https://www.udacity.com/course/developing-android-apps-fundamentals--ud853-nd>  
<http://www.appinventor.mit.edu/>

### IV Co-Curricular Activities

(Co-curricular activities shall not promote copying from text book or from others work and shall encourage self/independent and group learning)

#### Measurable

57. Assignments (in writing and doing forms on the aspects of syllabus content and outside the syllabus content. Shall be individual and challenging)
  58. Student seminars (on topics of the syllabus and related aspects (individual activity))
  59. Quiz (on topics where the content can be compiled by smaller aspects and data (Individuals or groups or teams))
  60. Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual participation and contribution of students shall be ensured (team activity))

#### General

43. Group Discussion
44. Try to solve MCQ’s available online.
45. Others.



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**Model paper**

Course Code: **CASSET03**

**Offered to (B.Sc. (CAME, CAMS))**

**Title of the Course: Mobile Application Development**

**SECTION – A**

**Short Answer Questions (25 Marks: 5 x 5)**

**Answer any Five questions. (At least 1 question should be given from each Unit)**

1. What is the Need of Android?(CO1,L1)
2. Explain the Steps to install and configure Android studio and sdk.(CO2,L2)
3. What are the Components of a screen?(CO3,L1)
4. What are the Android platform services?(CO4,L1)
5. How to write Application Coding?(CO5,L1)
6. Explain image button and radio button with an example.(CO3,L2)
7. Explain Android Security model.(CO4,L2)
8. Explain Web Browsing.(CO5,L2)

**SECTION B (Total: 5 x 10 = 50 Marks)**

**Answer all questions. (Two questions should be given from each unit with internal choice)**

9(a) Explain Android Architecture.(CO1,L2)

**OR**

9(b) Write Features of Android.(CO1,L1)

10(a) Explain Android development tools.(CO2,L2)

**OR**

10(b) Explain Android virtual devices.(CO2,L2)

11(a) Explain about Linear layout, absolute layout, table layout and relative layout.(CO3,L2)

**OR**

11(b) Discuss about List view, grid view, image view, scroll view.(CO3,L6)

12(a) How to create a small application using Android Application?(CO4,L6)

**OR**

12(b) Describe Android system Architecture.(CO5,L6)

13.(a) Explain Audio & Video Concepts.(CO5,L2)

**OR**

13(b) Develop Alarm clock application.(CO5,L6)

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Course Code: **CASSEP03**

Offered to: **(B.Sc. (CAME, CAMS))**

Domain Subject: **COMPUTER APPLICATIONS**

**Semester: V/ VI**

Max. Marks: **50** (CCIA: 10+ SEE: 40)

Practical Hrs./Week : **3**

**Course 6B: MOBILE APPLICATION DEVELOPMENT LAB**

Type of the Course: **Skill Enhancement Course** (Elective, Practical),

Credits: 02

**III. Course Outcomes: Students at the successful completion of the course will be able to:**

CO1: Understand the android platform.(PO5,PO7)

CO2: Design and implementation of various mobile applications.(PO5,PO7)

**II: Practical (Laboratory) Syllabus:**

**(30 Periods)**

**Lab Exercises**

1. Demonstrate mobile technologies and devices.
2. Demonstrate Android platform and applications overview.
3. Implement User interface design layouts.
4. Working with texts, shapes, buttons and lists.
5. Develop a calculator application.
6. Develop application in android using different views.
7. Implement an application that creates a alarm clock.
8. Develop audio and video drawing application.

**III. Lab References:**

1. Erik Hellman, "Android Programming–Pushing the Limits", 1stEdition, Wiley India Pvt Ltd, 2014.

2. App Inventor: create your own Android apps by Wolber, David (David Wayne).

**Reference Materials on the Web/web**

5. <https://www.udacity.com/course/developing-android-appsfundamentals--ud853-nd>

6. <http://www.appinventor.mit.edu/>



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Course Code: **CASSEP03**

Offered to: **(B.Sc. (CAME,CAMS))**

Domain Subject: **Computer Applications**

Semester: **V/VI**

**MOBILE APPLICATION DEVELOPMENT LAB**

Max. Marks: **50** (CCIA: 10+ SEE: 40)

Practical Hrs./Week : **3**

**Model Paper: Practicals**

**Time: Three hours**

**Max. Marks: 40**

	<b>Section A</b>
One Major Experiment (Experiment No : )	<b>15 M</b>
	<b>Section B</b>
One Minor Experiment (Experiment No : )	<b>10 M</b>
	<b>Section C</b>
Practical Record	<b>05 M</b>
	<b>Section D</b>
Viva Voce	<b>10 M</b>

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Course Code: **CASSET04**

Domain Subject: **COMPUTER APPLICATIONS**

Max. Marks: **100** (CCIA: 25+ SEE:75)

Offered to: **(B.Sc. (CAME,CAMS))**

Semester – **V/VI**

Theory Hrs./Week: **3**

**Course 7B: CYBER SECURITY AND MALWARE ANALYSIS**

Type of the Course: **Skill Enhancement Course** (Elective Theory), Credits: **03**

**I. Course Outcomes: Students at the successful completion of the course will be able to:**

CO1: Understand the computer networks, networking tools and cyber security.(PO6,PO7)

CO2: Learn about NIST Cyber Security Framework.(PO6,P07)

CO3: Understand the OWASP Vulnerabilities.(PO6, PO7)

CO4: Implement various Malware analysis tools.(PO6,P07)

CO5: Understand about Information Technologyact2000.(PO6,P07)

**II. Syllabus:**

**(Total Theory Hours: 45)**

**UNIT1: Introduction to Networks & cyber security**

**(9 Periods)**

Computer Network Basics, Computer network types, OSI Reference model, TCP/IP Protocol suite, Difference between OSI and TCP/IP, What is cyber, cyber-crime and cyber-security, All Layer wise attacks, Networking devices: router, bridge, switch, server, firewall, How to configure: router, How to create LAN, Network tools, IP scanner, Port scanner, Vulnerability scanner, Command tools--netstack, trace route, lookup, tcp view.

**UNIT2: NIST Cyber security framework**

**(9 periods)**

Introduction to the components of the framework, Cyber security Framework Tiers, What is NIST Cyber security framework, Features of NIST Cyber security framework, Functions of NIST Cyber

security framework, Turn the NIST Cyber security Framework into Reality/implementing the framework.

#### UNIT3: OWASP

(9 periods)

What is OWASP? OWASP Top10Vulnerabilities, Injection, Broken Authentication, Sensitive Data Exposure, XML External Entities (XXE), Broken Access Control, Security Misconfiguration, Cross-Site Scripting(XSS), Insecure Deserialization, Using Components with Known Vulnerabilities, Insufficient Logging and Monitoring, OWASP Juice Shop, Web application firewall.

#### UNIT4: MALWARE ANALYSIS

(9 periods)

What is malware, Types of malware, Key loggers, Trojans, Ransom ware, Rootkits, Antivirus, Firewalls, Malware analysis, VMware, How to uses and box, How to create virtual machine, Process explorer, Process monitor, SYS-internals Suite, SOC-security operations controls-Solar winds (study the tools), Network intrusion detection, Wire shark, IDS, IPS, Snort.

#### UNIT5: CYBER SECURITY: Legal Perspectives

(9 periods)

Cybercrime and the legal landscape around the world, IndianITACT2000—Cybercrime and Punishments, Weak areas of ITACT2000, Challenges to Indian law and cybercrime scenario in India, Amendments of the Indian IT Act.

### III References / Text Book/ e-books/websites

#### TEXTBOOKS:

9. Computer Networks | Fifth Edition | By Pearson (6th Edition) [Tanenbaum, Feamster &Wetherall](#)
10. Computer Networking | A Top-Down Approach | Sixth Edition | By Pearson | [KuroseJames F. Ross Keith W.](#)
11. Cyber Security by [Sunit Belapure, Nina Godbole](#)| Wiley Publications
12. TCP/IP Protocol Suite | Mc graw- hill| Forouzan| Fourth Edition

#### WEBSITEREFERENCES:

7. <https://csrc.nist.gov/Projects/cybersecurity-framework/nist-cybersecurity-framework-a-quick-start-guide>
8. <https://owasp.org/www-project-top-ten/>
9. <https://owasp.org/www-project-juice-shop/>

#### **IV Co-Curricular Activities**

(Co-curricular activities shall not promote copying from text book or from others work and shall encourage self/independent and group learning)

##### **Measurable**

61. Assignments (in writing and doing forms on the aspects of syllabus content and outside the syllabus content. Shall be individual and challenging)
  62. Student seminars (on topics of the syllabus and related aspects (individual activity))
  63. Quiz (on topics where the content can be compiled by smaller aspects and data(Individuals or groups a steams))
  64. Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual participation and contribution of students shall be ensured (team activity))

##### **General**

46. Group Discussion
47. Try to solve MCQ's available online.
48. Others.



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**Model paper**

Course Code: CASSET04

Offered to: B.Sc. (CAME, CAMS)

**Title of the Course: CYBER SECURITY AND MALWARE ANALYSIS**

**SECTION – A**

**Short Answer Questions (25 Marks: 5 x 5)**

**Answer any Five questions. (At least 1 question should be given from each Unit)**

1. Discuss all Layer wise attacks.(CO1,L6)
2. Explain about Cyber, Cyber-Crime and Cyber-Attacks.(CO1,L2)
3. Explain Features of NIST Cyber Security framework.(CO2,L2)
4. Explain Cyber Security framework Tiers.(CO2,L2)
5. Write about Web Application firewalls in OWASP.(CO3,L1)
6. Discuss about Key loggers, Trojans, Rootkits.(CO4,L6)
7. Explain Weak areas of IT ACT 2000.(CO5,L2)
8. Outline amendments of the Indian IT Act.(CO5,L6)

**SECTION B (Total: 5 x 10 = 50 Marks)**

**Answer all questions. (Two questions should be given from each unit with internal choice)**

9(a). Describe in detail TCP/IP Protocol Suite with diagrammatic representation.(CO1,L6)

**OR**

9(b). Explain different types of Network Tools with examples.(CO1,L2)

10(a). Discuss about components of framework and functions of NIST Cyber Security frameworks.(CO2,L6)

**OR**

10(b). Explain how to turn NIST Cyber Security framework into reality framework. (CO2,L6)

11(a). Explain OWASD Juice shop in detail. (CO3,L2)

**OR**

11(b). Explain any 6 OWASP vulnerabilities.(CO3,L2)

12(a). Discuss about different types of Malware analysis in detail. (CO4,L6)

**OR**

12(b). How to detect Network intrusion? Explain.(CO4,L1)

13(a). Explain what are the Challenges are to Indian law and cybercrime scenario in India. (CO5,L2)

**OR**

13(b). Discuss Indian IT-ACT 2000. Explain different Cybercrime and Punishments respectively.(CO5,L6)

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Course Code: **CASSEP04** Offered to: **B.Sc. (CAME, CAMS)**  
Domain Subject: **COMPUTER APPLICATIONS** Semester: V/VI  
Max. Marks: **50** (CCIA: 10+ SEE: 40) Practical Hrs./Week : **3**

**Course 7B: CYBER SECURITY AND MALWARE ANALYSYS LAB**

Type of the Course: **Skill Enhancement Course** (Elective, Practical), Credits: 02

**I. Course Outcomes: Students at the successful completion of the course will be able to:**

CO1: Implement LAN by using as witch and Router.(PO5)

CO2: Implement the task of creating mail messages by using fake mail id by using the "fake mailer" website.(PO5)

CO3: Implement port scanning mechanism.(PO5)

CO4: Implement SQL Injection attack.(PO5)

CO5: Implement to access a locked computer.(PO5)

**II: Practical (Laboratory) Syllabus:**

**(30 Periods).**

**Lab Exercises**

The purpose of this course is to impart practical understanding on Cyber security and protection of electronic systems and information from malware attacks.

1. Configure LAN by using a switch
2. Configure a LAN by using Router
3. Steps to attack a victim computer by using "ProRat" Trojan tool
4. Perform the packet sniffing mechanism by download the "wire shark" tool and extract the packets
5. Perform the task of creating mail messages by using fake email id by using the "fake mailer" website(<https://emkei.cz>)
6. Perform the IP scanning mechanism by using "tracert" and "arp" commands
7. Perform the port scanning mechanism by using NMAP tool
8. Perform an SQL Injection attack and its preventive measure to avoid Injection attack
9. Perform an activity to access a locked computer without knowing the user's password.

**III. Lab References:**

1. Computer Networks | Fifth Edition | By Pearson (6th Edition) [Tanenbaum, Feamster & Wetherall](#)

2. Computer Networking | A Top-Down Approach | Sixth Edition | By Pearson | [Kurose James F. Ross Keith W.](#)

#### **IV. Reference Materials on the Web/web**

5. <https://csrc.nist.gov/Projects/cybersecurity-framework/nist-cybersecurity-framework-a-quick-start-guide>
6. <https://owasp.org/www-project-top-ten/>



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Course Code: **CASSEP04**

Domain Subject: **Computer Applications**

Max. Marks: **50** (CCIA: 10+ SEE: 40)

Offered to: **B.Sc. (CAME, CAMS)**

Semester: V /VI

Practical Hrs./Week : **3**

**Cyber Security and Malware Analysis Lab**

**Model Paper: Practicals**

**Time: Three hours**

**Max. Marks: 40**

	<b>Section A</b>
One Major Experiment (Experiment No : )	<b>15 M</b>
	<b>Section B</b>
One Minor Experiment (Experiment No : )	<b>10 M</b>
	<b>Section C</b>
Practical Record	<b>05 M</b>
	<b>Section D</b>
Viva Voce	<b>10 M</b>

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## PP.B.SIDDHARTHACOLLEGE OFARTS& SCIENCE

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Course Code: **CASSET05**

Offered to: **B. Sc (CAME, CAMS)**

Domain Subject: **COMPUTER APPLICATIONS**

Semester – V/VI

Max. Marks: **100** (CCIA: 25+ SEE:75)

Theory Hrs./Week: **3**

### **Course 6C: MULTIMEDIA TOOLS AND APPLICATIONS**

Type of the Course: **Skill Enhancement Course** (Elective Theory), Credits: **04**

**I. Course Outcomes: Students at the successful completion of the course will be able to:**

CO1: Gain knowledge on the concepts related to Multimedia.(**PO5**)

CO2: Understand the concepts like image data representation and color modes.(**PO5**)

CO3: Understand the different types of video signals and digital audio.(**PO5**)

CO4: Know about multimedia data compression types and audio compression standards (**PO5**)

CO5: Know about basic video compression techniques.(**PO5,P07**)

**II. Syllabus:**

**(Total Theory Periods: 45)**

**UNIT-I: Introduction to multimedia**

**(8 periods)**

What is Multimedia? , Components of Multimedia System, Multimedia Research Topics and Projects, Multimedia and Hypermedia, Multimedia Authoring metaphors, Multimedia Production, Multimedia Presentation, Some Technical Design Issues, Automatic Authoring.

**UNIT-II: Image Data Representations and color models**

**(9periods)**

Color science Human vision Image data types, **Black & white images**-1-bit images (Binary image), 8-bit (Gray -level images), **Color images**- 24-bit color images, 8-bit color images, Color models.

**UNIT-III: Fundamental concepts in video**

**(10 periods)**

Types of Video Signals- Analog Video, Digital Video, Basics of Digital Audio: What is Sound?, Digitization of Sound, Quantization and Transmission of Audio, Pulse code modulation, Differential coding of audio, Predictive coding, DPCM.

**UNIT-IV: Multimedia Data Compression**

**(9 periods)**

Introduction- Basics of Information Theory, Lossless Compression Algorithms, Fix-Length Coding, Run-length coding, Differential coding, Dictionary-based coding, Variable Length Coding, Shannon-Fano Algorithm, Huffman Coding Algorithm.

Audio Compression standards: Introduction, Psychoacoustics model, MPEG Audio

## **UNIT-V: Basic Video Compression Techniques**

**( 9 periods)**

Introduction to Video compression, Video Compression with Motion Compensation, Video compression standard H.261, Video compression standard MPEG-1

### **III 1. Text Books**

Fundamentals of Multimedia by Ze-Nian Li & Mark S. Drew. Publisher: Prentice Hall

### **2. Reference Books:**

1. An introduction to digital multimedia by Savage, T. M. and Vogel, K. E. 2008.
2. Digital Multimedia by Nigel Chapman & Jenny Chapman. 2009.

### **3. Reference Materials on the Web/web-links:**

<https://www.tutorialspoint.com/multimedia>

<https://ksuit342.wordpress.com/lectuers/>

### **IV Co-Curricular Activities**

(Co-curricular activities shall not promote copying from textbook or from others work and shall encourage self/independent and group learning)

#### **A. Measurable**

1. Assignments (in writing and doing forms on the aspects of syllabus content and outside the syllabus content. Shall be individual and challenging)
2. Student seminars (on topics of the syllabus and related aspects (individual activity))
3. Quiz (on topics where the content can be compiled by smaller aspects and data (Individuals or groups as teams))
4. Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual participation and contribution of students shall be ensured (team activity))

#### **B. General**

1. Group Discussion
2. Others



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**Model paper**

Course Code: CASSET05

Offered to: B.Sc. ( CAME, CAMS)

**Title of the Course: Multimedia Tools and Applications**

**SECTION – A**

**Short Answer Questions (25 Marks: 5 x 5)**

**Answer any FIVE questions. (At least 1 question should be given from each Unit)**

1. What is multimedia? Explain components of multimedia system. (CO1, L1)
2. Discuss multimedia production.(CO1, L6)
3. Explain 8-Bit (gray-level images).(CO2,L2)
4. What is sound? Explain digitization of sound. (CO3, L1)
5. Write about SECAM video. (CO3 , L1)
6. Discuss Run-length coding. (CO4, L6)
7. Explain basics of information theory. (CO4, L5)
8. Compare and contrast H.261 and MPEG-1. (CO5, L2)

**SECTION B (Total: 5 x 10 = 50 Marks)**

**Answer all questions. (Two questions should be given from each unit with internal choice)**

9(a) Discuss in detail about multimedia and hypermedia. (CO1, L6)

**OR**

9(b) Explain about multimedia presentation. (CO1, L2)

10(a) Discuss about 24-bit color images and 8-bit color images. (CO2, L6)

**OR**

10(b) Explain Color models in images. (CO2, L2)

11(a) Discuss about PCM (pulse code modulation). (CO3, L6)

**OR**

11(b) Explain High-Definition TV (HDTV). (CO3, L2)

12(a) Discuss Huffman- coding algorithm. (CO4, L6)

**OR**

12(b) Write about MPEG audio compression algorithm. (CO4, L1)

13(a) Explain video compression based on motion compensation. (CO5, L2)

**OR**

13(b) Write about Video compression standard H.261. (CO5,L1)

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**Course Code: CASSEP05**

**Offered to: B.Sc. (CAMS/CAME)**

**Domain Subject: COMPUTER APPLICATIONS**

**Semester: V / VI**

**Max. Marks: 50 (CCIA: 10+ SEE: 40)**

**Practical Hrs./Week : 3**

**Course 6C: MULTIMEDIA TOOLS AND APPLICATIONS LAB**

**Type of the Course: Skill Enhancement Course (Elective, Practical) Credits: 01**

### **I. Course Outcomes:**

Students at the successful completion of the course will be able to:

CO1: Create/modify a new image with open source applications such as GIMP. (PO5)

CO2: Manipulate images using graphic tools. (PO5)

CO3: Learn basic layer mask essentials. (PO5)

CO4: Compress audio and video files. (PO5, PO7)

CO5: Create a realistic shadow. (PO5)

### **II: Practical (Laboratory) Syllabus: (30 Periods)**

1. Editing images using GIMP
2. Improve the Quality of your Image in GIMP
3. Introduction to Layer Masks.
4. Create an impressive background in GIMP
5. Applying Shadow & Highlight effects in images
6. Black& white and color photo conversion.
8. Using File Seizer Software for Audio compression.
9. Using File seizer Software for Video compression.

### **III. Lab References:**

Fundamentals of Multimedia by Ze-Nian Li & Mark S. Drew. Publisher: Prentice Hall

Reference Materials on the Web/web-links

<https://ksuit342.wordpress.com/lectuers/>

<https://www.tutorialspoint.com/multimedia>



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**TITLE: MULTIMEDIA TOOLS AND APPLICATIONS LAB**

**Course Code: CASSEP05**

**Offered to: B.Sc. (CAMS/CAME)**

**Domain Subject: COMPUTER APPLICATIONS**

**Semester: V / VI**

**Max. Marks: 40**

**Time: 3 Hrs**

**Type of the Course: Skill Enhancement Course (Elective, Practical) Credits: 01**

**Section A**

One Major Experiment (Experiment No : ) 15 M

**Section B**

One Minor Experiment (Experiment No : ) 10 M

**Section C**

Practical record 05 M Section D Viva Voce 10 M

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Course Code: **CASSET06**

Domain Subject: **COMPUTER APPLICATIONS**

Max. Marks: **100** (CCIA: 25+ SEE:75)

Offered to: **B.SC (CAME, CAMS**

Semester – **V/VI**

Theory Hrs./Week: **3**

**Course 7C: DIGITAL IMAGING**

Type of the Course: **Skill Enhancement Course** (Elective Theory), Credits: **04**

**I. Course Outcomes: Students at the successful completion of the course will be able to:**

CO1: Gain knowledge about Types of Graphics, Types of Objects, Types of video editing tools **(PO5)**

CO2: Show their skills in editing and altering photographs for through a basic understanding of the tool box. **(PO5)**

CO3: Gain knowledge in using the layers.**(PO5)**

CO4: Gain knowledge in using the selection tools, repair tools.**(PO5)**

CO5: Gain knowledge in using selection tools, applying filters and can show their skills.**(PO5)**

**II. Syllabus:**

**(Total Theory Hours: 45 Periods)**

**UNIT-I**

**(9periods)**

Types of Graphics- Raster vs Vector Graphics ,Types of Objects - Audio formats, Video formats , Image formats , Text document formats, Types of video editing , Different color modes, Image Scanner-Types of Image Scanners

**UNIT-II**

**(8Periods)**

What is GIMP? , GIMP tool box window, Layers Dialog, Tool Options Dialog, Image window. Image window menus

**UNIT-III**

**(10 Periods)**

**Improving Digital Photos** - Opening files, Rescaling saving files, Cropping, Brightening & Darkening 1 Rotating, Sharpening, and Fixing Red Eye.

**Introduction to layers-** What is layer?, Using layer to add text , Using move tool , Changing colors , Simple effects on layers, Linking layers together , Performing operations on layers, Using layers to copy and paste, Tour of layers dialog

#### **UNIT-IV**

**(9 Periods)**

**Drawing-** Drawing lines and curves , Changing colors and brushes, Erasing , Drawing rectangles, Circles and other shapes, Outlining and filling regions, Filling with patterns and gradients, Importing brushes or gradients or making your own.

**Selection:** Working with selections, Select by color and fuzzy, Select Bezier paths, intelligent scissors tool, Modifying selections with selection modes.

#### **UNIT-V**

**(9 Periods)**

**Erasing and Touching Up:** Dodge and burn tool, Smudging tool , Clone tool , Sharpening using convolve tool, Blurring with Gaussian Blur , Correcting Color Balance, Hue , Saturation , Color balance using curves and levels.

**Filters:** Filters , Blur, Enhance , Distort, Noise Filters.

#### **III References/ Text Book/ e-books/websites**

**Textbook:** Beginning GIMP from Novice to professional by Akkana Peck, Second Edition, A press

**Reference Materials on the Web/web-links:**

<https://www.mygreatlearning.com/gimp/tutorials/gimp-introduction>

#### **IV Co-Curricular Activities**

(Co-curricular activities shall not promote copying from textbook or from others work and shall encourage self/independent and group learning)

##### **A. Measurable**

1. Assignments (in writing and doing forms on the aspects of syllabus content and outside the syllabus content. Shall be individual and challenging)
2. Student seminars (on topics of the syllabus and related aspects (individual activity))
3. Quiz (on topics where the content can be compiled by smaller aspects and data (Individuals or groups as teams))
4. Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual participation and contribution of students shall be ensured (team activity))

##### **B. General**

1. Group Discussion
2. Others



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**Model paper**

Course Code: CASSET06

Offered to: B.SC(CAME, CAMS)

Title of the Course: Digital Imaging

**SECTION – A**

**Short Answer Questions (25 Marks: 5 x 5)**

**Answer any Five questions. (At least 1 question should be given from each Unit)**

1. Explain different types of image formats.(CO1,L2)
2. Write short notes on Tool box in GIMP.(CO2, L1)
3. Explain briefly about gradients in GIMP. (CO4, L2)
4. Write short notes on clone tool in GIMP.(CO5,L1)
5. Explain rotating, sharpening in GIMP.(CO3,L2)
6. What is a layer? Explain steps to use layer in GIMP.(CO3, L1)
7. Describe different color modes in GIMP.(CO1,L5)
8. What is GIMP? Who invented GIMP? Write about tool box options in GIMP?(CO2,L1)

**SECTION B (Total: 5 x 10 = 50 Marks)**

**Answer all questions. (Two questions should be given from each unit with internal choice)**

9(a) Describe the various color modes in GIMP with example.( CO1,L5)

**OR**

9(b) What are various types of audio and video formats in GIMP? Explain with example.(CO1,L1)

10(a) Describe image window menu in detail.( CO2, L5)

**OR**

10(b) Explain the window layers dialog in GIMP.(CO2, L2)

11(a) Describe Cropping-Brightening and Darkening in GIMP.(CO3, L5)

**OR**

11(b) Explain the steps to solve a fixed-red eye in GIMP.(CO3,L2)

12(a) Explain the working with selections in GIMP.(CO4, L2)

**OR**

12(b) Write about filling with patterns and gradients.(CO4, L1)

13(a) Describe the steps involved in Dodge, Burn and Smudging tool in GIMP.(CO5,L5)

**OR**

13(b) Write about distort and noise filters in GIMP.(CO5,L1)

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Course Code: **CASSEP06** Offered to: B.Sc. (CAME, CAMS)  
Domain Subject: **COMPUTER APPLICATIONS** Semester: V/VI  
Max. Marks: **50** (CCIA: 10+ SEE: 40) Practical Hrs./Week : **3**

**Course 7C: DIGITAL IMAGING LAB**

Type of the Course: **Skill Enhancement Course** (Elective, Practical) Credits: 01

**I. Course Outcomes: Students at the successful completion of the course will be able to:**

CO1: Students will gain a working knowledge of Photoshop (PO5)

CO2: Student will be able to show their skills in editing and altering photographs for through a basic understanding of the tool bar. (PO5)

CO3: Student will gain knowledge in using the layers. (PO5)

CO4: Student will gain knowledge in using the selection tools, repair tools.(PO5,PO7)

CO5: Student will gain knowledge in using filters and can show their skills. (PO5)

**II: Practical (Laboratory) Syllabus: (30 Periods)**

1. Designing a Visiting card
2. Design Cover page of a book
3. Paper add for calling tenders
4. Passport photo design
5. Design a Pamphlet
6. Brochure designing
7. Titles designing
8. Custom shapes creation
9. Black & white and color photo conversion
10. Image size modification
11. Background changes
12. Texture and patterns designing
13. Filter effects & Eraser effects



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Course Code: **CASSEP06**

Offered to: **B.Sc. (CAME, CAMS)**

Domain Subject: **COMPUTER APPLICATIONS**

Semester: V/VI

**DIGITAL IMAGING LAB**

Max. Marks: **50** (CCIA: 10+ SEE: 40)

Practical Hrs./Week : **3**

**Model Paper: Practicals**

**Time: Three hours**

**Max. Marks: 40**

	<b>Section A</b>
One Major Experiment (Experiment No : )	<b>15 M</b>
	<b>Section B</b>
One Minor Experiment (Experiment No : )	<b>10 M</b>
	<b>Section C</b>
Practical record	<b>05 M</b>
	<b>Section D</b>
Viva Voce	<b>10 M</b>

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**Title: CYBER SECURITY AND MALWARE ANALYSIS**

Course Code: **CABSET01**

Domain Subject: **COMPUTER APPLICATIONS**

Max. Marks: **100** (CCIA: 25+ SEE:75)

Offered to: **BCOM CA**

Semester – **VI**

Theory Hrs./Week: **3**

Type of the Course: **Skill Enhancement Course** (Elective Theory), Credits: **03**

**I. Course Outcomes: Students at the successful completion of the course will be able to:**

CO1: Understand the computer networks, networking tools and cyber security.(PO6,PO7)

CO2: Learn about NIST Cyber Security Framework.(PO6,P07)

CO3: Understand the OWASP Vulnerabilities.(PO6, PO7)

CO4: Implement various Malware analysis tools.(PO6,P07)

CO5: Understand about Information Technologyact2000.(PO6,P07)

**II. Syllabus:**

**(Total Theory Hours: 45)**

**UNIT1: Introduction to Networks & cybersecurity**

**(9 Periods)**

Computer Network Basics, Computer network types, OSI Reference model, TCP/IP Protocol suite, Difference between OSI and TCP/IP, What is cyber, cyber-crime and cyber-security, All Layerwise attacks, Networking devices: router, bridge, switch, server, firewall, How to configure: router, How to create LAN, Network tools, IP scanner, Port scanner, Vulnerability scanner, Command tools--netstack, trace route, lookup, tcp view.

**UNIT2: NIST Cyber security framework**

**(9 periods)**

Introduction to the components of the framework, Cyber security Framework Tiers, What is NIST

Cyber security framework, Features of NIST Cyber security framework, Functions of NIST Cyber security framework, Turn the NIST Cyber security Framework into Reality/implementing the framework.

#### UNIT3: OWASP

(9 periods)

What is OWASP? OWASP Top10Vulnerabilities, Injection, Broken Authentication, Sensitive Data Exposure, XML External Entities (XXE), Broken Access Control, Security Misconfiguration, Cross-Site Scripting(XSS), Insecure Deserialization, Using Components with Known Vulnerabilities, Insufficient Logging and Monitoring, OWASP Juice Shop, Web application firewall.

#### UNIT4: MALWARE ANALYSIS

(9 periods)

What is malware, Types of malware, Key loggers, Trojans, Ransom ware, Rootkits, Antivirus, Firewalls, Malware analysis, VMware, How to uses and box, How to create virtual machine, Process explorer, Process monitor, SYS-internals Suite, SOC-security operations controls-Solar winds (study the tools), Network intrusion detection, Wire shark, IDS, IPS, Snort.

#### UNIT5: CYBER SECURITY: Legal Perspectives

(9 periods)

Cybercrime and the legal landscape around the world, IndianITACT2000—Cybercrime and Punishments, Weak areas of ITACT2000, Challenges to Indian law and cybercrime scenario in India, Amendments of the Indian IT Act.

### III References/ Text Book/ e-books/websites

#### TEXTBOOKS:

13. Computer Networks | Fifth Edition | By Pearson (6th Edition) | [Tanenbaum, Feamster &Wetherall](#)
14. Computer Networking | A Top-Down Approach | Sixth Edition | By Pearson | [KuroseJamesF. Ross Keith W.](#)
15. Cyber Security by [Sunit Belapure,NinaGodbole](#)|Wiley Publications
16. TCP/IP Protocol Suite |Mcgraw-hill| Forouzan| FourthEdition

#### WEBSITEREFERENCES:

10. <https://csrc.nist.gov/Projects/cybersecurity-framework/nist-cybersecurity-framework-a-quick-start-guide>
11. <https://owasp.org/www-project-top-ten/>
12. <https://owasp.org/www-project-juice-shop/>

### IV Co-Curricular Activities

(Co-curricular activities shall not promote copying from textbook or from others work and shall encourage self/independent and group learning)

## Measurable

65. Assignments (in writing and doing forms on the aspects of syllabus content and outside the syllabus content. Shall be individual and challenging)
  66. Student seminars(on topics of the syllabus and related aspects(individual activity))
  67. Quiz (on topics where the content can be compiled by smaller aspects and data(Individuals or groups a steams))
  68. Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual participation and contribution of students shall be ensured (team activity))

## General

49. Group Discussion
50. Try to solve MCQ's available online.
51. Others.





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**Model paper**

**Title: CYBER SECURITY AND MALWARE ANALYSIS**

Course Code: **CABSET01**

Offered to: **BCOM CA**

Domain Subject: **COMPUTER APPLICATIONS**

Semester – **VI**

Max Marks: 75

Time: 3 Hrs.

**SECTION – A**

**Short Answer Questions (25 Marks: 5 x 5)**

**Answer any Five questions. (At least 1 question should be given from each Unit)**

1. Discuss all Layer wise attacks.(CO1,L6)
2. Explain about Cyber, Cyber-Crime and Cyber-Attacks.(CO1,L2)
3. Explain Features of NIST Cyber Security framework.(CO2,L2)
4. Explain Cyber Security framework Tiers.(CO2,L2)
5. Write about Web Application firewalls in OWASP.(CO3,L1)
6. Discuss about Key loggers, Trojans, Rootkits.(CO4,L6)
7. Explain Weak areas of IT ACT 2000.(CO5,L2)
8. Outline amendments of the Indian IT Act.(CO5,L6)

**SECTION B (Total: 5 x 10 = 50 Marks)**

**Answer all questions. (Two questions should be given from each unit with internal choice)**

9(a). Describe in detail TCP/IP Protocol Suite with diagrammatic representation.(CO1,L6)

**OR**

9(b). Explain different types of Network Tools with examples.(CO1,L2)

10(a). Discuss about components of framework and functions of NIST Cyber Security frameworks.(CO2,L6)

**OR**

10(b). Explain how to turn NIST Cyber Security framework into reality framework. (CO2,L6)

11(a). Explain OWASD Juice shop in detail. (CO3,L2)

**OR**

11(b). Explain any 6 OWASP vulnerabilities.(CO3,L2)

12(a). Discuss about different types of Malware analysis in detail. (CO4,L6)

**OR**

12(b). How to detect Network intrusion ? Explain.(CO4,L1)

13(a). Explain what are the Challenges are to Indian law and cybercrime scenario in India. (CO5,L2)

**OR**

13(b). Discuss Indian IT-ACT 2000. Explain different Cybercrime and Punishments respectively.(CO5,L6)

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**Title: CYBER SECURITY AND MALWARE ANALYSIS LAB**

Course Code: **CABSEP01**

Offered to: **BCOM CA**

Domain Subject: **COMPUTER APPLICATIONS**

Semester – **VI**

Max. Marks: **50** (CCIA: 10+ SEE: 40)

Practical Hrs./Week : **3**

Type of the Course: **Skill Enhancement Course** (Elective, Practical), Credits: **02**

**I. Course Outcomes: Students at the successful completion of the course will be able to:**

CO1:Implement LAN by using a switch and Router.(PO5)

CO2: Implement the task of creating mail messages by using fake mail id by using the "fakemailer" website.(PO5)

CO3: Implement port scanning mechanism.(PO5)

CO4: Implement SQL Injection attack.(PO5)

CO5: Implement to access a locked computer.(PO5)

**II: Practical (Laboratory) Syllabus:**

**(30 Periods).**

**Lab Exercises**

The purpose of this course is to impart practical understanding on Cyber security and protection of electronic systems and information from malware attacks.

19. Configure LAN by using a switch
20. Configure a LAN by using Router
21. Steps to attack a victim computer by using "ProRat" Trojan tool
22. Perform the packet sniffing mechanism by download the "wire shark" tool and extract the packets
23. Perform the task of creating mail messages by using fake email id by using the "fake mailer" website(<https://emkei.cz>)
24. Perform the IP scanning mechanism by using "tracert" and "arp" commands
25. Perform the port scanning mechanism by using NMAP tool
26. Perform an SQL Injection attack and its preventive measure to avoid Injection attack
27. Perform an activity to access a locked computer without knowing the user's password.

### III. Lab References:

5. Computer Networks | Fifth Edition | By Pearson (6th Edition) [\[Tanenbaum, Feamster & Wetherall\]](#)
6. Computer Networking | A Top-Down Approach | Sixth Edition | By Pearson | [\[KuroseJamesF. Ross Keith W.\]](#)

### IV. Reference Materials on the Web/web

7. <https://csrc.nist.gov/Projects/cybersecurity-framework/nist-cybersecurity-framework-a-quick-start-guide>
8. <https://owasp.org/www-project-top-ten/>



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**Title: CYBER SECURITY AND MALWARE ANALYSIS**

Course Code: **CABSEP01**

Domain Subject: **COMPUTER APPLICATIONS**

Max. Marks: **50** (CCIA: 10+ SEE: 40)

Offered to: **BCOM CA**

Semester – **VI**

Practical Hrs./Week : **3**

**Model Paper: Practicals**

**Time: Three hours**

**Max. Marks: 40**

	<b>Section A</b>
One Major Experiment (Experiment No : )	<b>15 M</b>
	<b>Section B</b>
One Minor Experiment (Experiment No : )	<b>10 M</b>
	<b>Section C</b>
Practical Record	<b>05 M</b>
	<b>Section D</b>
Viva Voce	<b>10 M</b>

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**Title: MULTIMEDIA TOOLS AND APPLICATIONS**

Course Code: **CABSET02**

Domain Subject: **COMPUTER APPLICATIONS**

Max. Marks: **100** (CCIA: 25+ SEE:75)

Offered to: **B. COM CA**

Semester – VI

Theory Hrs./Week: **3**

Type of the Course: **Skill Enhancement Course** (Elective Theory), Credits: **04**

**I. Course Outcomes: Students at the successful completion of the course will be able to:**

CO1: Gain knowledge on the concepts related to Multimedia.(**PO5**)

CO2: Understand the concepts like image data representation and color modes.(**PO5**)

CO3: Understand the different types of video signals and digital audio.(**PO5**)

CO4: Know about multimedia data compression types and audio compression standards (**PO5**)

CO5: Know about basic video compression techniques.(**PO5,P07**)

**II. Syllabus:** (Total Theory Periods: **45**)

**UNIT-I: Introduction to multimedia** (8 periods)

What is Multimedia? , Components of Multimedia System, Multimedia Research Topics and Projects, Multimedia and Hypermedia, Multimedia Authoring metaphors, Multimedia Production, Multimedia Presentation, Some Technical Design Issues, Automatic Authoring.

**UNIT-II: Image Data Representations and color models** (9periods)

Color science Human vision Image data types, **Black & white images**-1-bit images (Binary image), 8-bit (Gray -level images), **Color images**- 24-bit color images, 8-bit color images, Color models.

**UNIT-III: Fundamental concepts in video** (10 periods)

Types of Video Signals- Analog Video, Digital Video, Basics of Digital Audio: What is Sound?, Digitization of Sound, Quantization and Transmission of Audio, Pulse code modulation, Differential coding of audio, Predictive coding, DPCM.

**UNIT-IV: Multimedia Data Compression** (9 periods)

Introduction- Basics of Information Theory, Lossless Compression Algorithms, Fix-Length Coding, Run-length coding, Differential coding, Dictionary-based coding, Variable Length Coding, Shannon-Fano Algorithm, Huffman Coding Algorithm.

Audio Compression standards: Introduction, Psychoacoustics model, MPEG Audio

### **UNIT-V : Basic Video Compression Techniques**

**( 9 periods)**

Introduction to Video compression, Video Compression with Motion Compensation, Video compression standard H.261, Video compression standard MPEG-1

#### **III 1. Text Books**

Fundamentals of Multimedia by Ze-Nian Li & Mark S. Drew. Publisher: Prentice Hall

#### **2. Reference Books:**

1. An introduction to digital multimedia by Savage, T. M. and Vogel, K. E. 2008.
2. Digital Multimedia by Nigel Chapman & Jenny Chapman. 2009.

#### **3. Reference Materials on the Web/web-links:**

<https://www.tutorialspoint.com/multimedia>

<https://ksuit342.wordpress.com/lectuers/>

#### **IV Co-Curricular Activities**

(Co-curricular activities shall not promote copying from textbook or from others work and shall encourage self/independent and group learning)

##### **A. Measurable**

1. Assignments (in writing and doing forms on the aspects of syllabus content and outside the syllabus content. Shall be individual and challenging)
2. Student seminars (on topics of the syllabus and related aspects (individual activity))
3. Quiz (on topics where the content can be compiled by smaller aspects and data (Individuals or groups as teams))
4. Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual participation and contribution of students shall be ensured (team activity))

##### **B. General**

1. Group Discussion
2. Others



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Model paper

**Title: MULTIMEDIA TOOLS AND APPLICATIONS**

Course Code: **CABSET02**

Domain Subject: **COMPUTER APPLICATIONS**

Max. Marks: 75

Offered to: **B. COM CA**

Semester – VI

Time: **3 Hrs**

**SECTION – A**

**Short Answer Questions (25 Marks: 5 x 5)**

**Answer any FIVE questions. (At least 1 question should be given from each Unit)**

1. What is multimedia? Explain components of multimedia system. (CO1, L1)
2. Discuss multimedia production.(CO1, L6)
3. Explain 8-Bit (gray-level images).(CO2,L2)
4. What is sound? Explain digitization of sound. (CO3, L1)
5. Write about SECAM video. (CO3 , L1)
6. Discuss Run-length coding. (CO4, L6)
7. Explain basics of information theory. (CO4, L5)
8. Compare and contrast H.261 and MPEG-1. (CO5, L2)

**SECTION B (Total: 5 x 10 = 50 Marks)**

**Answer all questions. (Two questions should be given from each unit with internal choice)**

9(a) Discuss in detail about multimedia and hypermedia. (CO1, L6)

**OR**

(b) Explain about multimedia presentation. (CO1, L2)

10(a) Discuss about 24-bit color images and 8-bit color images. (CO2, L6)

**OR**

(b) Explain Color models in images. (CO2, L2)

11(a) Discuss about PCM(pulse code modulation). (CO3, L6)

**OR**

(b) Explain High-Definition TV(HDTV). (CO3, L2)

12(a) Discuss Huffman- coding algorithm. (CO4, L6)

**OR**

(b) Write about MPEG audio compression algorithm. (CO4, L1)

13(a) Explain video compression based on motion compensation. (CO5, L2)

**OR**

(b) Write about Video compression standard H.261. (CO5,L1)

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**Title: MULTIMEDIA TOOLS AND APPLICATIONS LAB**

Course Code: **CABSEP02**

Offered to: **B. COM CA**

Domain Subject: **COMPUTER APPLICATIONS**

Semester – VI

**Max. Marks: 50 (CCIA: 10+ SEE: 40)**

**Practical Hrs./Week : 3**

**Type of the Course: Skill Enhancement Course (Elective, Practical) Credits: 01**

**I. Course Outcomes:**

Students at the successful completion of the course will be able to:

CO1: Create/modify a new image with open source applications such as GIMP. (PO5)

CO2: Manipulate images using graphic tools. (PO5)

CO3: Learn basic layer mask essentials. (PO5)

CO4: Compress audio and video files. (PO5, PO7)

CO5: Create a realistic shadow. (PO5)

**II: Practical (Laboratory) Syllabus: (30 Periods)**

1. Editing images using GIMP
2. Improve the Quality of your Image in GIMP
3. Introduction to Layer Masks.
4. Create an impressive background in GIMP
5. Applying Shadow & Highlight effects in images
6. Black& white and color photo conversion.
8. Using File Seizer Software for Audio compression.
9. Using File seizer Software for Video compression.

**III. Lab References:**

Fundamentals of Multimedia by Ze-Nian Li & Mark S. Drew. Publisher: Prentice Hall

Reference Materials on the Web/web-links

<https://ksuit342.wordpress.com/lectuers/>

<https://www.tutorialspoint.com/multimedia>





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**Title: MULTIMEDIA TOOLS AND APPLICATIONS**

Course Code: **CABSEP02**

Offered to: **B. COM CA**

Domain Subject: **COMPUTER APPLICATIONS**

Semester – VI

**Max. Marks: 40**

**Time: 3 Hrs**

**Type of the Course: Skill Enhancement Course (Elective, Practical) Credits: 01**

**Section A**

One Major Experiment (Experiment No : ) 15 M

**Section B**

One Minor Experiment (Experiment No : ) 10 M

**Section C**

Practical record 05 M Section D Viva Voce 10 M

**#####**



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**Title: BIGDATA ANALYTICS USING R**

Course Code: **CABSET03**

Offered to: **B. COM CA**

Domain Subject: **COMPUTER APPLICATIONS**

Semester – **VI**

Max. Marks: **100** (CCIA: 25+ SEE: 75)

Theory Hrs. /Week: **3**

Type of the Course: **Skill Enhancement Course** (Elective Theory), Credits: **03**

**I. Course Outcomes: Students at the successful completion of the course will be able to:**

CO1: Understand data and classification of digital data. (PO5)

CO2: Gain knowledge of technologies used in big data Analytics. (PO5, PO7)

CO3: Understand basics of R and control structures in R. (PO5)

CO4: Load data into R objects and manipulate them as needed. (PO5)

CO5: Create and edit visualizations with R (PO7)

**II. Syllabus:**

**(Total periods: 45)**

**UNIT – I**

**(8 periods)**

**Introduction to Big data:** What is data, Classification of Digital Data-Structured Unstructured, semi-structured data, Characteristics of data, Evaluation of big data, Definition and challenges of big data, what is big data and why to use big data?

**UNIT – II**

**(10 periods)**

**Big data Analytics:** What is and isn't big data analytics? Classification of analytics, Importance of big data analytics, Technologies needed to meet challenges of big data, data science, Data scientist.

**UNIT – III**

**(9 periods)**

**Introduction to R and getting started with R:** What is R? Why R? Advantages of R over other programming languages, Data types in R - logical, numeric, integer, character, double, Complex, raw,

coercion, ls () command, Expressions, Variables and functions, control structures, Array, Matrix, Vectors, Factors, R packages

#### **UNIT – IV**

**(10 periods)**

**Exploring data in R**– Data frames-data frame access, Ordering data frames, functions for data frames dim(), nrow(), ncol(), str(), summary(), names(), head(), tail(), edit(), Load data frames—reading from .CSV files, Sub setting data frames, reading from tab separated value files, Reading from tables, merging data frames

#### **UNIT – V**

**(8 periods)**

**Data Visualization using R:** Reading and getting data into R (External Data), Using CSV files, XML files, Web Data, JSON files, Databases, Excel files, Working with R Charts and Graphs: Histograms, Boxplots, Bar Charts, Line Graphs, Scatterplots, Pie Chart

#### **Textbooks:**

1. Seema Acharya--Data Analytics using R, McGraw Hill education (India) Private Limited.
2. Big Data Analytics, Introduction to Hadoop, Spark, and Machine-Learning, Raj Kamal, Preeti Saxena, McGraw Hill, 2018

#### **Reference Books:**

1. Seema Acharya, Subhashini Chellappan --- Big Data and Analytics second edition, Wiley
2. Big Data, Big Analytics: Emerging Business intelligence and Analytic trends for Today's Business, Michael Minnelli, Michelle Chambers, and Ambiga Dhiraj, John Wiley & Sons, 2013
3. An Introduction to R, Notes on R: A Programming Environment for Data Analysis and Graphics. W. N. Venables, D.M. Smith and the R Development Core Team

#### **IV. RECOMMENDED CO-CURRICULAR ACTIVITIES:**

(Co-curricular activities shall not promote copying from textbook or from others work and shall encourage self/independent and group learning)

##### **A. Measurable**

1. Assignments (in writing and doing forms on the aspects of syllabus content and outside the syllabus content. Shall be individual and challenging)
2. Student seminars (on topics of the syllabus and related aspects (individual activity))
3. Quiz (on topics where the content can be compiled by smaller aspects and data (Individuals or groups as teams))

4. Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual participation and contribution of students shall be ensured (team activity

**B. General**

1. Group Discussion
2. Try to solve MCQ's available online.
3. Others



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*ISO9001 – 2015 Certified*  
**Model Question Paper**  
**Title: BIGDATA ANALYTICS USING R**

Course Code: **CABSET03**

Domain Subject: **COMPUTER APPLICATIONS**

**Max Marks: 75**

Offered to: **B. COM CA**

Semester – **VI**

**Time: 3 Hrs.**

**SECTION – A**

**Short Answer Questions (25 Marks: 5 x 5)**

**Answer any Five questions. (At least 1 question should be given from each Unit)**

1. What is big data and why to use a big data? (CO1, L1)
2. What is big data analytics? (CO2, L1)
3. Explain ls () command in R. (CO3, L2)
4. Explain about functions in R? (CO3, L1)
5. Write a short note on charts. (CO5, L1)
6. Develop R script to load data into data frames from files. (CO4, L6)
7. Develop bar chart in R. (CO4, L6)
8. Write about the control structures in R with examples. (CO3, L1)

**SECTION B (Total: 5 x 10 = 50 Marks)**

**Answer all questions. (Two questions should be given from each unit with internal choice)**

9(a) Give Classification of Digital Data and explain it. (CO1, L2)

**OR**

(b) Explain Characteristics of Data with an example. (CO1, L2)

10. (a) Write about Importance of big Data Analytics. (CO2, L1)

**OR**

(b) Explain Classification of Analytics. (CO2, L2)

11(a) Write about the Data types in Explain with examples. (CO3, L1)

**OR**

(b) Construct Vector in R and explain various operations on it. (CO3, L3)

12. (a) What are the data frames? Write its significance in R-Language. (CO4, L1)

**OR**

(b) Demonstrate various functions used in data frames. (CO4, L2)

13(a) Build a code in R for reading and getting data into R from databases. (CO5, L6)

**OR**

(b) Develop below plots in R (CO5, L6) Box Whisker plots    b) Scatter plots    c) Pairs plots



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**Title: BIGDATA ANALYTICS USING R LAB**

Course Code: **CABSEP03**

Offered to: **B. COM CA**

Domain Subject: **COMPUTER APPLICATIONS**

Semester – **VI**

Max. Marks: **50** (CCIA: 10+ SEE: 40)

Practical Hrs. /Week: **3**

Type of the Course: **Skill Enhancement Course** (Elective, Practical), Credits: 02

**I. Course Outcomes: Students at the successful completion of the course will be able to:**

CO1: Implement simple scripts or programs in R. (PO5)

CO2: Access online resources for R and import new function packages into the R workspace. (PO5, PO7)

CO3: Import, review, manipulate and summarize data-sets in R (PO5, PO7)

CO4: Explore data-sets to create testable hypotheses and identify appropriate statistical tests. (PO5, PO7)

CO5: Create and edit visualizations with R. (PO5, PO7)

**II: Practical (Laboratory) Syllabus: (30 Periods)**

10. Create a vector in R and perform operations on it (arithmetic operations, combining Vectors, retrieving elements of vector, assign names to vector elements).

11. Create integer, complex, logical, character data type objects in R and print their values And their class using print and class functions.

12. Create a matrix of values in R and extract data from matrix. (Ex. Second row third etc.) find transpose of matrix and combine two matrices using Rbind and Cbind functions.

4. Create a list in R and perform operations on it like list slicing, sum and mean functions, head and tail functions and finally delete list using rm() function.

5. Create data frame in R and perform operations on it

6. Write code in R to find out whether a number is prime or not.
7. Print numbers from 1 to 100 using while loop and for loop in R.
8. Find the factorial of a number using recursion in R.
9. Perform arithmetic operations in R using switch case
10. Write a code in R to find out whether the number is Armstrong or not.
11. Program to find Multiplication table from 1 to 10 number input by user.
12. Import data into R from text and excel files using read.table() and read.csv() function.
13. Create a dataset and draw different types of graphics using plot, box plot, histogram, pair plot functions.
  
14. Create a dataset and draw different types of graphs using bar charts, pie chart functions.
15. Create custom contingency in R and perform operations on it.

### **III. Lab References:**

1. Seema Acharya--Data Analytics using R, McGraw Hill education (India) Private Limited.
2. Big Data Analytics, Introduction to Hadoop, Spark, and Machine-Learning, Raj kamal, PreetiSaxena, McGraw Hill, 2018

### **Reference Materials on the Web/web-links:**

1. <https://www.wiley.com/enbd/Big+Data,+Big+Analytics:+Emerging+Business+Intelligence+and+Analytic+Trends+for+Today's+Businesses-p-9781118147603>
2. <https://www.wiley.com/en-gb/Big+Data+Analytics%3A+Turning+Big+Data+into+Big+Money-p-9781118147597>



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**Title: BIGDATA ANALYTICS USING R LAB**

Course Code: **CABSEP03**

Offered to: **B. COM CA**

Domain Subject: **COMPUTER APPLICATIONS**

Semester – **VI**

**Model Paper: Practical**

**Time: Three hours**

**Max. Marks: 40**

	<b>Section A</b>
One Major Experiment (Experiment No : )	<b>15 M</b>
	<b>Section B</b>
One Minor Experiment (Experiment No : )	<b>10 M</b>
	<b>Section C</b>
Practical Record	<b>05 M</b>
	<b>Section D</b>
Viva Voce	<b>10 M</b>

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**Title: DATASCIENCE USING PYTHON**

Course Code: **CABSET04**

Offered to: **BCOM CA**

Domain Subject: **COMPUTER APPLICATIONS**

Semester: **VI**

Max. Marks: **100** (CCIA: 25+ SEE:75)

Theory Hrs./Week: **3**

**Course 7A: DATASCIENCE USING PYTHON**

Type of the Course: **Skill Enhancement Course** (Elective Theory), Credits: **03**

**I. Course Outcomes: Students at the successful completion of the course will be able to:**

CO1: Understand the need and importance of data science.(PO5,PO7)

CO2: Understand basic concepts of python and implementing control structures in python.(PO5)

CO3: Implement strings and other data structures in python(PO5,PO7)

CO4: Learn and Implement functions and modules in python.(PO5)

CO5: Learn and Implement data cleaning and plotting using pandas.(PO5,PO7)

**II. Syllabus: (Total Theory Periods: 45)**

**UNIT-I: INTRODUCTION TODATA SCIENCE(9 periods)**

Data science and its importance, Advantages of data science, The process of data science , Responsibilities of a data scientist, Qualifications of data scientists, Would you be a good data scientist?, Why to use python for data science?

**UNIT-II :INTRODUCTION TO PYTHON (9 periods)**

What is python?, Features of python, History of python, Writing and executing the python program,

Basic syntax, Variables, Keywords, Data types , Operators, Indentation, Control Structures-Conditional statements—If, If-else, Nested if-else, Looping statements—For, While, Nested Loops, Break, Continue, Pass

### **UNIT-III STRINGS AND DATA STRUCTURES (9 periods)**

Strings - definition, accessing, slicing and basic operations, Lists - introduction, accessing list, operations, working with lists, functions and methods, Tuples - introduction, accessing tuple, operations, Dictionaries- introduction, accessing values in dictionaries, working with dictionaries.

### **UNIT-IV:FUNCTIONS AND MODULES (9 periods)**

Functions- Defining a function, Calling a function, Types of functions, Function arguments, Local and global variables, Lambda and recursive functions, Modules---Math, Random, OS, Date and Time

### **UNIT-V:PANDAS (9 periods)**

What is Pandas?, Series, Data Frame, Read CSV Files, Analyzing Data Frames, Data Correlations, Data Cleaning---Empty cells, Data in wrong format, Wrong data, Duplicates, Pandas Plotting-- plot () method, bar plot, hist plot, box plot, area plot, scatter plot, pie plot

### **III Prescribed Books:**

1. Steven cooper--- Data Science from Scratch, Kindle edition
2. Reemathareja—Python Programming using problem solving approach, Oxford Publication

### **Reference Books:**

- 1.Wes McKinney--- Python for Data Analysis ,O'REILLY

### **IV Co-Curricular Activities**

(Co-curricular activities shall not promote copying from textbook or from others work and shall encourage self/independent and group learning)

## Measurable

69. Assignments (in writing and doing forms on the aspects of syllabus content and outside the syllabus content. Shall be individual and challenging)
  70. Student seminars(on topics of the syllabus and related aspects(individual activity))
  71. Quiz (on topics where the content can be compiled by smaller aspects and data(Individuals or groups a steams))
  72. Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual participation and contribution of students shall be ensured (team activity))

## General

52. Group Discussion
53. Try to solve MCQ's available online.
54. Others.



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**Model paper**

**Title: DATASCIENCE USING PYTHON**

Course Code: **CABSET04**

Offered to: **BCOM CA**

Domain Subject: **COMPUTER APPLICATIONS**

Semester: **VI**

Max. Marks: **100** (CCIA: 25+ SEE:75)

Theory Hrs./Week: **3**

**SECTION – A**

**Short Answer Questions (25 Marks: 5 x 5)**

**Answer any Five questions. (At least 1 question should be given from each Unit)**

1. Write advantages of data science. (CO1, L1)
2. What are the qualifications of data scientist? (CO1, L2)
3. Explain about the history of python.(CO2, L1)
4. Explain about a) Keywords b) Variables in python.(CO2, L1)
- 5.Explain about string operations in python.(CO3, L1)
6. Explain about the date and time module in python.(CO4, L1)
7. Explain about the local and global variables in python.(CO4, L1)
8. What is data cleaning? Explain about duplicates in pandas.(CO5, L1)

**SECTION B (Total: 5 x 10 = 50 Marks)**

**Answer all questions. (Two questions should be given from each unit with internal choice)**

9. (a) What is Data Science? Explain the Responsibilities of a data scientist.(CO1, L2)

**OR**

9. (b) Explain the use of python for data science?(CO1, L1)
10. (a) Explain different types of conditional statements with examples.(CO2, L1)

**OR**

10. (b) Explain different types of Looping statements with examples.(CO2, L1)
11. (a) What is a list? Explain different operations of lists with examples in python. (CO3, L2)

**OR**

11. (b)What is a Dictionary? Explain accessing values in it with examples in python (CO3, L2)
12. (a) Explain Function definition, calling & different types in python with example.(CO4, L1)

**OR**

12. (b) Explain about random and math module in python with an example.(CO4, L1)
13. (a) What is a data frame? Illustrate the concept of analysing the data frames.(CO5, L2)

**OR**

13. (b) Explain different types of plotting techniques in pandas with examples.(CO5, L1)

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**Title: DATASCIENCE USING PYTHON LAB**

Course Code: **CABSEP04** Offered to: **BCOM CA**  
Domain Subject: **COMPUTER APPLICATIONS** Semester: VI  
Max. Marks: **50** (CCIA: 10+ SEE: 40) Practical Hrs./Week : **3**  
Type of the Course: **Skill Enhancement Course** (Elective, Practical), Credits: 02

**I. Course Outcomes: Students at the successful completion of the course will be able to:**

CO1: Implement simple programs in basics of python.(PO5)

CO2: Implement control structures in python.(PO5)

CO3: Implement data structures like strings, list, tuples, dictionaries in python.(PO5,PO7)

CO4: Implementation of data frames, data cleaning and plotting in pandas.(PO5,PO7)

**II: Practical (Laboratory) Syllabus: (30 Periods)**

1. Python Program to Find the Square Root
2. Python Program to Swap Two Variables
3. Python Program to Generate a Random Number
4. Python Program to Check if a Number is Odd or Even
5. Python Program to Find the Largest Among Four Numbers
6. Python Program to Check Prime Number
7. Python Program to Display the multiplication Table
8. Python Program to Print the Fibonacci sequence
9. Python Program to Check Armstrong Number
10. Python Program to Find the Sum of Natural Numbers
11. Python Program to Make a Simple Calculator
12. Python Program to Find Factorial of Number Using Recursion

13. Python Program to Add Two Matrices
14. Python Program to Multiply Two Matrices
15. Python Program to Check Whether a String is Palindrome or Not
16. Python Program to perform operations on strings.
17. Python Program to create a list and perform operations on its contents.
18. Python Program to perform operations on tuples.
19. Python Program to create a dictionary and print its content.
20. Python program to import data from CSV file using pandas.
21. Python program to demonstrate plots

### **III. Lab References:**

3. Reemathareja—Python Programming using problem solving approach, Oxford Publication

### **Reference Materials on the Web/web-links:**

1. <https://www.w3schools.com/python/>
2. <https://www.geeksforgeeks.org/python-basics/>



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**Title: DATASCIENCE USING PYTHON LAB**

Course Code: **CABSEP04**

Offered to: **BCOM CA**

Domain Subject: **COMPUTER APPLICATIONS**

Semester: **VI**

**Model Paper: Practicals**

**Time: Three hours**

**Max. Marks: 40**

**Section A**

One Major Experiment (Experiment No : )      **15 M**

**Section B**

One Minor Experiment (Experiment No : )      **10 M**

**Section C**

Practical Record      **05 M**

**Section D**

Viva Voce      **10 M**

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**Title: MOBILE APPLICATION DEVELOPMENT**

Course Code: **CABSET05**

Offered to: **B. COM CA**

Domain Subject: **Computer Applications**

Semester – **VI**

Max. Marks: **100** (CCIA: 25+ SEE:75)

Theory Hrs./Week: **3**

Type of the Course: **Skill Enhancement Course** (Elective Theory), Credits: **03**

**IV. Course Outcomes: Students at the successful completion of the course will be able to:**

CO1: Identify basic terms, tools and software related to android systems.(PO5)

CO2: Describe components of IDE, understand features of android development tools.(PO5)

CO3: Describe the layouts and controls and different views available.(PO5,PO7)

CO4: Understand Android system architecture and security model.(PO5)

CO5: Understand the features of services and able to publish android Application.(PO5,PO7)

**II. Syllabus:**

**(Total Theory Periods: 45)**

**Unit-1:**

**(9 periods)**

Introduction to android, Open headset Alliance, Android ecosystem, Need of android, Features of android, Tools and Software required For developing an Application, Android architecture.

**Unit-2:**

**(9 periods)**

Operating system, java JDK, Android SDK, Android development tools, Android virtual devices, Steps to install and configure Android studio and sdk.

**Unit-3:**

**(11 periods)**

Control flow, directory structure, Components of a screen, Fundamental UI design, Linear layout, absolute layout, table layout, relative layout, Textview, Edit text, Button image button, radio button, toggle button, Radio group, check box, and progress bar, List view, grid view, image view, scroll view, Time and date picker



**Unit-4:** (8 periods)  
Android platform services, Android system Architecture, Android Security model, Applications development: creating small application.

**Unit-5** (8 periods)  
Introduction of MIT App Inventor, Application Coding, Programming Basics & Dialog, More Programming Basics, Alarm Clock Application, Audio & Video, Drawing Application, File, Game, DeviceLocation, WebBrowsing.

### III References / Text Book/ e-books/websites

#### Text Books:

7. Erik Hellman, "Android Programming–Pushing theLimits", 1stEdition, WileyIndiaPvtLtd, 2014.
8. App Inventor: create your own Android apps by Wolber, David DavidWayne)

#### Reference Books:

7. DawnGriffithsandDavidGriffiths, "HeadFirstAndroidDevelopment", 1stEdition, O'ReillySPDPublishers, 2015.
8. JFDiMarzio, "BeginningAndroidProgrammingwithAndroidStudio", 4thEdition, WileyIndiaPvtLtd, 2016. ISBN-13: 978-8126565580

#### Web resources:

<https://www.udacity.com/course/developing-android-appsfundamentals--ud853-nd>  
<http://www.appinventor.mit.edu/>

### IV Co-Curricular Activities

(Co-curricular activities shall not promote copying from textbook or from others work and shall encourage self/independent and group learning)

#### Measurable

73. Assignments (in writing and doing forms on the aspects of syllabus content and outside the syllabus content. Shall be individual and challenging)
  74. Student seminars (on topics of the syllabus and related aspects (individual activity))
  75. Quiz (on topics where the content can be compiled by smaller aspects and data (Individuals or groups a steams))
  76. Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual participation and contribution of students shall be ensured (team activity))

#### General

55. Group Discussion
56. Try to solve MCQ's available online.
57. Others.



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**Model paper**

**Title: MOBILE APPLICATION DEVELOPMENT**

Course Code: **CABSET05**

Offered to: **B. COM CA**

Domain Subject: **Computer Applications**

Semester – **VI**

**SECTION – A**

**Short Answer Questions (25 Marks: 5 x 5)**

**Answer any Five questions. (At least 1 question should be given from each Unit)**

1. What is the Need of Android?(CO1,L1)
2. Explain the Steps to install and configure Android studio and sdk.(CO2,L2)
3. What are the Components of a screen?(CO3,L1)
4. What are the Android platform services?(CO4,L1)
5. How to write Application Coding?(CO5,L1)
6. Explain image button and radio button with an example.(CO3,L2)
7. Explain Android Security model.(CO4,L2)
8. Explain Web Browsing.(CO5,L2)

**SECTION B (Total: 5 x 10 = 50 Marks)**

**Answer all questions. (Two questions should be given from each unit with internal choice)**

9(a) Explain Android Architecture.(CO1,L2)

**OR**

9(b) Write Features of Android.(CO1,L1)

10(a) Explain Android development tools.(CO2,L2)

**OR**

10(b) Explain Android virtual devices.(CO2,L2)

11(a) Explain about Linear layout, absolute layout, table layout and relative layout.(CO3,L2)

**OR**

11(b) Discuss about Listview, grid view, image view, scroll view.(CO3,L6)

12(a) How to create a small application using Android Application?(CO4,L6)

**OR**

12(b) Describe Android system Architecture.(CO5,L6)

13.(a) Explain Audio Video Concepts.(CO5,L2)

**OR**

13(b) Develop Alarm clock application.(CO5,L6)

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**Title: MOBILE APPLICATION DEVELOPMENT LAB**

Course Code: **CABSEP05**

Domain Subject: **Computer Applications**

Max. Marks: **50** (CCIA: 10+ SEE: 40)

Offered to: **B. COM CA**

Semester – **VI**

Practical Hrs./Week : **3**

Type of the Course: **Skill Enhancement Course** (Elective, Practical),

Credits: 02

**IV. Course Outcomes: Students at the successful completion of the course will be able to:**

CO1: Understand the android platform.(PO5,PO7)

CO2: Design and implementation of various mobile applications.(PO5,PO7)

**II: Practical (Laboratory) Syllabus:**

**(30 Periods)**

**Lab Exercises**

1. Demonstrate mobile technologies and devices.
2. Demonstrate Android platform and applications overview.
3. Implement User interface design layouts.
4. Working with texts, shapes, buttons and lists.
5. Develop a calculator application.
6. Develop application in android using different views.
7. Implement an application that creates a alarm clock.
8. Develop audio and video drawing application.

**III. Lab References:**

1.Erik Hellman, “Android Programming–Pushing theLimits”,1stEdition,WileyIndiaPvt Ltd,2014.

2.App Inventor: create your own Android apps by Wolber,David (DavidWayne).

**Reference Materials on the Web/web**

7. <https://www.udacity.com/course/developing-android-appsfundamentals--ud853-nd>

8. <http://www.appinventor.mit.edu/>



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**Title: MOBILE APPLICATION DEVELOPMENT LAB**

Course Code: **CABSEP05**  
Domain Subject: **Computer Applications**

Offered to: **B. COM CA**  
Semester – **VI**

**Model Paper: Practicals**

**Time: Three hours**

**Max. Marks: 40**

**Section A**

One Major Experiment (Experiment No : ) **15 M**

**Section B**

One Minor Experiment (Experiment No : ) **10 M**

**Section C**

Practical Record **05 M**

**Section D**

Viva Voce **10 M**

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**Title: DIGITAL IMAGING**

Course Code: **CABSET06**

**Offered to: B. COM CA**

Domain Subject: **COMPUTER APPLICATIONS**

Semester: VI

Max. Marks: **100** (CCIA: 25+ SEE:75)

Theory Hrs./Week: **3**

**Course 7C: DIGITAL IMAGING**

Type of the Course: **Skill Enhancement Course** (Elective Theory),

Credits: **04**

**I. Course Outcomes: Students at the successful completion of the course will be able to:**

CO1: Gain knowledge about Types of Graphics, Types of Objects, Types of video editing tools **(PO5)**

CO2: Show their skills in editing and altering photographs for through a basic understanding of the tool box.**(PO5)**

CO3: Gain knowledge in using the layers.**(PO5)**

CO4: Gain knowledge in using the selection tools, repair tools.**(PO5)**

CO5: Gain knowledge in using selection tools, applying filters and can show their skills.**(PO5)**

**II. Syllabus:**

**(Total Theory Hours: 45 Periods)**

**UNIT-I**

**(9periods)**

Types of Graphics- Raster vs Vector Graphics ,Types of Objects - Audio formats, Video formats , Image formats , Text document formats, Types of video editing , Different color modes, Image Scanner- Types of Image Scanners

**UNIT-II**

**(8Periods)**

What is GIMP? , GIMP tool box window, Layers Dialog , Tool Options Dialog , Image window ,. Image window menus

**UNIT-III ( 10 Periods)**

**Improving Digital Photos** - Opening files, Rescaling saving files, Cropping, Brightening & Darkening 1 Rotating, Sharpening, Fixing Red Eye.

**Introduction to layers-** What is layer?, Using layer to add text , Using move tool , Changing colors , Simple effects on layers, Linking layers together , Performing operations on layers, Using layers to copy and paste, Tour of layers dialog

**UNIT-IV(9 Periods)**

**Drawing-** Drawing lines and curves , Changing colors and brushes, Erasing , Drawing rectangles, Circles and other shapes, Outlining and filling regions, Filling with patterns and gradients, Importing brushes or gradients or making your own.

**Selection:** Working with selections, Select by color and fuzzy, Select Bezier paths, intelligent scissors tool, Modifying selections with selection modes.

## **UNIT-V**

**(9 Periods)**

**Erasing and Touching Up:** Dodge and burn tool, Smudging tool , Clone tool , Sharpening using convolve tool, Blurring with Gaussian Blur , Correcting Color Balance, Hue , Saturation , Color balance using curves and levels.

**Filters:** Filters , Blur, Enhance , Distort, Noise Filters.

## **III References/ Text Book/ e-books/websites**

**Textbook:** Beginning GIMP from Novice to professional by Akkana Peck, Second Edition, A press

**Reference Materials on the Web/web-links:**

<https://www.mygreatlearning.com/gimp/tutorials/gimp-introduction>

## **IV Co-Curricular Activities**

(Co-curricular activities shall not promote copying from textbook or from others work and shall encourage self/independent and group learning)

### **A. Measurable**

1. Assignments (in writing and doing forms on the aspects of syllabus content and outside the syllabus content. Shall be individual and challenging)
2. Student seminars (on topics of the syllabus and related aspects (individual activity))
3. Quiz (on topics where the content can be compiled by smaller aspects and data (Individuals or groups as teams))
4. Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual participation and contribution of students shall be ensured (team activity))

### **B. General**

1. Group Discussion
2. Others



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**Model paper**

**Title: DIGITAL IMAGING LAB**

Course Code: **CABSET06**

**Offered to: B. COM CA**

Domain Subject: **COMPUTER APPLICATIONS**

Semester: VI

Max Marks: 75

Time: 3 Hrs.

**SECTION – A**

**Short Answer Questions (25 Marks: 5 x 5)**

**Answer any Five questions. (At least 1 question should be given from each Unit)**

1. Explain different types of image formats.(CO1,L2)
2. Write short notes on Tool box in GIMP.(CO2, L1)
3. Explain briefly about gradients in GIMP. (CO4, L2)
4. Write short notes on clone tool in GIMP.(CO5,L1)
5. Explain rotating ,sharpening in GIMP.(CO3,L2)
6. What is a layer? Explain steps to use layer in GIMP.(CO3, L1)
7. Describe different color modes in GIMP.(CO1,L5)
- 8.What is GIMP? Who invented GIMP? Write about tool box options in GIMP?(CO2,L1)

**SECTION B (Total: 5 x 10 = 50 Marks)**

**Answer all questions. (Two questions should be given from each unit with internal choice)**

9(a) Describe the various color modes in GIMP with example.( CO1,L5)

**OR**

9(b) What are various types of audio and video formats in GIMP? Explain with example.(CO1,L1)

10(a) Describe image window menu in detail.( CO2, L5)

**OR**

10(b) Explain the window layers dialog in GIMP.(CO2, L2)

11(a) Describe Cropping-Brightening and Darkening in GIMP.(CO3, L5)

**OR**

11(b) Explain the steps to solve a fixed–red eye in GIMP.(CO3,L2)

12(a) Explain the working with selections in GIMP.(CO4, L2)

**OR**

12(b) Write about filling with patterns and gradients.(CO4, L1)

13(a) Describe the steps involved in Dodge, Burn and Smudging tool in GIMP.(CO5,L5)

**OR**

13(b)Write about distort and noise filters in GIMP.(CO5,L1)

**@@@**



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**Title: DIGITAL IMAGING LAB**

Course Code: **CABSEP06**

Domain Subject: **COMPUTER APPLICATIONS**

Max. Marks: **50** (CCIA: 10+ SEE: 40)

**Offered to: B. COM CA**

Semester: VI

Practical Hrs./Week : **3**

Type of the Course: **Skill Enhancement Course** (Elective, Practical)

Credits: 01

**I. Course Outcomes: Students at the successful completion of the course will be able to:**

CO1:Students will gain a working knowledge of Photoshop (PO5)

CO2:Student will be able to show their skills in editing and altering photographs for through a basic understanding of the tool bar. (PO5)

CO3:Student will gain knowledge in using the layers. (PO5)

CO4:Student will gain knowledge in using the selection tools, repair tools.(PO5,PO7)

CO5:Student will gain knowledge in using filters and can show their skills. (PO5)

**II: Practical (Laboratory) Syllabus: (30 Periods)**

1. Designing a Visiting card
2. Design Cover page of a book
3. Paper add for calling tenders
4. Passport photo design
5. Design a Pamphlet
6. Brochure designing
7. Titles designing
8. Custom shapes creation
9. Black & white and color photo conversion
10. Image size modification
11. Background changes
12. Texture and patterns designing
13. Filter effects & Eraser effects





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**Title: DIGITAL IMAGING LAB**

Course Code: **CABSEP06**

**Offered to: B. COM CA**

Domain Subject: **COMPUTER APPLICATIONS**

Semester: VI

Max. Marks: **50** (CCIA: 10+ SEE: 40)

Practical Hrs./Week : **3**

**Model Paper: Practicals**

**Time: Three hours**

**Max. Marks: 40**

**Section A**

One Major Experiment (Experiment No : ) **15 M**

**Section B**

One Minor Experiment (Experiment No : ) **10 M**

**Section C**

Practical record **05 M**

**Section D**

Viva Voce **10 M**

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**TITLE: Problem solving in C** **COURSE CODE: CSCT11B/CGST11**  
**SECTIONS: B.Sc. (CAMS / CAME / MSCS / MPCS / MECS/ CSCS)**  
**SEMESTER: I** **TIME: 3 Hrs.** **MAX: 70M**  
**SECTION –A**

**ANSWER ALL QUESTIONS**

5 X 4 =20 M.

1. A) List out symbols used in flowchart? Utilize flowchart symbols and draw a flowchart to find biggest of two numbers. (CO1, L1)  
(Or)  
B) Define various parts in block diagram of computer. (CO1, L1)
2. A) Explain do...while loop with an example program. (CO2, L2)  
(Or)  
B) Discuss data types in C. (CO2, L2)
3. A) Describe C program to find largest number in a given integer list. (CO3, L2)  
(Or)  
B) Explain how to declare and initialize 1D array in C. (CO3, L2)
4. A) Describe C program to calculate grade of a student (CO4, L2)  
(Or)  
B) Discuss about types of functions in C. (CO4, L2)
5. A) Demonstrate command line arguments in C with help of a program. (CO5, L3)  
(Or)  
B) Use different file opening modes in C to open different files. (CO5, L3)

**SECTION – B**

**ANSWER ALL QUESTIONS**

5 X 10 =50 M.

6. A) Define Algorithm. Explain Key features of algorithm with examples. (CO1, L1)  
(or)  
B) List out the characteristics and limitations of computers. (CO1, L1)
7. A) Give classification of Control statements in C. Explain multi-way decision making statements in C with examples. (CO2, L2)  
(or)  
B) Describe C program to check whether the given number is Armstrong or not. (CO2, L2)
8. A) Describe a C program for matrix multiplication. (CO3, L2)  
(Or)  
B) Discuss various String handling functions in C with examples. (CO3, L2)
9. A) Differentiate between structures with unions. (CO4, L2)  
(Or)  
B) Explain storage classes in C. (CO4, L2)
10. A) Illustrate file handling functions in C with examples. (CO5, L3)  
(Or)  
B) Apply parameter passing techniques to any C program. (CO5, L3)

**Model Question Paper – Blue Print Semester End Examination-2022-23**  
**(With effect from 2022-23 and onwards)**

**Max. Marks: 70**

**Max. Time: 3 Hrs**

**SECTION – A**

**Answer the following. One question from each Unit**

**5X4 = 20 M**

- |        |    |           |       |
|--------|----|-----------|-------|
| 1. (a) | 4M |           | L1/L2 |
|        |    | <b>OR</b> |       |
| (b)    | 4M |           | L1/L2 |
| 2. (a) | 4M |           | L1/L2 |
|        |    | <b>OR</b> |       |
| (b)    | 4M |           | L1/L2 |
| 3. (a) | 4M |           | L1/L2 |
|        |    | <b>OR</b> |       |
| (b)    | 4M |           | L1/L2 |
| 4. (a) | 4M |           | L1/L2 |
|        |    | <b>OR</b> |       |
| (b)    | 4M |           | L1/L2 |
| 5. (a) | 4M |           | L3/L4 |
|        |    | <b>OR</b> |       |
| (b)    | 4M |           | L3/L4 |

**SECTION – B**

**Answer the following. One question from each Unit**

**5X10 = 50 M**

- |         |     |           |       |
|---------|-----|-----------|-------|
| 6. (a)  | 10M |           | L1/L2 |
|         |     | <b>OR</b> |       |
| (b)     | 10M |           | L1/L2 |
| 7. (a)  | 10M |           | L1/L2 |
|         |     | <b>OR</b> |       |
| (b)     | 10M |           | L1/L2 |
| 8. (a)  | 10M |           | L1/L2 |
|         |     | <b>OR</b> |       |
| (b)     | 10M |           | L1/L2 |
| 9. (a)  | 10M |           | L1/L2 |
|         |     | <b>OR</b> |       |
| (b)     | 10M |           | L1/L2 |
| 10. (a) | 10M |           | L3/L4 |
|         |     | <b>OR</b> |       |
| (b)     | 10M |           | L3/L4 |



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**TITLE: OPERATING SYSTEMS MODEL PAPER COURSE CODE:**

**CGST12A**

**Max. Marks: 70**

**CLASS: I B.Sc. (CSCS)**

**Semester -I**

**Max Time: 3 Hrs**

**SECTION – A**

**Answer the following.**

**5X4 = 20 M**

1. (a) Write about Components of Computer. (CO1, L1)

**OR**

- (b) Write about Central Processing Unit (CO1, L1)

2. (a) Write about operations in Processes. (CO2, L1)

**OR**

- (b) Write about multiprocessor scheduling. (CO2, L1)

3. (a) What is meant by paging? (CO3, L2)

**OR**

- (b) What is meant by Demand paging? (CO3, L2)

4. (a) Explain how to protect a File. (CO4, L2)

**OR**

- (b) Explain Structures of Directory in Operating System. (CO4, L2)

5. (a) Demonstrate server roles on Windows Server 2016? (CO5, L3)

**OR**

- (b) Perform user's creation in Windows Server 2016 in detail. (CO5, L3)

**SECTION – B**

**Answer the following.**

**5X10 = 50 M**

6. (a) Explain various Applications of Computers. (CO1, L2)

**OR**

- (b) Explain about various types of an operating System. (CO1, L2)

7. (a) Explain about Scheduling Algorithms. (CO2, L2)

**OR**

- (b) Discuss about CPU Scheduling. (CO2, L2)

8. (a) Classify various Memory management strategies. (CO3, L4)

**OR**

- (b) Distinguish between Page Replacement Techniques and Algorithms (CO3, L4)

9. (a) Explain various File Access Methods. (CO4, L2)

**OR**

- (b) Explain about File Allocation Methods and Free Space Management (CO4, L2)

10. (a) Demonstrate the steps to be followed for Windows Client OS installation (CO5, L2)

**OR**

- (b) Explain the steps to be followed to configure DHCP. (CO5, L2)

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**TITLE OF THE COURSE: Computer Fundamentals and Office Tools**  
**COURSE CODE: CSCT12B CLASS/GROUP: B. C. A SEMESTER: I**  
**TIME: 3HRS TOTAL MARKS: 70 MARKS**

**Answer ALL the following questions** **5X 4=20MARKS**

1. A) Define computer and explain characteristics of computer.(CO1,L1)  
OR  
B) Explain the history of computers.(CO1,L2)
2. A) Explain types of Software.(CO2,L2)  
OR  
B) Describe functions of Operating System (CO2,L1)
3. A) Explain about spelling and grammar check in Libre Office Writer.(CO3,L2)  
OR  
B) Explain about adding foot notes and end notes to Libre Office Writer document.(CO3,L2)
4. A) Describe about cell references in Libre Office Calc.(CO4,L1)  
OR  
B) Explain about sorting in Libre Office Calc .(CO4,L2)
5. A) Describe about slide sorter tab in Libre Office Impress.(CO5,L1)  
OR  
B) Explain the features of impress Presentations. (CO5, L2)

**SECTION- B**

**Answer ALL the following questions** **5 X10 =50MARKS**

6. A) Explain the Block diagram of Computer with neat diagram. (CO1,L2)  
OR  
B) Describe various Input and Output devices. (CO1,L1)
7. A) Define software. Explain characteristics of good programming language. (CO2,L1)  
OR  
B) Explain operating system? Write its features and types. (CO2,L2)
8. A) Explain the procedure for performing MailMerge in Libre Office Writer. (CO3,L2)  
OR  
B) Explain Libre Office Writer window in detail with an example. (CO3,L2)
9. A) Explain about Format Cells in detail with examples in Libre Office Calc. (CO4,L2)  
OR  
B) Define function. Illustrate any 10 functions in Libre Office Calc with syntax and example. (CO4,L1)
10. A) Explain how to create a Presentation with Transitions, Animations. (CO5,L2)  
OR  
B) List various charts that are available in Libre Office Calc and explain how to create a chart with example. (CO5,L1)

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**TITLE: Programming in C**  
**PROGRAMME: BCA**  
**TIME: 3 Hrs.**

**COURSE CODE: CSCT13A**  
**SEMESTER: I**  
**MAX: 70M**

**SECTION –A**

**ANSWER ANY FIVE QUESTIONS**

**5 X 4 =20 M.**

1. A) List out the symbols in a flowchart? Utilize flowchart symbols and draw a flowchart to find biggest of two numbers. (CO1, L1)  
(Or)  
B) Label the execution process in C. (CO1, L1)
2. A) Explain do...while loop with an example program. (CO2, L2)  
(Or)  
B) Explain about jumping statements in C. (CO2, L2)
3. A) Illustrate to search the element in array. (CO3, L2)  
(Or)  
B) Explain the concept of Array to declare, initialise and access it. (CO3, L2)
4. A) Define a structure and write example program using structure.(CO4, L1)  
(or)  
B) List out the differences between structures and unions. (CO4, L1)
5. A) prepare a program to read the contents from a file. (CO5, L3)  
(or)  
B) Produce different file opening modes in C. (CO5, L3)

**SECTION – B**

**ANSWER ALL THE QUESTIONS**

**5 X 10 =50 M.**

6. A) State the structure of C program in detail with example. (CO1, L1)  
(or)  
B) List out the data types in C with detailed description. (CO1, L1)
7. A) Discuss about Looping control statements with examples. (CO2, L2)  
(or)  
B) Explain about storage classes with example. (CO2, L2)
8. A) Discuss about matrix multiplication and write the program. (CO3, L2)  
(or)  
B) Discuss various String handling functions in C with examples. (CO3, L2)
9. A) Define structure and write example program to define, declare and access a student nested structure. (CO4, L1)  
(or)  
B) Define pointer and write about pointer usage, expressions and arithmetic (CO4, L1)
10. A) Outline different file handling functions in C with examples. (CO5, L4)  
(or)  
B) Outline the program to write, read and append contents in a file. (CO5, L4)

**Model Question Paper – Blue Print Semester End Examination-2022-23**  
**(With effect from 2022-23 and onwards)**

**Max. Marks: 70**

**Max. Time: 3 Hrs**

**SECTION – A**

**Answer the following. One question from each Unit**

**5X4 = 20 M**

11. (a) 4M L1/L2

**OR**

(b) 4M L1/L2

12. (a) 4M L1/L2

**OR**

(b) 4M L1/L2

13. (a) 4M L1/L2

**OR**

(b) 4M L1/L2

14. (a) 4M L1/L2

**OR**

(b) 4M L1/L2

15. (a) 4M L3/L4

**OR**

(b) 4M L3/L4

**SECTION – B**

**Answer the following. One question from each Unit**

**5X10 = 50 M**

16. (a) 10M L1/L2

**OR**

(b) 10M L1/L2

17. (a) 10M L1/L2

**OR**

(b) 10M L1/L2

18. (a) 10M L1/L2

**OR**

(b) 10M L1/L2

19. (a) 10M L1/L2

**OR**

(b) 10M L1/L2

20. (a) 10M L3/L4

**OR**

(b) 10M L3/L4



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**TITLE: Information Technology**  
**PROGRAMME: B. COM (CA)**  
**TIME: 3 Hrs.**

**COURSE CODE: CABT11**  
**SEMESTER: I**  
**MAX: 70M**

**SECTION –A**

**ANSWER ALL QUESTIONS**

**5 X 4 =20 M.**

1. (a) Illustrate the characteristics of RAM and ROM. (CO1, L2)  
OR  
(b) Explain about input devices. (CO1, L2)
2. (a) Define Operating system. What are different types of OS? (CO2, L1)  
OR  
(b) What are the different types of networks? (CO4, L1)
3. (a). Demonstrate application software and system software. (CO3, L2)  
OR  
(b). Explain the steps involved in the process of KDD. (CO5, L2)
4. (a). What are analog and digital signals? (CO4, L1)  
OR  
(b). Describe Primary Memory.(CO1,L1)
5. (a). Classify Modem.(CO4,L3)  
OR  
(b). Classify Guided Media Transmission. (CO4, L3)

**SECTION – B**

**ANSWER ALL QUESTIONS**

**5 X 10 =50 M.**

6. a) Categorize the block diagram of computer. (CO1, L3)  
OR  
b) Categorize the generations of computers. (CO1, L3)



7. a) What are the functions of operating system? (CO2, L1)

**OR**

b) What are DOS Internal and External commands? (CO2, L1)

8. a) Explain the characteristics of various types of programming languages. Give examples. (CO3, L2)

**OR**

b) Summarize the concepts on CAD, CAM and CIM. (CO3, L2)

9. a) Define the various types of Communication media and channels. (CO4, L1)

**OR**

b) What are the Advantages and Disadvantages of Internet. (CO4, L1)

10. a) Demonstrate On-Line Analytical process (OLAP). (CO5, L2)

**OR**

b) Explain about Artificial Intelligence and Business Intelligence. (CO5, L2)

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**TITLE OF THE COURSE: IT for Managers**

**COURSE CODE: MITT11**

**CLASS/GROUP: I B.B.A**

**SEMESTER: I**

**TIME: 3HRS**

**TOTAL MARKS: 70 MARKS**

**SECTION A**

**Answer ALL Questions**

**5\*4=20 Marks**

- 2 A) Discuss the need of IT in the modern organization.(CO1, L1)

OR

- B) Explain about keyboards. (CO2, L1)

2. A) Explain about printers. (CO2, L1)

OR

- B) Describe about notebook operating systems. (CO3, L1)

3. A) Discuss about speech recognition software. (CO3, L1)

OR

- B) Discuss about modems. (CO4, L1)

4. A) Categorize Multiplexers.(CO4,L4)

OR

- B) Categorize Output Devices (CO1,L4)

5. A) Explain about WWW. (CO4, L1)

OR

- B) Explain about Geographic Information Systems.(CO5, L1)

**SECTION B**

**Answer All Questions5\*10=50 Marks**

6. (A) Classify and explain digital computer systems. (CO1, L2)

OR

(B) Summarize generations of modern computers. (CO1, L2)

7. (A) Summarize various types of secondary storage devices. (CO2, L2)

OR

(B) Classify and explain RAM. (CO2, L2)

8. (A) Explain about Mobile Device Operating Systems. (CO3, L1)

OR

(B) Explain about Procedural and Non – Procedural Programming Languages. (CO3, L1)

9. (A) Summarize various types of communication media. (CO4, L2)

OR

(B) Summarize various types of networks. (CO4, L2)

10. (A) Discuss about Artificial Intelligence. (CO5, L1)

OR

(B). Discuss about Supply Chain Management. (CO5, L1)

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**END OF DOCUMENT**

## Department of Computer Science (UG)

Minutes of the meeting of Board of Studies in Computer Science (UG) held on 12-09-2022 at 11:00 AM for B. Sc (MSDS, AIML) programmes.

### LIST OF BOS MEMBERS

Name of the Member	Role
Dr. G. Krishna Mohan, HOD, Dept. of CS, P.B. Siddhartha College of Arts & Science. Mobile: 9440446847, Email: <a href="mailto:gylkm@pbsiddhartha.ac.in">gylkm@pbsiddhartha.ac.in</a>	Chairman
Dr. R. Kiran Kumar, Associate Professor, Department of Computer Science, Krishna University, Machilipatnam. Mobile: 9440872455	Nominee, Krishna University
Dr. Yogesh Kumar Meena Associate Professor, Department of CSE, MNIT Jaipur. Mobile: 7891005056 Email : <a href="mailto:ymeena.cse@mnit.ac.in">ymeena.cse@mnit.ac.in</a>	Subject Expert
Sri. Prashant R. Nair Associate Professor, Vice- Chairman- IQAC, Dept. of CSE, Amrita Viswa Vidyapeetham, Coimbatore.	Subject Expert
Ms. Reema Thareja Professor, Dept. of Computer Science, Shyama Prasad Mukherji College (W), University of Delhi. <a href="mailto:reemathareja@gmail.com">reemathareja@gmail.com</a>	Subject Expert
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Dr. T.S. Ravi Kiran	Member
Mr. K. Sridhar	Member
Mr. K. Sudhir	Member
Dr .K. Udaya Sri	Member
Mrs. M. Suneela	Member

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<b>DEPARTMENT OF COMPUTER SCIENCE (UG)</b>						
<b>LIST OF COURSES INTRODUCED IN V SEMESTER 2022 - 2023</b>						
<b>S. No.</b>	<b>Title of the Course</b>	<b>Course Code</b>	<b>Offered in Sem</b>	<b>Year of Introduction</b>	<b>OBE with BTL</b>	<b>Offered to</b>
1	Introduction to Machine Learning	DSCSET01	V	2022 - 2023	YES	B. Sc. (MSDS)
2	Introduction to Machine Learning Lab	DSCSEP01	V	2022 - 2023	YES	B. Sc. (MSDS)
3	Big Data Technology	DSCSET02	V	2022 - 2023	YES	B. Sc. (MSDS)
4	Big Data Technology Lab	DSCSEP02	V	2022 - 2023	YES	B. Sc. (MSDS)
5	Data Mining and Data Analysis	DSCSET03	V	2022 - 2023	YES	B. Sc. (MSDS)
6	Data Mining and Data Analysis Lab	DSCSEP03	V	2022 - 2023	YES	B. Sc. (MSDS)
7	Multivariate Technique for Data Analysis	DSCSET04	V	2022 - 2023	YES	B. Sc. (MSDS)
8	Multivariate Technique for Data Analysis Lab	DSCSEP04	V	2022 - 2023	YES	B. Sc. (MSDS)
9	Data & Information Security through Python	DSCSET05	V	2022 - 2023	YES	B. Sc. (MSDS)
10	Data & Information Security through Python Lab	DSCSEP05	V	2022 - 2023	YES	B. Sc. (MSDS)
11	Spark Programming	DSCSET06	V	2022 - 2023	YES	B. Sc. (MSDS)
12	Spark Programming Lab	DSCSEP06	V	2022 - 2023	YES	B. Sc. (MSDS)
13	Introduction to NumPy and Pandas	SDCCSCP	III	2022 – 2023	YES	B. Sc. (MSDS)
14	Foundation of Data science using R	DSCT31B	III	2022 – 2023	YES	B. Sc. (MSDS)
15	Foundation of Data science using R Lab	DSCP31B	III	2022 – 2023	YES	B. Sc. (MSDS)
16	Introduction to Artificial Intelligence	AIMLT31	III	2022 - 2023	YES	B. Sc. (AIML)
17	Introduction to Artificial Intelligence Lab	AIMLP31	III	2022 - 2023	YES	B. Sc. (AIML)
18	Document Oriented Database	AIMLT32	III	2022 - 2023	YES	B. Sc. (AIML)
19	Document Oriented Database Lab	AIMLP32	III	2022 - 2023	YES	B. Sc. (AIML)

**Resolutions:**

1. It is resolved and recommend to introduce “Introduction to Machine Learning” with course code DSCSET01 in V semester of B. Sc. (MSDS) for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 6 to 8.
2. It is resolved and recommend to introduce “Introduction to Machine Learning Lab” with course code DSCSEP01 in V semester of B. Sc. (MSDS) for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 9 to 10 .
3. It is resolved and recommend to introduce “Big data Technology” with course code DSCSET02 in V semester of B. Sc. (MSDS) for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 11 to 13.
4. It is resolved and recommend to introduce “Big data Technology Lab” with course code DSCSEP02 in V semester of B. Sc. (MSDS) for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 14 to 18.
5. It is resolved and recommend to introduce “Data Mining and Data Analysis” with course code DSCSET03 in V semester of B. Sc. (MSDS) for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 19 to 22.
6. It is resolved and recommend to introduce “Data Mining and Data Analysis Lab” with course code DSCSEP03 in V semester of B. Sc. (MSDS) for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 23 to 24 .
7. It is resolved and recommend to introduce “Multivariate Techniques for Data Analysis” with course code DSCSET04 in V semester of B. Sc. (MSDS) for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 25 to 28 .
8. It is resolved and recommend to introduce “Multivariate Techniques for Data Analysis Lab” with course code DSCSEP04 in V semester of B. Sc. (MSDS) for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 29 to 30 .

9. It is resolved and recommend to introduce “Data and Information security through Python” with course code DSCSET05 in V semester of B. Sc. (MSDS) for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 31 to 33.
10. It is resolved and recommend to introduce “Data and Information Security through Python Lab” with course code DSCSEP05 in V semester of B. Sc. (MSDS) for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 34 to 35.
11. It is resolved and recommend to introduce “Spark Programming” with course code DSCSET06 in V semester of B. Sc. (MSDS) for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 36 to 39.
12. It is resolved and recommend to introduce “Spark Programming Lab” with course code DSCSEP06 in V semester of B. Sc. (MSDS) for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 40 to 41.
13. It is resolved and recommend to introduce “Introduction to NumPy Pandas Lab” with course code SDCCSCP in III semester of B. Sc. (MSDS) for the batch of students admitted in 2021-22 and onwards. For the syllabus and model question paper vide page number from 42 to 43 .
14. It is resolved and recommend to introduce “Foundation of Data Science using R” with course code DSCT31B in III semester of B. Sc. (MSDS) for the batch of students admitted in 2021-22 and onwards. For the syllabus and model question paper vide page number from 44 to 46.
15. It is resolved and recommend to introduce “Foundation of Data Science using RLab” with course code DSCP31B in III semester of B. Sc. (MSDS) for the batch of students admitted in 2021-22 and onwards. For the syllabus and model question paper vide page number 47.
16. It is resolved and recommend to introduce “Introduction to Artificial Intelligence” with course code AIMLT31 in III semester of B. Sc. (AIML) for the batch of students admitted in 2021-22 and onwards. For the syllabus and model question paper vide page number from 48 to 51.

17. It is resolved and recommend to introduce “Introduction to Artificial Intelligence Lab” with course code AIMLT31 in III semester of B. Sc. (AIML) for the batch of students admitted in 2021-22 and onwards. For the syllabus and model question paper vide page number from 52 to 53.
18. It is resolved and recommend to introduce “Document Oriented Database” with course code AIMLT32 in III semester of B. Sc. (AIML) for the batch of students admitted in 2021-22 and onwards. For the syllabus and model question paper vide page number from 54 to 57.
19. It is resolved and recommend to introduce “Document Oriented Database Lab” with course code AIMLP32 in III semester of B. Sc. (AIML) for the batch of students admitted in 2021-22 and onwards. For the syllabus and model question paper vide page number 58.





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*College with Potential for Excellence*

*ISO9001 – 2015 Certified*

Course Code: **DSCSET01**

Domain Subject: **Data Science**

Max. Marks: **100** (CCIA: 25+ SEE:75)

Offered to: **B.Sc. (MSDS)**

Semester – **V**

Theory Hrs./Week: **3**

### **6A: Introduction to Machine Learning**

Type of the Course: **Core**

Credits: **03**

**I. Course Outcomes: Students at the successful completion of the course will be able to:**

1. **Identify** the characteristics of machine learning. **(PO5,PO7)**
2. **Summarize** the Model building and evaluation approaches. **(PO5,PO7)**
3. **Apply** Bayesian learning and regression algorithms for real-world Problems **(PO5, PO6, PO7).**
4. **Apply** supervised learning algorithms to solve real-world Problems. **(CO5, PO7).**
5. **Apply** unsupervised learning algorithms for the real world data. **(PO5, PO7).**

## **II. Syllabus:**

**(Total Theory periods: 45)**

### **Unit – 1**

#### **1. Introduction to Machine Learning and Preparing Model**

##### **1.1 Introduction to Machine Learning-**

- 1.1.1 Introduction
- 1.1.2 What is Human Learning?
- 1.1.3 Types of Human Learning
- 1.1.4 What is Machine Learning?
- 1.1.5 Types of Machine Learning,
- 1.1.6 Problems not to be solved using Machine Learning
- 1.1.7 Applications of Machine Learning

##### **1.2 Preparing to Model**

- 1.2.1 Introduction, Machine Learning Activities
- 1.2.2 Basic Types of Data in Machine Learning
- 1.2.3 Exploring Structure of Data
- 1.2.4 Data Quality and Remediation
- 1.2.5 Data Pre-Processing

### **Unit – II**

#### **2. Modeling & Evaluation, Basics of Feature Engineering**

##### **2.1 Modeling & Evaluation**

- 2.1.1 Introduction,
- 2.1.2 Selecting a Model,
- 2.1.3 Training a Model (for Supervised Learning),
- 2.1.4 Model Representation and Interpretability, Evaluating Performance of a Model.

## **2.2 Basics of Feature Engineering**

- 2.2.1 Introduction,
- 2.2.2 Feature Transformation,
- 2.2.3 Feature Subset Selection.

### **Unit- III**

#### **3. Supervised Learning Regression**

- 3.1 Introduction
- 3.2 Example of Regression
- 3.3 Common Regression Algorithms
- 3.4 Simple linear Regression, Multiple linear Regression
- 3.5 Assumptions in Regression Analysis
- 3.6 Main Problems in Regression, Analysis
- 3.7 Improving Accuracy of the linear Regression Model

### **Unit – IV**

#### **4. Classification**

- 4.1 Naive Bayes model
- 4.2 Decision Tree, Tree Terminology
- 4.3 Decision Tree learning
- 4.4 Decision Boundaries
- 4.5 Random Forest
- 4.6 Logistic Regression.

### **Unit – V**

#### **5. Unsupervised Learning**

- 5.1 Introduction
- 5.2 Unsupervised Vs Supervised Learning
- 5.3 Applications of Unsupervised Learning
- 5.4 Clustering, Clustering as a machine learning task
- 5.5 Different types of clustering techniques: K- Means, Density
- 5.6 Hierarchical clustering
- 5.7 Finding Pattern using Association Rule, Definition of common terms, Association rule
- 5.8 The Apriori algorithm for association rule learning, Build the Apriori Principle Rule
- 5.9 Introduction to Deep Learning

### **III. Text Books:**

1. Machine Learning, 1<sup>st</sup> Edition by Subramanian Chandramouli, Saikat Dutt, Amit Kumar Das, Pearson Education India.
2. Machine Learning with Python by Abhishek Vijayagria – BPB Publications.

#### **Reference Books:**

1. Machine Learning, 1997 by Tom M. Mitchell, MGH Publisher
2. Pattern Recognition & Machine Learning , 2006 by Christopher M. Bishop, Newyork Springer Publisher.
3. Understanding Machine Learning : From Theory to Algorithms by Shai S ShaiShalev-Shwartz, ShaiBen David , Cambridge Publisher.
4. Machine Learning in Action,1<sup>st</sup> edition, 2012 by Peter Harington , Cengage Publisher
5. Introduction to artificial neural systems by J. Zurada, St. Paul , West Publisher.
6. Introduction to machine learning, 2<sup>nd</sup> Edition by Ethem Alpaydin , The MIT Press

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Course Code: **DSCSET01**

Offered to: **B.Sc. (MSDS)**

Domain Subject: **Data Science**

Semester – **V**

**6A: Introduction to Machine Learning**

**SEMESTER END MODEL QUESTON PAPER**

**Time: 3 Hrs.**

**Max.: 75 Marks**

**Min. Pass: 30 Marks**

**SECTION –A**

**ANSWER ANY FIVE QUESTIONS**

**5 X 5 =25 M.**

1. What is Machine Learning? Briefly explain the types of Machine Learning. {CO1, L2}
2. Differentiate Dimensionality reduction and Feature Selection {CO1, L2}
3. Explain the process of k-fold cross-validation. {CO2, L2}
4. When can a feature be termed as irrelevant? How can it be measured? {CO2 ,L2}
5. What is multiple linear regression? {CO3 ,L2}
6. What are the conditions of a positive and a negative slope in linear regression? {CO3, L2}
7. What is entropy in a decision tree? {CO4, L2}
8. Mention few application areas of unsupervised learning. {CO5, L2}

**SECTION – B**

**ANSWER ALL THE QUESTIONS**

**5 X 10 =50 M**

9. (A) What is Machine Learning? Explain different perspective and issues in machine learning. {CO1, L2}  
(OR)  
(B) Explain the quantitative and qualitative data in detail. Differentiate between the two. {CO1, L2}
10. (A) Explain, in detail, the process of evaluating the performance of a classification model. {CO2, L2}  
(OR)  
(B) What are the different techniques for data pre-processing? Explain the filter approach of feature selection. How is the different from wrapper approach? {CO2, L2}
11. (A) Define simple linear regression using a graph explaining slope and intercept? {CO3, L2}  
(OR)  
(B) What is regression? Explain OLS algorithm with formula for 'a' and 'b'. {CO3, L2}
12. (A) Explain the K – nearest neighbor algorithm. {CO4, L2}  
(OR)  
(B) What is a decision tree? Discuss the use of decision tree for classification purpose with an example. {CO4, L2}
13. (A) Define Clustering. Explain different types of clustering techniques? {CO5, L2}  
(OR)  
(B) Explain the Apriori algorithm with suitable example. {CO5, L2}

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Course Code: **DSCSET01**

Offered to: **B.Sc. (MSDS)**

Domain Subject: **Data Science**

Semester – **V**

### **6A: Introduction to Machine Learning Lab**

Max. Marks: **50** (CCIA: 10+ SEE: 40)

Practical Hrs./Week : **2**

Type of the Course: **Core Lab**

Credits: **02**

### **I. Course Outcomes: Students at the successful completion of the course will be able to:**

CO1: Apply the appropriate pre-processing techniques on the data set. (PO5, PO7)

CO2: Implement supervised Machine Learning algorithms. (PO5, PO7)

CO3: Implement unsupervised Machine Learning algorithms (PO5, PO7)

### **II: Practical (Laboratory) Syllabus: (30 Periods)**

1. Demonstrate the packages Numpy, Pandas, Matplotlib/Seaborn.
2. Scikit Learn Package – Loading, basics of Scikit learn.
3. How to import data, basic operations on data frame: info, shape, head, data types, describe.
4. Checking missing values, Outliers, Unique value, Dropping/Adding Columns, Renaming the Columns.
5. EDA and Data Visualization – Numeric Variables
6. EDA and Data Visualization - Objective Variable
7. Scikit Learn – Splitting data, creating independent and dependent variables
8. Model Building Scikit Learn – Supervised - Classification
9. Model Building Scikit Learn – Supervised - Regression
10. Model Building Scikit Learn – Unsupervised - Clustering

### **WEB REFERENCES:**

- <https://towardsdatascience.com/exploratory-data-analysis-eda-python-87178e35b14https://www.analyticsvidhya.com/blog/2020/08/exploratory-data-analysiseda-from-scratch-in-python/>
  - <https://www.analyticsvidhya.com/blog/2020/10/feature-selection-techniques-in-machine-learning/>
  - <https://machinelearningmastery.com/principal-components-analysis-for-dimensionality-reduction-in-python/>
  - <https://towardsdatascience.com/dimension-reduction-techniques-with-python-f36ca7009e5chttps://www.analyticsvidhya.com/blog/2021/05/machine-learning-model-evaluation/>
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Course Code: **DSCSET01**

Offered to: **B.Sc. (MSDS)**

Domain Subject: **Data Science**

Semester – **V**

**6A: Introduction to Machine Learning Lab**

Max. Marks: **50** (CCIA: 10+ SEE: 40)

Practical Hrs./Week : **2**

Type of the Course: **Core Lab**

Credits: **02**

## **Model Paper: Practical**

**Time: Three hours**

**Max. Marks: 40**

### **Section A**

One Major Experiment (Experiment No : ) **15 M**

### **Section B**

One Minor Experiment (Experiment No : ) **10 M**

### **Section C**

Practical Record **05 M**

### **Section D**

Viva Voce **10 M**

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Course Code: <b>DSCSET02</b>	Offered to: <b>B.Sc. (MSDS)</b>
Domain Subject: <b>Data Science</b>	Semester – <b>V</b>
Type of the Course: <b>Core</b>	Credits: <b>03</b>
Max. Marks: <b>100</b> (CCIA: 25+ SEE: 75)	Theory Hrs. /Week: <b>3</b>

### **7A: BIG DATA TECHNOLOGY**

#### **Course Objective:**

1. To Understand big data, types of big data and applications in big data
2. To understand the map reduce concepts and scaling map reduce word count program
3. To understand the Concepts of Hadoop Ecosystem
4. To apply file commands in HDFS and concepts of mapper and reducer
5. To analyse Hive queries and concepts of YARN

**Course Outcomes:** At the end of this course the student is able

- CO1: Recognize and understand use and applications of big data and analytics. (PO,PO7)
- CO2: Learn how to apply Map reduce. (PO1, PO7)
- CO3: Understand Hadoop ecosystem components. (PO1, PO7)
- CO4: Learn to build and maintain reliable, scalable, distributed systems with Apache Hadoop. (PO1,PO7)
- CO5: Able to use Hive as an interface to access data in Hadoop. (PO1, PO7)

#### **II. Syllabus:**

**(Total Theory periods: 45)**

##### **Unit – 1**

**Introduction to Big data:** What is Big Data, Structuring Big Data-Types of Big Data, Elements of big data- Volume, Velocity, Variety, Veracity, Big Data Analytics- Advantages of Big Data Analytics, Big Data Applications.

##### **Unit – II**

**Introduction to Hadoop:** What is Hadoop, Understanding distributed systems & Hadoop, Comparing SQL databases and Hadoop, Understanding Map Reduce- scaling word count program manually, scaling word count program in Mapreduce

### Unit – III

Hadoop Eco System, HDFS-HDFS Architecture, concept of blocks in HDFS- name node, data node, secondary name node, job tracker, task tracker). Introducing HBase-HBase architecture, Regions, storing Big Data with HBase, Why hive, pig, scoop, zookeeper, flume, oozie.

### Unit – IV

**Working with files in HDFS**-Basic file commands, reading & writing to HDFS programmatically, Anatomy of Map Reduce program-Hadoop data types, Mapper, Reducer, Partitioner, Combiner, word counting with pre-defined mapper and Reducer, Reading & Writing-input format, output format.

### Unit – V

Background of YARN, limitations of map reduce, advantages of YARN, YARN architecture, working of YARN. Introducing Hive, Hive Services, Hive Variables, Hive Queries, Data types, Hive Built in functions, Hive - DDL, DML, and Data Retrieval Queries.

### Text Books:

1. Black Book “BIG DATA (covers hadoop2, map reduce, Hive, Yarn, Pig, R and Data Visualization)”. Dream Tech Press. **(Units – 1,3,5)**
2. Chuck Lam, “Hadoop in Action”, Dream Tech Press**(Units – 2,4)**

### Reference Books:

1. Boris lublinsky, Kevin t. Smith, Alexey Yakubovich, “**Professional Hadoop Solutions**”, Wiley,2015.
2. Chris Eaton, Dirk deroos, “**Understanding Big data**”, McGraw Hill,2012

**Course Delivery method:** Face-to-face / Blended **Course has focus on:** Skill Development, Employability **Website of Interest:**

[https://www.tutorialspoint.com/big\\_data\\_tutorials.htm](https://www.tutorialspoint.com/big_data_tutorials.htm)



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Course Code: **DSCSET02**

Domain Subject: **Data Science**

Type of the Course: Core

Max. Marks: **75**

Offered to: **B.Sc. (MSDS)**

Semester – **V**

Credits: **03**

Time: 3 Hrs.

**7A: BIG DATA TECHNOLOGY**

**SEMESTER END MODEL QUESTON PAPER**

**Section-A**

**ANSWER ANY FIVE QUESTIONS**

**5x5M=25M**

1. Write a short note on elements of Big Data.(CO1,L5)
2. Write down the advantages of Big Data Analytics.(CO1,L5)
3. Differentiate between SQL database and Hadoop.(CO2,L2)
4. List and explain the components of Hadoop(CO2,L2)
5. Write a short on Hadoop Ecosystem(CO3,L5)
6. Explain data types in Hadoop.(CO4,L2)
7. Explain advantages of YARN over Map Reduce.(CO5,L2)
8. List out the data types present in hive.(CO5,L1)

**Section-B**

**ANSWER THE FOLLOWING QUESTIONS**

**5x10M=50M**

9. (A) Define Big Data? Explain different types of Big Data.(CO1,L2)  
OR  
(B) Discuss the applications of Big Data in detail. (CO1,L4)
10. (A) Define Hadoop? Explain the history of Hadoop in detail.(CO2,L2)  
OR  
(B) Explain Map Reduce word count program with example. (CO2,L2)
11. (A) Define HDFS? Explain different blocks of HDFS in detail.(CO3,L2)  
OR  
(B) Define HBase? Explain the architecture of HBase. (CO3,L2)
12. (A) Explain the following (CO4,L2)
  - i) Mapper 5M
  - ii) Reducer 5MOR  
(B) Illustrate basic file commands in HDFS with examples (CO4,L3)
13. (A) Describe YARN architecture and Working with YARN.(CO5,L2)  
OR  
(B) Explain hive DDL commands with examples. (CO5,L2)

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Course Code: **DSCSEP02**

Domain Subject: **Data Science**

Max. Marks: **50** (CCIA: 10+ SEE: 40)

Offered to: **B.Sc. (MSDS)**

Semester – **V**

Practical Hrs./Week : **3**

Type of the Course: **Skill Enhancement Course** (Elective, Practical) Credits: 02

### Course 7A : BIG DATA TECHNOLOGY LAB

#### Experiment – 1:

Perform setting up and Installing Hadoop in its three operating modes:

- Standalone,  Pseudo distributed,  Fully distributed.

#### Experiment – 2:

Implement the file management tasks in Hadoop.

#### Experiment – 3:

Run a basic Word Count Map Reduce program to understand Map Reduce Paradigm.

#### Experiment – 4:

Create a database with name “CustInfo”.

Create a customers table with the

following fields Customer Id	int
CustomerName	String
CustomerAge	int
Address	String

Perform the following operations on customers table:

1. Describe the customers table
2. Load data of ten customers
3. Alter table name customers to customer details
4. Display the details of all customers
5. Add column name gender to table

#### Experiment – 5:

Create a database with name “college”.

Create a student table with the

following fields Student Id	int
Student Name	String
Student Age	int
Course Name	String
Fee	double
City	String

State String  
Pincode int

Perform the following operations on studenttable:

1. Describe the student table
2. Load data of six students
3. Alter table name to “Student Details”
4. Add column name **year of joining** to table
5. Display the details of all students

### Experiment – 6:

Create a database with name “company”.

Create an employee table with the following fields

Employee Id	int
EmployeeName	String
Designation	String
Gender	String
Salary	double
Address	String
City	String
State	String
Pincode	int

Perform the following operations on employeetable:

1. Describe the employee table
2. Load data of eight employees
3. Alter table name to “EmpDet”
4. Add column name **department** to table
5. Alter the column name address to comaddr
6. Display the details of all employees
7. Add the salary of all employees

### Experiment – 7:

(A) Create a database with name “retail”. Create a categories table with the following fields

CategoryId	int
CategoryName	String

Perform the following operations on student table:

1. Describe the categories table
2. Load data of five categories
3. Alter table name to “Category Details”
4. Display the details of all categories

(B) Create a products table with the following fields

CategoryId	int
ProductId	int
ProductName	String
ProductDescription	String
ProductPrice	String
ProductImage	String

Perform the following operations on student table:

1. Describe the product stable
2. Load data of eight products
3. Alter table name to “Product Details”
4. Display the details of all products
5. Display the details of products present in second category with category description

### Experiment – 8:

Use the database “college”. Create a book information table with the following fields

Book Id	int	
Book ISBNNumber		String
BookTitle		String
AuthorofBook		String
YearofPublication		String
PublisherofBook		String
EditionofBook		String
Book Image		String
Priceof Book		int

Perform the following operations on student table:

1. Describe the book information table
2. Load data of ten books
3. Alter table name to “Book Info”
4. Display the details of all books
5. Display the details of books of specific publisher

### Experiment – 9:

Create a database with name “online”.

(A) Create an items table with the following fields

ItemId	int	
ItemName		String
ItemDescription		String
ItemPrice		String
Item Image		String
Quantity		int

Perform the following operations on student table:

1. Describe the items table
2. Load data of ten items
3. Alter table name to “Item Details”
4. Display the details of all items

(B) Create an orders table with the following fields

Order Id	int	
OrderName		String
OrderDate		String
Amount		double
ShippingAddress		String
ShippingDate		String

Perform the following operations on student table:

1. Describe the order stable
2. Load data of five orders
3. Alter table name to “Order Details”
4. Display the details of all orders

### Experiment – 10:

Create a database with name “university”. Create a staff table with the following fields

	int	
StaffName		String
Designation		String
DepartmentName		String
DateofJoining		String
Gender		String
Basic Salary		double
CommunicationAddress		String
City		String
State		String
Pincode		int
MobileNumber		String

Perform the following operations on employee table:

1. Describe the staff table
2. Load data of ten staff members
3. Alter table name to “Staff Details”
4. Add column name **Qualification** to table
5. Get the data of staff members working in Computer Science in department

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## **P.B.SIDDHARTHACOLLEGE OF ARTS& SCIENCE**

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*(An Autonomous College under the Jurisdiction of Krishna University)*

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*College with Potential for Excellence*

*ISO9001 – 2015 Certified*

Course Code: **DSCSEP02**

Domain Subject: **Data Science**

Max. Marks: **50** (CCIA: 10+ SEE: 40)

Offered to: **B.Sc. (MSDS)**

Semester – **V**

Practical Hrs./Week : **3**

Type of the Course: **Skill Enhancement Course** (Elective, Practical) Credits: 02

**Title : BIG DATA TECHNOLOGY LAB**

**Model Paper: Practical**

**Time: Three hours**

**Max. Marks: 40**

### **Section A**

One Major Experiment (Experiment No : )      **15 M**

### **Section B**

One Minor Experiment (Experiment No : )      **10 M**

### **Section C**

Practical Record      **05 M**

### **Section D**

Viva Voce      **10 M**

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Course Code: **DSCSET03**

Offered to: **B.Sc. (MSDS)**

Domain Subject: **Data Science**

Semester – **V**

Max. Marks: **100** (CCIA: 25+ SEE: 75)

Theory Hrs./Week: **3**

### **DATA MINING AND DATA ANALYSIS**

Type of the Course: **Skill Enhancement Course** (Elective Theory)

Credits: **03**

**I. Course Outcomes: Students at the successful completion of the course will be able to:**

CO1: Understand various Data Mining Processes & Techniques.

CO2: Characterize the various kinds of patterns that can be discovered by association rule mining.

CO3: Evaluate mathematical methods underlying the effective application of data mining.

CO4: Analyse different Classification Techniques

CO5: Apply different clustering models & methods

### **II. Syllabus:**

**(Total Theory periods: 45)**

#### Unit-I

- 1.1 Data mining
- 1.2 KDD versus data mining
- 1.3 Stages of the Data Mining Process
- 1.4 Task primitives
- 1.5 Data Mining Techniques
- 1.6 Data mining knowledge representation

#### Unit-II

- 2.1 Data mining query languages
- 2.2 Integration of Data Mining System with a Data Warehouse- Issues
- 2.3 Data pre-processing
- 2.4 Data Cleaning.
- 2.5 Data transformation
- 2.6 Feature selection
- 2.7 Dimensionality reduction
- 2.8 Discretization and generating concept hierarchies
- 2.9 Mining frequent patterns association
- 2.10 Correlation.

#### Unit-III

- 3.1 Classification
  - 3.1.1 Basic Concepts
  - 3.1.2 General Approach to solving a classification problem
- 3.2 Decision Tree Induction

- 3.2.1 Working of Decision Tree
- 3.2.2 Building a decision tree
- 3.2.3 Methods for expressing an attribute test conditions
- 3.2.4 Measures for selecting the best split
- 3.2.5 Algorithm for decision tree induction.

### **3.3 Model Over fitting**

- 3.3.1 Due to presence of noise
- 3.3.2 Due to lack of representation samples

### **3.4 Evaluating the performance of classifier**

- 3.4.1 Holdout method
- 3.4.2 Random sub sampling
- 3.4.3 Cross-validation
- 3.4.4 Bootstrap

## **Unit-IV**

- 4.1 Bayesian Classification
- 4.2 Rule Based Classification
- 4.3 Classification by back propagation
- 4.4 Support Vector Machines
- 4.5 Associative Classification
- 4.6 Lazy Learners
- 4.7 Other Classification Methods

## **Unit-V**

- 5.1 Clustering techniques
- 5.2 Partitioning methods-k-means
- 5.3 Hierarchical Methods
- 5.4 Distance based agglomerative and divisible clustering
- 5.5 Density
- 5.6 Based Methods
- 5.7 Expectation maximization
- 5.8 Grid Based Methods
- 5.9 Model
- 5.10 Based Clustering
- 5.11 Methods
- 5.12 Constraint
- 5.13 Based Cluster Analysis
- 5.14 Outlier Analysis.

### **III. Text Books:**

1. A delchi Azzalini, Bruno Scapa, “Data Analysis and Data mining” , 2<sup>nd</sup> Ediiton, Oxford University Press Inc., 2012

### **Reference Books:**

1. Jiawei Han and Micheline Kamber, “Data Mining: Concepts and Techniques”, 3<sup>rd</sup>Edition, Morgan Kaufmann Publishers, 2011.
2. Alex Berson and Stephen J. Smith, “Data Warehousing, Data Mining & OLAP”, 10<sup>th</sup>Edition, Tata Mc Graw Hill Edition , 2007.
3. G.K. Gupta, “Introduction to Data Mining with Case Studies”, 1<sup>st</sup> Edition, Easter Economy Edition, PHI, 2006.

### **IV. RECOMMENDED CO-CURRICULAR ACTIVITIES:**

(Co-curricular activities shall not promote copying from textbook or from others work and shall encourage self/independent and group learning)

#### **A. Measurable**

1. Assignments (in writing and doing forms on the aspects of syllabus content and outside the syllabus content. Shall be individual and challenging)
2. Student seminars (on topics of the syllabus and related aspects (individual activity))
3. Quiz (on topics where the content can be compiled by smaller aspects and data (Individuals or groups as teams))
4. Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual participation and contribution of students shall be ensured (team activity

#### **B. General**

1. Group Discussion
2. Try to solve MCQ’s available online.
3. Others





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**DATA MINING AND DATA ANALYSIS**

Course Code: **DSCSET03** Offered to: **B.Sc. (MSDS)**  
Domain Subject: **Data Science** Semester – **V**  
Type of the Course: **Skill Enhancement Course** (Elective Theory) Credits: **03**  
Time: **3 Hrs.** Max.: **75 Marks** Min. Pass: **30 Marks**

**SECTION - A**

Answer any **five** of the following: **5 X 5= 25 MARKS**

1. What is Data mining? What kinds of data can be mined? (CO1,L2)
2. Describe classification of data mining systems. (CO1,L2)
3. What is the need of data preprocessing? List major tasks in data preprocessing. (CO2,L2)
4. Write DMQL syntax for specifying task-relevant data. (CO2,L3)
5. Explain market basket analysis in detail. (CO3,L2)
6. List various pre-processing steps may be applied to prepare data for classification and prediction.(CO4,L3)
7. Explain the methods of tree pruning. (CO4,L2)
8. Differentiate between clustering and classification. (CO5,L3)

**SECTION – B**

Answer **all** the following questions **5 X 10 = 50 MARKS**

9. (a) Describe data mining functionalities, and the kinds of patterns they can discover. (CO1,L2)  
OR  
(b) Illustrate essential steps in the process of knowledge discovery in databases. (CO1,L3)
10. (a) Explain the methods to handle missing values and smooth noise in data cleaning. (CO2,L2)  
OR  
(b) What is dimensionality reduction? Explain dimensionality reduction steps in discrete wavelet transform with an example. (CO2,L3)
11. (a) Write an algorithm to generate frequent itemsets using Apriori algorithm. (CO3,L3)  
OR  
(b) Write an algorithm to generate frequent itemsets using FP-Growth.(CO3,L3)
12. (a) Write an algorithm for classification using Decision tree induction.(CO4,L3)  
OR  
(b) Explain Bayesian classification in detail. (CO4,L3)
13. (a) Explain categorization of clustering methods in detail. (CO5,L2)  
OR  
(b) Write K-means clustering algorithm. Explain with suitable example. (CO5,L3)

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**DATA MINING AND DATA ANALYSIS LAB**

Course Code: **DSCSEP03** Offered to: **B.Sc. (MSDS)**  
Domain Subject: **Data Science** Semester – **V**  
Type of the Course: **Skill Enhancement Course** (Elective Theory) Credits: **02**  
Max. Marks: **50** (CCIA: 10+ SEE: 40) Practical Hrs./Week : **3**

**I. Course Outcomes: Students at the successful completion of the course will be able to:**

1. Use Statistical techniques to carry out the analysis of data
2. Gain hands-on skills and experience on data mining tools.

**II: Practical (Laboratory) Syllabus: (30 Periods)**

1. Data Analysis – Getting to know the Data (Using ORANGE WEKA)
  - Parametric – Means, T-Test, Correlation
  - Prediction for numerical outcomes – Linear regression
  - Correlation analysis
  - Preparing data for analysis o Pre-Processing techniques
2. Data Mining (Using ORANGE WEKA or any source data mining tool)
  - Implement clustering algorithm
  - Implement classification using oDecision tree oBack Propagation
  - Visualization methods



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**DATA MINING AND DATA ANALYSIS LAB**

Course Code: **DSCSEP03** Offered to: **B.Sc. (MSDS)**  
Domain Subject: **Data Science** Semester – **V**  
Type of the Course: **Skill Enhancement Course (Elective Theory)** Credits: **02**  
Max. Marks: **40** Practical Hrs./Week : **3**

**Model Paper: Practical**

**Time: Three hours**

**Max. Marks: 40**

**Section A**

One Major Experiment (Experiment No : ) **15 M**

**Section B**

One Minor Experiment (Experiment No : ) **10 M**

**Section C**

Practical Record **05 M**

**Section D**

Viva Voce **10 M**

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**Multivariate Technique for Data Analysis**

Course Code: **DSCSET04** Offered to: **B.Sc. (MSDS)**  
Domain Subject: **Data Science** Semester – **V**  
Type of the Course: **Skill Enhancement Course** (Elective Theory) Credits: **03**  
Max. Marks: **100** (CCIA: 25+ SEE:75) Theory Hrs./Week: **3**

**I. Course Outcomes: Students at the successful completion of the course will be able to:**

- CO1: Understanding the usage of multivariate techniques for the problem under the consideration.
- CO2: Analyse different Deriving & Interpreting factors
- CO3: Classify the Interpretation & validation of profiling the clusters.
- CO4: Evaluate Procedure for conducting discriminate analysis
- CO5: Apply Graphical & Simplex methods with programming

**II. Syllabus: (Total Theory periods: 45)**

**Unit-I:**

- 1.1 Introduction to Multivariate Analysis
- 1.2 Meaning of Multivariate Analysis
- 1.3 Measurements Scales
- 1.4 Metric measurement scales
- 1.5 Non- Metric measurement scales
- 1.6 classification of multivariate techniques (Dependence Techniques and Inter-dependence Techniques)
- 1.7 Applications of Multivariate Techniques in different disciplines.

**Unit-II:**

- 2.1 Factor Analysis
  - 2.1 Factor Analysis
  - 2.2 Meaning
  - 2.3 objectives and Assumptions
  - 2.4 Designing a factor analysis
  - 2.5 Deriving factors and assessing overall factors
  - 2.6 Interpreting the factors
  - 2.7 validation of factor analysis.

**Unit-III: Cluster Analysis**

- 3.1 Cluster Analysis
- 3.2 Objectives and Assumptions
- 3.3 Research design in cluster analysis

- 3.4 Deriving clusters and assessing overall fit
  - 3.4.1 Hierarchical Methods
  - 3.4.2 Non Hierarchical Methods
  - 3.4.3 Combinations
- 3.5 Interpretation of clusters
- 3.6 validation of profiling of the clusters.

#### Unit-IV: Discriminate Analysis

- 4.1 Discriminate Analysis
- 4.2 Concept
- 4.3 Objective and applications
- 4.4 Procedure for conducting discriminate analysis
- 4.5 Stepwise discriminate analysis
- 4.6 Mahalanobis procedure
- 4.7 Logit model.

#### Unit-V: Linear Programming

- 5.1 Linear Programming problem
- 5.2 Formulation
- 5.3 Graphical method
- 5.4 Simplex method
- 5.5 Integer Programming
- 5.6 Transportation
- 5.7 Assignment problem.

### III. Text Books:

1. Joseph F Hair, William C Black et al, "Multivariate Data Analysis", Pearson Education, 7<sup>th</sup> edition, 2013

### Reference Books:

1. T.W Anderson, " An introduction to Multivariate Statistical Analysis, 3<sup>rd</sup> Edition", Wiley 2003.
2. William r Dillon, John Wiley & Sons, "Multivariate Analysis Methods and Applications", Wiley, 1984.
3. Naresh K Malhotra, Satyabhusan Dash, "Marketing Research An applied Orientation", Pearson, 2011.
4. Hamdy A Taha, "Operations Research", Pearson, 2012.
5. S R Yaday, A K Malik, "Operations Research", Oxford, 2014.

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**Multivariate Technique for Data Analysis**

Course Code: **DSCSET04** Offered to: **B.Sc. (MSDS)**  
Domain Subject: **Data Science** Semester – **V**  
Type of the Course: **Skill Enhancement Course** (Elective Theory) Credits: **03**  
Time: **3 Hrs.** Max.: **75 Marks** Min. Pass: **30 Marks**

**SECTION - A**

**Answer any five of the following: 5 X 5= 25 MARKS**

1. Define Multivariate Analysis. What are the metrics of Measurement Scale? (CO1,L2)
2. How to build the multivariate model? (CO1,L2)
3. Define Factor Analysis. What are the objectives and assumptions of Factor Analysis?(CO2,L2)
4. How to design a Factor Analysis? (CO2,L3)
5. What are the basic stages in the application of Cluster Analysis? (CO3,L2)
6. What is the purpose of of Cluster Analysis and when should it be used instead of Factor Analysis? (CO4,L3)
7. Define Discriminate Analysis. What are the applications of Discriminate Analysis?(CO4,L2)
8. How to solve a Linear Programming problem? (CO5,L3)

**SECTION – B**

**Answer all the following questions 5 X 10 = 50 MARKS**

- 9.(a) Explain classification of multi variate techniques in detail. (CO1,L2)  
OR  
(b) What are the applications of Multivariate Techniques in different disciplines? (CO1,L3)
- 10.(a) How can factor analysis help the researcher improve the results of other mulivariate techniques? (CO2,L2)  
OR  
(b) How to interpret the factors and Validate of factor analysis? Explain with suitable example. (CO2,L3)
- 11.(a) How does the researcher know whether to use hierarchical or non hierarchical cluster techniques? Under which conditions would each approach be used? (CO3,L3)  
OR  
(b) As a data analyst, you could use multiple regressions to predict crop growth. In this example, crop growth is your dependent variable and you want to see how different factors affect it. Your independent variables could be rainfall, temperature, amount of sunlight, and amount of fertilizer added to the soil. A multiple regression model would show you the proportion of variance in crop growth that each independent variable accounts for. (CO3,L3)
12. (a) How to do Discriminate Analysis in stepwise? (CO4,L3)  
OR  
(b) Explain about Logit model with suitable example. (CO4,L3)
13. (a) Explain about graphical method and simplex method in Linear Programming. (CO5,L2)  
OR  
(b) Explain about Transportation and Assignment problem with suitable example. (CO5,L3)



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**Multivariate Technique for Data Analysis Lab**

Course Code: **DSCSEP04**

Offered to: **B.Sc. (MSDS)**

Domain Subject: **Data Science**

Semester – **V**

Type of the Course: **Skill Enhancement Course** (Elective Theory)

Credits: **02**

Max. Marks: **50** (CCIA: 10+ SEE: 40)

Practical Hrs./Week : **3**

**I. Course Outcomes: Students at the successful completion of the course will be able to:**

CO1: Install, Code and Use R Programming Language in R Studio IDE to perform basic tasks on Vectors, Matrices and Data frames.

CO2: Describe key terminologies, concepts and techniques employed in Statistical Analysis.

CO3: Define, Creating and manipulating network objects.

**II: Practical (Laboratory) Syllabus: (30 Periods)**

1. Navigating the basic operating environment of 'R'
2. Importing network data.
3. Creating and manipulating network objects.
4. Plotting Network Graphs.
5. Network Descriptive Statistics.
6. Hypothesis Testing.



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**Multivariate Technique for Data Analysis Lab**

Course Code: **DSCSEP04**

Offered to: **B.Sc. (MSDS)**

Domain Subject: **Data Science**

Semester – **V**

Type of the Course: **Skill Enhancement Course** (Elective Theory)

Credits: **02**

Max. Marks: **40**

Time : **3 Hrs.**

**Model Paper: Practical**

**Time: Three hours**

**Max. Marks: 40**

**Section A**

One Major Experiment (Experiment No : ) **15 M**

**Section B**

One Minor Experiment (Experiment No : ) **10 M**

**Section C**

Practical Record **05 M**

**Section D**

Viva Voce **10 M**

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Course Code: **DSCCSET05**

Offered to: **B.Sc. (MSDS)**

Domain Subject: **Data Science**

Semester – **V**

Max. Marks: **100** (CCIA: 25+ SEE:75)

Theory Hrs./Week: **3**

Type of the Course: **Skill Enhancement Course** (Elective Theory) Credits: **03**

### **Data and Information Security through Python**

**I. Course Outcomes: Students at the successful completion of the course will be able to:**

**CO1:** Examine and apply the fundamental techniques of computer security.

**CO2:** Identify and explain risk and potential security issues.

**CO3:** Demonstrate responsible computer use as it deals with Cryptographic algorithms.

**CO4:** Applying Digital Signatures for information security/assurance within the organization.

**CO5:** Demonstrate knowledge of security objectives and policy development

### **II. Syllabus:**

**(Total Theory periods: 45)**

#### **Unit -I**

##### **1. Overview of Security**

- 1.1 Protection versus security
- 1.2 Aspects of security
- 1.3 Data integrity
- 1.4 Data availability
- 1.5 Privacy
- 1.6 Security problems
- 1.7 User authentication
- 1.8 Orange Book.

#### **Unit -II**

##### **2. Security Threats**

- 2.1 Program threats
- 2.2 Worms
- 2.3 Viruses
- 2.4 Trojan horse
- 2.5 Trap door
- 2.6 stack and buffer overflow
- 2.7 System threats
- 2.8 Intruders
- 2.9 Communication threats
- 2.10 Tapping and piracy
- 2.11 Denial of Services (DoS)

## Unit -III

### 3. Cryptography

- 3.1 Substitution
- 3.2 Transposition ciphers
- 3.3 Symmetric
- 3.4 key algorithms
- 3.5 Data Encryption Standard
- 3.6 Advanced encryption standards
- 3.7 Public key encryption
- 3.8 RSA
- 3.9 Diffie-Hellman key exchange
- 3.10 ECC cryptography
- 3.11 Message Authentication
- 3.12 MAC & Hash functions.

## Unit -IV

### 4. Digital Signatures

- 4.1 Symmetric key signatures
- 4.2 public key signatures
- 4.3 Message digests
- 4.4 Public key infrastructures.
- 4.5 Firewalls
- 4.6 Kerberos
- 4.7 session hierarchy

## Unit -V

### 5. Security Mechanism

- 5.1 Intrusion detection
- 5.2 Auditing and logging
- 5.3 Tripwire
- 5.4 System
- 5.5 Call monitoring.

### III. Text Books:

1. W. Stallings, Cryptography and Network Security Principles and Practices (4<sup>th</sup> ed.), Prentice – Hall of India, 2006  
[http://uru.ac.in/uruonlinelibrary/Cyber\\_Security/Cryptography\\_and\\_Network\\_Security.pdf](http://uru.ac.in/uruonlinelibrary/Cyber_Security/Cryptography_and_Network_Security.pdf)
2. Behrouz A. Forouzan and Debdeep Mukhopadhyay, “Cryptography & Network Security”, 3rd Edition, TMH.

### References:

1. C. Pfleeger and SL Pfleeger, Security in Computing (3<sup>rd</sup> ed.), Prentice- Hall of India, 2007.
2. D. Gollamann, Computer Security, John Wiley and Sons, Ny, 2002.
3. J. Piwprzyk, T. Hardjono and J. Seberry, Fundamentals of Computer Security, Springer-Verlag Berlin, 2003.
4. J.M. Kizza, Computer Network Security, Springer, 2007
5. M. Merkow and J. Breithaupt, Information Security: Principles and Practices, Pearson Education, 2006.

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Course Code: **DSCCSET05** Offered to: **B.Sc. (MSDS)**  
Domain Subject: **Data Science** Semester – **V**  
Max. Marks: **75** Time: **3 Hrs**  
Type of the Course: **Skill Enhancement Course** (Elective Theory) Credits: **03**

**Data and Information Security through Python**

**SECTION - A**

Answer any **five** of the following:

**5 X 5= 25 MARKS**

1. Explain Data Integrity. (CO1,L2)
2. Explain Intruders in Network Security. (CO2,L2)
3. What is the difference between Private Key and Public Key encryption.(CO3,L2)
4. Briefly Explain Symmetric key Signatures.(CO4,L3)
5. Write a short note on Auditing and logging.(CO5,L2)
6. What is the importance of Digital Signatures.(CO4, L3)
7. Explain Security Mechanisms.(CO5,L2)
8. Discuss Secure hash Algorithm. (CO3,L3)

**SECTION – B**

Answer **all** the following questions

**5 X 10 = 50 MARKS**

9. (a) List and briefly define categories of passive and active security attacks(CO1,L2)  
OR  
(b) List and briefly define categories of security services. (CO1,L3)
10. (a) Explain the different types of threats in security. (CO2,L2)  
OR  
(b) What is information security. Discuss Program threats and system threats.  
(CO2,L3)
11. (a) What is the role of a compression function in a hash function? (CO3,L3)  
OR  
(b) What are three broad categories of applications of public-key cryptosystems  
(CO3,L3)
12. (a) What are some threats associated with a direct digital signature scheme?  
(CO4, L3)  
OR  
(b) What are the properties a digital signature should have? (CO4, L3)
13. (a) Explain Relationship between Security Services and Mechanisms(CO5, L2)  
OR  
(b) Write about Specific Security Mechanisms (CO5, L3)

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Course Code: **DSCCSEP05** Offered to: **B.Sc. (MSDS)**  
Domain Subject: **Data Science** Semester – **V**  
Max. Marks: **50** (CCIA: 10+ SEE: 40) Practical Hrs./Week : **3**

Type of the Course: **Skill Enhancement Course** (Elective, Practical) Credits: 02

**DATA & INFORMATION SECURITY THROUGH PYTHON LAB**

**I. Course Outcomes: Students at the successful completion of the course will be able to:**

Develop and implement Python Programming for encryption and decryption algorithms i.e., DES, MD5 and RSA algorithms

**II: Practical (Laboratory) Syllabus: (30 Periods)**

1. Implement Ceiser Cipher encryption in Python.
2. Implement Ceiser Cipher decryption in Python.
3. Implement Transposition technique encryption in Python.
4. Implement Substitution cipher encryption in Python
5. Implement Substitution cipher decryption in Python.
6. Implement one time Pad cipher in Python.
7. Implement DES encryption in Python.
8. Implement RSA Public Key encryption in Python.

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*College with Potential for Excellence*  
*ISO9001 – 2015 Certified*

Course Code: **DSCCSEP05**  
Domain Subject: **Data Science**  
Max. Marks: **40**

Offered to: **B.Sc. (MSDS)**  
Semester – **V**  
Time : **3 Hrs.**

Type of the Course: **Skill Enhancement Course** (Elective, Practical)

Credits: 02

**DATA & INFORMATION SECURITY THROUGH PYTHON LAB**

**Model Paper: Practical**

**Time: Three hours**

**Max. Marks: 40**

**Section A**

One Major Experiment (Experiment No : )      **15 M**

**Section B**

One Minor Experiment (Experiment No : )      **10 M**

**Section C**

Practical Record      **05 M**

**Section D**

Viva Voce      **10 M**

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Course Code: **DSCSET06**

Offered to: **B.Sc. (MSDS)**

Domain Subject: **Data Science**

Semester – **V**

Max. Marks: **100** (CCIA: 25+ SEE:75)

Theory Hrs./Week: **3**

Type of the Course: **Skill Enhancement Course** (Elective Theory) Credits: **03**

### **Spark Programming**

**I. Course Outcomes: Students at the successful completion of the course will be able to:**

CO1: Understand the architecture of data, layers & Spark libraries

CO2: Analysing the Twitter data

CO3: To learn about Spark Algorithms

CO4: Understand the Supervised machine learning workflows

CO5: Building a fault tolerance, reliable and scalable streaming app

### **II. Syllabus:**

**(Total Theory periods: 45)**

#### **Unit - I**

- 1.1 Setting Up a Spark Virtual Environment
- 1.2 Understanding the architecture of data
- 1.3 Intensive applications
- 1.4 Infrastructure layer
- 1.5 Persistence layer
- 1.6 Integration layer
- 1.7 Analytics layer
- 1.8 Engagement layer
- 1.9 Understanding Spark
- 1.10 Spark libraries
- 1.11 PySpark in action
- 1.12 The Resilient distributed Dataset
- 1.13 Understanding Anaconda

#### **Unit – II**

- 2.1 Building Batch and Streaming Apps with Spark
- 2.2 Architecting data-intensive apps
- 2.3 Processing data at rest
- 2.4 Processing data in motion
- 2.5 Exploring data interactively
- 2.6 Connecting to social networks
- 2.7 Getting Twitter data
- 2.8 Analysing the data
- 2.9 Discovering the anatomy of tweets

### Unit – III

- 3.1 Learning from Data Using Spark
- 3.2 Contextualizing Spark Mllib in the app architecture
- 3.3 Classifying Spark Mllib algorithms
- 3.4 Supervised and unsupervised learning
- 3.5 Additional learning algorithms
- 3.6 Spark Mllib data types

### Unit – IV

- 4.1 Machine learning workflows and data flows
- 4.2 Supervised machine learning workflows
- 4.3 Unsupervised machine learning workflows
- 4.4 Clustering the Twitter dataset
- 4.5 Applying Scikit
- 4.6 Learn on the Twitter dataset
- 4.7 Pre-processing the dataset
- 4.8 Running the clustering algorithm
- 4.9 Evaluating the model and the results
- 4.10 Building machine learning pipelines

### Unit - V

- 5.1 Streaming Live Data with Spark
- 5.2 Laying the foundations of streaming architecture
- 5.3 Spark Streaming inner working
- 5.4 Going under the hood of Spark Streaming
- 5.5 Building in fault tolerance
- 5.6 Processing live data with TCP sockets
- 5.7 Setting up TCP sockets, Processing live data
- 5.8 Manipulating Twitter data in real time
- 5.9 Processing Tweets in real time from the Twitter firehose
- 5.10 Building a reliable and scalable streaming app

### III. Text Books:

1. Spark for Python developers, Amit Nandi, Orielly Publishing,2015.

### Reference Books:

2. Interactive Spark using PySpark, Benjamin Bengfort& Jenny Kim, Orielly.
3. Spark: The Definitive Guide: Big Data Processing Made Simple, 1st Edition  
by Bill Chambers & Matei Zaharia

<https://www.pdfdrive.com/spark-for-python-developers-d158022250.html>



Spark for Python  
Developers (PDFDrive)

#### **IV. RECOMMENDED CO-CURRICULAR ACTIVITIES:**

(Co-curricular activities shall not promote copying from textbook or from others work and shall encourage self/independent and group learning)

##### **A. Measurable**

1. Assignments (in writing and doing forms on the aspects of syllabus content and outside the syllabus content. Shall be individual and challenging)
2. Student seminars (on topics of the syllabus and related aspects (individual activity))
3. Quiz (on topics where the content can be compiled by smaller aspects and data (Individuals or groups as teams))
4. Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual participation and contribution of students shall be ensured (team activity)

##### **B. General**

1. Group Discussion
2. Try to solve MCQ's available online.
3. Others

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Course Code: **DSCSET06**  
Domain Subject: **Data Science**  
**Max.: 75 Marks**

Offered to: **B.Sc. (MSDS)**  
Semester – **V**  
**Time: 3 Hrs.**

Type of the Course: **Skill Enhancement Course** (Elective Theory) Credits: **03**

**Spark Programming**  
**Model Question Paper**

**SECTION – A**

**Answer any Five questions.**

**5X5=25 Marks**

1. Explain the Spark Libraries. (CO1,L2)
2. Why Anaconda is used in Python?(CO1,L2)
3. How to Analyze data in Spark. (CO2,L3)
4. What are the MLlib data types in Spark.(CO3,L2)
5. How to build a machine learning Pipelines. (CO4, L2)
6. How evaluating the model and the result in Spark.(CO4, L2)
7. How to manipulating Twitter data in real time. (CO5, L3)
8. Explain Spark streaming inner working.(CO5, L3)

**SECTION- B**

**Answer all questions.**

**5X10 = 50 Marks**

9. A) Explain the architecture of data-intensive applications in Spark. (CO1,L2)  
OR  
B) What are the applications of Spark.(CO1,L2)
10. A)Data Intensive App Frame work.(CO2,L3)  
OR  
B) Explain the stages in batch and streaming data processing by Spark.(CO2,L3)
11. A) Classifying Spark MLlib Algorithms.(CO3,L2)  
OR  
B) Explain Supervised and Unsupervised Learning Algorithms.(CO3,L2)
12. A) Explain Machine Learning Workflows and Data flows. (CO4, L2)  
OR  
B) How to Apply Scikit-Learn on the Twitter dataset.(CO4, L3)
13. A) Explain the foundations of streaming architecture. (CO5, L3)  
OR  
B) How to Processing live data with TCP sockets. (CO5, L3)

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Course Code: **DSCSEP06**

Offered to: **B.Sc. (MSDS)**

Domain Subject: **Data Science**

Semester – **V**

Max. Marks: **50** (CCIA: 10+ SEE: 40)

Practical Hrs./Week : **3**

Type of the Course: **Skill Enhancement Course** (Elective, Practical)

Credits: **02**

### **SPARK PROGRAMMING LAB**

**I. Course Outcomes: Students at the successful completion of the course will be able to:**

**CO1:** Prepare data sets and write spark programming in python

**CO2:** Apply basic operation required for data analytics in spark

**CO3:** Analyse the streaming process in real time scenario

### **II: Practical (Laboratory) Syllabus: (30 Periods)**

1. To work with Ipython Notebook for a friendlier user experience than the console.
2. Word count of manual script using Pyspark. Create tuple (Count, word) and sort in descending, take top 20 words by frequently.
3. Create a function for histogram of most frequent words. Visualize the most frequent words by plotting them.
4. Create AWS EC2 key pair via the AWS console. (<http://aws.amazon.com/console/>)
5. Create the Python twitter API class and its base methods for authentication, searching and parsing the results. Self. auth gets the credentials from Twitter.
6. Create Python program to call the Meet up API using an authentication token. Retrieve the profile of the meet up members in order to analyse their participation in similar meet up groups.
7. Write a python class that manages to persist data in CSV format and read from a given CSV.
8. Create a Pandas Data frame by reading the parsed tweets saved in a CSV file, on tweet data

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Course Code: **DSCSEP06**

Offered to: **B.Sc. (MSDS)**

Domain Subject: **Data Science**

Semester – **V**

Max. Marks: 40

Time: 3 Hrs.

Type of the Course: **Skill Enhancement Course** (Elective, Practical)

Credits: 02

**SPARK PROGRAMMING LAB**

**Model Paper: Practical**

**Time: Three hours**

**Max. Marks: 40**

**Section A**

One Major Experiment (Experiment No : ) **15 M**

**Section B**

One Minor Experiment (Experiment No : ) **10 M**

**Section C**

Practical Record **05 M**

**Section D**

Viva Voce **10 M**

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Course Code: **SDCCSCP**

Offered to: **B.Sc. (MSDS)**

Domain Subject: **Data Science**

Semester: III

Max. Marks: **50** (CCIA: 10+ SEE: 40)

Practical Hrs./Week : **2**

**Course Prerequisites (if any):** Basics of Python, Linear Equation

**Course Description:** Make the Students to understand Numpy and Pandas.

**Course Objective:**

1. Understand the Numpy Library files.
2. Understand the Pandas Library files.
3. Generates the Random numbers, Statistical Functions.
4. Create and cleaning the data.
5. Data Visualization

**Course Outcomes:** At the end of this course, students should be able to:

CO1: Understand the Array concepts, Statistical functions.(PO5, PO7)

CO2: Implement Vector and Matrix, Statistical functions using Numpy (PO5, PO6, PO7)

CO3: Understand and Implement the Data Frames (PO5, PO7)

CO4: Cleaning the data (PO5, PO6, PO7)

CO5: Visualizing the data (PO5, PO6, PO7)

**List of Experiments**

1. Implement Vector and matrix using Numpy.
2. Implement Statistical functions.
3. Generate Random number using Numpy
4. Creation of Series and Data Frames
5. Importing data, Exporting data, Data selection, Adding Columns and rows
6. Rows to a Data Frame, dropping rows and columns in a Data Frame.
7. Grouping data, Sorting a Data Frame, Binning numerical features, Creating dummy variables.
8. Implement Descriptive Statistics, Accessing elements in series.
9. Data Cleaning: Missing values, Outliers, duplicates, detection and implication. Split-Apply- Combine operators
10. Data Visualization with Pandas for Uni- Variate, Bi-Variate data.

**Recommended book:**

1. *Jake VanderPlas*, “Python Data Science Handbook” by 2<sup>nd</sup> Edition, December 2022, ISBN: 9781098121204, O’Reilly

Reference Books:

1. *Fabio Nelli*, “Python Data Analytics With Pandas NumPy and Matplotlib”, A press.

**Course Delivery method:** Face-to-face / Blended **Course has focus on :** Skill

**Development Websites of Interest :**

1. <https://jakevdp.github.io/PythonDataScienceHandbook/>
2. <https://github.com/jakevdp/PythonDataScienceHandbook>
3. <https://indianpdf.com/python-data-analytics-pdf/>
4. <https://www.hackerearth.com/practice/machine-learning/data-manipulation-visualisation-r-python/tutorial-data-manipulation-numpy-pandas-python/tutorial/>
5. <https://cloudxlab.com/blog/numpy-pandas-introduction/>
6. <https://github.com/PacktPublishing/Hands-On-Data-Analysis-with-NumPy-and-pandas>

**Co-curricular Activities:** Hands on Exercises

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Course Code: **DSCT31B**

Offered to: **B.Sc. (MSDS)**

Domain Subject: **Data Science**

Semester: III

**SEMESTER: III**

**Credits: 4**

**FOUNDATION OF DATA SCIENCE USING R**

**I. Type of the Course: Skill Enhancement Course (Elective Theory)**

**Course Outcomes:** On successful completion of the course, students will be able to do following:

CO1: Able to load data into R and spot problems in data loaded. (PO5, PO7)

CO2: Understand basics of R and control structures in R. (PO5)

CO3: Load data into R objects and manipulate them as needed. (PO5)

CO4: Create and edit visualizations with R (PO7)

CO5: Document and transfer the results and communicate the findings using visualization techniques. (PO5, PO7)

**II. Syllabus**

**(Total Theory Hours: 60)**

**UNIT-I**

**(12 hours)**

**1. Introduction to Data Science**

1.1 Data science process

1.1.1. Roles

1.1.2. Stages in data science project

1.2 Loading data into R:

1.2.1. Working with data from files

1.2.2. Working with relational databases

1.3 Exploring data

1.3.1. Using summary statistics to spot problems

1.3.2. Spotting problems using graphics and visualization

1.4 Managing data

1.4.1. Cleaning

1.4.2. Sampling for modelling and Validation

**UNIT-II**

**(12 hours)**

**2. Introduction to R and getting started with R**

2.1. What is R? Why R?

2.2. Advantages of R over other programming languages

2.3. Data types in R - logical, numeric, integer, character, double

2.4. Complex, raw

2.5. Coercion, ls () command

2.5. Expressions, Variables and functions, control structures

2.6. Array, Matrix, Vectors, Factors, R packages

**UNIT-III**

**(12 hours)**

**3. Exploring data in R**

3.1. Data frames-data frame access, ordering data frames

3.2. R functions for data frames -

- dim(), nrow(), ncol(), str(), summary(), names(), head(), tail(), edit()
- 3.3. Load data frames—reading from .CSV files
- 3.4. Sub setting data frames, reading from tab separated value files
- 3.5. Reading from tables, merging data frames

#### **UNIT-IV**

**(12 hours)**

#### **4. Data Visualization using R**

- 4.1. Reading and getting data into R (External Data), Using CSV files
- 4.2. XML files, Web Data, JSON files, Databases, Excel files
- 4.3. Working with R Charts and Graphs:  
Histograms, Boxplots, Bar Charts, Line Graphs, Scatterplots, Pie Chart

#### **UNIT-V**

**(12 hours)**

#### **5. Delivering Results**

- 5.1 Displaying multivariate data
- 5.2 Plot () function
- 5.3 Matrix plots
- 5.4 Multiple plots in one window
- 5.5 Exporting graph
- 5.6 using graphics parameters

#### **III. TEXT BOOKS:**

1. Nina Zumel, John Mount, “Practical Data Science with R”, Manning Publications, 2014.(UNIT I)
2. Seema Acharya--Data Analytics using R, McGraw Hill education (India) Private Limited. (UNIT II,III,IV).
3. Mark Gardener, “Beginning R - The Statistical Programming Language”, John Wiley & Sons, Inc., 2012.(UNIT V)

#### **Reference Books:**

1. An Introduction to R, Notes on R: A Programming Environment for Data Analysis and Graphics. W. N. Venables, D.M. Smith and the R Development Core Team

#### **Websites of References:**

- [https://nbisweden.github.io/workshop-r/2011/slide\\_elements\\_1.pdf](https://nbisweden.github.io/workshop-r/2011/slide_elements_1.pdf)
- <https://www.guru99.com/r-tutorial.html>
- <https://www.javatpoint.com/r-tutorial>
- [https://cran.r-project.org/doc/contrib/Paradis-rdebuts\\_en.pdf](https://cran.r-project.org/doc/contrib/Paradis-rdebuts_en.pdf)

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Course Code: **DSCT31B**  
Domain Subject: **Data Science**  
**SEMESTER: III**

Offered to: **B.Sc. (MSDS)**  
Semester: **III**  
Credits: **4**

**FOUNDATION OF DATA SCIENCE USING R**

**Max Marks: 75**

**Time: 3 Hrs.**

**SECTION – A**

**Short Answer Questions**

**(Total: 5 x 5 = 25 Marks)**

**Answer any five questions**

1. List and explain the roles in a data science project. (CO1, L4)
2. Explain `ls ()` command in R. (CO2, L2)
3. Write about the control structures in R with examples. (CO2, L1)
4. Develop R script to load data into data frames from files. (CO3, L6)
5. Write a short note on charts. (CO4, L1)
6. Develop bar chart in R. (CO4, L6)
7. Write about the `plot ()` function in R. (CO5, L1)
8. Explain about Multiple plots in one window. (CO5, L2)

**SECTION B**

**Answer all questions**

**(Total: 5 x 10 = 50 Marks)**

9. A) List different stages of the Data Science Project and explain them. (CO1, L1)  
(OR)  
B) What are the various problems encountered when using data summaries? (CO1, L1)
10. A) Write about the Data types in R Explain with examples. (CO2, L1)  
(OR)  
B) Construct a Vector in R and explain various operations on it. (CO2, L3)
11. A) What are the data frames? Write its significance in R-Language. (CO3, L1)  
(OR)  
B) Demonstrate various functions used in data frames. (CO3, L2)
12. A) Build code in R for reading and getting data into R from databases. (CO4, L6)  
(OR)  
B) Develop any four plots in R. (CO4, L6)
13. A) Develop a matrix plot and explain it. (CO5, L3)  
(OR)  
B) Explain about exploring graphs. (CO5, L2)

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Course Code: **DSCP31B**  
Domain Subject: **Data Science**  
**SEMESTER: III**

Offered to: **B.Sc. (MSDS)**  
Semester: **III**  
Credits: **1**

## **FOUNDATION OF DATA SCIENCE USING R LAB**

### **PRACTICAL SYLLABUS**

#### **I. Type of the Course: Skill Enhancement Course (Elective, Practical)**

**Course Outcomes:** At the end of this course, students should be able to:

CO1: Implement simple scripts or programs in R.(PO5)

CO2: Access online resources for R and import new function packages into the R workspace.  
(PO5, PO7)

CO3: Import, review, manipulate and summarize data-sets in R (PO5, PO7)

CO4: Explore data-sets to create testable hypotheses and identify appropriate statistical tests.  
(PO5, PO7)

CO5: Create and edit visualizations with R. (PO5, PO7)

#### **II: Practical (Laboratory) Syllabus:**

**(30 Hours)**

1. Create a vector in R and perform operations on it (arithmetic operations, combining vectors, retrieving elements of vector, assign names to vector elements).
2. Create integer, complex, logical, character data type objects in R and print their values and their class using print and class functions.
3. Create a matrix of values in R and extract data from matrix. (Ex. Second row third etc) Find transpose of matrix and combine two matrices using Rbind and Cbind functions.
4. Create a list in R and perform operations on it like list slicing, sum and mean functions, Head and tail functions and finally delete list using rm() function.
5. Create data frame in R and perform operations on it
6. Write code in R to find out whether a number is prime or not.
7. Print numbers from 1 to 100 using while loop and for loop in R.
8. Find the factorial of a number using recursion in R.
9. Perform arithmetic operations in R using switch case
10. Write a code in R to find out whether the number is Armstrong or not.
11. Program to find Multiplication table from 1 to 10 number input by user.
12. Import data into R from text and excel files using read.table() and read.csv() function.
13. Create a dataset and draw different types of graphics using plot, box plot, histogram, pair plot functions.
14. Create a dataset and draw different types of graphs using bar charts, pie chart functions.
15. Create custom contingency in R and perform operations on it.

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<b>COMPUTER SCIENCE</b>	<b>AMLT31</b>	<b>2022 - 2023</b>	<b>B.Sc. (AI &amp; ML)</b>
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**SEMESTER – III**

**Credits – 4**

**Introduction to Artificial Intelligence**

**Total: 60 Prds.**

**Course Objective:**

The objective of this course is to educate students in basic Artificial Intelligence concepts and provide insights of solving problems using AI. This course also aims to educate students in basics of practical natural language processing and robotics.

**Course Outcomes:**

<b>COURSE OUTCOME NO</b>	Upon successful completion of this course, students should have the knowledge and skills to:	<b>PROGRAM OUTCOME NO</b>
CO1	Understand the need of AI and generic Search Techniques.	PO5, PO7
CO <sub>2</sub>	Understand Different Search Methods.	PO5, PO7
CO <sub>3</sub>	Gain knowledge about learning Gaming Theory	PO5, PO7
CO <sub>4</sub>	Learn the knowledge representation and reasoning	PO5, PO7
CO <sub>5</sub>	Gain knowledge about machine learning process	PO5, PO7

**Unit- I : Artificial Intelligence**

**12 prds**

Introduction: Artificial Intelligence –Historical Backdrop – What is Intelligence? – The Turing Test – Topics in AI.-State Space Search – Generate and Test – Graph Search – Generic Search Algorithm - Depth First Search (DFS) – Breadth First Search(BFS) – Iterative Deepening – Uniform cost Search – Bidirectional Search.

**Unit-II Problem Solving using Search**

**12 Prds**

Heuristic Search –Heuristic Functions – Heuristics and AI –Problem Relaxation – Admissible Heuristics – Dominance – Composite Heuristics – Consistent Heuristics - Informed Search Heuristic Search – Types of Heuristic Search – BFS – A\* Algorithm – Local Search – Hill

Climbing – Simulated Annealing – Constraint Satisfaction Problems – N-queens Problem – Varieties of CSP – Backtracking Search – Strategies – AND-OR Graph – AO\* Algorithm.

### **Unit-III Game Play**

**12 prds**

Introduction – Grundy’s Game – Game Trees – Minimax – Tic-Tac-Toe – Minimax – Alpha-beta Pruning - Planning – Forward State Space Planning – Backwards State Space Planning – Goal Stack Planning – Plan Space Planning – A Unified Framework for Planning.

### **Unit-IV Knowledge Representation**

**12 prds**

Introduction – Logic for KR – Propositional Logic – First Order Logic – Inference of first order Logic – Answer Extraction – Reasoning with uncertainty – Bayesian Network – Decision Network – Fuzzy Reasoning – Sequential Decision Problems.

### **Unit-V Machine Learning**

**12 Prds**

Introduction – Decision Tree –Linear Regression - Support Vector Machine – Unsupervised Learning – Reinforcement Learning – Introduction to Neural Network – Introduction to Deep Learning

### **TEXT BOOKS**

Stuart Russell, Peter Norvig: “Artificial Intelligence: A Modern Approach”,7<sup>th</sup> Edition, Pearson Education, 2007

### **REFERENCES**

1. Artificial Neural Networks B. YagnaNarayana, PHI
2. Artificial Intelligence , 2nd Edition, E.Rich and K.Knight (TMH).
3. Artificial Intelligence and Expert Systems – Patterson PHI.
4. Expert Systems: Principles and Programming- Fourth Edn, Giarrantana/ Riley, Thomson.
5. PROLOG Programming for Artificial Intelligence. Ivan Bratka- Third Edition – PearsonEducation.
6. Neural Networks Simon Haykin PHI

### **Web Resources:**

[https://onlinecourses.nptel.ac.in/noc22\\_ge29/preview](https://onlinecourses.nptel.ac.in/noc22_ge29/preview)

[https://onlinecourses.swayam2.ac.in/aic20\\_sp06/preview](https://onlinecourses.swayam2.ac.in/aic20_sp06/preview)

[https://onlinecourses.swayam2.ac.in/arp19\\_ap79/preview](https://onlinecourses.swayam2.ac.in/arp19_ap79/preview)

### **Recommended Co – Curricular Activities:**

(Co-curricular activities shall not promote copying from textbook or from others work and shall encourage self/independent and group learning)

#### **A: Measurable**

1. Assignments (in writing and doing forms on the aspects of syllabus content and outside the syllabus content. Shall be individual and challenging)
2. Student seminars (on topics of the syllabus and related aspects (individual activity))
3. Quiz (on topics where the content can be compiled by smaller aspects and data (Individuals or groups as teams))
4. Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual participation and contribution of students shall be ensured (team activity))

#### **B: General**

1. Group Discussion
2. Others

**RECOMMENDED CONTINUOUS ASSESSMENT METHODS:**

Some of the following suggested assessment methodologies could be adopted;

1. The oral and written examinations (Scheduled and surprise tests),
2. Closed-book and open-book tests,
3. Programming exercises,
4. Practical assignments and laboratory reports,
5. Observation of practical skills,
6. Individual and group project reports.
7. Efficient delivery using seminar presentations,
8. Viva voce interviews.
9. Computerized adaptive testing, literature surveys and evaluations,
10. Peers and self-assessment, outputs form individual and collaborative work.

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**TITLE: Introduction to Artificial Intelligence**

**COURSE CODE: AML31**

**CLASS: B.Sc. (AI & ML)**

**Max.Marks:75M**

**Semester III**

**Section-A**

**Answer any FIVE questions.**

**5 X 5=25M**

1. Explain in detail the applications of Artificial Intelligence.
2. Design perceptrons for AND and NOT boolean functions.
3. Explain the syntax and semantics of propositional logic.
4. Discuss A\* algorithm in detail.
5. Discuss categorization of intelligent systems.
6. Compare Fuzzy logic with traditional logic.
7. Solve the water-jug problem by writing the production rules.
8. Explain about certainty factor theory

**Section-B**

**Answer ALL questions.**

**10 X 5 = 50M.**

9. (a). Explain about Tic-Tac-Toe game problem by assuming one player is X the other one can be either human or a computer by taking 3X3 grid space.  
Or  
(b) Explain Multi layer perceptron( MLP ) with back propagation with schematic block diagram.
10. (a) What is Inference Engine? Describe Backward and Forward chaining mechanism used by an inference engine?  
or  
(b) Explain the forward-chaining algorithm for propositional logic
11. (a) Describe the mathematical model of perceptron with example  
OR  
(b) Explain about Extended semantic networks for KR
12. (a) Explain about hill climbing heuristic search technique.  
or  
(b) Write a short note on Bayesian networks?
13. (a) Describe case based reasoning and learning.  
or  
(b) What is machine learning? Differentiate between supervised learning and unsupervised learning

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COMPUTER SCIENCE	AML31	2022 - 2023	B.Sc. (AI & ML)
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**SEMESTER – III**

**Credits – 2**

**Artificial Intelligence Lab**

**Total: 30 Periods.**

**Course Objective:**

The objective of this course is to enable students to analyse various AI related problems and develop a solution using Python programming language.

**Course Outcomes:**

<b>COURSE OUTCOME NO</b>		<b>PROGRAM OUTCOME NO</b>
	Upon successful completion of this course, students should have the knowledge and skills to:	
CO1	Develop various basic python programs.	PO5, PO7
CO <sub>2</sub>	Analyse and develop solutions for various problems like water jug, Tic – Tack – Toe, etc.	PO5, PO7
CO <sub>3</sub>	Develop programs using DFS, BFS, A* and hill climbing algorithms.	PO5, PO7
CO <sub>4</sub>	Develop python programs for analysing given data set.	PO5, PO7
CO <sub>5</sub>	Develop python programs for implementing Bayes Classification.	PO5, PO7

**Lab List**

1. Basic Programs in Python.
2. Program implementing list , Vector.
3. Program implementing Matrix and Array.
4. Write a Program to Implement Breadth First Search using Python.
5. Write a Program to Implement Depth First Search using Python.
6. Write a Program to Implement Tic-Tac-Toe game using Python.
7. Write a Program to Implement 8-Puzzle problem using Python.
8. Write a Program to Implement Water-Jug problem using Python.
9. Write a Program to Implement Tower of Hanoi using Python.
10. Write a Program to Implement N-Queens Problem using Python.

11. Develop Python code for Mini-max algorithm.
12. Develop Python for Implementing Grundy's Game
13. Write a Program to Implement 8-Puzzle problem using A\* algorithm.
- 14.** Write a program to implement alpha-beta pruning algorithm.

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**SEMESTER III**

**Credits:4**

**Total: 60 Periods**

**Document Oriented Databases**

**Course Objective:**

- To educate student regarding databases and how to manage databases.
- To handle the large amount of data handling demands of business
- To implement a data store that provides high performance, high availability, and automatic scaling
- To Process an immense diversity of data that needs to be stored and processed.
- To make use of features and functionalities to work on NO SQL Data Base Mongo DB

<b>COURSE OUTCOME NO</b>	Upon successful completion of this course, students should have the knowledge and skills to:	<b>PROGRAM OUTCOME NO</b>
CO1	Have knowledge about database and DBMS Architecture	PO5, PO7
CO2	Able to know No SQL databases, various features of Mongo DB, the installation procedure, and how to interact with MongoDB.	PO5, PO7
CO3	Able to work on Mongo DB's rich query language to support create, read, update, and delete (CRUD) operations.	PO5, PO7
CO4	Analyses the aggregation framework to perform aggregation operations.	PO5, PO7
CO5	Able to work on indexes, types of index, index properties, and the various indexing strategies to be considered. Indexes are used to improve the performance of a query.	PO5, PO7

**Unit –I**

**12periods**

**Overview of Database Management Systems:**

Introduction to Data, information, data vs. information –database and DBMS Role and advantages of DBMS – types of databases –problems with file system data management.

**Data Models:**



The importance of Data models –The evolution of Data Models-Degrees of data abstraction  
Introduction to Sql-Data Definition Commands – Data Types - Creating Table Structures -  
advanced data definition commands - alter – drop

## **Unit-II**

**12 periods**

Entity Super types and Subtypes- Specialization and Generalization -entity integrity -  
selecting primary keys - Natural Keys and Primary Keys - Primary Key Guidelines - The  
need for normalization – The normalization process – converting to first normal form –  
conversion to second normal form – conversion to third normal form – higher level normal  
forms.

SQL Constraints Adding Table Rows Saving Table Changes - Updating Table Rows -  
Restoring Table Contents - Deleting Table Rows

## **Unit – III**

**12 Periods**

### **Data Manipulation Language:**

**Select Queries:** Selecting Rows with Conditional Restrictions – operators - advanced select  
queries – virtual tables – joining database tables – sub queries – SQL functions

Mongo DB Features and Installation, The Need for No SQL Databases, What Are No SQL  
Databases?

CAP Theorem, BASE Approach, Types of NoSQL Databases, Mongo DB Features,  
Document Database

Mongo DB Is Schema less Mongo DB Uses BSON, Rich Query Language, Aggregation  
Framework

Indexing, Grid FS, Replication, Sharing The mongo Shell , Terms Used in Mongo DB, Data  
Types in Mongo DB, Working with Database Commands, Create Database, Drop Database ,  
Display List of Databases, Display the Version of Mongo DB, Display a List of Commands

## **Unit IV**

**12 Periods**

Mongo DB CRUD Operations, Collections, Create a Collection, Create Capped  
Collections, Create Operations, Insert Documents, Read Operations, Query Documents,  
Update Operations, Update Documents, Delete Operations, Delete Documents, Working  
with Arrays, Working with Arrays, Query for Null or Missing Fields, To Query Null or  
Missing Fields, Working with the limit() and skip() Methods, limit() and skip() Methods

## **Unit V**

**12 Periods**

Data Modelling and Aggregation, Data Models, Embedded Data Models, Normalized Data  
Models

Data Model Relationship Between Documents, Data Model Using an Embedded Document,  
Data Model Using Document References, SQL Aggregation Terms and Corresponding  
Mongo DB, Aggregation Operators, Matching SQL Aggregation to Mongo DB, Aggregation  
Operations .

**Text Book:**

1. “Fundamentals of Database Systems” by R. Elmasri and S.Navathe
2. “Database System Concepts” by Abraham Silberschatz, Henry Korth, and S. Sudarshan, Mc Grawhill, 2010.
3. Mongo DB Recipes: With Data Modeling and Query Building Strategies By Subhashini Chellappan, Dharanitharan Ganesan ,Publisher : Apress

**Reference Book:**

1. “Database Management Systems” by Raghu Ramakrishnan, NcGrawhill,2002
2. “Principles of Database Systems” by J.D.Ullman
3. Mongo DB Basics 1st ed. Edition ,by [Peter Membrey](#) (Author) Publisher **Apress** :Web Resources

**Web Links:**

1. <https://docs.mongodb.com/manual/tutorial/getting-started>
2. <https://www.tutorialspoint.com/mongodb/index.htm>

**Recommended Co – Curricular Activities:****A. Measurable**

1. Assignments (in writing and doing forms on the aspects of syllabus content and outside the syllabus content. Shall be individual and challenging)
2. Student seminars (on topics of the syllabus and related aspects (individual activity))
3. Quiz (on topics where the content can be compiled by smaller aspects and data (Individuals or groups as teams))
4. Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual participation and contribution of students shall be ensured (team activity))

**B. General**

1. Group Discussion
2. Others

**RECOMMENDED CONTINUOUS ASSESSMENT METHODS:**

1. Programming exercises,
2. Practical assignments and laboratory reports,
3. Observation of practical skills,
4. Individual and group project reports.
5. Efficient delivery using seminar presentations,
6. Viva voce interviews.
7. Computerized adaptive testing, literature surveys and evaluations,
8. Peers and self-assessment, outputs form individual and collaborative work.

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**TITLE: Document Oriented Databases**

**COURSE CODE: AMLT32**  
**CLASS: B.Sc. (AI & ML)**

**Max.Marks:75M**  
**Semester III**

**Section-A**

**Answer any FIVE questions.**

**5 X 5=25M**

1. How dependency preservation can be achieved?
2. Write about the usability of ‘group by’ and ‘having’ clauses in SQL.
3. Drop Database() Method
4. Explain any four SQL Aggregate operators with an example.
5. Advantages of Mongo DB over RDBMS
6. The pretty() Method
7. List out set operators can be used in SQL?
8. Differentiate File systems from DBMS.

**Section-B**

**Answer ALL questions.**

**10 X 5 = 50M.**

9. (a) Explain the architecture of DBMS with a neat sketch.  
Or  
(b) Compare and contrast various Data Models
10. (a) Explain BCNF and the properties of decompositions  
Or  
(b) Briefly Explain about Mongo DB Data types
11. (a) Explain about Mongo DB Replication  
Or  
(b) Some considerations while designing Schema in Mongo DB
12. (a) Write any three data base applications with their functionalities.  
Or  
(b) Explain FOURTH and THIRD normal forms with examples.
13. (a) Elaborate the importance of computing closure of functional dependencies.  
Explain the procedure with an example.  
Or  
(b) Explain the Limit () Method
14. (a) What is the utilisation of Mongo DB Aggregation  
Or  
(b) List out any four operations on relational algebra. Explain.

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Course Code: AMLP32

Domain Subject: **COMPUTER SCIENCE**

Max. Marks: **50**(CCIA:10+SEE:40)

Offered to: **II B.Sc(AI & ML)**

Semester:**III**

Practical Hrs./Week:**2**

**Credits:2**

**Document Oriented Databases LAB**

**Course Objective:**

The objective of this course is to enable student to implement database related queries using Mongo DB.

<b>COURSE OUTCOME NO</b>	<b>UPON SUCCESSFUL COMPLETION OF THIS COURSE, STUDENTS SHOULD HAVE THE KNOWLEDGE AND SKILLS TO:</b>	<b>PROGRAM OUTCOME NO</b>
CO1	Familiarity of the Database Structures	PO5, PO7
CO2	DDL, DML commands and Query execution	PO5, PO7
CO3	Installation of mongo db ,configuring, running mongo db	PO5, PO7
CO4	Implementation of crud operations	PO5, PO7
CO5	Implementing multiple document transactions in mongo db	PO5, PO7

WEEK 1: Introduction to Database. Environment of Oracle / MySQL

Week 2: Creating the database with DDL Commands CRUD Operations

Week 3: Working with Queries

Week 4: Relationship among tables and queries

Week 5: Installation of Mongo db

Week 6: Difference between SQL and NOSQL.

Week 7: Creating Database structure in Mongo db

Week 8: CRUD Operations in Mongo db

Week 9: CRUD Operations in Mongo db

Week 10: Implement Aggregation in Mongo db

Week 11: Implement different functions in Mongo db

Week 12: Implement different functions in Mongo db

Week 13: Identifying the data storage in SQL and NOSQL

Week 14: Working with CaseStudy1

Week 15: Working with CaseStudy2

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**DEPARTMENT OF ECONOMICS**

Minutes of **Board of Studies in Economics** meeting held on **12-08-2022 at 11:00** am in the Department of Economics for **ODD SEMESTER** of 2022-2023 academic year.

**Members Present**

<b>S.No</b>	<b>Name of the Member</b>	<b>Designation</b>	<b>Signature</b>
1.	<b>Dr. Ch. Surya Prakasa Rao</b>	Chairman	
2.	<b>Dr. B. Narayana Rao</b>	University Nominee	
3.	<b>Prof. B. Nageswara Rao</b>	Subject Expert	
4.	<b>Prof. T.Koti Reddy</b>	Subject Expert	
5.	<b>Sri V. Keshava Rao</b>	Industrialist	
6.	<b>Smt. Ch. V. R. Kusuma</b>	Member	

DEPARTMENT OF ECONOMICS							
LIST OF THE COURSES REVISED/ INTRODUCED IN V/VI SEMESTERS -2022-23							
S.NO	TITLE OF THE COURSE	Course Code	Offered in SEM	Type of the Paper	Year of Introduction	OBE with BTL	Offered to
1	Third internship / Project Work / On the Job Training / Apprenticeship	ECOCIAP5	V	CORE PROJECT	2022-23	YES	B.A.(E.M.S)
2	Rural Entrepreneurship	ECOSET01	VI	SEC ELECTIVE A	2022-23	YES	B.A.(E.M.S)
3	Farmer Producer Organizations (FPOs)	ECOSET02					B.A.(E.M.S)
4	Urban Entrepreneurship and MSMEs	ECOSET03	VI	SEC ELECTIVE B	2022-23	YES	B.A.(E.M.S)
5	Retail and Digital Marketing	ECOSET04					B.A.(E.M.S)
6	Insurance Services	ECOSET05	VI	SEC ELECTIVE C	2022-23	YES	B.A.(E.M.S)
7	Banking and Financial Services	ECOSET06					B.A.(E.M.S)
8	Inferential Statistics and Software Packages	ECOSET07	VI	SEC ELECTIVE D	2022-23	YES	B.A.(E.M.S)
9	Project Designing and Report Writing	ECOSET08					B.A.(E.M.S)

## Resolutions

The following resolutions are approved by The Board of studies in Economics, held on 12-8-2022 at 11.00 am in the Department of Economics for Odd Semester of 2022-23 recommend to Academic council for its approval.

1. It is resolved and recommend to introduce Rural Entrepreneurship with course code ECOSET01 in VI semester of B.A(EMS) for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 4 to 8.
2. It is resolved and recommend to introduce Farmer Producer Organizations (FPOs) with course code ECOSET02 in VI semester of B.A(EMS) for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 9 to 13.
3. It is resolved and recommend to introduce Urban Entrepreneurship and MSMEs with course code ECOSET03 in VI semester of B.A(EMS) for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 14 to 18.
4. It is resolved and recommend to introduce Retail and Digital Marketing with course code ECOSET04 in VI semester of B.A(EMS) for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 19 to 23.

5. It is resolved and recommend to introduce **Insurance Services** with course code **ECOSET05** in VI semester of B.A(EMS) for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 24 to 28.
6. It is resolved and recommend to introduce **Banking and Financial Services** with course code **ECOSET06** in VI semester of B.A(EMS) for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 29 to 32.
7. It is resolved and recommend to introduce **Inferential Statistics and Software Packages** with course code **ECOSET07** in VI semester of B.A(EMS) for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 33to 37.
8. It is resolved and recommend to introduce **Project Designing and Report Writing** with course code **ECOSET08** in VI semester of B.A(EMS) for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 38 to 42.
9. It is resolved to permit the III BA students to do **Third internship / Project Work / On the Job Training / Apprenticeship** for 90 days / 720 hrs in V / VI semester.

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**P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE  
VIJAYAWADA – 10.**

**Three-Year B.A (EMS)**

Course Code: **ECOSET01**

Domain Subject: **ECONOMICS**

III Year B.A.-Semester-V

Max Marks: 100

**Course 6A: Rural Entrepreneurship**  
(Skill Enhancement Course (Elective, 4 Credits))

**I. Learning Outcomes:**

Students at the successful completion of the course shall be able to:

1. Explain the basic theories and essentials of entrepreneurship;
2. Identify and analyze the entrepreneurship opportunities available in local rural area;
3. Apply the theories of entrepreneurship to the conditions of local rural area and formulate appropriate business ideas;
4. Demonstrate practical skills that will enable them to start rural entrepreneurship.

**II. Syllabus:** (Hours: Teaching: 60, Training: 10, Others Including Unit

Tests: 05)

**Unit - 1: Entrepreneurship: Concept and Theories**

Concept and Importance of Entrepreneurship - Theories of Entrepreneurship: Innovations, X-Efficiency, Risk Bearing - Qualities and Functions of an Entrepreneur – Women Entrepreneurship – Ecopreneurship.

**Unit - 2: Rural Entrepreneurship, Business Planning and Agribusiness**

Rural Entrepreneurial Ecosystem - Factors affecting Rural Entrepreneurships - Process of Identification of new Entrepreneurship Opportunities in Rural Areas - Formulation of Business Planning for Rural Entrepreneurship - Problems and Challenges to Rural Entrepreneurship - Agribusiness and Value Addition: Procuring, Processing, Storing, and Marketing.

**Unit - 3: New Rural Entrepreneurship Opportunities**

New Entrepreneurship Opportunities in Farm sector: Organic Farm Products, Nutri-Cereals, Horticultural Products, Forest Produce, Medicinal Plant Products - New Entrepreneurship Opportunities in Rural Non-farm sector: Poultry, Aquaculture, Sericulture, Honeybee, Mushrooms Cultivation - New Entrepreneurship Opportunities in Rural Services: Micro Finance, Handicrafts, Custom Hiring Machines, Cold Storages.



#### **Unit - 4: Financing and Marketing for Rural Entrepreneurship**

Financing the Rural Entrepreneurship: Procedures to obtain formal loans from banks and other institutions - Preparation of Detailed Project Report for Loan - New avenues of Finance: Crowd Funding and Venture Capital - Marketing of Rural Products: Market Survey, Demand Forecasting, Marketing Strategies, Branding, Planning and Promotion, Digital and Social Media Marketing.

#### **Unit - 5: Institutional Support and Case Studies of Rural Entrepreneurship**

Intutional Support for Rural Entrepreneurship - Special Role of NABARD in promoting and supporting the Rural Entrepreneurship - Government Schemes for promotion of Rural Entrepreneurship and their important features – Rules and Procedures to start a Rural Entrepreneurship Firm – Discussion of two different types of Case Studies related to Rural Entrepreneurship with local relevance.

### **III. References:**

1. Gordona, E and N. Natarajan: *Entrepreneurship Development*, Himalaya Publishing House Pvt Ltd, Mumbai, 2017.
2. Sudhir Sharma, Singh Balraj, SinghalSandeep, *Entrepreneurship Development*, Wisdom Publications, Delhi, 2005.
3. Drucker, P., *Innovation and Entrepreneurship: Practice and Principles*, Harper & Row, New York, 1985; revised edn., Butterworth-Heinemann, Oxford, 1999.
4. National Council of Rural Institute (NCRI): Curriculum for Rural Entrepreneurship, 2019.  
<http://www.mgncre.org/pdf/Rural%20Entrepreneurship%20Material.pdf>
5. NITI Aayog: *Report of Expert Committee on Innovation and Entrepreneurship*, New Delhi, 2015.  
[https://niti.gov.in/writereaddata/files/new\\_initiatives/report-of-the-expert-committee.pdf](https://niti.gov.in/writereaddata/files/new_initiatives/report-of-the-expert-committee.pdf)
6. VardhamanMahavir Open Unversity, *Entrepreneurship Development & Small Scale Business*, Kota. <http://assets.vmou.ac.in/BBA12.pdf>
7. MANAGE: *Agri-Business and Entrepreneurship Development*, Course Material AEM-202, 2013.  
<https://www.manage.gov.in/pgdaem/studymaterial/aem202.pdf>
8. NABARD: *Model Bankable Farming on Hi-Tech Agriculture, Green Farming*, 2015.

[https://www.nabard.org/demo/auth/writereaddata/ModelBankProject/1612162301Precision farming for vegetable cultivation in Kerala \(E\).pdf](https://www.nabard.org/demo/auth/writereaddata/ModelBankProject/1612162301Precision%20farming%20for%20vegetable%20cultivation%20in%20Kerala%20(E).pdf)

9. JohanneHanko:*A Handbook for Training of Disabled on Rural Enterprise Development*, Food and Agricultural Organisation (FAO), 2003. <http://www.fao.org/3/ad453e/ad453e.pdf>
- 10.IGNOU: *Marketing for Managers*, New Delhi. <http://egyankosh.ac.in/handle/123456789/4271>
- 11.[www.nirdpr.org](http://www.nirdpr.org)
- 12.<https://www.nabard.org/>
- 13.<http://sfacindia.com/>
- 14.Other Relevant web resources suggested by the teacher and college librarian

#### **IV. Co-Curricular Activities: (Lecturer Participation: Total 10 Hours)**

##### 1. For Teachers:

- Presentation of audio-video or print material to demonstrate the practical ground level activities of a rural entrepreneur so as to encourage the students to develop their own rural entrepreneurship ideas
- Conducting activities like brainstorming sessions, group discussions, student seminars, role play etc., for generating ideas and plans.
- Organize guest lectures and interactions with successful real rural entrepreneurs in the local area to discuss ideas and plans and preparation of DPRs
- Arranging interaction sessions or workshops with officers of relevant government department and financial institutions to work on specific proposals
- Engage the students in field work to study the successful rural entrepreneurs in the local area and gain working knowledge

##### 2. For Students:

- Students shall actively participate in the above co-curricular activities and gain practical knowledge, understanding, ideas and skills related to the subject.
- Students shall participate in field work, collect data, analyze, and make a report and present it in the class.

##### 3. Suggested Field Work Report Format:

Title Page, Student Details, Acknowledgments, Index of Contents;  
*Objectives, Step-wise process, Findings, Conclusion & References*

##### 4. Max Marks for Field Work Report: 05

##### 5. Unit Tests/Internal Examinations

**Note:** For the latest topics which have no formal material available, the teacher is expected to prepare own material by using multiple latest sources and practical knowledge.

Section - A

Answer any FIVE of the following.

5x5=25M

1. Write about women Entrepreneurship  
మహిళా వ్యవస్థాపకత్వము గూర్చివ్రాయుము.
2. Explain the concept of Processing  
ప్రోసెసింగ్ భావనను వివరింపుము
3. Write about Mushrooms cultivation  
పుట్టగొడుగుల వ్యవసాయమును గూర్చి వ్రాయుము
4. Write about Aquaculture  
అక్వాకల్చర్ గూర్చి వ్రాయుము
5. Explain the concept of Venture capital  
వెంచర్ మూలధనము భావనను వివరింపుము
6. Explain the concept of social media marketing  
సామాజిక మాధ్యమాల మార్కెటింగ్ భావనను వివరింపుము
7. What are the rules to about rural form  
గ్రామీణ సంస్థ ఏర్పాటుకు ఉన్న నియమాలు ఏవి?
8. NABARD  
జాతీయ గ్రామీణ మరియు అభివృద్ధి (నాబార్డ్) విధులు ఏవి?

Section - B

Answer the following.

5x10=50M

9. A) What is entrepreneurship and explain the importance of entrepreneurship  
ఉద్యమిత్వము అనగానేమి? ఉద్యమత్వ ప్రాధాన్యతను వివరింపుము

Or

- B) Explain the qualities and functions of an entrepreneurship  
ఉద్యమిత్వ గుణాలు మరియు విధులను వివరింపుము మరియు సవాళ్ళను వివరింపుము

10. A) Explain the problems and challenges of rural entrepreneurs.  
గ్రామీణ వ్యవస్థాపకత్వములో ఉన్న సమస్యలు మరియు సవాళ్ళను వివరింపుము

Or

- B) Explain the process of identification of new entrepreneurship opportunities in Rural Areas.

గ్రామీణ ప్రాంతాలలో నూతన వ్యవస్థాపకత్వ అవకాశాలను గుర్తించే ప్రక్రియను వివరింపుము.

11. A) Write about the different new entrepreneurs opportunities in Form section.  
వ్యవసాయ రంగంలో వివిధ నూతన వ్యవస్థాపన అవకాశాలను గూర్చి వ్రాయుము

Or

B) Write about the different New entrepreneurs opportunities in Rural Non-farm sectors.

గ్రామీణ వ్యవసాయేతర రంగాలలో నూతన వ్యవస్థాపన అలకాలను గూర్చి వ్రాయుము.

12. A) Explain the procedures to obtain formal loans from banks and other institutions..  
బ్యాంకులు మరియు ఇతర సంస్థల దగ్గర నుండి ఋణము పొందే ప్రక్రియను వివరింపుము.

Or

B) Explain the different steps in marketing of Rural Products.

గ్రామీణ ఉత్పత్తులను మార్కెట్లో వున్న వివిధ దశలను వివరింపుము.

13. A) Explain the role of NABAB in promotes rural entrepreneurs

గ్రామీణ వ్యవస్థాపనను ప్రోత్సహించడంలో నాబార్డ్ పాత్రను వివరింపుము

Or

B) Write about the different government schemes for promotion of Rural entrepreneurs

గ్రామీణ వ్యవస్థాపనలో వివిధ ప్రభుత్వ పథకాలను గూర్చి వ్రాయుము.

**P.B.SIDDHARTHA COLLEGE OF ARTS &SCIENCE  
VIJAYAWADA – 10.**

Course Code: **ECOSET02**

Three-Year B.A

Domain Subject: **ECONOMICS**

III Year B.A.-Semester-V

Max Marks: 100

Course 7A: **Farmer Producer Organizations (FPOs)**  
(Skill Enhancement Course (Elective)), 4 Credits

**I. Learning Outcomes:**

Students at the successful completion of the course shall be able to:

1. Explain the concept and organization of FPO and its economic activities.
2. Identify and analyse the opportunities related to FPO in local rural area.
3. Apply the concepts to the identified FPO related opportunities available in the local area and formulate business ideas.
4. Demonstrate practical skills that will enable them to start a FPO or earn wage employment in it

**II. Syllabus:** (Hours: Teaching: 60, Training: 10, Others Including Unit

Tests: 05)

**Unit 1: Concept of FPO and Importance**

Concept and importance of FPO – Types of FPOs - Organizational structure and Functions of FPO - Ecosystem required for FPO - Role of FPOs in present Indian Agricultural Development – Current Problems and Challenges of FPOs in India.

**Unit 2: Establishing FPO and Collaborations**

Situation Analysis and Mobilizing Farmer Producers for FPO - Rules and Regulation related to FPOs - Procedures to start FPO – Infrastructure required for FPO - Collaboration with Other Organizations – Training and Capacity Building to Persons in FPO – Managing Financial Accounts of FPO.

**Unit 3: Economic Activities and Business Planning of FPO**

Economic Activities and Services undertaken by FPO: Input Purchase, Custom Hiring Machines - Output Business: Procuring, Processing, Storage,

Logistics, Marketing, Exporting etc. - Product Identification and Value Chain Analysis - Business Planning for FPO - Viable Business Models of FPO: Multi-product and Value Added.

#### **Unit 4: Financing and Marketing of FPO**

Financial Planning in FPO - Mobilization of Capital from Members, Banks and other Funding Agencies - Marketing of FPO Products: Market Survey, Demand Forecasting, Marketing Strategies, Branding, Planning and Promotion, Digital and Social Media Marketing.

#### **Unit 5: Institutional Support and Case Studies of FPOs**

Institutional Support and Resource Supporting Agencies for FPOs - Special Roles of NABARD and SFAC – Government Schemes for promotion of FPOs - Discussion of two important Case Studies related to FPOs with different product or process types of local relevance.

### **III. References:**

1. NABARD: *Farmer Producer Organisations*, FAQs. Mumbai, 2015. <https://www.nabard.org/demo/auth/writereaddata/File/FARMER%20PRODUCER%20ORGANISATIONS.pdf>
2. NABARD: *Farmer Producer Organisations: Status, Issues and Suggested Policy Reforms*, Mumbai, 2019-20. <https://www.nabard.org/auth/writereaddata/CareerNotices/2708183505Paper%20on%20FPOs%20-%20Status%20&%20%20Issues.pdf>
3. NABARD: *FPO e-Learning Module*. [https://www.nabard.org/FPO/story\\_html5.html](https://www.nabard.org/FPO/story_html5.html)
4. SFAC: *Formation and Promotion of 10, 000 Farmer Producer Organisations: Operational Guidelines*, New Delhi, 2020. <http://sfacindia.com/UploadFile/Statistics/Formation%20&%20Promotion%20of%2010,000%20FPOs%20Scheme%20Operational%20Guidelines%20in%20English.pdf>
5. FAO: *Course on Agribusiness Management for Producers' Associations*, 2009. <http://www.fao.org/3/i0499e/i0499e00.htm>
6. Richa Govil, Annapurna Neti and Madhushree R. Rao: *Farmer Producer Organisations: Past, Present and Future*, Azim Premji University, Bengaluru, 2020. <http://publications.azimpremjifoundation.org/2268/>
7. IGNOU: *Marketing for Managers*, New Delhi. <http://egyankosh.ac.in/handle/123456789/4271>
8. <https://www.nabard.org/>
9. <http://sfacindia.com/FPOS.aspx>
10. Other Relevant web resources suggested by the teacher and college librarian

### **IV. Co-Curricular Activities: (Lecturer Participation: Total 10 Hours)**

1. For Teachers:

- Presentation of audio-video or print material to demonstrate the practical ground level activities of a FPO, so as to encourage the students to develop their own FPO models
- Conducting activities like brainstorming sessions and group discussion, student seminars, role play etc., to generate ideas
- Organize guest lectures and interactions with successful FPOs in the local area.
- Organize interactive sessions with the officers of the government departments concerned to seek practical guidance in meeting the procedural requirement of starting and running a FPO
- Engage the students in field work to study and gain practical knowledge for successful organization of FPOs in the local area.

2. For Students:

- Students shall actively participate in the above co-curricular activities and gain practical knowledge, understanding, ideas and skills related to the subject.
- Students shall participate in field work, collect data, analyze, and make a report and presentation in the class.

3. Suggested Field Work Format:

Title Page, Student Details, Acknowledgments, Index of Contents;  
*Objectives, Step-wise process, Findings, Conclusion & References*

4. Max Marks for Field Work Report: 05

5. Unit Tests/Internal Examination

**Note:** For the latest topics which have no formal material available, the teacher is expected to prepare own material by using multiple latest sources and practical knowledge.

###

**P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE :: VIJAYAWADA  
- 10**

**Name of Programme : III B.A. (EMS)  
Course 7A : Farmer Producer Organization  
SEMESTER - V / VI**

**Skill Enhancement Course**

**Time: 3 Hours**

**Max. Marks: 75M**

**Course Code : ECOSET02**

**Section - A**

**Answer any FIVE of the following.**

**5x5=25M**

1. Explain the concept of Farmer produce organisation (FPO's)  
వ్యవసాయ ఉత్పత్తిదారుల వ్యవస్థ భావనను వివరింపుము
2. Organizational structure of FPO  
వ్యవసాయ ఉత్పత్తి దారుల వ్యవస్థ నిర్మాణమును వివరింపుము.
3. Managing Financial Accounts of FPO  
వ్యవసాయ ఉత్పత్తిదారుల వ్యవస్థ ఆర్థిక గణాంకల నిర్వహణ
4. Economic activities FPO  
వ్యవసాయ ఉత్పత్తిదారుల వ్యవస్థ ఆర్థిక కార్యకలాపాలు
5. Write about business planning for FPO  
వ్యవసాయ ఉత్పత్తిదారుల వ్యవస్థ వ్యాపార ప్రణాళికను గూర్చి వ్రాయుము
6. Demand Forecasters  
డిమాండ్ అంచనాదారులు
7. Digital and social media  
డిజిటల్ మరియు సామాజిక మాధ్యమాలు
8. NABARD  
నాబార్డ్

**Section - B**

**Answer the following.**

**5x10=50M**

9. A) Explain the organization structure and functions of FPO  
వ్యవసాయ ఉత్పత్తిదారుల వ్యవస్థ నిర్మాణము మరియు విధులను వివరింపుము

Or



B) Explain the Role of FPO's in present Indian agricultural Development  
వ్యవసాయరంగ అభివృద్ధిలో వ్యవసాయ ఉత్పత్తి దారుల వ్యవస్థ పాత్రను వివరింపుము

10. A) Explain the Rules and Regulations related to FPOs

వ్యవసాయ ఉత్పత్తిదారుల వ్యవస్థకు సంబంధించిన నియమ నిబంధనలను వివరింపుము

Or

B) Explain the training and capacity Building to pension in FPO

వ్యవసాయ ఉత్పత్తి దారుల ప్రస్తుత వ్యవస్థ శిక్షణ మరియు శక్తి అభివృద్ధిని వివరింపుము

11. A) Explain the economic activities undertaken by FPO

వ్యవసాయ ఉత్పత్తి దారుల వ్యవస్థ నిర్వహించే ఆర్థిక కార్యకలాపాలను వివరింపుము

Or

B) Write about the visible Business models of FPO

వ్యవసాయ ఉత్పత్తిదారుల వ్యవస్థ బయటికి కనిపించే వ్యాపార నమూనాలను గూర్చి వ్రాయుము

12. A) Explain the financial planning in FPO

వ్యాపార ఉత్పత్తిదారుల వ్యవస్థ ఆర్థిక ప్రణాళికను వివరింపుము

Or

B) Explain the methods of Marketing of FPO products.

వ్యవసాయ ఉత్పత్తిదారుల వ్యవస్థ ఉత్పత్తుల మార్కెటింగ్ పద్ధతులను వివరింపుము

13. A) Explain the special role of NABARD is in supports FPO

వ్యవసాయ ఉత్పత్తిదారుల వ్యవస్థకు నాబార్డ్ యొక్క మద్దతును వివరింపుము.

Or

B) Explain the Government schemes for promotion of FPO

వ్యవసాయ ఉత్పత్తిదారుల వ్యవస్థను ప్రోత్సహించడం ప్రభుత్వ పథకాలను వివరింపుము.

**P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE  
VIJAYAWADA – 10.**

Course Code: **ECOSSET03**

Three-Year B.A

Domain Subject: **ECONOMICS**

III Year B.A.-Semester-V

Max Marks: 100

**Course 6B: Urban Entrepreneurship and MSMEs**  
(Skill Enhancement Course (Elective)), 4 Credits

**I. Learning Outcomes:**

Students at the successful completion of the course shall be able to:

1. Explain the basic theories and essentials of entrepreneurship
2. Identify and analyze the entrepreneurship opportunities available in local urban area.
3. Apply the theories of entrepreneurship to the conditions of local urban area and formulate appropriate business ideas.
4. Demonstrate practical skills that will enable them to start urban entrepreneurship

**II. Syllabus:** (Hours: Teaching: 60, Training: 10, Others Including Unit Tests: 05)

**Unit1: Entrepreneurship: Concept and Theories**

Concept and Importance of Entrepreneurship - Theories of Entrepreneurship: Innovations, X-Efficiency, Risk Bearing - Qualities and Functions of an Entrepreneur – Women Entrepreneurship - Ecopreneurship.

**Unit2: Urban Entrepreneurship and Business Planning**

Urban Entrepreneurial Ecosystem - Factors affecting Urban Entrepreneurships - Process of Identification of new Entrepreneurship Opportunities in Urban Areas - Formulation of Business Planning for Urban Entrepreneurship - Problems and Challenges to Urban Entrepreneurship.

**Unit 3: MSMEs and New Urban Entrepreneurship Opportunities**

Features of Micro Small Medium Enterprises (MSMEs) – Cluster Development Approach and Leveraging Technology for MSMEs – Problems and Challenges of MSMEs - Urban Consumerism and Emerging Trends - New

Entrepreneurial Opportunities in Urban Area: Food and Beverages, Sanitary and Health Products, Solid Waste and Scrap Disposal, Tourism and Hospitality Services, Consultancy Services and Event Management, Logistic services.

#### **Unit 4: Financing and Marketing of Urban Entrepreneurship**

Financing the Urban Entrepreneurship and MSMEs: Procedures to obtain formal loans from Banks and other Institutions, Preparing Detailed Project Report for Loan - New avenues of Finance: Crowd Funding and Venture Capital – Marketing of Urban Entrepreneurship and MSMEs products: Market Survey, Demand Forecasting, Marketing Strategies, Branding, Planning and Promotion, Digital and Social Media Marketing – Public Procurement Policy to purchase MSME Products.

#### **Unit5: Institutional Support and Case Studies of Urban Entrepreneurship**

Institutional support for Urban Entrepreneurship and MSMEs - Government Schemes for promotion of Urban Entrepreneurship and MSMEs and their important features: Startup, Standup, PMKVY, PLI etc. – Rules and Procedures to start a Urban Entrepreneurship Firm and MSME – Discussion of two different types of Case Studies related to Urban Entrepreneurship with local relevance.

### **III. References:**

1. Gordona, E and N. Natarajan: *Entrepreneurship Development*, Himalaya Publishing House Pvt Ltd, Mumbai, 2017.
2. Sharma Sudhir, Singh Balraj, SinghalSandeep, *Entrepreneurship Development*, Wisdom Publications, Delhi, 2005.
3. Drucker, P., *Innovation and Entrepreneurship: Practice and Principles*, Harper & Row, New York, 1985; revised edn, Butterworth-Heinemann, Oxford, 1999.
4. NITI Aayog: *Report of Expert Committee on Innovation and Entrepreneurship*, New Delhi, 2015.  
[https://niti.gov.in/writereaddata/files/new\\_initiatives/report-of-the-expert-committee.pdf](https://niti.gov.in/writereaddata/files/new_initiatives/report-of-the-expert-committee.pdf)
5. VardhamanMahavir Open University, *Entrepreneurship Development & Small Scale Business*, Kota.  
<http://assets.vmou.ac.in/BBA12.pdf>
6. Reserve Bank of India: *Report of Expert Committee on Marginal, Small, Medium Enterprises*, Mumbai, 2019.  
<https://www.rbi.org.in/Scripts/PublicationReportDetails.aspx?UrlPage=&ID=924>

7. IGNOU: Marketing for Managers, New Delhi.  
<http://egyankosh.ac.in/handle/123456789/4271>
8. <https://nimsme.org>
9. Other Relevant web resources suggested by the teacher and college librarian

#### **IV. Co-Curricular Activities: (Lecturer Participation: Total 10 Hours)**

##### 1. For Teachers:

- Presentation of audio-video or print material to demonstrate the practical ground level activities of a urban entrepreneur so as to encourage the students to develop their own urban entrepreneurship ideas
- Conducting activities like brainstorming sessions, group discussions, student seminars, role play etc. for generating ideas and plans.
- Organize guest lectures and interactions with successful real urban entrepreneurs in the local area to discuss ideas and plans and preparation of DPRs
- Arranging interaction sessions or workshops with officers of relevant government department and financial institutions to work on specific proposals
- Engage the students in field work to study the successful urban entrepreneurs in the local area and gain working knowledge

##### 2. For Students:

- Students shall actively participate in the above co-curricular activities and gain practical knowledge, understanding, ideas and skills related to the subject.
- Students shall participate in field work, collect data, analyze, and make a report and presentation in the class.

##### 3. Suggested Field Work Format:

Title Page, Student Details, Acknowledgments, Index of Contents;  
*Objectives, Step-wise process, Findings, Conclusion & References*

4. Max Marks for Field Work Report: 05

5. Unit Tests/Internal Examinations

**Note:** For the latest topics which have no formal material available, the teacher is expected to prepare own material by using multiple latest sources and practical knowledge.

###

**P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE :: VIJAYAWADA**  
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**Name of Programme : III B.A. (EMS)**  
**Course 6B : Urban Entrepreneurship and MSMEA**  
**SEMESTER – V / VI**

**Skill Enhancement Course**

**Time: 3 Hours**

**Max. Marks: 75M**

**Course Code : ECOSET03**

**Section – A**

**Answer any FIVE of the following.**  
**5x5=25M**

1. Concept of Entrepreneurship  
వ్యవస్థాపన భావన
2. Concept of Risk Bearing  
నష్ట భయ భావన
3. Business planning for urban entrepreneurship  
పట్టణ ఉద్యమత్వంలో వ్యాపార ప్రణాళిక
4. Features of MSMEs  
ఎమ్.ఎస్.ఎమ్.ఇ.ఎస్. (సూక్ష్మ, చిన్న, మధ్యతరహా సంస్థల లక్షణాలు)
5. Logistic services  
రవాణా సేవలు
6. Food and Beverages  
సామాజిక మద్యాముల ద్వారా మార్కెటింగ్
7. Social Media Marketing  
ఆహారము మరియు బహరేజిస్
8. Write about PMKVY  
పి.యం.కె.వి.వై.ను గూర్చి వ్రాయుము

**Section – B**

**Answer the following.**

**5x10=50M**

9. A) Explain the different theory of entrepreneurship  
వ్యవస్థాపన యొక్క వివిధ సిద్ధాంతాలను వివరింపుము  
Or  
B) Write about the qualities and functions of entrepreneurship  
వ్యవస్థాపన యొక్క గుణాలు మరియు విధులను గూర్చి వ్రాయుము
10. A) Explain the problems and challenges of urban entrepreneurs.  
పట్టణ వ్యవస్థాపనలో ఉన్న సమస్యలు మరియు సవాళ్ళను వివరింపుము  
Or  
B) Write about the process of identification of new entrepreneurship opportunities in urban Areas.  
నూతన వ్యవస్థాపనను పట్టణాలలో ఉన్న గుర్తించబడి ఉన్న ప్రక్రియను గూర్చి వ్రాయుము.

11. A) Explain the problem of MSMES

ఎమ్.ఎస్.ఎమ్.ఇ.సి సమస్యలను వివరింపుము

Or

B) Explain the cluster development approach and leveraging technology for MSMES.

ఎమ్.ఎస్.ఎమ్.ఇ.సి.లలో క్లస్టర్ అభివృద్ధి విధానమును వివరింపుము.

12. A) Explain the New avenues of Financer of urban entrepreneurship

పట్టణ ఆర్థిక వ్యవస్థాపనలో ఉన్న కొత్త అవకాశాలను వివరింపుము

Or

B) Explain the public procurement policy to purchase MSME products.

ఎమ్.ఎస్.ఎమ్.ఇ.సి. ఉత్పత్తుల సేకరణలో ప్రభుత్వ విధానములను వివరింపుము.

13. A) Write about the Government schemes for promotion of urban entrepreneurship and MSMES

పట్టణ వ్యవస్థాపనను ప్రోత్సహించడంలో ప్రభుత్వ పథకాలను వివరింపుము

Or

B) Explain the rules and procedures to start a Urban entrepreneurship firm.

పట్టణ వ్యవస్థాపన సంస్థ స్థాపించుటలో ఉన్న నియమాల మరియు ప్రక్రియను వివరింపుము.

**P.B.SIDDHARTHA COLLEGE OF ARTS &SCIENCE  
VIJAYAWADA – 10.**

Course Code: **ECOSSET04**

Three-Year B.A

Domain Subject: **ECONOMICS**

III Year B.A.-Semester-V

Max Marks: 100

**Course 7B: Retail and Digital Marketing**  
(Skill Enhancement Course (Elective)), 4 Credits

**I. Learning Outcomes:**

Students at the successful completion of the course shall be able to:

1. Explain the concepts and principles about the retail and digital marketing;
2. Identify and analyse the opportunities related to retail and digital marketing available in the local area;
3. Apply the concept to formulate the new strategies related to retail and digital marketing;
4. Demonstrate the practical skills required to get employment in retail and digital marketing or to start own digital marketing.

**II. Syllabus:** (Hours: Teaching: 60, Training: 10, Others Including Unit Tests: 05)

**Unit 1: Concept of Marketing**

Concept of Marketing - Type of Markets - Current Market types in India – Marketing Mix – Marketing Strategies – Marketing Segmentation – Marketing Organization - Marketing Research - Pricing Policies and Practices - Major Players in Retail and Digital Market in India

**Unit 2: Understanding Product and Consumer**

Marketing Product Types – Product Decision and Strategies - Product Life Cycle – Factors determining Consumer Behavior - Consumer Behavior Models – Understanding Indian Consumer - Strategies of persuading the Consumer – Sale Promotion: Advertisement, Branding and Packaging.

### **Unit 3: Retail Marketing**

Concept of Retail Marketing – Types of Retailing – Big and Small Retail Markets - Retail Marketing Mix – Essentials of Successful Retail Marketing - Retail Marketing Strategies – Multichannel Retailing – Store Management – Shopping Market Dynamics.

### **Unit 4: Digital Marketing**

Digital Marketing: Concept and Types – Telemarketing – Online or e-tailing – Essentials of Digital Marketing – Difference between Physical Retail and Digital Marketing – Digital Marketing Channels - Customer Behavior in Digital Marketing – Major players in Digital Marketing and their Marketing Strategies - Tools and Apps of Digital Marketing.

### **Unit 5: Marketing Models and Case Studies**

Marketing Models of Retail and Digital Market Companies/Shops: Global, National and Local levels - Discussion of two different types of Case Studies related to Retail and Digital Marketing.

### **III. References:**

1. VenkateshGanapathy: *Modern Day Retail Marketing Management*, Bookboon Company, 2017.  
<https://mmimert.edu.in/images/books/modern-day-retail-marketing-management.pdf>
2. PrashantChaudary: *Retail Marketing in the Modern Age*, Sage Publication, 2019
3. JermyKagan and SiddarthShekar Singh: *Digital Marketing & Tactics*, Wiely Publishers, 2020.
4. Philip Kotler: *Marketing Management*, 11<sup>th</sup> Edition, Prentice-Hall of India Pvt. Ltd., New Delhi. , 2002
5. S.Neelamegham: *Marketing in India*, 3<sup>rd</sup> edition, Vikas Publications, New Delhi, 2000.
6. IGNOU: *Marketing for Managers*, New Delhi.  
<http://egyankosh.ac.in/handle/123456789/4271>
7. Digitalmarketer: The Ultimate Guide to Digital Marketing.  
<https://www.digitalmarketer.com/digital-marketing/assets/pdf/ultimate-guide-to-digital-marketing.pdf>
8. NITI Aayog: *Connected Commerce: Creating a Roadmap for Digitally Inclusive Bharat, 2021*.  
<https://niti.gov.in/writereaddata/files/Connected-Commerce-Full-Report.pdf>



9. IASRI Course in *Agribusiness Management and Trade Concepts in Marketing* <http://ecoursesonline.iasri.res.in/mod/page/view.php?id=710>
10. World Bank: *Digital Economy in South East Asia: Strengthening the Foundations for Future Growth*, 2019. <https://documents1.worldbank.org/curated/en/328941558708267736/pdf/The-Digital-Economy-in-Southeast-Asia-Strengthening-the-Foundations-for-Future-Growth.pdf>
11. Relevant web resources suggested by the teacher and college librarian

#### **IV. Co-Curricular Activities: (Lecturer Participation: Total 10 Hours)**

##### 1. For Teachers:

- Presentation of audio-video or print material to demonstrate the practical ground level activities of a retail and digital marketing so as to encourage the students to develop their own ideas
- Conducting activities like brainstorming sessions, group discussions, student seminars, role play etc. for generating ideas and plans.
- Organize guest lectures and interactions with successful people in the field of retail and digital marketing in the local area.
- Engage the students in field work to study the successful retail and digital marketing strategies practiced by the firms in the local area and gain working knowledge

##### 2. For Students:

- Students shall actively participate in the above co-curricular activities and gain practical knowledge, understanding, ideas and skills related to the subject.
- Students shall participate in field work, collect data, analyze, and make a report and presentation in the class.

##### 3. Suggested Field Work Format:

Title Page, Student Details, Acknowledgments, Index of Contents; *Objectives, Step-wise process, Findings, Conclusion & References*

4. Max Marks for Field Work Report: 05

5. Unit Tests/Internal Examinations

**Note:** For the latest topics which have no formal material available, the teacher is expected to prepare own material by using multiple latest sources and practical knowledge.

###

**Section – A**

**Answer any FIVE of the following.  
5x5=25M**

1. Explain the concept of Marketing  
మార్కెటింగ్ భావనను వివరింపుము
2. What is market segmentation  
మార్కెట్ సెగ్మెంట్ అనగానేమి
3. What is product life cycle  
వస్తువు జీవిత కాల చక్రము అనగానేమి?
4. Write about advertisement  
ప్రకటనలను గూర్చి వ్రాయుము
5. Concept of Retail Marketing  
చిల్లర మార్కెటింగ్ గూర్చి వ్రాయుము
6. Explain the concept of Retail marketing mix  
చిల్లర మార్కెటింగ్ మిశ్రమ భావనను వివరింపుము
7. What is Digital Marketing  
డిజిటల్ మార్కెటింగ్ అనగానేమి?
8. Meaning of Marketing Models  
మార్కెటింగ్ నమూనాలు అర్థము

**Section – B**

**Answer the following.**

**5x10=50M**

9. A) Write about the marketing strategy  
మార్కెటింగ్ వ్యూహమును గూర్చి వ్రాయుము  
Or  
B) Explain the pricing policy and practice  
ధరలి విధానమును మరియు అమలును వివరింపుము
10. A) Explain the different types of Marketing products

వివిధ రకాల మార్కెటింగ్ ఉత్పత్తులను వివరింపుము

Or

B) Explain the strategies of persuasive the consumer  
వినియోగదారుని చోరవ వ్యూహములో ఉన్న వ్యూహాలను వివరింపుము

11. A) Explain the types of Retailing

రిటైలింగ్ రకాలను వివరింపుము

Or

B) Explain the different Retail Marketing strategies  
వివిధ రకాల చిల్లర మార్కెటింగ్ వ్యూహాలను వివరింపుము

12. A) Explain the types of Digital marketing

డిజిటల్ మార్కెటింగ్ రకాలను వివరింపుము

Or

B) Explain the today and apps of Digital marketing  
డిజిటల్ మార్కెటింగ్ ఉన్న వివిధ రాకాల యాప్స్‌ను వివరింపుము

13. A) Explain the marketing models of retail and Digital Marketing company

చిల్లర మరియు డిజిటల్ మార్కెటింగ్ కంపెనీ నమూనాలను వివరింపుము

Or

B) Write a brief discussion about any Retail and Digital marketing  
చిల్లర మరియు డిజిటల్ మార్కెటింగ్‌ను గూర్చి సూక్ష్మంగా వివరింపుము.

**P.B.SIDDHARTHA COLLEGE OF ARTS &SCIENCE :: VIJAYAWADA – 10**

**An autonomous college in the jurisdiction of Krishna university**

**III B.A (EMS), SEMESTER – V**

**COURSE – VI**

**Course Code : **ECOSET05****

**INSURANCE SERVICES**

**No of Hours per week : 5**

**Credits :4**

- Col : Students are able to acquire the knowledge about principles of insurance since and functioning of insurance science ....
- Co2 : Students are about know importance of life insurance and products
- Co3 : Students are able to again the knowledge about general and health insurance
- Co3 : Students are able to acquire the knowledge about practicing as an insurance agent
- Co5 : Students are able to acquire the knowledge about understanding the continuous midst and case studies related to the general or health ....

**UNIT I : INSURANCE CONCEPT AND PRINCIPLES**

Risk Management: Risk and Uncertainty, Risk Classification – Concept, Importance and Types of Insurance– Principles of Insurance – Insurance Regulations in India - Role of IRDA and Insurance Ombudsman –Scope for Insurance Business in India.

**UNIT II : LIFE INSURANCE AND PRODUCTS**

Life Insurance: Nature and Features - Major Life Insurance Companies in India - Important Life Insurance Products/policies and their Features: Conventional, Unit Linked, Annuities, Group Policies – Medical Examiner.

**UNIT III : GENERAL AND HEALTH INSURANCES AND PRODUCTS**

General Insurance: Nature, Features and Types - Major General Insurance Companies in India - Important General Insurance Products/Policies and their Features - Surveyor – Health Insurance: Nature and Features - Health Insurance Companies in India - Major Health Insurance Products/policies and their Features: Individual, Family, Group.

**UNIT IV : PRACTICING AS AN INSURANCE AGENT**

Insurance Contract and Terms of Insurance Policy - Registration of Insurance Agency with the Company - Procedure to issue a Policy: Application and Acceptance – Policy Lapse and Revival – Premium Payment, Assignment,

Nomination and Surrender of Policy – Policy Claim - Important Websites and Apps of Insurance in India.

## **UNIT V : UNDERSTANDING THE CUSTOMER AND CASE STUDIES**

Insurance Customer and Categories – Understanding Customer Mindset and Satisfaction - Addressing the Grievances of the Customer – Ethical Behavior in Insurance – Moral Hazard –Discussion of two different Case Studies related to Life or General or Health Insurance Services.

### **References:**

1. Insurance Institute of India: Principles of Insurance (IC-01), Mumbai, 2011.
2. Insurance Institute of India: Practice of Life Insurance (IC-02), Mumbai, 2011.
3. Insurance Institute of India: Practice of General Insurance (IC-11), Mumbai, 2011
4. IGNOU: Life Insurance  
<https://egyankosh.ac.in/bitstream/123456789/6472/1/Unit-20.pdf>
5. IGNOU: Non-Life Insurance  
<https://egyankosh.ac.in/bitstream/123456789/6470/1/Unit-21.pdf>
6. P. Periyaswamy: Principles and Practice of Insurance, Himalaya Publishers, New Delhi (2nd Edition), 2019.
7. G. Dionne and S.E. Harrington (Eds.): Foundations of Insurance Economics, Kluwer Academic Publishers, Boston, 1997.
8. K. Jr. Black, and H.D. Skipper Jr.:Life and Health Insurance, Prentice Hall, Upper Saddle River, New Jersey, 2000.
9. <https://www.irdai.gov.in>
10. <https://www.insuranceinstituteofindia.com>
11. <https://licindia.in/>
12. Other Relevant web resources suggested by the teacher and college librarian

**Co-Curricular Activities:**

a) Mandatory (Training of students in the related skills by the teacher for a total 10 Hours)

- 1) For Teacher: Training of students by teacher in the classroom and in the field for a total of not less than 10 hours on skills and hands on experience like explaining the details of an insurance policy to a customer – life, health and general policy, filling up application for a policy, calculation of premium and claim, make use of important websites and apps etc. pertaining to insurance and make a field visit to any insurance organization in local area. The expertise of practicing insurance agent or trainer can be utilized for this purposes.

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**III B.A (EMS), SEMESTER – V**  
**COURSE – VI Course Code : ECOSET05**  
**MODEL QUESTION PAPER**  
**INSURANCE SERVICES**

**Time : 3 Hours**

**Max. Marks : 75M**  
**Min. Pass : 30 M**

**Section – A**

**Answer any Five of the following.**

**5 x5=25M**

1. Write about Risk classification  
నష్ట భావవర్గీకరణను గూర్చి వ్రాయుము
2. What are the features of life insurance  
జీవిత భీమా లక్షణాలు ఏవి?
3. What are the benefits of groups insurance policies  
సమూహభీమా ప్రయోజనములు ఏవి
4. Write about General Insurance  
సాధారణ భీమా గూర్చి వ్రాయుము
5. Write about Health Insurance  
ఆరోగ్యభీమా గూర్చి వ్రాయుము
6. What are the Terms of Insurance policy  
భీమా విధానం యొక్క నియములు
7. Write about Grievances  
గ్రేవియన్స్ను గూర్చి వ్రాయుము
8. Explain the customer satisfaction  
కస్టమర్ యొక్క సంతృప్తి గూర్చి వ్రాయుము.

**Section – B**

**Answer the following.**

**5 x10= 50M**

9. A) Explain the different principles of insurance  
వివిధరకాల భీమా సూత్రాలను వివరింపుము
- Or
- B) Explain the scope of insurance business in India  
భారతదేశంలో భీమా పరిధిని వివరింపుము

10. A) Write about the major life Insurance companies in India  
భారతదేశంలో ముఖ్యమైన జీవితభీమా కంపెనీలను గూర్చి వ్రాయుము

Or

B) Explain the importance of life insurance policies  
జీవిత భీమా విధానాల యొక్క ప్రాముఖ్యతను వివరింపుము

11. A) Write about the major general insurance companies in India  
భారతదేశంలో ముఖ్యమైన సాధారణ భీమా కంపెనీలను గూర్చి వ్రాయుము

Or

B) Explain the major Health insurance products.  
ముఖ్యమైన ఆరోగ్య భీమా విధానాలను గూర్చి వ్రాయుము

12. A) Write about the insurance contract and terms of insurance policy  
భీమా ఒప్పందము మరియు నిబంధనలను గూర్చి వ్రాయుము

Or

B) Explain the procedure to issues a policy  
భీమా పాలసీని జారీచేయుటలో ఉన్న ప్రక్రియను వివరింపుము

13. Explain the Ethical Behaximin Insurance  
భీమాలో ఉన్న నైతిక ప్రవర్తనను వివరింపుము

Or

B) Write about understanding customer mindset and satisfaction  
కస్టమర్ మైండ్ సెట్ మరియు సంతృప్తిని గూర్చి వ్రాయుము.



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**III B.A (EMS), SEMESTER – V**  
**SEMESTER – V**

**Max.Marks : 100**

**Number of Credits : 4**

**COURSE – VII Course Code : **ECOSET06****

**BANKING AND FINANCIAL SERVICES**

- Co1 : Students are able to acquit the knowledge about the principles of banking and Indian Banking system.
- Co2 : Students are able to acquit the knowledge about Deposits, Loans and Digital Banking Systems.
- Co3 : Students are able to acquit he knowledge about Banking correspondents and common service centers
- Co4 : Students are able to acquit the knowledge about Financial service of NBFIs.
- Co5 : Students are able to acquit the knowledge about more with Finance service Company (FSC).

**UNIT I : PRINCIPLES OF BANKING AND INDIAN BANKING SYSTEM**

Meaning of Banking – Principles of Banking – Functions of Banking –  
Structure of Indian Banking System – Regulations of Banking in India – Role  
of RBI in Banking – Anti-money Laundering - Basics of Financial literacy -  
Problems and Challenges of Banking in India.

**UNIT II : DEPOSITS, LOANS AND DIGITAL BANKING**

Bank Deposit Account Types – Account Opening and Closing – Banking  
Customer types – KYC Norms – Negotiable Instruments: Cheque, Bill of  
Exchange, Promissory Note, Endorsement - Principles of Lending – Different  
categories of Loans – Mortgaging -Priority Sector Lending – E-Banking  
facilities: Debit Card, Credit Card, Net Banking, Mobile Banking, Tele-  
banking, Micro ATMs, Digital Currency – Core Banking Solutions.

**UNIT III : BANKING CORRESPONDENTS AND COMMON SERVICE  
CENTERS**

Banking Correspondent Model - Activities of Banking Correspondent: Deposit  
Mobilization.

Identification of Borrowers, Collection and Recovery Loan, Other Banking  
Services – Common Services Centre (CSC) - Provision of Services by CSC

- Requirement for Registering CSC and Telecentre - Case Study of Banking Correspondents with any Bank or CSC in Local Area.

#### **UNIT IV : FINANCIAL SERVICES OF NBFIS**

Non-Banking Financial Institutions (NBFIs): Types and Major Players of NBFIs in India – Important Financial Services offered by NBFIs and their Features – Concept of EMI - Micro Finance: Concept and Operation - Chit Funds: Concept and Operations– Payment Banks - Regulations of NBFIs in India – Problems and Challenges of NBFIs in India.

#### **UNIT V : WORK WITH FINANCE SERVICE COMPANY (FSC)**

Types of loans by Finance Service Company (FSC) – Customer of FSC: Types and Needs - Marketing of FSC's Loans – Procedures and Requirements in FSC's Loan Sanction - Collection and Recovery of FSC Loans - Case Study of a FSC's services in Local Area.

#### **References:**

1. Indian Institute of Banking and Finance: Principles and Practices of Banking, Macmillan India Limited, 2021.  
<https://drive.google.com/file/d/1VU7aN4s5ikPQ17nX6mTBW-sVLQCNhfvK/view>
2. Indian Institute of Banking and Finance: Retail Banking, Macmillan India Limited, 2015.
3. D.R.Patade Babasaheb Sangale and T.N.Salve : Banking and Finance: Fundamental of Banking, Success Publications, Pune, January 2013.  
<https://app1.unipune.ac.in/external/course-material/Fundamental-of-Banking-English.pdf>
4. N. Mukund Sharma: Banking and Financial Services, Himalaya Publishers, 2015.
5. Akhan Ali Jafor: Non-Banking Financial Companies in India: Functioning and Practice, New Century Publications, New Delhi, 2010.
6. RBI: “Non-Banking Financial Institutions” in Report on Trend and Progress of Banking in India 2019-20.
7. RBI: Discussion Paper on Engaging Business Correspondents.  
[https://www.rbi.org.in/scripts/bs\\_viewcontent.aspx?Id=2234](https://www.rbi.org.in/scripts/bs_viewcontent.aspx?Id=2234)
8. Govt. of India: Ministry of Electronic and Information Technology: Digital Seva-Operational Manual for Common Service Centres.  
<https://csc.gov.in/assets/cscmanual/digitalsevaoperationalmanual.pdf>
9. <http://www.cscentrepneur.in/> for Telecentre Entrepreneurship Course

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**III B.A (EMS), SEMESTER – V**  
**COURSE – VII Course Code : ECOSET06**  
**MODEL QUESTION PAPER**  
**BANKING AND FINANCIAL SERVICES**

**Time : 3 Hours**

**Max. Marks : 75M**

**Min. Pass : 30 M**

**Section – A**

**Answer any Five of the following.**

**5 x5=25M**

1. What are the principals of Banking  
బ్యాంకింగ్ సూత్రాలు ఏవి?
2. Write about the KYC Norms  
KYC నియమాలను గూర్చి వ్రాయుము
3. Writ about priority sector lending  
ప్రాధాన్యత రంగ ఋణాలను గూర్చి వ్రాయుము
4. Write about collection and recovery of loan  
కలెక్షన్ మరియు రకవరి గూర్చి వ్రాయుము
5. Write about micro Finance  
సూక్ష్మ విత్తము గూర్చి వ్రాయుము
6. Explain the payment Banks  
చెల్లింపు బ్యాంకులను వవరింపుము
7. What is a Finance service company  
విత్త సేవా కంపెని అనగానేమి?
8. Types of Finance Service companies  
విత్త సేవా కంపెనీల రకాలు

**Section – B**

**Answer the following.**

**5 x10= 50M**

9. A) Explain the structure of Indian Banking system  
భారత బ్యాంకింగ్ నిర్మాణమును గూర్చి వివరింపుము  
Or  
B) Explain the problem and challenges of Banking in India  
భారతదేశ బ్యాంకింగ్ రంగం ఎదుర్కొంటున్న సమస్య మరియు సవాళ్లను వివరింపుము

10. A) Explain the principles of lending

ఋణ సూత్రాలను వివరింపుము

Or

B) Write about the negotiable instruments act

అన్యాయకాంత చట్టమును గూర్చి వ్రాయుము

11. A) Explain the activities of banking correspondent

బ్యాంకింగ్ కర్పొండింట్ కార్యకలాపాలను వివరింపుము

Or

B) Explain the provision of Services of Common services Centre (CSC)

కామన్ సర్వీస్ కు చేస్తున్న సేవలను వివరింపుము

12. A) Write about the major NBF in India

భారతదేశంలో ముఖ్యమైన ( )ను గూర్చి వ్రాయుము

Or

B) Explain the problems and challenges of NBFIs in India

భారతదేశంలో ( )లు ఎదుర్కొంటున్న సమస్యలు మరియు సవాళ్లను వివరింపుము

13. Explain the procedures and requirement in FSC's loan sanction

ఋణ కేటాయింపు విధానముల ప్రక్రియను వివరింపుము

Or

B) Explain the collection and recovery of FSC loan.

( ) ఋణ సేకరణ మరియు రికవరీని గూర్చి వివరింపుము

**P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE  
VIJAYAWADA – 10.**

Course Code: **ECOSET07**

Three-Year B.A

Domain Subject: **ECONOMICS**

III Year B.A.-Semester-V

Max Marks: 100

**Course 6D: Inferential Statistics and Software Packages**  
(Skill Enhancement Course (Elective)), 4 Credits

**1. Learning Outcomes:**

Students at the successful completion of the course shall be able to:

1. Demonstrate the knowledge related to the important concepts and techniques of inferential statistics
2. Calculate correlation, regression coefficients and interpret the results.
3. Use Excel sheets and SPSS package to analyse the data and derive the results.

**II. Syllabus:** (Hours: Teaching: 60, Training: 10, Others Including Unit Tests: 05)

**Unit 1: Concept and Theories of Probability**

Concept of Probability - Definitions of Probability: Classical or Mathematical and Empirical or Statistical – Axiomatic Approach to Probability – Theorems of Probability: Addition and Multiplication (without proofs).

**Unit 2: Theoretical Probability Distributions**

Binomial Distribution: Constants (without proof) and Properties – Poison Distribution: Constants (without proof) and Properties – Normal Distribution: Constants (without proof) and Properties – Standard Normal Distribution and Standard Normal Curve – Economic and Practical Applications of Binomial, Poison and Normal Distributions.

**Unit 3: Test of Significance - Large and Small Sample Tests**

Steps involved in Testing of Hypotheses – Large Sample or Z-Test – Testing the difference between Means and Proportions – Small Sample Tests –

Difference between Large and Small Sample Tests – Applications of Student's t-test,  $\chi^2$  test, F-test – One way and Two way ANOVA.

#### **Unit 4: Linear and Non-linear Multiple Regression Models**

Three Variable Linear Multiple Regression Model – Notation – Assumptions – Estimation of Partial Regression Coefficients – Interpretation of Regression coefficients - Testing the coefficients: t-test, p- value – Coefficient of Determination:  $R^2$  and adjusted  $R^2$  – Estimation of Non-linear Multiple Regression: Cobb-Douglas Production Function and Interpretation of Elasticity Coefficients.

#### **Unit 5: Excel and Software Packages for Data Analysis**

Worksheet – Entering data in Worksheets – Creating Graphs and Charts - Mathematical and Statistical Functions -Data Analysis Pack in Excel - Descriptive Statistics, Testing of Hypotheses, ANOVA, Correlation and Regression, Random Number Generation - Data Handling Using SPSS - Opening Excel files in SPSS - Analysis Tools - Descriptive Statistics - Selection of Variables in Multiple Linear Regression – Estimation of Regression Coefficients using SPSS and their interpretation.

### **III. References:**

1. S. C. Gupta: **Fundamentals of Statistics**, Himalaya Publishing House, Bombay, 1982.
2. S. P. Gupta: **Statistical Methods**, S. Chand & Company, New Delhi, 2000.
3. K. V. S. Sharma :**Statistics Made Simple: Do it yourself on PC, (Second edn.)**Prentice Hall of India, New Delhi, 2010.
4. తెలుగు అకాడమీ ప్రచురణ “పరిమాణాత్మక పద్ధతులు”
5. B. N. Gupta: **Statistics Theory and Practice**, Sahitya Bhavan, Agra, 1992.
6. Goon A.M., M. K. Gupta and B. Dasgupta: **Fundamentals of Statistics**, Vol.1, The World Press, Ltd, Calcutta, 1975.
7. Nagar, A.L. and R. K. Das: **Basic Statistics**, Oxford University Press, New Delhi, 1996.
8. **D N Elhance**, Veena Elhance & B M Aggarwal **Foundation of Statistics**, Kitab Mahal, New Delhi, 2018.
9. Relevant web resources suggested by the teacher and college librarian

#### **IV. Co-Curricular Activities: (Lecturer Participation: Total 10 Hours)**

##### **a) Mandatory:**

##### 1. For Teacher:

- Provide hands on training and skills to the students about the techniques of statistical inferences and software packages with real life example data sets.
- Organise the guest lectures and interactions with the people who are practically applying those techniques and software packages.
- Engage the students in a project work with a model data set to gain the practical knowledge

##### 2. For Student:

- Students shall actively participate in the above co-curricular activities and gain practical knowledge, understanding, ideas and skills related to the subject.
- Students shall demonstrate those skills by using a data set and make a report and presentation in the class.

##### 3. Suggested Project Work Format:

Title Page, Student Details, Acknowledgments, Index of Contents;  
*Objectives, Step-wise process, Findings, Conclusion & References*

##### 4. Max Marks for Project Work Report: 05

##### 5. Unit Tests/Internal Examinations

###

**Section – A**

**Answer any FIVE of the following.**

**5x5=25M**

1. Define Probability  
సంభావ్యతను నిర్వచించుము
2. What is poisson Distributions  
పాయిజన్ పంపిణీ అంటే ఏమిటి
3. What is normal distribution  
సాధారణ పంపిణీ అంటే ఏమిటి
4. ANOVA Test  
అనోవ పరీక్ష
5.  $X^2$  test  
కైస్కేర్ పరీక్ష
6. Cobb-Douglas production function  
కాబ్-డగ్లస్ ఉత్పత్తి ఫంక్షన్
7. Elasticity of Coefficients  
వ్యాకోచత్వ గుణకము
8. Testing of Hypothesis  
పరికల్పన పరీక్ష

**Section – B**

**Answer the following.**

**5x10=50M**

9. A) Explain the Axiomatic Approach to probability  
సంభావ్యత యొక్క అక్సోమెట్ అప్రోచ్‌ను వివరింపుము  
Or  
B) Explain the addition and multiplication theorem of probability  
సంభావ్యత సంకలన మరియు గుణక సిద్ధాంతములను వివరింపుము
10. A) Explain the standard Normal Distribution and standard Normal cause



ప్రామాణిక సామాన్య పంపిణీ మరియు ప్రామాణిక సాధారణ కారణమును వివరింపుము

Or

B) Explain the Economic and practical application of Normal Distributions  
సాధారణ డిస్ట్రిబ్యూటర్ యొక్క ఆర్థిక మరియు అనువర్తితాలను వివరింపుము

11. A) Explain the various steps involved in Testing of Hypothesis  
పరికల్పన పరీక్షలో ఉన్న వివిధ దశలను వివరింపుము

Or

B) Distinguish between large sample test and small sample tests  
పెద్ద నమూన మరియు చిన్న నమూనాల మధ్య విభేదించుము

12. A) Explain the various tests of Coefficients  
గుణకాల యొక్క వివిధ పరీక్షలను వివరింపుము

Or

B) Explain the procedures for estimation of Non-Linear multiple Regressions  
బహుళైచ్చిక ప్రతి గమన వక్రరేఖ అంచనా ప్రక్రియను వివరింపుము

13. A) What is worksheet? Explain the procedure of Entering data in worksheets  
వర్క్ షీట్ అనగానేమి? వర్క్ షీట్ లో దత్తాంశమును వ్రాయటంలో ఉన్న ప్రక్రియను వివరింపుము

Or

B) Explain the estimation of regression of co-efficient using SPSS and their  
interpretation  
ఎస్.పి.ఎస్.ఎస్. ద్వారా ప్రతి గమన గుణకములను అంచనా లేయడంను వివరింపుము.

**P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE  
VIJAYAWADA – 10.**

Course Code: **ECOSET08**

Three-Year B.A

Domain Subject: **ECONOMICS**

III Year B.A.-Semester-V

Max Marks: 100

Course 7D: **Project Designing and Report Writing**  
(Skill Enhancement Course (Elective)), 4 Credits

**I. Learning Outcomes:**

The Student at the successful completion of the course shall be able to:

1. Demonstrate the knowledge relating to research, its role in enhancement of knowledge in social sciences in general and economics in particular;
2. Formulate a good research design to undertake mini research projects with a view to studying the socio-economic problems of the society;
3. Undertake a field survey by himself/herself to collect relevant data and information relating to his/her project work;
4. Develop capacity to write a simple project report with all relevant components on the research project undertaken by him/her.

**II. Syllabus:** (Hours: Teaching: 60, Training: 10, Others Including Unit Tests: 05)

**Unit 1: Foundations of Research**

Meaning and Importance of Research - Scientific Research – Social Science Research – Methods of ensuring Objectivity in Social Science Research – Limitations of Research in Social Science – Ethics in Research.

**Unit 2: Classification of Research**

Pure and Applied Research – Exploratory and Descriptive Research – Diagnostic Research – Action Research – Analytical Research – Evaluation Research – Experimental Research Design – Concepts of Independent and Dependent Variables – Case Study method.

### **Unit 3: Planning of Research Project**

Selection of a Research Problem – Criteria for Selecting a Research Problem – Review of Theoretical and Related Research Studies - Choice of Secondary and Primary Data for the Study - Choice of Census and Sample Data – Preparation of a Research Proposal – Components of a good Research Proposal.

### **Unit 4: Implementation of a Project Design**

Field Work and Collection of Data – Choice of Schedules and Questionnaire – Pilot Study – Role of Observation and Participation – Documentary Evidences - Projective Techniques: Functions and Types - Editing Data – Graphical and Statistical Analysis of Data using Appropriate Statistical Techniques.

### **Unit 5: Report Writing**

Types of Research Report – Target Audience – Nature of Language to be used in Research Report - Outlines of a good Research Report – Prefatory Items – Body of the Report – Terminal Items: Differences between References and Bibliography – Appendices - Ethical values in Research Report - Plagiarism Test - Components of a good Research Paper.

### **III. References:**

1. C. T. Kurien: *A Guide to Research in Economics*, Sangam Publishers for Madras Institute of Development Studies, Chennai, 1973.
2. O. R. Krishnaswami and M. Ranganatham: *Methodology of Research in Social Sciences*, Himalaya Publishing House, Mumbai, 2018.
3. C. R. Kothari: *Research Methodology: Methods and Techniques*, New Age International (Pvt.) Ltd. Publishers, New Delhi, 2004.
4. K. V. S. Sharma :*Statistics Made Simple: Do it yourself on PC*, (Second edn.) Prentice Hall of India, New Delhi, 2010.
5. John W. Creswell and J. David Creswell :*Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*, Sage Publications, New Delhi, 2018.
6. Shanti Bhushan Mishra and ShashiAlok, *Handbook of Research Methodology*, Educreation, Bilaspur, 2017.
7. Wayne C. Booth, Gregory G. Colomb, and Joseph M. Williams: *The Craft of Research*, University of Chicago Press, Chicago, 2016.
8. Dr. Ranjit Kumar: *Research Methodology: A Step-by-Step Guide for Beginners*, Sage Publications, New Delhi, 2014.
9. Geoffrey Marczyk, David DeMatteo, and David Festinger: *Essentials of Research Design and Methodology*, John Wiley and Sons, New Jersey, 2005.

10. Sharan B. Merriam: *Qualitative Research: A Guide to Design and Implementation* Jossey Boss, San Francisco, 2009.
11. Mark Balnaves & Peter Caputi: *Introduction to Quantitative Research Methods: An Investigative Approach*, Sage Publications, New Delhi, 2001.
12. Relevant web resources suggested by the teacher and college librarian.

#### **IV. Co-Curricular Activities: (Lecturer Participation: Total 10 Hours)**

##### 1. For Teachers:

- Demonstrate the practical ground level activities to undertake a project designing thereby encourage the students to participate in activities like group discussion, student seminars etc.
- Organize guest lectures and interactions with people who engage in the research projects.
- Engage the students in any model research project work and make the students to prepare a report and present.

##### 2. For Student:

- Students shall actively participate in the above co-curricular activities and gain practical knowledge, understanding, ideas and skills related to the subject.
- Students shall demonstrate those skills by using any model research project and make report and presentation in the class.

##### 3. Suggested Project Work Format:

Title Page, Student Details, Acknowledgments, Index of Contents;  
*Objectives, Step-wise process, Findings, Conclusion & References*

##### 4. Max Marks for Field Work Report: 05

##### 5. Unit Tests/Internal Examinations

###

**Section – A**

**Answer any FIVE of the following.**  
**5x5=25M**

1. What is scientific research  
శాస్త్రీయ పరిశోధన అనగానేమి?
2. Limitations of Research in social science  
సామాజిక శాస్త్రములో పరిశోధనకున్న పరిమితులు
3. Write about Evaluation Research  
మూల్యాంకన పరిశోధన గూర్చి వ్రాయుము
4. What are the components of a good Research Proposal  
మంచి పరిశోధనయొక్క భాగాలు ఏవి?
5. What are qualities of good questionance  
మంచి ప్రశ్నావలి యొక్క లక్షణాలు ఏవి?
6. Bibliography  
గ్రంథ పట్టిక
7. Plagiarism Test  
దోపిడి పరీక్ష
8. Write about Editing of data  
దత్తాంశ విజిటింగ్ గూర్చి వ్రాయుము

**Section – B**

**Answer the following.**

**5x10=50M**

9. A) Explain the importance social science research  
సామాజిక శాస్త్రీయ పరిశోధన ప్రాముఖ్యతను వివరింపుము

Or

- B) Write about the methods of ensuring objectivity in social science Research.

సామాజిక శాస్త్రాల లక్ష్యాల నిర్ధారణ పద్ధతులను గూర్చి వ్రాయుము

10. A) Write about pure and Applied Research  
శుద్ధ మరియు అను వర్తిత పరిశోధన గూర్చి వ్రాయుము

Or

B) Distinguish between exploratory and descriptive research  
వివరణాత్మక మరియు అవివరణాత్మక మధ్య విభేదించుము

11. A) Explain the various methods to collect the primary data  
ప్రాథమిక దత్తాంశ సేకరణ వివిధ పద్ధతులను వివరింపుము

Or

B) Explain the criterion for selecting a Research problem.  
పరిశోధన సమస్య ఎంపికలలో గల ప్రాముఖ్యతను వివరింపుము

12. A) Explain the importance of graphical presentation of data  
రేఖాపటముల ద్వారా దత్తాంశ సమర్పణ ప్రాముఖ్యతను వివరింపుము

Or

B) Explain the importance of statistical Analysis of data  
దత్తాంశ విశ్లేషణ ప్రాముఖ్యతను వివరింపుము

13. A) Explain the various types of Research report  
పరిశోధన రిపోర్ట్‌లోని వివిధ రకాలను వివరింపుము

Or

B) Write about the outlines of a good Research Report  
మంచి పరిశోధన రిపోర్ట్ నమూనాలను గూర్చి వ్రాయుము.

**Minutes of Board of studies for the academic year 2022-2023(odd semesters) on 17-08-2022 , 10 AM in the department.**

**A G E N D A**

1. To evaluate the syllabus in relation to its socio-economic relevance.
2. To explore the possibilities of introducing any new subjects as additional optional subjects, or new combinations of subjects.
3. To assess the potential of the courses against the employment prospects.
4. To assess the compatibility of practical courses to theory courses.
5. Any other item with the permission of the Chairman.

**List of members in BOS**

<b>1</b>	Sri K.S.V.SAMBASIVA RAO, HOD, Electronics	Chairman	Sd/-
<b>2</b>	Smt.P.SAILAJA ,S.R.R& C.V.R govt degree college ,vijayawada.	University Nominee	Sd/-
<b>3</b>	Dr..B.T.P.MADHAVProfessor & Associate dean (Academic research), Department of ECE, K.L.University.	Subject Expert	Sd/-
<b>4</b>	Dr.A. NARENDRA BABU, Professor, Department of ECE, LakkireddyBalareddy Engineering College.	Subject Expert	Sd/-
<b>5</b>	Sri.N.VARAPRASAD ARETE IT SOLUTIONS, Vijayawada.	industrialist	Sd/-
<b>6</b>	Smt.J.PRASMAI KANTI, Head, dept.of.Electronics, SDMSDegree College, Vijayawada.	Alumnus	Sd/-
<b>6</b>	D. SRINIVASA REDDY, Lecturer in Electronics.	Member	Sd/-
<b>7</b>	G. NAGA SASANKA, Lecturer in Electronics.	Member	Sd/-

Department of Electronics							
List of the courses revised / introduced in III & V Semesters 2022-23							
S.NO	Title of the course	Course code	Offers in SEM	Type of the paper	Year of Introduced	OBE with BTL	Offered to
1	MICROPROCESSOR SYSTEMS	ELET31A	III	CORE	2022-23(100)	YES	B.Sc(MECs&Ca.M.E)
2	MICROPROCESSOR SYSTEMS LAB	ELEP31A	III	CORE LAB	2022-23(100)	YES	B.Sc(MECs&Ca.M.E)
3	INDUSTRIAL ELECTRONICS	ELESET01	V/VI	SEC ELECTIVE A	<b>2022-23</b>	YES	B.Sc (CAME & M.E.Cs)
4	INDUSTRIAL ELECTRONICS LAB	ELESEP01	V/VI		<b>2022-23</b>	YES	B.Sc(CAME & M.E.Cs)
5	ELECTRONIC INSTRUMENTATION	ELESET02	V/VI	SEC ELECTIVE A	<b>2022-23</b>	YES	B.Sc(CAME & M.E.Cs)
6	ELECTRONIC INSTRUMENTATION LAB	ELESEP02	V/VI		<b>2022-23</b>	YES	B.Sc(CAME & M.E.Cs)
7	EMBEDDED SYSTEM DESIGN	ELESET03	V/VI	SEC ELECTIVE B	<b>2022-23</b>	YES	B.Sc(CAME & M.E.Cs)
8	EMBEDDED SYSTEM DESIGN LAB	ELESEP03	V/VI		<b>2022-23</b>	YES	B.Sc(CAME & M.E.Cs)
9	CONSUMER ELECTRONICS	ELESET04	V/VI	SEC ELECTIVE B	<b>2022-23</b>	YES	B.Sc(CAME & M.E.Cs)
10	CONSUMER ELECTRONICS LAB	ELESEP04	V/VI		<b>2022-23</b>	YES	B.Sc(CAME & M.E.Cs)
11	DATA COMMUNICATION AND NETWORKING	ELESET05	V/VI	SEC ELECTIVE C	<b>2022-23</b>	YES	B.Sc(CAME & M.E.Cs)
12	DATA COMMUNICATION AND NETWORKING LAB	ELESEP05	V/VI		<b>2022-23</b>	YES	B.Sc(CAME & M.E.Cs)
13	VLSI DESIGN	ELESET06	V/VI	SEC ELECTIVE C	<b>2022-23</b>	YES	B.Sc(CAME & M.E.Cs)
14	VLSI DESIGN LAB	ELESEP06	V/VI		<b>2022-23</b>	YES	B.Sc(CAME & M.E.Cs)
15	INTERNET OF THINGS	ELESET07	V/VI	SEC ELECTIVE D	<b>2022-23</b>	YES	B.Sc(CAME & M.E.Cs)
16	INTERNET OF THINGS LAB	ELESEP07	V/VI		<b>2022-23</b>	YES	B.Sc(CAME & M.E.Cs)
17	VERILOG HDL WITH PROGRAMMING	ELESET08	V/VI	SEC ELECTIVE D	<b>2022-23</b>	YES	B.Sc(CAME & M.E.Cs)
18	VERILOG HDL WITH PROGRAMMING LAB	ELESEP08	V/VI		<b>2022-23</b>	YES	B.Sc(CAME & M.E.Cs)

### Resolutions:

1. It is resolved and recommend to introduce MICROPROCESSOR SYSTEM with course code ELET31A in III semester of B.Sc.(M.E.Cs,CA.M.E) for the batch of students admitted in 2021-22 and onwards. For the syllabus and model question paper vide page number from 5 to 8.



2. It is resolved and recommend to introduce Microprocessor LAB with course code ELEP31A in III semester of B.Sc.(M.E.Cs,CA.M.E) for the batch of students admitted in 2021-22 and onwards. For the syllabus and model question paper structure vide page number 9.
3. It is resolved and recommend to introduce INDUSTRIAL ELECTRONICS with course code ELESET01 in V/VI semester of B.Sc.(M.E.Cs,CA.M.E)for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from10 to 12
4. It is resolved and recommend to introduce INDUSTRIAL ELECTRONICS with course code ELESEP01 in V/VI semester of B.Sc.(M.E.Cs,CA.M.E)for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper structure vide page number 13.
5. It is resolved and recommend to introduce ELECTRONIC INSTRUMENTATION with course code ELESET02 in V/VI semester of B.Sc.(M.E.Cs,CA.M.E)for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 13 to 15
6. It is resolved and recommend to introduce ELECTRONIC INSTRUMENTATION with course code ELESEP02 in V/VI semester of B.Sc.(M.E.Cs,CA.M.E)for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from16
7. It is resolved and recommend to introduce EMBEDDED SYSTEM DESIGNwith course code ELESET03 in V/VI semester of B.Sc.(M.E.Cs,CA.M.E)for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from17 to 19
8. It is resolved and recommend to introduce EMBEDDED SYSTEM DESIGNwith course code ELESEP03 in V/VI semester of B.Sc.(M.E.Cs,CA.M.E)for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from20
9. It is resolved and recommend to introduce CONSUMER ELECTRONICSwith course code ELESET04 in V/VI semester of B.Sc.(M.E.Cs,CA.M.E)for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 21 to 24
10. It is resolved and recommend to introduce CONSUMER ELECTRONICS LAB with course code ELESEP04 in V/VI semester of B.Sc.(M.E.Cs,CA.M.E)for the batch of

students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 25

11. It is resolved and recommend to introduce DATA COMMUNICATION AND NETWORKING with course code ELESET05 in V/VI semester of B.Sc.(M.E.Cs,CA.M.E)for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 26 to 28
12. It is resolved and recommend to introduce DATA COMMUNICATION AND NETWORKINGLAB with course code ELESEP05 in V/VI semester of B.Sc.(M.E.Cs,CA.M.E)for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 29 to 30
13. It is resolved and recommend to introduce VLSI DESIGN with course code ELESET06 in V/VI semester of B.Sc.(M.E.Cs,CA.M.E)for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 31 to 32
14. It is resolved and recommend to introduce VLSI DESIGN LAB with course code ELESEP06 in V/VI semester of B.Sc.(M.E.Cs,CA.M.E)for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number 33
15. It is resolved and recommend to introduce INTERNET OF THINGSwith course code ELESET07 in V/VI semester of B.Sc.(M.E.Cs,CA.M.E)for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 34 to 36.
16. It is resolved and recommend to introduce INTERNET OF THINGSLAB with course code ELESEP07 in V/VI semester of B.Sc.(M.E.Cs,CA.M.E)for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number 37
17. It is resolved and recommend to introduce VERILOG HDL WITH PROGRAMMING with course code ELESET08 in V/VI semester of B.Sc.(M.E.Cs,CA.M.E)for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 38 to 40
18. It is resolved and recommend to introduce VERILOG HDL WITH PROGRAMMING LABwith course code ELESEP08 in V/VI semester of B.Sc.(M.E.Cs,CA.M.E)for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number 41.



## P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

Siddhartha Nagar, Vijayawada – 520 010

*Autonomous - ISO 9001 – 2015 Certified*

### **Title of the Paper: MICROPROCESSOR SYSTEM**

**Offered to:** B.SC (M.ECs, CA.M.E) –ELET31A

**Course Type:** Core (TH) /Core(p)

**Year of Introduction:** 2022-23

**Year of Revision:**

**Percentage of Revision:**

**Semester :** III

**Credits :** 4

**Hours Taught:** 60 hrs. Per Semester

**Max.Time :** 3 Hours

### **Course Prerequisites:**

Introduction of Digital Electronics

### **COURSE OBJECTIVES:**

1. To understand basic architecture of 16 bit & interfacing of 16 bit microprocessor with memory and peripheral chips involving system design.
2. To understand RISC based microprocessors and concept of multi core processors.
3. The student can gain good knowledge on microprocessor and implement in practical applications
4. Design system using memory chips and peripheral chips for 16 bit 8086 microprocessor.
5. To Understand and devise techniques for faster execution of instructions, improve speed of operations and enhance performance of microprocessors.

### **Course outcomes:**

At the end of the course, the student will be able to

CO<sub>1</sub>: To gain knowledge on micro processors 8086 architectures and implement in practical application.

CO<sub>2</sub>: To understand and device techniques for faster execution of instructions, improve the speed of operation and enhance performance of microprocessor.

CO<sub>3</sub>: To apply various assembly language programs and test using moderate complexity.

CO<sub>4</sub>: To understand the memory chips and peripheral chips for 16-bit 8086 microprocessor.

CO<sub>5</sub>: To remember multi core processor and its advantages of ARMTDMIS.

**UNIT -I:** (15Hrs)

### **CPU ARCHITECTURE**

Introduction to Microprocessor, INTEL -8085( $\mu$ P) Architecture, CPU, ALU unit, Register organization, Address, data and control Buses. Pin configuration of 8085, 8086 Architecture, Evaluation of Microprocessor, Internal operation, Pin description. Instruction format, Machine language instructions, Instruction Execution timing, Addressing modes

**UNIT -II:** (10 Hrs)

INSTRUCTION SET: Data transfer Instruction, Logical Instructions, Arithmetic Instructions, Branch Instructions, Flag Manipulation , Shift and rotate Instruction, Loop Instruction

**UNIT -III:** (15Hrs)

Assembly Language Programming, Programmes for Addition, Subtraction, Multiplication, Find the largest and smallest number in an array. Modular programming:–Linking and Relocation, Stacks, Procedures, Interrupts and Interrupt Routines.

**UNIT -IV:** (10Hrs)

Basic 8086 Configurations – Minimum mode and Maximum Mode, Interrupt Priority Management I/O Interfaces: Serial Communication interfaces, Parallel Communication, Programmable Timers, Keyboard and display, DMA controller

**UNIT -V:** (10Hrs)

### **ARM PROCESSOR**

Introduction to 16/32 bit processors, Arm architecture & organization, Arm based MCUs, Programming model, Instruction.

### **TEXT BOOKS:**

1. Microcomputer Systems the 8086/8088 family – YU-Cheng Liu and Glenn SA Gibson
2. Microcontrollers Architecture Programming, Interfacing and System Design – Raj Kamal Chapter: 15.1, 15.2, 15.3, 15.4.1
- 3.8086 and 8088 Microprocessor by Tribel and avatar singh

## REFERENCES:

1. Microprocessors and Interfacing – Douglas V.Hall
2. Microprocessor and Digital Systems – Douglas V. Hall
3. Advanced Microprocessors & Microcontrollers - B.P.Singh & Renu Singh  
– New Age
4. The Intel Microprocessors – Architecture, Programming and Interfacing –  
Bary B. Brey.
5. Arm Architecture reference manual –Arm ltd.

**Course Delivery method:** Face-to-face / Blended

**Course has focus on:** Foundation and Skill Development

**Websites of Interest:** <https://en.wikipedia.org/wiki/VHDL>

**Activities:** Assignments, PPT's.



## P.B .SIDDHARTHA COLLEGE OF ARTS &SCIENCE

### Title: Microprocessor systems

#### MODEL PAPER

#### SECTION-A

Answer any FIVE of the following:

5x5=25M

1. Describe the flag register of 8086.-(co2)-(L1)
2. Explain about register organization of 8086. (Co1)-(L2)
3. Define interrupt vector table and explain.-(co3)-(L2)
4. Draw the block diagram of DMA.-(co4)-(L3)
5. Write short notes on shift instructions.(co2)-(L1)
6. Discuss about minimum mode configuration.(co4)-(L2)
7. Compare series communication and parallel communication systems.  
(Co4)-(L4)
8. Write briefly about instruction format.-(co1)-(L2)

#### SECTION-B

**Answer the following:**

**5x10=50M**

- 9.a) Explain the functional block diagram of 8085 microprocessor and explain each block in detail.-(co1)-(L1)  
(or)  
b) Draw the architecture of 8086 microprocessor and explain each block in detail.(co1)-(L1)
10. a) Discuss briefly about (i) Data transfer (ii) Arithmetic (iii) branch instructions.(co2)-(L2)  
(or)  
b) Explain briefly about Flag manipulation and loop instructions.-(co2)-(L2)
11. a) Explain the procedure concepts of assembly language and What are differences between procedures and interrupts-(co3)-(L3)  
(or)  
b) Write an ALP program to find the largest number in an array.-(co3)-(L3)
12. a) With a neat block diagram explain programmable peripheral interface(8255) and explain BSR & I/O mode. (Co4) -(L3)  
(or)  
b) Explain about the block diagram of 8279 of keyboard/display and each pin in detail.(co4)-(L3)
13. a) Briefly explain the architectural features of ARM processor.(co5) -(L1)  
(or)  
b) Write about programming model of ARM in detail.-(co5)-(L3)



## P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

Siddhartha Nagar, Vijayawada – 520 010

*Autonomous - ISO 9001 – 2015 Certified*

### **Title of the Paper: MICROPROCESSOR LAB**

**Offered to:** B.SC (M.ECs, CA.M.E) –ELEP31A

**Course Type:** Core (P)

**Year of Introduction:** 2022-23    **Year of Revision:**    **Percentage of Revision:**

**Semester :** III

**Credits :1**

CO1: To understand basic programmes in microprocessor.

CO2: To understand software simulation using emu8086mp

CO3: To understand multi core processor and its advantages

#### LAB LIST:

1. PROGRAM TO ADD TO DECIMAL NUMBERS
2. SUBTRACTION OF TWO DECIMAL NUMBERS
3. ADD TWO WORDS IN MEMORY LOCATION AND STORE THE RESULT IN SUBSEQUENT MEMORY LOCATION
4. TO INTERCHANGE TWO WORDS FROM 4100 AND 4102 LOCATION
5. PROGRAM TO COMPUTE LOGICAL ONES IN A WORD AND STORE THE RESULT IN MEMORY
6. PROGRAM TO CONVERT TWO BCD NUMBERS IN TO HEX
7. PROGRAM TO CONVERT HEX NUMBER IN TO BCD NUMBER.
8. PROGRAM TO FIND THE SQUARE ROOT OF A GIVEN NUMBER.
9. Interfacing Experiments using 8086 microprocessor (DEMO):
  - (i). Traffic Light Controller
  - (ii). Elevator,
  - (iii) 7-segment display

. LAB MANUAL ARE SUPPLIED BY DEPARTMENT



## P.B. Siddhartha College of Arts & Science, Vijayawada-10

Course Code: ELESET01

Offered to: B.Sc. (M.E.Cs,CA.M.E)

Domain Subject: ELECTRONICS

Semester – V

Max. Marks: 100 (CCIA: 25+ SEE: 75)

Theory Hrs./Week: 3

### Course 6B: INDUSTRIAL ELECTRONICS

**Type of the Course : Skill Enhancement Course (Elective: Theory), Credits: 04**

Course Outcomes: Students at the successful completion of the course will be able to:

**CO1:** Identify various facilities required to set up a basic Instrumentation Laboratory

**CO2:** Acquire a critical knowledge of various Electrical Instruments used in the Laboratory

**CO3:** Demonstrate skills in using instruments like Rectifiers, Multimeters, Power supplies,

**CO4:** An Voltage Regulators etc. through hands-on experience.

**CO5:** Understand the Principle and operation of different Electronic Heating devices

#### UNIT-I (09 hours)

Rectifiers and filters: Rectifiers– Half wave, full-wave and bridge rectifiers- Efficiency- Ripple factor- Regulation – Harmonic components in rectified output – Types of filters- Choke input (inductor) filter-Shunt capacitor filter- Voltage Regulators: Transistor Series voltage regulator - Transistor Shunt voltage regulator – Three terminal regulators (78XX and 79XX).

#### UNIT-II (09 hours)

Power Supplies: Block diagram of regulated power supply – A simple regulated transistorized power supply (circuit and working) – Principle and working of switch mode power supply (SMPS).

#### UNIT-III (09 hours)

Voltage Multipliers: Half wave voltage doubler, Full wave voltage doubler, Voltage Tripler circuit diagram and working mentioning of applications of voltage multipliers.

#### UNIT-IV (09 hours)

Controlled rectifiers: SCR Half wave rectifier circuit, working with wave forms, mathematical analysis for resistive load - SCR Full wave rectifier circuit, working with wave forms, mathematical analysis for resistive load – SCR as inverter parallel and series circuits.

#### UNIT-V (09 hours) :

Heat effects: Resistance, inductance and dielectric heating. Principle of operations and its applications.

#### **Text Books:**

1. Unified Electronics Volume II by J.P Agarwal and Amit Agarwal.
2. Industrial Electronics, S.B. Biswas, Dhanapur Rai & Sons.
3. Industrial Electronics, G.K. Mithal, Khanna Publishers.

#### **Reference Books:**

1. Electronic Devices and Circuits – G.K. Mithal.
2. Electronic Devices and Circuits-Millman and Halkias- Tata Mc Graw Hill (TMH)
3. Microelectronics- J. Millman and A. Grabel – TMH

**Course Delivery method:** Face-to-face / Blended

**Course has focus on:** Foundation and Skill Development

**Websites of Interest:** <https://www.etcourse.com/news-blog/what-industrial-electronics-and-what-does-it-look-2022>

**Co-curricular Activities:** Assignments, PPT's, Major projects





# P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE,VIJAYAWADA– 10

Model Question Paper

## TITLE: INDUSTRIAL ELECTRONICS

Course Code: ELESET01

Maximum Marks: 75M

Time: 3 Hours

Pass Minimum: 30M

### SECTION-A

Answer any FIVE of the following:

5x5=25M

1. Write about shunt capacitor filter (CO1)-L1
2. Explain simple regulated transistorized power supply (CO2)-L1
3. Discuss about power supplies (CO2)-L1
4. Write about voltage multipliers (CO3)-L1
5. Write a short note on controlled rectifiers (CO3)-L1
6. Write about mathematical analysis for resistive load of SCR full wave rectifier? (CO4-L1)
7. Explain about resistive heat effect and inductive heat effect. (CO4)-L1
8. Write about voltage regulators. (CO5)-L1

### SECTION-B

Answer the following:

5x10=50M

- 9.a) Discuss about different types rectifiers (CO1)-L1  
(or)  
b) Define filter and discuss various types of filters? (CO1)-L1
10. a) Discuss briefly about SMPS and description of each block. (CO2)-L1  
(or)  
b) Draw the block diagram of regulated power supply(RPS). (CO2)-L1
11. a) Explain half wave voltage doubler and full wave voltage doubler (CO3)-L1  
(or)  
b) What are the applications of voltage multipliers.(CO3)-L1
12. a) Discuss briefly about SCR half wave rectifier circuit with wave forms (CO4)-L1  
(or)  
b) Discuss briefly about SCR full wave rectifier circuit and write about mathematical analysis for resistive load. (CO4)-L1
- 13.a) Explain different types of heat effects and its operations? (CO5)-L1  
(or)  
b) Define heat effect and discuss about dielectric heating. (CO5)-L1



## P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

Siddhartha Nagar, Vijayawada – 520 010

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Title of the Paper: **INDUSTRIAL ELECTRONICS LAB**

Offered to: B.SC (M.ECs,CA.M.E), ELESEP01

Course Type: Core (P)

Year of Introduction: 2020-21

Year of Revision:

Percentage of Revision:

Semester : V

Credits : 1

Max. Marks: 50(CCIA: 10+ SEE: 40)

Practical Hrs./Week : 3

### **Course 6B: INDUSTRIAL ELECTRONICS**

**CO1:** To make the students to design triggering circuits of SCR.

**CO2:** To introduce power electronics components from which the characteristics of SCR TRIAC, IGBT and MOSFET.

**CO3:** To perform experiments on various converters

**CO4:** To analyze the operations of converters.

**CO5:** To analyze the series and parallel inverter.

### **LABS:**

1. D.C Power supply and filters.
2. Transistor series regulator
3. Transistor as a shunt regulator
4. Voltage regulator using IC-7805 and IC-7905.
5. Voltage doubler using diodes
6. Voltage Tripler using diodes
7. SCR VI characteristics.
8. SCR Series inverter
9. SCR parallel inverter.

LAB MANUAL ARE SUPPLIED BY DEPARTMENT.



## PARVATHANENI BRAHMAYYA Siddhartha College of Arts & Science, Vijayawada

Course Code: ELESET02

Offered to: B.Sc. (M.E.Cs)

Domain Subject: ELECTRONICS

Semester – V

Max. Marks: 100 (CCIA: 25+ SEE: 75)

Theory Hrs./Week: 3

### Course 7B: ELECTRONIC INSTRUMENTATION

Type of the Course: Skill Enhancement Course (Elective: Theory), Credits: 04

I. Course Outcomes: Students at the successful completion of the course will be able to:

CO1: Design a system, component or process to meet desired needs in electrical engineering.

CO2: Measurement of R,L,C ,Voltage, Current, Power factor , Power, Energy

CO3: Ability to balance Bridges to find unknown values.

CO4: .Ability to measure frequency, phase with Oscilloscope, Digital voltmeters

CO5: Ability to measure strain, displacement, Velocity, Angular Velocity, temperature, Pressure ,Vacuum, and Flow.

#### UNIT-I (09hrs)

##### Measurements:

Basic block diagram of measurement system, Accuracy and precision, resolution, sensitivity, linearity, Errors, systematic and random errors, standards & calibrations of an instrument.  
Applications of instrument

#### UNIT –II (09hrs)

**Basic Measurement Instruments:** DC measurement-ammeter, voltmeter, ohm meter, AC measurement, Digital voltmeter systems (integrating and non-integrating). Digital Multimeter; Block diagram principle of measurement of I, V, C. Accuracy and resolution of measurement. **Measurement of Impedance-** A.C. bridges, Measurement of Self Inductance (Anderson's bridge), Measurement of Capacitance (De Sauty bridge), Measurement of frequency (Wien's bridge).

#### UNIT-III (09hrs)

**Lock-in-amplifier:** Basic Principles of phase locked loop (PLL), Phase detector (XOR& edge triggered), Voltage Controlled Oscillator (Basics, varactor), lock and capture.

**Signal Generators:** Function generator, Pulse Generator, (Qualitative only).

#### UNIT-IV (09hrs)

##### Analytical instruments

Spectrophotometer, working with block diagram, features of spectrophotometer,

**P<sub>H</sub>** meter - principle working with block diagram, features of **P<sub>H</sub>** meter.

##### Temperature Transducers

Standards and calibration, Fluid expansion and metal expansion type transducers, like bimetallic strip, Thermometer, RTD, Thermo couple and their characteristics.

#### UNIT-V : ( 09hrs)

Direct digital control (DDC), Distributed control system (DCS),

**PLC'S: Block diagram**, hardware, PLC operation, basic logic program (ladder logic),

Applications of PLC'S

## **TEXT BOOKS**

1. Introduction to instrumentation and control By A.K.Ghosh
2. Sensors and transducers PHI 2Ed By D.Patranabis.
3. Instrument measurement analysis By Nakra and chaudhry.

## **Reference Books:**

1. W.D. Cooper and A. D. Helfrick, Electronic Instrumentation and Measurement Techniques, Prentice Hall (2005).
2. E.O. Doebelin, Measurement Systems: Application and Design, McGraw Hill Book - fifth Edition (2003).
3. David A. Bell, Electronic Devices and Circuits, Oxford University Press (2015).

**Course Delivery method:** Face-to-face / Blended

**Course has focus on:** Foundation and Skill Development

**Websites of Interest:**

[https://en.wikipedia.org/wiki/Measuring\\_instrument#Electricity.2C\\_electronics\\_and\\_electrical\\_e  
ngineering](https://en.wikipedia.org/wiki/Measuring_instrument#Electricity.2C_electronics_and_electrical_engineering)

**Co-curricular Activities:** Assignments, PPT's, Mini projects

**P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE, VIJAYAWADA – 10**

Model Question Paper

**TITLE: ELECTRONIC INSTRUMENTATION**

Course Code: SECELET04

Maximum Marks: 75M

Time: 3 Hours

Pass Minimum: 30M

**SECTION-A**

**Answer any FIVE of the following: 5x5=25M**

1. Define the terms (i)Accuracy (ii)Precision. (CO1)-(L1)
2. What is Digital multimeter? (CO2)-(L2)
3. Write a short note on lock in amplifier?(CO2)-(L1)
4. Explain about thermo couple and characteristics.(CO4)-(L2)
5. Write short notes on Temperature Transducer. (CO4)-(L2)
6. Mention some applications of PLC.(CO5)-(L2)
7. Define the terms (i)Resolution (ii)Sensitivity.(CO1)-(L1)
8. Explain about ohm meter.(CO2)-(L1)

**SECTION-B**

**Answer the following: 5x10=50M**

- 9.a) Explain briefly about the block diagram of measurement system. (CO1)-(L1)  
(or)
- b) Define the following terms in brief (a)Systematic errors. (b) Random errors. : (CO1)-(L2)
10. a) Explain about Digital voltmeter systems in brief. (CO2)-(L1)  
(or)
- b) Discuss briefly about measurement of frequency(Wien bridge) . (CO2)-(L3)
11. a) Define principle and working characteristics of PLL. (CO3)-(L1)  
(or)
- b) Explain briefly about function generator. (CO3)-(L2)
12. a) Draw the block diagram of Spectrophotometer and explain. (CO3)-(L3)  
(or)
- b) Define principle and working characteristics of P<sub>H</sub> meter. (CO3)-(L2)
- 13.a) Discuss briefly about Direct digital control. (CO4)-(L1)  
(or)
- b) Explain about the block diagram of PLC and it's operation.(CO4)-(L2)



## P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

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### **Title of the Paper:** ELECTRONIC INSTRUMENTATION LAB

Offered to: B.SC (M.ECs), ELESEP02

Course Type: Core (P)

Year of Introduction: 2020-21

Year of Revision:

Percentage of Revision:

Semester: V

Credits : 1

Max. Marks: 50(CCIA: 10+ SEE: 40)

Practical Hrs./Week : 3

### **Course 7B: ELECTRONIC INSTRUMENTATION**

Type of the Course: Skill Enhancement Course (Elective: Practical), Credits: 01

I. Course Outcomes: Students at the successful completion of the course will be able to

CO1: Measurement of temperature and Resistance.

CO2: Measurement of R,L,C ,Voltage, Current, Power factor , Power, Energy.

CO3: Ability to balance Bridges to find unknown values.

CO4: .Ability to measure frequency, phase with Oscilloscope.

CO5: Ability to use Digital voltmeters

### LABS:

1. CHARACTERISTICS OF- LDR.
2. CHARACTERISTICS OF -THERMISTER.
3. CHARACTERISTICS OF- THERMOCOUPLE.
4. TO FIND THE UN-KNOWN FREQUENCY BY USING WHEAT STONE BRIDGE.
5. TO FIND THE UN-KNOWN CAPACITANCES BY USING WHEAT STONE BRIDGE.
6. MEASUREMENT OF CURRENT USING GALVANOMETER.
7. CHARACTERISTICS OF- LED.
8. CHARACTERISTICS OF- RTD.

LAB MANUAL ARE SUPPLIED BY DEPARTMENT



# PARVATHANENI BRAHMAYYA Siddhartha College of Arts & Science, Vijayawada

Course Code: ELESET03

Domain Subject: ELECTRONICS

Max. Marks: 100 (CCIA: 25+ SEE: 75)

Offered to: B.Sc. (CA.M.E.)

Semester – V

Theory Hrs./Week: 3

## Course 7C: EMBEDDED SYSTEM DESIGN

Type of the Course: **Skill Enhancement Course** (Elective Theory), Credits: **04**

I. Course Outcomes: Students at the successful completion of the course will be able to:

CO1: Acquire a basic knowledge about fundamentals of microcontrollers

CO2: Acquire a basic knowledge about programming and system control to perform a specific task.

CO3: Acquire knowledge about devices and buses used in embedded networking

CO4: Develop programming skills in embedded systems for various applications.

CO5: Acquire knowledge about Life cycle of embedded design and its testing.

### **UNIT 1: (09Hrs)**

#### **Introduction to Embedded Systems:**

Embedded systems overview, Design Challenge, Processor Technology, IC Technology, and Design Technology.

### **UNIT 2: (09Hrs)**

#### **Custom Single Purpose Processor – Hardware Development:**

Introduction, Combinational logic, Sequential logic, Custom Single Purpose Processor Design, RT-Level Custom Single-Purpose Processor.

### **UNIT 3: (09Hrs)**

#### **General Purpose Processor – Software Development:**

Introduction, Basic Architecture, Operation, Programmer's View, ASIPs, and Development Environment: Host and Target Machines, Linker / Locators for Embedded Software, Getting Embedded Software into the target system. Debugging Techniques: Testing on your Host Machine, and Instruction Set Simulators

### **UNIT 4: (09Hrs)**

#### **RTWA for Embedded Systems:**

Introduction, Timers, Counters and Watchdog Timers, UART, Pulse Width Modulators, LCD Controllers, Keypad Controllers, Stepper Motor Controllers, Analog – to – Digital Converters, and Real Time Clocks

## **UNIT 5: (09Hrs)**

### **Advanced Communication Principles:**

Parallel Communication, Serial Communication, Wireless Communication, **Serial Protocols:** I<sup>2</sup>C, CAN, FireWire, and USB. **Parallel Protocols:** PCI BUS and ARM BUS. **Wireless Protocols:** IrDA, Bluetooth, and IEEE 802.11.

### **TEXT BOOKS:**

1. Embedded System Design – A Unified Hardware / Software Introduction By **Frank Vahid / Tony Givargis** – WILEY EDITION.

**Chapter 1:** 1.1, 1.2, 1.3, 1.4, 1.5

**Chapter 2:** 2.2, 2.3, 2.4, 2.5

**Chapter 3:** 3.2, 3.3, 3.4, 3.5, 3.6

**Chapter 4:** 4.2, 4.3, 4.4, 4.5, 4.6, 4.7, 4.8, 4.9

**Chapter 6:** 6.8, 6.9, 6.10, 6.11

### **REFERENCES:**

1. Embedded Systems Architecture, Programming and Design – 2<sup>nd</sup> Edition By **Raj Kamal** – Tata McGraw-Hill Education.
2. An Embedded Software Premier - **David E- Siman**, PEARSON Education
3. Embedded / real - time systems - **DR. K.V.K.K. Prasad**, dreamtech
4. The art of programming Embedded systems, **Jack G. Ganssle**, academic press
5. Intelligent Embedded systems, **Louis L. Odette, Adison Wesly**, 1991

**Course Delivery method:** Face-to-face / Blended

**Course has focus on:** Foundation and Skill Development

**Websites of Interest:** [https://en.wikipedia.org/wiki/Embedded\\_system](https://en.wikipedia.org/wiki/Embedded_system)

**Co-curricular Activities:** Assignments, PPT's, Mini projects



**P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE, VIJAYAWADA – 10**

Model Question Paper

**TITLE: EMBEDDED SYSTEM DESIGN**

Course Code: SECELET06

Maximum Marks: 75M

Time: 3 Hours

Pass Minimum: 30M

**SECTION-A**

Answer any FIVE of the following:

5x5=25M

1. Write about embedded system. (CO1-L1)
2. Explain about Combinational logic. (CO2-L1)
3. Discuss about instruction set simulator. (CO2-L2)
4. Write about watchdog timers. (CO3-L1)
5. Write a short note on Bluetooth. (CO4-L3)
6. Write short notes on ARM bus. (CO5-L2)
7. Explain about IC technology. (CO2-L3)
8. Draw the pin diagram for Pulse width modulators. (CO4-L1)

**SECTION-B**

Answer the following:

5x10=50M

9.a) List various application areas of embedded systems and give examples for each application area? (CO2-L1)

(or)

b) Explain about different technologies used in embedded systems. (CO1-L2)

10. a) Explain the design of custom single processor. (CO3-L1)

(or)

b) Discuss about RT-level custom single processor. (CO3-L2)

11. a) Explain about different debugging techniques. (CO5-L1)

(or)

b) Describe the function of linker/locator for embedded software. (CO3-L3)

12. a) Interface ADC 0801 with 8051 to convert -5V -0 +5V analog voltage to digital equivalent, draw hardware and write appropriate program? (CO4-L2)

(or)

b) Discuss briefly about Stepper motor controllers. (CO4-L3)

13.a) Distinguish between parallel and serial communication Principles. Explain USB Serial Protocol. (CO1-L2)

(or)

b). Write a short note on (a)PCI BUS and (b) ARM BUS. (CO5-L1)



**P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE**

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**Title of the Paper: EMBEDDED SYSTEM DESIGN LAB**

Offered to: B.SC (M.ECs,CA.M.E), ELESEP03

Course Type : Core (P)

Year of Introduction: 2020-21

Year of Revision:

Percentage of Revision:

Semester : V

Credits : 1

Max. Marks: 50(CCIA: 10+ SEE: 40)

Practical Hrs./Week : 3

**Course 7C: EMBEDDED SYSTEM DESIGN LAB**

Type of the Course: Skill Enhancement Course (Elective: Practical), Credits: 01

I. Course Outcomes: Students at the successful completion of the course will be able to

**Peripherals Interfacing to 89s51/52**

1. INTERFACING LED TO 8051 MICROCONTROLLER (KEIL SOFTWARE).
2. INTERFACING BUZZER TO 8051 MICROCONTROLLER (KEIL SOFTWARE).
3. INTERFACING RELAY TO 8051 MICROCONTROLLER (KEIL SOFTWARE).
4. INTERFACING SEVEN SEGMENTS TO 8051 MICROCONTROLLER (KEIL SOFTWARE).
5. INTERFACING *LCD* TO 8051 MICROCONTROLLER (KEIL SOFTWARE).
6. INTERFACING *DC MOTOR* TO 8051 MICROCONTROLLER (KEIL SOFTWARE).
7. INTERFACING *STEPPER MOTOR* TO 8051 MICROCONTROLLER (KEIL SOFTWARE).
8. INTERFACING *MATRIX KEYPAD* TO 8051 MICROCONTROLLER (KEIL SOFTWARE).
9. INTERFACING COMPUTER'S *SERIAL* PORT TO 8051 MICROCONTROLLER (KEIL SOFTWARE).
10. INTERFACING *ADC0804* TO 8051 MICROCONTROLLER (KEIL SOFTWARE).

LAB MANUAL ARE SUPPLIED BY DEPARTMENTS.



## P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

Siddhartha Nagar, Vijayawada – 520 010

*Autonomous - ISO 9001 – 2015 Certified*

Course Code: ELESET04

Offered to: B.Sc. (M.E.Cs)

Domain Subject: ELECTRONICS

Semester – V

Max. Marks: 100 (CCIA: 25+ SEE: 75)

Theory Hrs./Week: 3

### Course 6C: CONSUMER ELECTRONICS

**Type of the Course : Skill Enhancement Course (Elective: Theory), Credits: 04**

I. Course Outcomes: Students at the successful completion of the course will be able to:

**CO1:** The Student can gain a good knowledge of microwave ovens and implement them in practical applications.

**CO2:** The Student can gain a good knowledge of Washing Machines and implement in practical applications.

**CO3:** The Student can gain a good knowledge of Air conditioners and Refrigerators and implement them in practical applications.

**CO4:** The Student can gain a good knowledge of Digital access devices and implement in practical applications.

**CO5:** Ability to measure strain, displacement, velocity, angular velocity, temperature, pressure Vacuum, and Flow.

#### UNIT-1 (09hrs)

Microwave Ovens – Microwaves (Range used in Microwave ovens) – Microwave oven block diagram – LCD timer with alarm – Single-Chip Controllers – types of Microwave oven – Wiring and Safety instructions – care and Cleaning.

#### Unit – II(09hrs)

Washing Machines – Electronic controller for washing machines – Washing machine hardware and software – Types of washing machines – Fuzzy logic washing machines Features of washing machines.

#### Unit – III(09hrs)

Air Conditioners And Refrigerators - Air Conditioning – Components of air conditioning systems – All water air conditioning systems – All air conditioning systems – Unitary and central air conditioning systems – Split air conditioners.

#### Unit – IV(09hrs)

Home/Office Digital Devices – Fascimile machine – Xerographic copier – calculators – Structure of a calculator – Internal organization of a calculator – Servicing electronic calculators – Digital clocks – Block diagram of a digital clock.

#### Unit – V(09hrs)

Digital Access Devices – Digital computer – Internet access – online ticket reservation – functions and networks – barcode scanner and decoder – Electronic Fund Transfer – Automated Teller Machines(ATMs) – Set-Top boxes – Digital cable TV – Video on demand.

### TEXTBOOKS:

1. S.P. Bali, Consumer Electronics – Pearson Education, New Delhi, 2005.
2. R.G. Gupta Audio and Video systems Tata McGraw Hill (2004)

**Course Delivery method:** Face-to-face / Blended

**Course has focus on:** Foundation and Skill Development

**Websites of Interest:** [https://en.wikipedia.org/wiki/Consumer\\_electronics](https://en.wikipedia.org/wiki/Consumer_electronics)

**Co-curricular Activities:** Assignments, PPT's, Mini projects

**P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE, VIJAYAWADA – 10**

Model Question Paper

**TITLE: CONSUMER ELECTRONICS**

Course Code: ELESET04

Maximum Marks: 75M

**Time: 3 Hours**

**Pass Minimum: 30M**

**SECTION- A**

Answer any FIVE of the following

5 X 5 = 25 Marks

1. Explain the microwave oven safety instructions. (CO1)-L1
2. What are the uses of a microwave oven? (CO1)-L1
3. Explain the features of the washing machine. (CO2)-L1
4. Explain the different types of washing machines. (CO2)-L1
5. Explain the working of the air conditioning system. (CO3)-L1
6. What is a unitary air conditioning system. (CO3)-L1
7. How servicing the electronic calculators. (CO4)-L1
8. What is facsimile machine? And give the two uses of it. (CO5)-L1

**SECTION- B**

Answer the following

5x10=50 Marks

9. a) Draw the block diagram of the microwave oven and explain each block. (CO1)-L1  
(OR)
- b). Explain the LCD timer with alarm in the washing machine. (CO1)-L1
10. a) What is FUZZY logic washing machine? (CO2)-L1  
(OR)
- b) Explain the hardware details of washing machine. (CO2)-L1
11. a) Explain the different components of air-condition system. (CO3)-L1  
(OR)
- b) Explain the working of split air condition. (CO3)-L1
12. a) Draw the block diagram of digital clock and explain it. (CO4)-L1  
(OR)
- b) Draw the structure of calculator. And explain each one. (CO4)-L1
13. a) What is network and explain its online ticket reservation procedure. (CO5)-L1  
(OR)
- b) Explain the details about digital cable TV. (CO5)-L1



## P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

Siddhartha Nagar, Vijayawada – 520 010

*Autonomous - ISO 9001 – 2015 Certified*

**Title of the Paper: CONSUMER ELECTRONICS LAB**

Offered to: B.SC (M.ECs), ELESEP04

Course Type : Core (P)

Year of Introduction: 2020-21

Year of Revision:

Percentage of Revision:

Semester : V

Credits : 1

Max. Marks: 50(CCIA: 10+ SEE: 40)

Practical Hrs./Week : 3

**Course 6C: CONSUMER ELECTRONICS LAB**

Type of the Course: Skill Enhancement Course (Elective: Practical), Credits: 01

I. Course Outcomes: Students at the successful completion of the course will be able to

**LAB:** (At least two Activities should be done)

1. Study of PA systems for various situations – Public gathering, closed theatre/ Auditorium, Conference room, Prepare Bill of Material(Costing)
2. Installation of Audio/Video systems – site preparation, electrical requirements, cables and connectors
3. Market Survey of products (at least one from each module)
4. Identification of block and tracing the system, Assembly and Disassembly of system using Toolkit
5. Assembly and Disassembly of system and printer.

**NOTE:** one activity as directed in practical course is equivalent to 4 experiments.

LAB MANUAL ARE SUPPLIED BY DEPARTMENT.



## **P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE**

Siddhartha Nagar, Vijayawada – 520 010

*Autonomous - ISO 9001 – 2015 Certified*

Course Code: ELESET05

Domain Subject: ELECTRONICS

Max. Marks: 100 (CCIA: 25+ SEE: 75)

Offered to: B.Sc. (M.E.Cs)

Semester – V

Theory Hrs./Week: 3

### **Course 7C: DATA COMMUNICATION AND NETWORKING**

**Type of the Course: Skill Enhancement Course (Elective: Theory), Credits: 04**

I. Course Outcomes: Students at the successful completion of the course will be able to:

CO1: To understand network communication using the layered concept, Open System Interconnect (OSI) and the Internet Model.

CO2: To understand various types of transmission media, network devices; and parameters of evaluation of performance for each media and device.

CO3: To understand the concept of flow control, error control and LAN protocols; to explain the design of, and algorithms used in, the physical, data link layers

CO4: The working principles of LAN and the concepts behind physical and logical addressing.

CO5: The functions performed by a Network Management System and to analyze connection establishment and congestion control with respect to TCP Protocol.

#### **UNIT –I (09 Hrs):**

Data Communication and its Components – Introducing of Network, Types of Networks: Personal Area Network, wide Area Network.

#### **UNIT-II (09 hrs):**

Network Topologies: Bus Topology, Star Topology, Ring Topology, Mesh Topology, Tree Topology, Hybrid, Topology.

#### **UNIT-III (09 Hrs):**

Transmission Media's - Guided Media: Twisted pair Cable, Coaxial Cable, Optical Fiber Cable. Un-Guide Media: Radio Waves, Microwaves, Infrared.

#### **UNIT-IV (09 Hrs):**

Data Transmissions: Digital – To – Digital Conversion (line coding only), Analog – To – Digital Conversion (PCM only), Digital – To – Analog (ASK only) Analog – To – Analog Transmission (AM only) – Transmission Modes (Parallel and Serial).

#### **UNIT – V (09 Hrs):**

Frequency Division Multiplexing, Time Division Multiplexing Wave Division Multiplexing. Modems: Traditional Modems, Cable Modems.

#### **TEXT BOOKS**

1. Data communication and Networking (2 Edition) By Behrouz A.Forouzan.
2. Data and Communication by Stallings Williams.
3. Computer Networks By Kurose James F

**SECTION- A**

**Answer any FIVE of the following**

**5 X 5 = 25M**

1. Explain data communication and its components. (CO1)-L1
2. Write about start topology. (CO1)-L2
3. Explain the features of the optical fiber cable. (CO2)-L1
4. Explain the different types of transmission medias. (CO2)-L3
5. Explain the working of PCM transmitter. (CO3)-L1
6. Write a short note on transmission modes. (CO3)-L2
7. Explain the types of traditional modems. (CO4)-L1
8. What is multiplexing? Explain time division multiplexing. (CO5)-L1

**SECTION- B**

**Answer the following**

**5x10=50M**

9. a) What are the different types of networks? Explain in detail. (CO1)-L1  
(OR)  
b). Explain the OSI reference model with neat diagram. (CO1)-L2
10. a) what is network topology? Explain the different network topologies (CO2)-L1  
(OR)  
b Explain the tcp/ip reference model with neat diagram. (CO2)-L2
11. a) Explain the Shielded twisted pair (STP) and Unshielded twisted pair(UTP). (CO3)-L1  
(OR)  
b) Write briefly notes on unguided media. (CO3)-L2
- 12.a) Explain AM , FM and PM with neat diagram. (CO4)-L3  
(OR)  
b) Explain ASK, FSK , and PSK with neat diagram. (CO4)-L1
13. a) Explain the concept of MODEM. (CO5)-L2  
(OR)  
b) Explain the various types of multiplexing. (CO5)-L1



## **P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE**

Siddhartha Nagar, Vijayawada – 520 010

*Autonomous - ISO 9001 – 2015 Certified*

### **Title of the Paper: DATA COMMUNICATION AND NETWORKING LAB**

Offered to: B.SC (M.ECs), ELESEP05

Course Type: Core (P)

Year of Introduction: 2020-21

Year of Revision:

Percentage of Revision:

Semester : V

Credits : 1

Max. Marks: 50(CCIA: 10+ SEE: 40)

Practical:Hrs./Week : 3

Type of the Course: Skill Enhancement Course (Elective: Practical), Credits: 01

I. Course Outcomes: Students at the successful completion of the course will be able to

C01: To understand the principles and operations behind various application layer protocols like HTTP, SMTP, FTP.

C02: To understand the working principle of various communication protocols.

co3: To analyze the various routing algorithms.

co4: To know the concept of data transfer between nodes

1. TO STUDY DIFFERENT TYPES OF TRANSMISSION MEDIA.
2. TO STUDY THE SERIAL INTERFACE USING RS-232.
3. TO STUDY LAN USING STAR TOPOLOGY
4. TO STUDY LAN USING BUS TOPOLOGY
5. TO STUDY LAN USING TREE TOPOLOGY
6. TO STUDY CONFIGURE MODEM OF COMPUTER
7. TO STUDY CONFIGURE HUB/SWITCH
8. ANALOG TO DIGITAL CONVERSION
9. DIGITAL TO ANALOG CONVERSION.

LAB MANUAL ARE SUPPLIED BY DEPARTMENT.





## P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

Siddhartha Nagar, Vijayawada – 520 010

*Autonomous - ISO 9001 – 2015 Certified*

Course Code: ELESET06

Offered to: B.Sc. (M.E.Cs)

Domain Subject: ELECTRONICS

Semester – V

Max. Marks: 100 (CCIA: 25+ SEE: 75)

Theory Hrs./Week: 3

### Course 6C: VLSI DESIGN

**Type of the Course :Skill Enhancement Course (Elective: Theory), Credits: 04**

I. Course Outcomes: Students at the successful completion of the course will be able to:

CO1: Identify the various IC fabrication methods.

CO2: Express the Layout of simple MOS circuit using Lambda based design rules.

CO3: Apply the Lambda based design rules for subsystem design

CO4 : Differentiate various FPGA architectures.

CO5: Design an application using Verilog HDL.

#### UNIT-I (09 hrs)

Integrated Circuit- Definition, Classification's, and Advantages of IC's – MOS Transistors: Enhancement type, Depletion type, Modes of NMOS – CMOS, Fabrications: n-Well, p-Well.

#### UNIT-II (09 hrs)

NMOS Inverter – CMOS inverter – VLSI Design Flow: Design Specification's Design Entry – Examples of (Circuit Diagrams only) NMOS, PMOS and CMOS.

#### UNIT-III (09 hrs)

Basic logic gates in CMOS – Complex logic gate: Two, Three inputs of CMOS NAND gate – Combinational Logic: Two and Three inputs of CMOS NOR gate – Compound gates in CMOS.

#### UNIT-IV (09 hrs)

**VHDL:** Brief History, Logical, Relational, Arithmetic, Shift and Rotate Operators, Data types.

**Verilog HDL:** Brief History, Logical, Relational, Arithmetic, Shift and Rotate Operators, Data types

– Comparison of VHDL and Verilog HDL.

#### UNIT-V (09 hrs)

Data – Flow Description's and HDL programs:-

Basic Logic Gates, Universal Gates, Half-Adder, Multiplexer, Magnitude Comparator, Binary Adder.

#### TEXT BOOKS

1. VLSI Design by Vilas S.Baged.
2. VHDL and Verilog programming By Nazeih M.Botros.
3. VLSI Design By A.Albert Raj and T.Latha.

**P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE, VIJAYAWADA – 10**

Model Question Paper

**TITLE: VLSI DESIGN**

Course Code: ELESET06

Maximum Marks: 75M

**Time: 3 Hours**

**Pass Minimum: 30M**

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SECTION- A

Answer any FIVE of the following

5 X 5 = 25 Marks

1. Explain about classification of IC's(CO1)-L1
2. What are advantages of IC's (CO1)-L1
3. Difference between NMOS and PMOS (CO2)-L1
4. Explain about CMOS circuit diagram. (CO2)-L1
5. Discuss about basic logic gates in CMOS (CO3)-L1
6. What is a Compound gates in CMOS. (CO3)-L1
7. Comparison between VHDL and Verilog HDL. (CO4)-L1
8. What is Data types (CO5)-L1

SECTION- B

Answer the following

5x10=50 Marks

9. a)Discuss briefly about MOS transistors (CO1)-L1  
(OR)
- b). Explain about different modes of NMOS (CO1)-L1
10. a)Discuss about NMOS inverter (CO2)-L1  
(OR)
- b) Explain briefly about VLSI design flow (CO2)-L1
11. a)Explain about 2&3 inputs of CMOS NOR gate. (CO3)-L1  
(OR)
- b) Discuss about 2&3 inputs of CMOS NAND gate (CO3)-L1
- 12.a) Discuss about different operators in VHDL (CO4)-L1  
(OR)
- b) Discuss about different operators in **Verilog HDL** (CO4)-L1
  
13. a) Explain about data flow in HDL. (CO5)-L1  
(OR)
- b) Write a program on Magnitude comparator.(CO5)-L1



## **P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE**

Siddhartha Nagar, Vijayawada – 520 010  
*Autonomous - ISO 9001 – 2015 Certified*

### **Title of the Paper: VLSI DESIGN LAB**

**Offered to:** B.SC (M.ECs), ELESEP06

**Course Type:** Core (P)

**Year of Introduction:** 2020-21    **Year of Revision:**                      **Percentage of Revision:**

**Semester:** V

**Credits : 1**

Max. Marks: 50(CCIA: 10+ SEE: 40) Practical Hrs./Week : 3

**Course 6C: VLSI DESIGN**

C01: Familiarize with the CAD tool to write HDL programs.

C02: Understand simulation and synthesis of digital design.

C03: Program FPGAs/CPLDs to synthesize the digital designs.

C04: Interface hardware to programmable ICs through I/O ports.

- 1) BASIC GATES CIRCUIT
- 2) UNIVERSAL GATES
- 3) HALF –ADDER
- 4) FULL –ADDER
- 5) MULTIPLEXER
- 6) DECODER
- 7) S-R LATCH
- 8) D-LATCH
- 9) MAGNITUDE COMPARATOR
- 10) BINARY ADDER

LAB MANUAL ARE SUPPLIED BY DEPARTMENT.



## P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

Siddhartha Nagar, Vijayawada – 520 010

*Autonomous - ISO 9001 – 2015 Certified*

**Course Code:** ELESET07

**Offered to:** B.Sc. (M.E.Cs)

**Domain Subject:** ELECTRONICS

**Semester – V**

**Max. Marks:** 100 (CCIA: 25+ SEE: 75)

**Theory Hrs./Week:** 3

**Course 6A:** INTERNET OF THINGS

**Credits:** 04

**Type of the Course:** Skill Enhancement Course (Elective: Theory)

**Course Outcomes:** Students at the successful completion of the course will be able to:

**CO1:** Understand IoT applications and architecture

**CO2:** Identify sensors needed for different IoT solutions

**CO3:** Understand the component parts of an IoT network

**CO4:** Understand how data is managed in an IoT network.

**CO5:** Analyse protocols and determine best fit for different IoT applications

### **Unit - I (9 hours)**

**Fundamentals of IoT:** Introduction, Definitions & Characteristics of IoT, IoT Architectures, Physical & Logical Design of IoT, Enabling Technologies in IoT, History of IoT, IoT frameworks, IoT and M2M. **Applications of IoT:** Home Automation, Smart Cities, Energy, Retail Management, Logistics, Agriculture, and Health.

### **Unit - II (09 hours)**

**Sensors Networks:** Definition, Types of Sensors, Types of Actuators, Examples and Working.

**IoT Development Boards:** Arduino IDE & Board Types, RaspberriPi Development Kit and NODEMCU. **Wireless Sensor Networks:** WSN and IoT.

### **Unit - III (09 hours)**

**Wireless Technologies for IoT (WPAN Technologies):** IEEE 802.15.4, Zigbee, NFC, Z-Wave, and BLE. **IP Based Protocols for IoT:** IPv6, 6LowPAN, LoRA, AMPQ, CoAP, MQTT.

### **Unit - IV (09 hours)**

**Arduino Simulation Environment:** Arduino Uno, Setting up the IDE, Writing Arduino Software, Arduino Libraries, Basics of Embedded C programming for Arduino, Interfacing LED, push-button, buzzer and LCD with Arduino.

**Sensor & Actuators with Arduino:** Overview of Sensors working, Analog and Digital Sensors, Interfacing of Temperature, Humidity, Motion, Light and Gas Sensors with Arduino, Interfacing of Actuators like Relay and Servo Motor with Arduino.

### **Unit - V (10 hours)**

**Developing IOT's:** Implementation of IoT with Arduino, Connecting and using various IoT Cloud Based Platforms such as Blynk, Thingspeak, AWS IoT, Google Cloud IoT Core and Security Issues in IoT.

**Text books:**

1. Handbook of Modern Sensors, physics, design and applications – Jacob Fraden
2. Introduction to data communication and networking by Wayne Tomasi
3. NoSQL Distilled - A Brief Guide to the Emerging World of Polyglot Persistence

**Reference Books:**

4. Data science and Big Data Analytics\_EMC (Publication: Willey)
5. An Introduction to Probability and statistics – V K Rohatgi, A.K.Md.Ehsanes Sale

**Course Delivery method:** Face-to-face / Blended

**Course has focus on:** Foundation and Skill Development

**Websites of Interest:**

[https://www.internetsociety.org/iot/?gclid=CjwKCAjw\\_b6WBhAQEiwAp4HyIIPF5\\_HuiilmtdwMSiVWZiVa5msf0av9XE8lsMuxXHTUonkdpDCvoRoCFAgQAvD\\_BwE](https://www.internetsociety.org/iot/?gclid=CjwKCAjw_b6WBhAQEiwAp4HyIIPF5_HuiilmtdwMSiVWZiVa5msf0av9XE8lsMuxXHTUonkdpDCvoRoCFAgQAvD_BwE)

**Co-curricular Activities:** Assignments, PPT's, Major projects

**TITLE:** INTERNET OF THINGS

**Course Code:** ELESET07

**Time:** 3 Hours

**Maximum Marks:** 75M

**Pass Minimum:** 30M

**SECTION-A**

**Answer any FIVE of the following:**

**5x5=25M**

1. Write about an Characteristics of IOT. (CO1-L2)
2. Difference between IOT & M2M. (CO2-L1)
3. Discuss briefly about Sensors. (CO2-L2)
4. Write a short note on WSN. (CO3-L1)
5. Write about 6 LOWPAN protocols. (CO3-L2)
6. Write a sketch to interface MQ-2 GAS sensor to Arduino. (CO5-L2)
7. Write a sketch to interface DHT11 to Arduino. (CO5-L3)
8. Write a sketch to interface LED to NODEMCU and control with Blynk APP. (CO4-L1)

**SECTION-B**

**Answer the following:**

**5x10=50M**

9. a) Explain about block diagram of IOT architecture. (CO1-L1)  
(or)  
b) How the Technologies are enabling in IoT give its importance. (CO1-L2)
10. a) Discuss about different types of sensor and actuators. (CO2-L1)  
(or)  
b) Give the significance of Arduino UNO and Raspberry-Pi. (CO3-L1)
11. a) Write about IEEE 802.15.4 wireless technology in IOT. (CO3-L1)  
(or)  
b) Explain LORA network protocol and its applications. (CO3-L3)
12. a) Design an embedded system, to control fan speed using different temperatures. (CO4-L2)  
(or)  
b) Design an embedded system, to control door on motion detection. (CO4-L1)
13. a) Design an embedded system, to upload GAS values in Thingspeak IoT cloud. (CO5-L3)  
(or)  
b) Design an embedded system, to control 4-channel relay using Blynk APP. (CO5-L2)



**P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE**  
**Siddhartha Nagar, Vijayawada – 520 010**  
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Title of the Paper: **IOT LAB**

**Offered to:** B.SC (M.ECs), ELESEP07

**Course Type:** Core (P)

**Year of Introduction:** 2020-21

**Year of Revision:**

**Percentage of Revision:**

**Semester:** V

**Credits:** 1

**Max. Marks:** 50(CCIA: 10+ SEE: 40)

**Practical Hrs./Week :** 2

**Course 6A: IOT LAB**

Type of the Course: Skill Enhancement Course (Elective: Practical), Credits: 01

I. Course Outcomes: Students at the successful completion of the course will be able to

CO1: Acquire the skills to design a small IoT device.

CO2: Connect various sensors, actuators, etc to Arduino board.

CO3: Connect the things to Internet

CO4: Design a small mobile app to control the sensors.

CO5: Deploy a simple IoT device.

1. Understanding Arduino UNO Board and Components
2. Installing and work with Arduino IDE
3. Blinking LED sketch with Arduino
4. Simulation of 4-Way Traffic Light with Arduino
5. Using Pulse Width Modulation
6. LED Fade Sketch and Button Sketch
7. Analog Input Sketch (Bar Graph with LEDs and Potentiometer)
8. Digital Read Serial Sketch (Working with DHT/IR/Gas or Any other Sensor)
9. Working with Adafruit Libraries in Arduino
10. Spinning a DC Motor and Motor Speed Control Sketch
11. Working with Shields
12. Design APP using Blink App or Things peak API and connect it LED bulb.
13. Design APP Using Blynk App and Connect to Temperature, magnetic Sensors.

**LAB MANUAL ARE SUPPLIED BY DEPARTMENT.**



## P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

Siddhartha Nagar, Vijayawada – 520 010

*Autonomous - ISO 9001 – 2015 Certified*

Course Code: ELESET08

Offered to: B.Sc. (M.E.Cs)

Domain Subject: ELECTRONICS

Semester – V

Max. Marks: 100 (CCIA: 25+ SEE: 75)

Theory Hrs./Week: 3

### **Course 7A: VERILOG HDL WITH PROGRAMMING**

**Type of the Course : Skill Enhancement Course (Elective: Theory), Credits: 04**

I.Course Outcomes: Students at the successful completion of the course will be able to:

**CO1:** Identity the suitable Abstraction level for a particular digital design

**CO2:** Model digital systems in Verilog HDL using gate level and data flow modelling

**CO3:** Write behavioral models of digital circuits using Verilog HDL

**CO4:** Design and verify the functionality of digital circuit /system using test benches and performs timing, delay modeling.

**CO5:** Apply Verilog HDL for switch level modeling.

#### **Unit – I:**

**09L**

Introduction, Evaluation of computer aided digital design, Emergency of HDL, Typical design flow, Hierarchical Modeling Concepts- Design Methodologies Modules and instances. Components of Simulation, Basic concepts, Data types, System Tasks and Compiler Directives;

#### **Unit – II:**

**09L**

Modules and Ports- List of ports, Port Declaration, Port Connections Rules, Inputs, outputs, in-outs, Gate-Level Modeling-Gate types, Gate Delays and Dataflow Modeling-Continuous Assignments, Delays, Expressions, Operators, and Operands, operator types.

#### **Unit – III:**

**09L**

Behavioral Modeling- Structured Procedures, Procedure Assignment, Timing Controls and Conditional Statements, Multi-way branching, Tasks and functions.

#### **Unit – IV:**

**09L**

Switch level modeling-MOS switches, CMOS switches, Bi-directional switches, power and ground, Resistive switches, Delay specifications on switches, Examples.

#### **Unit – V:**

**09L**

Logic Synthesis with verilog HDL-Impact of logic synthesis, verilog HDL synthesis, Synthesis Design flow- RTL to gates, RTL description and Translation, Verification of gate-level , Modeling Tips for logic synthesis.



### **Text books:**

1. Verilog HDL-A guide to Digital Design and Synthesis-Samir Palnitkar-ISBN: 0134516753; Pub: Prentice Hall PTR.
2. Fundamentals of Digital logic with Verilog design-2e, Brown Vranesic, McGrawHill education, ISBN-13:978-0-07-066724-2.

### **Reference books:**

1. M.D.Ciletti, "Modeling, Synthesis and Rapid Prototyping with the Verilog HDL", PHI, 1999.
2. J Bhaskar, "A Verilog HDL Primer (3/e)", Kluwer, 2005.

**Course Delivery method:** Face-to-face / Blended

**Course has focus on:** Foundation and Skill Development

**Websites of Interest:** <https://en.wikipedia.org/wiki/VHDL>

**Activities:** Assignments, PPT's, Major projects

Model Question Paper

TITLE: VERILOG –HDL PROGRAMMING

Course Code: ELESET08

Maximum Marks: 75M

Time: 3 Hours

Pass Minimum: 30M

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**SECTION – A**

Answer any Five of the following

5x5=25M

1. Explain about Evolution of computer aided digital design (CO1)-L1
2. Write about Data types of HDL. (CO1)-L1
3. Discuss briefly about ports, list of ports and declaration of ports in a module. (CO2)-L1
4. Explain about Buf/NOT gates in brief with truth tables (CO2)-L1
5. Discuss briefly about various loop conditions in behavioral modeling (CO3)-L1
6. Explain the difference between task and functions (CO3)-L1
7. Write a 2x1 mux using switch level modeling (CO4)-L1
8. Explain briefly about synthesis design flow. (CO5)-L1

**Section – B**

Answer ALL following questions:

5 x 10 = 50 M

9. (a) Explain about basic building block in verilog module in detail. (CO1)-L1

(or)

- (b) (i) Discuss briefly about system task operations in verilog.(CO1)-L2

10. (a) Discuss briefly about the Gate level delays in Gate level modeling. (CO2)-L1

(or)

- (b) Explain different types of expression, operands, operators used in data flow modeling. (CO2)-L2

11. (a) Explain about Procedural assignments for Blocking and non-blocking statements. (CO3)-L1

(or)

- (b) Discuss about the conditional statements in behavioral modeling. (CO3)-L2

12. (a) Discuss about different types of MOS switches used in switch level modeling (CO4)-L1

(or)

- (b) Explain about the Resistive and Bi-directional switches in switch level modeling. (CO4)-L2

13. (a) Explain about Logic synthesis with verilog and computer aided logic synthesis in brief. (CO5)-L1

(or)

- (b) Discuss about modeling tips for logic synthesis flow in brief. (CO5)-L2



# P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

Siddhartha Nagar, Vijayawada – 520 010

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## **Title of the Paper: VERILOG –HDL PROGRAMMING**

**Offered to:** B.SC (M.ECs), ELESEP08

**Course Type :** Core (P)

**Year of Introduction:** 2020-21

**Year of Revision:**

**Percentage of Revision:**

**Semester :** V

**Credits :** 1

Max. Marks: 50(CCIA: 10+ SEE: 40) Practical Hrs./Week : 3

Course 7A: **VERILOG –HDL PROGRAMMING**

C01: Familiarize with the CAD tool to write HDL programs.

C02: Understand simulation and synthesis of digital design.

C03: Program FPGAs/CPLDs to synthesize the digital designs.

C04: Interface hardware to programmable ICs through I/O ports.

### **LAB LIST:**

- 1) BASIC GATES CIRCUIT
- 2) UNIVERSAL GATES
- 3) HALF –ADDER
- 4) FULL –ADDER
- 5) MULTIPLEXER
- 6) DECODER
- 7) S-R LATCH
- 8) D-LATCH
- 9) MAGNITUDE COMPARATOR
- 10) BINARY ADDER

### **SOFTWARES:**

**Write the verilog code for the following problems and simulate using any HDL simulator/synthesis software (Xilinx)**

LAB MANUAL ARE SUPPLIED BY DEPARTMENT

**DEPARTMENT OF ENGLISH  
BOARD OF STUDIES – 2022-23**

The members of the Board of Studies of the Department of English met in the Department at 11 am on 22nd August, 2022 to discuss the following agenda.

**Syllabus and Model Paper**

**Members present:**

Dr. G. Srilatha HOD Dept of English  
 Prof. P. Hari Padma Rani Subject expert, Sri Padmavathi Mahila University, Tirupati  
 Dr. M. Koteswara Rao University Nominee – Krishna University  
 Dr. K. Santha Kumari Assistant Professor in English  
 Sri K. Perachary Lecturer in English  
 Smt. Ch. Anantha Sai Lakshmi Lecturer in English  
 Dr. Ch. Rajeswari Lecturer in English  
 Sri K. Siluva Raju Lecturer in English  
 Ms. K. Nutana Sai Lecturer in English  
 Smt. Bhanu Nareesha Lecturer in English  
 Dr. Naga Madhuri Assistant Professor in English, VR Siddhartha College, Vijayawada.

**RESOLUTIONS**

**List of courses revised and introduced**

<b>DEPARTMENT OF ENGLISH</b>								
<b>LIST OF THE COURSES REVISED/ INTRODUCED IN I &amp; V SEMESTERS -2022-23</b>								
S. No	Title Of The Course	Course Code	Offered In Semester	Type Of The Paper	Year Of Introduction	Year of Revision	OBE with BTL	Offered to (Name of the Programme)
1	<b>BUSINESS ENGLISH I</b>	ENGT15 A	I	First Language	2020-21	2022-23 (20%)	YES	B.Com.( A&F, TPP,BFSI & BPM), B.Sc.( M.S.Ds, CSCS, AI & ML ), BBA(General, RM,
2	<b>ENGLISH PRAXIS I</b>	ENGT11B	I	First Language	2020-21	2022-23 (only QP)	YES	B.A(EMS),B.Com.(G,CA),B.Sc.(M.PC, BZC, M.PCS, MECs, MSCa,
3	<b>CAMPUS TO CORPORATE</b>	ENGSET01	V	SEC (Elective)	2022-23	Introduced	YES	B.Com(BPM) & B.Sc.(CSCS)

- It is resolved and recommend the revised syllabus & model question paper of Business English with course code ENGT15A in I semester of B.Com.( A&F, TPP,BFSI & BPM), B.Sc.( M.S.Ds, CSCS, AI & ML ), BBA(General, RM, Business Analytics) from the batch of students admitted in 2022-23 and onwards. In place of Business English – I course code ENGT15. For the syllabi and model question paper vide page number from 3 to 6.

2. It is resolved and recommend the revised model question paper of **English Praxis-I** with course code **ENGT11B** in I semester of B.A(EMS),B.Com.( G,CA),B.Sc.(M.PC, BZC, M.PCS, MECs, MSCa, CaME, M.S.Cs, BCA) from the batch of students admitted in 2022-23 and onwards. In place of **English Praxis-I** course code ENGT11A. For the model question paper vide page number from 7 to 11.
  
3. It is resolved and recommend to introduce “Campus to Corporate” with course code ENGSET01 in V semester of B.Com.(BPM) and B.Sc.(CSCS) for the batch of students admitted in 2020-21 and onwards. For the syllabi and model question paper vide page number from 12 to 18.

**P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE**  
**DEPARTMENT OF ENGLISH**  
**Course Structure and Syllabi under CBCS**

Sl No.	Semester	Course Code	Name Of The Subject	Teaching Hours	Credits
1	I Semester	ENGT15A	Business English-I	4	3

**BUSINESS ENGLISH-I**

No. of Hours per Week: 4  
No. of Credits: 3

Max. Marks: 100  
External: 70M

Internal: 30M

**OBJECTIVE:** The main objective of this course is not only to facilitate the learners to acquire the linguistic competence with a focus on business contexts and environments but also to help them practice and enrich their communication skills by using English in specific business settings and situations and develop their intellectual, personal and professional abilities.

**COURSE OUTCOMES:**

At the end of the course, the learners will be able to:

- CO 1.** Recognize the basics of Communication, i.e., its process, components and besides types, giving them a clear perception of the nature of business communication, its global, ethical and legal aspects. **PO1**
- CO 2.** Establish and maintain interpersonal relationships with agility and transmit message through nonlinguistic signs focus is on both spoken and written form. **PO3**
- CO 3.** Identify the basic principles and elements of writing business letters and apply the fundamentals to compose business letters required for business transactions. **PO7**
- CO 4.** Produce clear and coherent writing in which the development, order and style are appropriate to task, purpose and addressees. **PO1**



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BUSINESS ENGLISH SYLLABUS FOR BBA/ BBA BA/BBA RM/ B.COM AF/B.COM

TPP/BPM/MSDS/CSCS/BSFI/AI&ML COURSES UNDER CBCS

**SEMESTER-I (2022-23)**

**COURSE CODE: ENG T15 Max Marks: 100**

**Course Title: Business English - I**

**No. of Hours per Week: 4**

**External: 70M**

**No. of Credits: 3**

**Internal: 30M**

**UNIT-I-Nature of Communication**

**P- 3-19 - 12 hours**

- Communication core, Process of communication ,Types of communication, Aspects – Global, Ethical and Legal ,Communication in organizations
- Review Questions/Exercises

**UNIT-II-Non Verbal Communication**

**P-28-52 - 14 hours**

- Importance-Means, Kinesics, Paralinguistics– Proxemics ,Chronemics - Haptics
- Review Questions/Exercises.  
**Barriers of Communication-** Causes- Linguistic, Psychological, Interpersonal-Cultural– Physical, Organizational Barriers
- Reviews Questions/Exercises

**UNIT-III Principles of Letter Writing**

**P-93-104 - 10 hours**

- **Nature and function of Letters**
- Principles/ Review Questions/Exercises

**UNIT-IV Quotations, orders and tenders**

**P-125-141- 12 hours**

- Inviting quotations
- Sending quotations
- Placing orders
- Inviting tenders
- Review Questions/Exercises

**UNIT-V Soft Skills**

**P- 163-192 - 12 hours**

- SWOC
- Attitude
- Emotional Intelligence.

Text book : 1. English Praxis Course-I, (A Course in Communication and Soft Skills)

2 **Business Correspondence and Report Writing**,RC Sharma and Krishna Mohan.



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**SEMESTER-I(2022-23)**

**Course Code: ENG T15 Max Marks: 70**

**Course Title: Business English-I**

**Pass Marks: 28No. of**

**Credits: 3**

**Time: 3 hours**

**FOR BBA, BBA BA, BBA RM, B.COM AF, B.COM TPP, BPM, BFSI, B.SC MSDS, CSCS AND AI&ML**

## **MODEL PAPER**

### **SECTION – A**

#### **I. Answer the following questions. 2x5=10M**

1. (a) Describe the process of communication, indicating clearly the role of each constituent element. L2

**Or**

- (b) What do you understand by the term semantic gap? Give examples to illustrate your answer. L2

2. (c) What are the advantages and disadvantages of relying exclusively on oral communication. L1

**Or**

- (d) What points should be borne in mind while communicating with a group of persons belonging to different cultures? L1

### **SECTION – B**

#### **II. Answer the following questions. 2x10=20M**

1. (a) "Non-verbal means are more important than verbal means in oral communication". Discuss this statement, giving examples in support of your answer. L2

**Or**

- (b) What kinds of meaning can be conveyed through various elements of voice? Give examples to illustrate your answer. L2

2. (c) Distinguish clearly between interpersonal and psychological barriers. L4

**Or**

- (d) "Linguistic barriers are the easiest to overcome." Do you agree with this view? Give examples in support of your answer. L4

### **SECTION – C**

#### **III. Answer the following questions. 2x5=10M**

1. (a) What are the principles of business correspondence? Explain the significance of each by giving suitable examples. L2

**Or**

- (b) Write a note on the various purposes for which a business letter is written. L2



2. (c) What is attitude? Discuss the importance of attitude. L2  
**Or**  
 (d) Write a note on the types of attitude. L2

**SECTION – D**

**IV. Answer the following questions 2x10=20M**

1. (a) Assuming that you are the purchase officer of DuroGarmnts Enterprises, Hoshipur Road, Rohtak – 124003. Place an order for the following items with the Modern Furniture Mart, Sardar Bazar, New Delhi – 110008. L4
- |                |    |
|----------------|----|
| Office Chairs  | 20 |
| Steel Almirahs | 07 |
| Wooden Tables  | 15 |
| File Racks     | 23 |

**Or**

- (b) Imagine that you are Mr.B.N.Sen, the Maintenance Officer of the Birla Education Trust, Pilani, Rajasthan. Write a letter of Inviting Quotations for a 3000 kVA transformer to Mr. SuhanSen, Purchase Officer, Giridhar Private Limited . L4
2. (c) What is SWOC analysis? L4  
**Or**  
 (d) Explain the five elements of emotional intelligence. L4

**SECTION –E**

**V. 1. Match the following. 5x1=5M L3**

- |                         |     |   |
|-------------------------|-----|---|
| 1. Chronemics           | ( ) | a. interactions in professional organizations |
| 2. Polysemy             | ( ) | b. a study of time management                 |
| 3. Paralinguistics      | ( ) | c. a word conveying a number of meanings      |
| 4. Dyadic communication | ( ) | d. language of voice                          |
| 5. Social Space         | ( ) | e. two persons                                |

**2. Fill in the blanks with appropriate words given in the box. 5x1=5M L3**

Kinesics, Communication, A Psychological Barrier, Claim or Complaint Letters, Proxemics

- \_\_\_\_\_ is the process of transmitting meaning from one person to another.
- A systematic study of the use of space in face to face interactions is called \_\_\_\_\_.
- \_\_\_\_\_ is a mental turbulence that distracts the attention of the interactants from encoding or decoding the message properly.
- Letters written to bring some mistakes to the notice of those who must own the responsibility for them are called \_\_\_\_\_.
- A study of non-verbal vocal cues that accompany the delivery of speech is termed as \_\_\_\_\_.



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**SEMESTER-I(2022-23)**

**COURSE CODE: ENGT11B**

**Course Title: English Praxis-I**

**External: 70M**

**Internal: 30M**

**Max. Marks: 100**

**No. of Hours per Week: 4**

**No. of Credits: 3**

**Course Structure and Syllabi under CBCS**

Sl No.	Semester	Course Code	Name Of The Subject	Teaching Hours	Credits
1	I Semester	ENGT11B	English Praxis-I	4	3

**OBJECTIVE:** The main objective of this course is to equip the learners with listening, speaking, reading, writing skills and also build up their ability to use Soft Skills in their professional and daily life effectively.

**COURSE OUTCOMES:**

At the end of the course, the learners will be able to:

**CO 1.** Gain more confidence in learning various kinds of listening techniques as well as create more effective strategies to improve one's ability to listen and to understand people.**PO2**

**CO 2.** Improve their speaking ability in English both in terms of fluency and comprehensibility and practice in using English to perform preliminary communicative functions required for their everyday social and professional interactions with others.**PO3**

**CO 3.** Explore basic elements of grammar and test their abilities in concord, modals, tenses, articles, prepositions, question tags and transformation of sentences.**PO7**

**CO 4.** Develop their written expression of thought and discover opportunities to build connections within the areas of punctuations, spelling and paragraph writing. **PO2**

**CO 5.** Formulate problem solving skills, making appropriate and responsible decisions, improve their attitude, emotional intelligence, telephone etiquette and interpersonal skills.**PO1**



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**SYLLABUS FOR B.A/ B.COM/B.SC COURSES UNDER CBCS**

**SEMESTER-I (2022-23)**

**Course Code: ENGT11B**

**Time: 3 Hours**

**Course Title: English Praxis– I**

**Max. Marks: 70**

**Credits: 3**

**Pass Marks: 28**

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**SYLLABUS**

**ENGLISH PRACTICE-I**

**A COURSE IN COMMUNICATION AND SOFT SKILLS**

**I. UNIT: Listening Skills      10 hours**

1. Importance of Listening
2. Types of Listening
3. Barriers to Listening
4. Effective Listening

**II. UNIT: Speaking Skills      10 hours**

1. Sounds of English: Vowels and Consonants
2. Word Accent
3. Intonation

**III. UNIT: Grammar      15 hours**

1. Concord
2. Modals
3. Tenses (Present/Past/Future)
4. Articles
5. Prepositions
6. Question Tags
7. Sentence Transformation (Voice, Reported Speech & Degrees of Comparison)
8. Error Correction

**IV. UNIT: Writing      10 hours**

1. Punctuation
2. Spelling
3. Paragraph Writing

**V. UNIT: Soft Skills      15 hours**

1. SWOC
2. Attitude
3. Emotional Intelligence
4. Telephone Etiquette
5. Interpersonal Skills

## REFERENCES:

1. A Course in Communication Skills and Soft Skills – I & II, Published by Orient Black Swan Private Limited, 2016.
2. A Course in Communication Skills and Soft Skills – III, Published by Orient Black Swan Private Limited, 2016.
3. “Communication Skills” by LeenaSen, published by Asoke K Ghosh, Prentice Hall of India Private Ltd – Delhi-110006.
4. “Effective English Communication for you” by Syamala, Emerald publishers New Edition-2007.
5. “A Practical Course in Spoken English” by J.K. Gangal, PHI Learning Private Ltd – 2010.
6. Murphy’s English Grammar, Published by Cambridge University Press, 2004.
7. Communication Skills in English, Published by Oxford University Press, 1990.
8. Modern English by N. Krishnaswamy, Published by Macmillan India Limited, 1998.



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**Course Code: ENGT11B**

**Title: English Praxis– I (Semester-I)**

**Credits: 3**

**Time: 3 Hours**

**Max. Marks: 70**

**Pass Marks: 28**

**MODEL PAPER**

**Section-A**

- I. Answer the following questions. 3X5=15M**
1. (a) What are the different types of listening? Describe in brief each of them. L2  
**Or**  
(b) What are the main barriers of listening? Expand each in your own words. L2
2. (c) How many consonant sounds are there in English language? What are they? L1  
**Or**  
(d) How many vowel sounds are there in English language? What are they? L1
3. (e) What are the elements that are essential to effective paragraph writing? L2  
**Or**  
(f) Write a paragraph on your favourite hobby. L2

**Section-B**

- II. Answer the following questions. 2X5=10M**
4. (a) Describe the process of listening. L2  
**Or**  
(b) What are the differences between listening and hearing? L2
5. (c) How many types of Intonations are there in English? What are they? L1  
**Or**  
(d) What is discriminative listening? Explain in your own words. L2

**Section-C**

- III. Answer the following as directed. L3 20X1=20M**
- A. i. My sister or my brothers \_\_\_\_\_ (is / are) arriving by flight today. **5x1 =5**  
ii. Cars and bikes \_\_\_\_\_ (is / are) my means of transportation.  
iii. A number of people \_\_\_\_\_ (has / have) written in about this subject.  
iv. The students, who all belonged to the same neighbourhood \_\_\_\_\_ (form / forms) a formidable cricket team.  
v. My dogs, along with my cat, \_\_\_\_\_ (is / are) chasing the ball.

- B.** i. Asha loves mangoes \_\_\_\_\_ we take some for her. (shall / might) **5x1 =5**  
 ii. \_\_\_\_\_ I borrow your pen, please. (could / would )  
 iii. They \_\_\_\_\_ play the drums as well as the guitar. (present ability )  
 iv. The bus \_\_\_\_\_ (will / must) be coming any minute. (expectedness)  
 v. She \_\_\_\_\_ (can, could) run fast. (to show ability )

- C** i. Raghu \_\_\_\_\_ (teach / teaches) art in a school in Mangalore. **5x1= 5**  
 ii. I \_\_\_\_\_ (live) in Delhi since 1998.  
 iii. He \_\_\_\_\_ (read) a novel now.  
 iv. She \_\_\_\_\_ (complete) her homework just now.  
 v. They \_\_\_\_\_ (go / goes) to school every day

- D.** i. Mary is \_\_\_\_\_ Australian, but her husband is \_\_\_\_\_ European. (**a, an , the**) **5x1 =5**  
 ii. \_\_\_\_\_ Ganges is a holy river. (**a, an , the**)  
 iii. His father is \_\_\_\_\_ university professor. (**a, an , the**)  
 iv. He was proud \_\_\_\_\_ his work. (**on, of**)  
 v. Seema sings well, \_\_\_\_\_? (**don't she, doesn't she**)

#### Section-D

**IV. Answer the following as directed. L3 2X5=10M**

- A.** i. John said I enjoyed the breakfast very much (punctuation marks) **5x1=5**  
 ii. Run as fast as you can he shouted (punctuation marks)  
 iii. Begining (correct the spelling)  
 iv. Restaurent (correct the spelling)  
 v. Parlament (correct the spelling)

- B.** i. My friend has completed the work. (change into passive voice ) **5x1=5**  
 ii. A beautiful picture was painted by Tony. (change into active voice )  
 iii. Jameel said, "I am going home tomorrow". (change into Indirect speech )  
 iv. The lotus is the most beautiful flower. (change into positive degree)  
 v. I speak the Telugu. (correct the sentence )

#### Section-E

**V. Answer the following questions. 3X5=15M**

6. (a) Explain how SWOC / T model can be used to analyze an Individual. **L2 1x5=5**  
**Or**  
 (b) What are the characteristics of Emotional Intelligence? Explain. **L2**
7. (c) What are the tips that will help you communicate better over the phone? **L1 1x5=5**  
**Or**  
 (d) How do you develop the positive attitude? **L1**
8. (e) What is the importance Attitude? **L2 1x5=5**  
**Or**  
 (f) What are the Interpersonal Skills? **L2**

\*\*\*



Parvathaneni Brahmayya  
Siddhartha College of Arts & Science, Vijayawada

Course Code: **ENGSET01**

Offered to: B.Sc. (CSCS) & B.Com BPM

Semester – V

Course Title: Campus to Corporate

Credits: 04

Max. Marks: 100 (75+25)

**Theory (40) + Practical (35)**

**Course Title: Campus to Corporate**

**Type of the Course: Skill Enhancement Course (Elective, Theory)**

Type of the Course: Skill Enhancement Course (Elective Theory)

I. Course Outcomes: Students at the successful completion of the course will be able to:

CO1: Overview of Corporate & BPS Industry (PO6)

CO2: Understand what is Grooming for Corporates (PO1, PO6)

CO3: Learn Elementary Level English Communication (PO1, PO6)

CO4: Learn Intermediate Level English Communication (PO1, PO6)

CO5: Learn Advanced Level English Communication (PO1, PO6)

**II. Syllabus:**

(Total Theory Hours: 45)

**Unit I:** Overview of Corporate & Business Process System Industry (5 Hours)

Corporate: Ice-breaker Session, History of Corporate, What is Corporate?

BPS Industry: What is BPS? History of BPS, Benefits of BPS, BPS Industry in World, BPS Industry in India, TCS BPS Difference between Campus and Corporate

Change Management (Understand the difference between campus and corporate life and prepare themselves for the same)

Awareness to Corporate Culture, Impact of your attitude and behaviour, Language Proficiency, Good relationship, Respect others, Self Confidence, zeal for continuous learning & Nonverbal communication.

**Unit II:** Grooming for Corporate (10 Hours)

Corporate Etiquettes: Dressing and Grooming Skills, Workplace Etiquette, Business Etiquette, Email Etiquette, Telephone Etiquette, Meeting Etiquette & Presentation Skills

Professional Competencies: Analytical Thinking, Listening Skills, Time Management, Team Skills, Assertiveness, Stress Management, Participating in Group Discussion, Interview Facing, Ownership and Attention to detail.

**Unit III:** Elementary Level English Communication (6 Hours)

Grammar- Parts of Speech, Articles, Tenses, Be-forms, Punctuation, Sentence Construction.

**Unit IV:** Intermediate Level English Communication (10 Hours)

Improving Vocabulary, Improving Writing Skills and Comprehension while interacting face to face.

**Unit V: Advanced Level English Communication (14 Hours)**

Narration of short stories, Interview Skills, Group Discussion, Social Conversation Skills, Presentation skills & One Act Plays.

**References/ Text Book/ e-books/websites**

1. Ramachandra K.K, Karthick K.K From Campus to Corporate, Pearson ISBN 978-93-325-5467-2 2016.
2. English in Use – I Orient Blackswan
3. English in Use – II Orient Blackswan

**Reference Materials on the Web/web-links:**

Speak— <https://www.speechactive.com> (it can record our speech to check our pronunciation) (for vowels and consonants)

Reading— <https://www.freeonlinetest.in> (for practice to reading) Correction of the sentences and sentence fillers— <https://meritnotes.com>

**Faculty & Student Resources:**

- Practical Assessments (Evaluation Rubric to assess the skills learnt) – 80% Allocation
- Written Examination – 20% Allocation

**Co-Curricular Activities:**

(Co-curricular activities shall not promote copying from textbook or from others work and shall encourage self/independent and group learning)

**A. Measurable**

1. Assignments (in writing and doing forms on the aspects of syllabus content and outside the syllabus content. Shall be individual and challenging)
2. Student seminars (on topics of the syllabus and related aspects (individual activity))
3. Quiz (on topics where the content can be compiled by smaller aspects and data (Individuals or groups as teams))
4. Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual participation and contribution of students shall be ensured (team activity))

**B. General**

1. Group Discussion
2. Try to solve MCQ's available online.





Parvathaneni Brahmaya  
Siddhartha College of Arts & Science, Vijayawada

Title of the Course: (Theory) Campus to Corporate

Course Code: **ENGSET01**

Offered to B.Sc. (CSCS) & B.Com BPM

Max.Marks : 40

Max.Time: 2Hrs

**MODEL QUESTION PAPER**  
**SECTION – A(5x2=10 Marks)**

**Answer any Five questions.**

1. What is Business Process Service? What are the growth opportunities in BPS? CO1, L1
2. Explain nonverbal communication. CO2, L2
3. Write a note on Time management? CO2, L3
4. Explain the difference between campus life and corporate life? CO4, L4
5. What is the importance of listening in our day to day life? CO4, L2
6. What is corporate grooming and etiquette? CO3, L4
7. Discuss the importance of Business Etiquette? CO4, L5
8. Describe briefly the points one should bear in mind for effective participation in a group discussion. CO5, L5

**SECTION B** (5 x 6 = 30 Marks)

Answer all questions. (Two questions should be given from each unit with internal choice)

9(a) What are the principles of Corporate Governance? CO1, L1

OR

9(b) Discuss the role of NEDs in the application of good corporate governance? CO1, L2

10(a) How to manage stress and be assertive? CO2, L4

OR

10(b) What is analytical thinking? Explain. CO3, L1

11 (a) Write the correct verb forms CO4, L1

1. I \_\_\_\_\_ you, but you didn't ask me.
2. Soccer fans \_\_\_\_\_ to fill the stands an hour before the game.
3. Her greatest pleasure \_\_\_\_\_ movies.
4. Our mayor has not \_\_\_\_\_ any promises.
5. The clock \_\_\_\_\_ all the day.
6. The sun \_\_\_\_\_ brightly.

**OR**

11 (b) Write the correct verb in agreement with its subject:

1. The cost of all these articles \_\_\_\_\_ risen.
2. The cow as well as the horse \_\_\_\_\_ grass.
3. The books borrowed from the library \_\_\_\_\_ on my desk.

4. To take pay and then not to work \_\_\_\_\_ dishonest.
5. The tornadoes that tear through this country every spring \_\_\_\_\_ more than just a nuisance.
6. Some of the grain \_\_\_\_\_ to be contaminated.

12 (a) Write the correct articles/ prepositions for the following CO4, L3

1. He returned after \_\_\_\_\_ hour.
2. I lived in Chennai when I was \_\_\_\_\_ Child.
3. She had problems \_\_\_\_\_ reading the instructions.

**Identify all the Parts of Speech in the given sentences.**

- 4) I helped him carry it.
- 5) We didn't spend the night there.
- 6) The boy said he was sorry.

**OR**

12 (b) **Change into Simple sentences**

1. As the decision has already been taken, it is no point discussing the issues.
2. Most of the poems that Kalidas wrote have been preserved.

**. Change into Compound sentences**

1. I am sure that you have done the mischief.
2. When the document was signed, they were all satisfied.

Change into Complex sentences

1. These books were stolen in my absence.
2. The doctor did his best for the patient, but he could not save him.

13(a) How should you prepare yourself for facing an interview? What does the employer expect from you? CO5, L4

**OR**

13(b) What are the various purposes for which group discussion is held? Discuss the points that the group as a whole should bear in mind for the smooth and goal-oriented flow of communication.

CO4, L2

\*\*\*

Parvathaneni Brahmayya  
Siddhartha College of Arts & Science, Vijayawada

Course Code: **ENGSET01**

Offered to: B.Sc. (CSCS) & B.Com BPM

Semester: V

Max. Marks: 35, Max. Time : 1 Hr

Practical Hrs./Week : 3

**Course Title: Campus to Corporate**

**Type of the Course: Skill Enhancement Course (Elective, Practical)**

### **OBJECTIVES**

1. To help them shed their inhibitions and self-consciousness while speaking in English and to build their confidence. The focus shall be on fluency ahead of accuracy.
2. To enable them to speak English correctly with focus on stress and intonation.
3. To expose the students to a variety of self-instructional, learner-friendly modes of language learning.
4. To train them to use language effectively to face interviews, group discussions, public speaking.
5. To initiate them into greater use of the computer in resume preparation, report writing, format-making etc.

**I. Course Outcomes:** Students at the successful completion of the course will be able to: CO1: Understand the importance of four basic skills of communication.

CO2: Understand the techniques of listening, speaking, reading, and writing which helps in Communication.

CO3: Learn fluent and accurate language by learning important grammar items.

CO4: Learn to face interviews and group discussions.

CO5: Learn professional competency in communication and also corporate etiquette.

### **Syllabus: Practical**

**Unit I:** Overview of Corporate & Business Process System Industry (2 Hours)

Corporate: Ice-breaker Session, Nonverbal communication.

**Unit II:** Grooming for Corporate (4 Hours)

Corporate Etiquettes: Dressing and Grooming Skills, Workplace Etiquette, Business Etiquette, Email Etiquette, Telephone Etiquette, Meeting Etiquette & Presentation Skills

**Unit III:** Elementary Level English Communication (6 Hours) Phonetics, One on One basic conversation skill practice

**Unit IV:** Intermediate Level English Communication (8 Hours)

Reading Comprehension, Listening Comprehension, Comprehension while interacting face to face.

**Unit V:** Advanced Level English Communication (10 Hours)

Narration of short stories, Interview Skills, Group Discussion, Social Conversation Skills, Presentation skills & One Act Plays.

Reference Books for Language Lab:

1. Speaking English Effectively 2nd Edition by Krishna Mohan and N. P. Singh, 2011. Macmillan Publishers India Ltd. Delhi.
2. Sasi Kumar, V &Dhamija, P.V. How to Prepare for Group Discussion and Interviews. Tata McGraw Hill
3. Hancock, M. 2009. English Pronunciation in Use. Intermediate. Cambridge: CUP

III. Lab References:

Provide the author, year of publication, title, and publisher of the book in the order. Use the same format for both print books and e-books.

Reference Materials on the Web/web-links: Not more than two

Listening— <https://ielts-up.com> (listening these the student can practice advanced listening tests)  
Practice to speaking—<https://www.free4talk.com> / <https://speakingclub.com> (it is a free-online language practice website)

**Parvathaneni Brahmayya**  
**Siddhartha College of Arts & Science, Vijayawada**

Course Code: **ENGSET01**  
Semester: V

Offered to: B.Sc. (CSCS)& B.Com BPM  
Max. Marks: 35

**Model Paper:**

**LAB**

**Max. Marks: 35**

**Section A**

**10 M**

1. CORRECTION OF SENTENCES ON TENSES, BE-FORMS, ARTICLES, TRANSFORMATION OF SENTENCES, PUNCTUATION
2. VOCABULARY SYNONYMS, ANTONYMS, IDIOMS,

**Section B**

**10 M**

1. REPORT WRITING
2. RESUME WRITING
3. SLIDE PREPARATION

**Section C**

**10 M**

1. GROUP DISCUSSION
2. VIVA VOCE

**Section D**

**Record**

**5M**

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**BOARD OF STUDIES 2022-23(ODD SEMESTERS)**

**Date: 26-08-2022**

**Minutes of the meeting of Board Of Studies in Hindi, conducted in Online in the Dept.of Hindi On 26<sup>th</sup> August 2022 at 2:30 P.M**

**Members present:**

*BOS Chairperson,*

*1.Smt.M.Jayalakshmi, H.O.D,*

*Dept. of Hindi,P.B.S. College of Arts & Science, VJA-10.*

*University Nominee,*

*2.Dr.V.Mohana Rao ,Principal,*

*K.R.K. Govt.Degree College,Singarakondapalem,*

*Addanki,Prakasam Dist ., A.P.*

*Subject Expert,*

*3. Dr.J.Atmaram, Assistant Professor,*

*Dept.of Hindi, University of Hyderabad, T.S.*

*Poet & Critic,*

*4. Dr.Dodda Seshu Babu, Assistant Professor,*

*Dept.of Hindi, Maulana Azad National Urdu University,*

*Gachibowli , Hyderabad-500032, T.S.*

*Alumnus ,*

*5.Yash Sankhlecha,*

*Bangalore-560004.*

**FACULTY MEMBER:**

*6.Smt. M.Bhavya,*

*Lecturer in Hindi,P.B.S. College of Arts & Science,Vijayawada-10.*

**The following are the Resolutions:**

- 1) It is resolved and recommend to introduce HINDI-III with the course code HINT01A for the III/IV semester of all Programmes (B.A,B.Com-Gen,C.A,TPP,A&F,BPM, BFSI, BBA,BBA-B.A,B.C.A,B.Sc ,CSCS & AI&ML) adopting Cos in the line with guideline of OBE following Blooms Taxonomy for the students admitted in the academic year 2021-2022 and onwards. Model paper, prepared with levels of Bloom's Taxonomy , is appended at the end of the syllabus
- 2) It is resolved and recommend to introduce HINDI-I with the course code HINT11A for the I semester of all Programmes (B.A,B.Com-Gen,C.A,TPP,A&F,BPM, BFSI, BBA,BBA-B.A, BBA-Retail Management, B.C.A,B.Sc ,CSCS & AI&ML) adopting Cos in the line with guideline of OBE following Blooms Taxonomy for the students admitted in the academic year 2022-2023 and onwards. Model paper, prepared with levels of Bloom's Taxonomy , is appended at the end of the syllabus .
- 3) The Chairman BOS in Hindi , is empowered to see that syllabus is divided according to the semesters.The Question papers are to be prepared by the members of the department.

**PARVATHANENI BRAHMAIAH SIDDHARTHA COLLEGE OF ARTS AND SCIENCE; VIJAYAWADA-10**

(An autonomous college in the jurisdiction of Krishna University)

**SEMESTER- I**

**PAPER - I**

**TITLE OF THE PAPER: HINDI-I**

**NO OF HOURS: 60**

**CREDITS: 03**

**WEF: 2021-22**

**COURSE CODE: HINT11A**

**COURSE OUTCOMES:**

1. मानव मूल्यों को पहचानकर छात्र समाज कल्याण हेतु अपने योगदान दे सकेंगे ।
2. आधुनिक युग की भावनाओं को पहचानकर सामाजिक समस्याओं के प्रति जागरूक हो सकेंगे।
3. हिन्दी और अंग्रेजी के माध्यम से विद्यार्थी अनुवाद कौशल विकसित कर सकेंगे।
4. छात्रों में व्याकरण के द्वारा भाषा में निपुणता बढ़ेगी।
5. छात्रों में पत्रलेखन द्वारा लेखन कौशल बढ़ेगा तथा संप्रेषण बढ़ेगा।

# SYLLABUS

## I. गद्य संदेश :

1. साहित्य की महत्ता
2. सच्ची वीरता
3. मित्रता

## II. कथा - लोक :

1. मुक्तिधन
2. गूढ साई
3. उसने कहा था

## III. व्याकरण : कार्यालय हिन्दी शब्दावली

(हिन्दी से अंग्रेजी में बदलना तथा अंग्रेजी से हिन्दी में बदलना)

## IV. व्याकरण :

1. लिंग
2. वचन
3. विलोम शब्द
4. काल
5. वाच्य
6. वाक्य शुद्ध कीजिए

## V. पत्र लेखन: पत्र लेखन (मित्र को पत्र, पिताजी को पत्र)

### Recommended Books:

1. गद्य संदेश – Dr. V.L. Narasimham Siva Koti
2. कथा - लोक - Dr. Ghana Shyam
3. मिलिन्द प्रकाशन

Hyderabad-95.

Degree First Year Text Book,

Vikram Publishers Pvt. Ltd., Durga Agraharam, Vijayawada-2





**SECTION-I**

। निम्न लिखित प्रश्नों का उत्तर लिखिए।

**4×5=20**

1.(a) जीवन में साहित्य की क्या आवश्यकता है? साहित्य द्वारा सभ्यता की परीक्षा किस प्रकार हो सकती है? L1

(अथवा)

(b) वीरता किसे कहते हैं? लेखक का 'सच्ची वीरता' से क्या अभिप्राय है? L1

2.(c) रहमान का चरित्र-चित्रण कीजिए। L2

(अथवा)

(d) गूदड़ साई का शीर्षक पर अपना उद्देश्य प्रकट कीजिए। L2

3.(e) काल किसे कहते हैं तथा उसके कितने प्रकार हैं? L3

(अथवा)

(f) वाच्य किसे कहते हैं तथा उसके कितने प्रकार हैं? L3

4.(g) नीचे दिए गए शब्दों का लिंग बदलकर लिखिए। L1

1.विद्वान 2.अध्यापक 3.मोर 4.ठाकुर 5.धोबी

(अथवा)

(h) नीचे दिए गए शब्दों का वचन बदलकर लिखिए। L1

1.लड़की 2.वीर 3.सेना 4. रुपया 5.कविता

**SECTION-II**

**1×10=10**

5.(a) 'मित्रता' पाठ का सारांश लिखिए। L2

(अथवा)

(b) 'साहित्य की महत्ता' पाठ का सारांश लिखिए। L2

**SECTION-III**

**1×10=10**

6.(a) 'मुक्तिधन' कहानी का सारांश लिखिए। L2

(अथवा)

(b) 'उसने कहा था' कहानी का सारांश लिखिये। L2

**SECTION-IV**

7.(a) किन्हीं पाँच शब्दों को अंग्रेजी से हिंदी में अनुवाद कीजिए। L2

**5×2=10**

- 1.Acceptance 2.Ballot Officer 3.Chairman 4.Duty 5.Supervisor  
6.High Court 7.Fair copy 8.Eligibility 9.Passport 10.Accountant

(अथवा)

(b) किन्हीं पाँच शब्दों को हिंदी से अंग्रेजी में अनुवाद कीजिए। L2

- 1.प्रशासन 2.परिपत्र 3.गोपनीय 4.स्पष्टीकरण 5.राजदूत  
6.निर्देशक 7.शिक्षा-अधिकारी 8.कुलपति 9.महा प्रबंधक 10.अनुवादक

8.(a) किन्हीं पाँच शब्दों का विलोम शब्द लिखिए। L1

**5×2=10**

- 1.वीरता 2. अच्छा 3.नया 4.आना 5.भिन्न 6.सस्ता 7.मित्र 8. लेना

(अथवा)

(b) वाक्य शुद्ध कीजिए। L1

- 1.मोहन पुस्तक पढ़ा।  
2.सीता ने चार आम खाया।  
3.राम ने गया।  
4.दशरथ की तीन रानियाँ थीं।  
5.चोरी कौन किया?

**SECTION-V**

**1×10=10**

9.(a) पुस्तकें खरीदने के लिए पैसे माँगते हुए अपने पिताजी के नाम पर पत्र लिखिए। L3

(अथवा)

(b) हिंदी सीखने की आवश्यकता के बारे में बताते हुए अपने मित्र को पत्र लिखिए। L3



**PARVATHANENIBRAHMAIAH SIDDHARTHA COLLEGE OF ARTS AND SCIENCE; VIJAYAWADA-10**

(An autonomous college in the jurisdiction of Krishna University)

**SEMESTER- III/IV**

**PAPER – III/IV**

**TITLE OF THE PAPER: HINDI-III/IV**

**NO OF HOURS: 60**

**CREDITS: 03**

**WEF: 2021-22**

**COURSE CODE: HINT01A**

## **Cos:**

1. दोहों के द्वारा विद्यार्थियों में समाज सुधार की भावना, मानव मूल्यों का विकास हो सकेगा।
2. हिंदी साहित्य के इतिहास के द्वारा हिन्दी भाषा और साहित्य की प्रमुखता से परिचित हो सकेंगे।
3. समाज कल्याण के विषयों को समझकर विद्यार्थी अपने ज्ञान का विकास कर सकेंगे।
4. समाज में हिन्दी भाषा के परिचित हो सकेंगे और हिन्दी भाषा का ज्ञान प्राप्तकर दूसरों से आसानी से संप्रेषित करने में सक्षम हो सकेंगे।
5. प्रयोजनमूलक हिन्दी प्राप्तकर सकेंगे और हिन्दी में पत्राचार का कौशल विकसित कर सकेंगे।

## SYLLABUS

### I.काव्य दीप:

- साखी- 1-10 - कबीरदास  
सूरदास - बालवर्णन  
मातृभूमि - मैथिलीशरण गुप्त  
तोडती पत्थर - सूर्यकांत त्रिपाठी निराला  
गीत फरोश - भवानी प्रसाद मिश्र

### II.हिन्दी साहित्य का इतिहास:

- काल विभाजन - आचार्य रामचन्द्र शुक्ल के अनुसार  
भक्ति काल : जानाश्रयी शाखा - कबीर  
प्रेमाश्रयी शाखा - जायसी

### III.साधारण निबन्ध:समाचार पत्र, पर्यावरण और प्रदूषण, बेकारी की समस्या, कंप्यूटर

### IV. अनुवाद : (हिन्दी से अंग्रेजी में बदलना तथा अंग्रेजी से हिन्दी में बदलना)

### V.प्रयोजनमूलक हिन्दी: परिपत्र,कार्यालय ज्ञापन,राष्ट्र-भाषा हिन्दी

#### Recommended Books:

- 1.काव्य दीप- SRI B.RADHA KRISHNA MURTHY

Course Code: **HINT01A**

Max. Marks: 75M

Time: 3 Hrs.

Pass Min. : 30M



**PART-A**

I. निम्नलिखित प्रश्नों में से किन्हीं पाँच प्रश्नों का उत्तर दीजिए:

5×5=25M

1. व्याख्या कीजिए । L2

पाहन पूजे हरि मिलै, तो मैं पूजूँ पहाड़।

ताते ये चाकी भली , पीस खाय संसार ॥

2. किसी एक कवि का साहित्यक परिचय दीजिए। L1

(i)कबीर (ii) सूर्यकांत त्रिपाठी 'निराला'

3. मातृभूमि कविता की विशेषताएँ लिखिए। L1

4. व्याख्या कीजिए । L2

जी गीत जनम का लिखूँ, मरन का लिखूँ,

जी गीत जीत का लिखूँ, शरण कर लिखूँ।

5. ज्ञानमार्ग शाखा की विशेषताएँ बताइए। L2

6. प्रदूषण के निवारणोपाय लिखिए। L1

7. परिपत्र की परिभाषा दीजिए। L1

8. अनुवाद किसे कहते हैं? L2

**PART-B**

II. निम्नलिखित प्रश्नों का उत्तर दीजिए:

5×10=50M

9. किसी एक कविता का सारांश विशेषताओं के सहित लिखिए। L2

(i)गीत फरोश (ii) तोड़ती पत्थर

10. (अ) हिन्दी साहित्य का इतिहास - काल विभाजन के बारे में लिखिए। L2  
अथवा

(आ) प्रेमाश्रय शाखा की विशेषताओं का परिचय दीजिए।

11. किसी एक निबंध पर प्रकाश डालिए। L2

(i) बेकारी की समस्या (ii) पर्यावरण और प्रदूषण (iii) कंप्यूटर

12. (अ) हिन्दी में अनुवाद कीजिए। L2

(i) India is our country

(ii) We should respect our parents

(iii) How many students are there in the class room?

(iv) Where are you going now?

(v) This is our college.

अथवा

(आ) अंग्रेजी में अनुवाद कीजिए।

(i) हम कॉलेज जाते हैं।

(ii) हिन्दी हमारी राष्ट्रभाषा है।

(iii) रमा नाचती है।

(iv) मानव सेवा ही माधव सेवा है।

(v) कल रविवार था।

13. किसी एक पर टिप्पणी लिखिए। L1

(i) परिपत्र (ii) कार्यालय जापन (iii) राष्ट्र-भाषा हिन्दी



**Board of Studies for the academic Year 2022-23 :: Odd (I, III, V) Semester  
Department of Physics (UG)**

**Agenda:** To discuss and approve ODD SEMESTER (I, III, V) syllabus and model question papers in the Board of Studies meeting.

The Board of Studies (BOS) UG meeting was held on 27<sup>th</sup> August 2022 for Physics program in online.

**List of Members in BOS**

- |   |                        |
|---|------------------------|
| 1. Dr. T. Srinivasa Krishna, In-charge, Physics | Chairman               |
| 2. Dr. P. B. Sandhya Sri                        | University Nominee     |
| 3. Dr. R. P Vijaya Lakshmi                      | Subject Expert         |
| 4. Dr. D. Haranath                              | Outside Subject Expert |
| 5. Sri N. Mallikarjuna                          | Industry Expert        |
| 6. Dr. T. Srikumar                              | Alumni                 |
| 7. Sri. N. Raja Sekhar                          | Member                 |
| 8. Dr. Sk. Khaja Muswareen                      | Member                 |

S.NO	Title of the Course	Course Code	Offered in SEM	Type of the Paper	Year of Introduction	Revision /Introduce	OBE with BTL	Offered to
1	Modern Physics	PHYT01	III	Core	2020-2021	2022-23 Revised 10%	yes	B.Sc. (MPC & MPCs)
2	Modern Physics lab	PHYP01	III	Core lab	2020-2021	No Revision	yes	B.Sc. (MPC & MPCs)
3	Applications of Electricity and Electronics	PHYSET01	V/VI	SEC ELECTIVE A	2022-2023	Introduced	yes	B.Sc. (MPC & MPCs)
4	Applications of Electricity and Electronics lab	PHYSEP01	V/VI		2022-2023	Introduced	yes	B.Sc. (MPC & MPCs)
5	Electronic Instrumentation	PHYSET02	V/VI	SEC ELECTIVE A	2022-2023	Introduced	yes	B.Sc. (MPC & MPCs)
6	Electronic Instrumentation lab	PHYSEP02	V/VI		2022-2023	Introduced	yes	B.Sc. (MPC & MPCs)
7	Optical Imaging and photography	PHYSET03	V/VI	SEC ELECTIVE B	2022-2023	Introduced	yes	B.Sc. (MPC & MPCs)
8	Optical Imaging and photography lab	PHYSEP03	V/VI		2022-2023	Introduced	yes	B.Sc. (MPC & MPCs)
9	Optical instruments and optometry	PHYSET04	V/VI	SEC ELECTIVE B	2022-2023	Introduced	yes	B.Sc. (MPC & MPCs)
10	Optical instruments and optometry lab	PHYSEP04	V/VI		2022-2023	Introduced	yes	B.Sc. (MPC & MPCs)
11	Low temperature physics and refrigeration	PHYSET05	V/VI	SEC ELECTIVE C	2022-2023	Introduced	yes	B.Sc. (MPC & MPCs)
12	Low temperature physics and refrigeration lab	PHYSEP05	V/VI		2022-2023	Introduced	yes	B.Sc. (MPC & MPCs)
13	Solar Energy and applications	PHYSET06	V/VI	SEC ELECTIVE C	2022-2023	Introduced	yes	B.Sc. (MPC & MPCs)
14	Solar Energy and applications lab	PHYSEP06	V/VI		2022-2023	Introduced	yes	B.Sc. (MPC & MPCs)

## **RESOLUTIONS\RECOMENDATIONS**

**The following resolutions are made in board of studies in Physics for UG programs of odd-semester to recommend to the Academic Council for its approval.**

1. It is resolved to recommend the revised syllabus & model question paper of MODERN PHYSICS with course code PHYT01 in III / IV semester of B.Sc. (MPC & MPCS) with 10% modification in theory for the batch of students admitted in 2021-22 and onwards. Model paper is prepared with levels of Bloom's Taxonomy. For the syllabus and model question paper refer vide Page No 4 to 8.
2. It is resolved and recommend to continue the course with title MODERN PHYSICS Lab with course code PHYP01 in III / IV semester of B.Sc. (MPC & MPCS) for practical with no modifications for the batch of students admitted in 2021-22 and onwards. For the syllabus refer vide Page No 9 &10.
3. It is resolved and recommend to introduce APPLICATIONS OF ELECTRICITY AND ELECTRONICS in PHYSICS-1 with course code PHYSET01 in V/VI semester of B.Sc. (MPC & MPCS) for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper refer vide Page No 11 to14.
4. It is resolved and recommend to introduce APPLICATIONS OF ELECTRICITY AND ELECTRONICS LAB in PHYSICS-1 with course code PHYSEP01 in V/VI semester of B.Sc. (MPC & MPCS) for the batch of students admitted in 2020-21 and onwards. For the syllabus refer vide Page No 15 &16.
5. It is resolved and recommend to introduce ELECTRONIC INSTRUMENTATION in PHYSICS-1 with course code PHYSET02 in V/VI semester of B.Sc. (MPC & MPCS) for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper refer vide Page No 17 to19.
6. It is resolved and recommend to introduce ELECTRONIC INSTRUMENTATION LAB in PHYSICS-1 with course code PHYSEP02 in V/VI semester of B.Sc. (MPC & MPCS) for the batch of students admitted in 2020-21 and onwards. For the syllabus refer vide Page No 18 & 19.
7. It is resolved and recommend to introduce OPTICAL IMAGING AND PHOTOGRAPHY in PHYSICS-2 with course code PHYSET03 in V/VI semester of B.Sc. (MPC & MPCS) for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper refer vide Page No 20 to 22.
8. It is resolved and recommend to introduce OPTICAL IMAGING AND PHOTOGRAPHY LAB in PHYSICS-2 with course code PHYSEP03in V/VI semester of B.Sc. (MPC & MPCS) for the batch of students admitted in 2020-21 and onwards. For the syllabus refer vide Page No 23 & 24.
9. It is resolved and recommend to introduce OPTICAL INSTRUMENTS AND OPTOMETRY in PHYSICS-2 with course code PHYSET04 in V/VI semester of B.Sc. (MPC & MPCS) for the batch of



students admitted in 2020-21 and onwards. For the syllabus and model question paper refer vide Page No 25 to 27.

10. It is resolved and recommend to introduce OPTICAL INSTRUMENTS AND OPTOMETRY LAB in PHYSICS-2 with course code PHYSEP04 in V/VI semester of B.Sc. (MPC & MPCS) for the batch of students admitted in 2020-21 and onwards. For the syllabus refer vide Page No 28 & 29.
11. It is resolved and recommend to introduce LOW TEMPERATURE PHYSICS AND REFRIGERATION in PHYSICS-3 with course code PHYSET05 in V/VI semester of B.Sc. (MPC & MPCS) for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper refer vide Page No 30 to 32.
12. It is resolved and recommend to introduce LOW TEMPERATURE PHYSICS AND REFRIGERATION LAB in PHYSICS-3 with course code PHYSEP05 in V/VI semester of B.Sc. (MPC & MPCS) for the batch of students admitted in 2020-21 and onwards. For the syllabus refer vide Page No 33 & 34.
13. It is resolved and recommend to introduce SOLAR ENERGY AND APPLICATIONS in PHYSICS-3 with course code PHYSET06 in V/VI semester of B.Sc. (MPC & MPCS) for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper refer vide Page No 35 to 37.
14. It is resolved and recommend to introduce SOLAR ENERGY AND APPLICATIONS LAB in PHYSICS-3 with course code PHYSEP06 in V/VI semester of B.Sc. (MPC & MPCS) for the batch of students admitted in 2020-21 and onwards. For the syllabus refer vide Page No 38 & 39.

**P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE:: VIJAYAWADA**  
**Semester-wise revised syllabus under CBCS, 2021-22**  
**MODERN PHYSICS**

**Course Code:** PHYT01

**Domain Subject:** PHYSICS

**Max.Marks :**100(CIA 25 + SEE: 75)

**Year of Introduction:** 2020-21

**Percentage of Revision:10%**

**Hours Taught:** 60 hrs. per Semester

**Offered to B.Sc (MPC&MPCS)**

**Semester:** III/V

**Theory Hrs./Week:** 4

**Year of Revision:** 2022-23

**Credits: 04**

**Course Objectives:**

1. To learn the concepts in Atomic Physics.
2. Review the experiments that led development of quantum theory
3. Understand the underlying foundations and basic principles of quantum mechanics
4. Impart knowledge of the nuclear processes that yield nuclear energy
5. Acquire the knowledge of crystal structures and superconductivity.

**Course outcomes:** On successful completion of this course, the students will be able to:

CO1 Remember the different atomic models and basic knowledge of spectroscopy

CO2 Understand the theory and application of microwave, infrared and Raman spectroscopy

CO3 Apply non- relativistic Schrödinger wave mechanics to a variety of potentials in one and three dimensions.

CO4 Analyse the prerequisite in a molecule towards its Rotational and vibrational activity

CO5 Examine the basic properties of nuclei, characteristics of Nuclear forces, salient features of particle physics.

**SYLLABUS**

Unit	Learning Units	Lecture Hours
I	<p><b>1. Atomic Physics</b> (07 hrs)            Vector atom model and Stern-Gerlach experiment, Quantum numbers associated with it, Angular momentum of the atom, Coupling schemes, Selection rules, Intensity rules, Spectral terms and spectral notations.</p> <p><b>2. Molecular Physics</b> (05 hrs)            Raman effect, Characteristics of Raman effect, Experimental study of Raman effect, Quantum theory of Raman effect, Applications of Raman effect.</p>	12

II	<p><b>3. Matter waves &amp; de-Broglie's hypothesis</b> (06 hrs)  <b>Failures of Classical Mechanics</b>, Matter waves – de-Broglie's hypothesis, Derivation for de-Broglie wave length of matter waves, Properties of matter waves, Davisson and Germer's experiment, Phase and group velocities (<b>Qualitative</b>),</p> <p><b>4. Uncertainty Principle and Quantization</b> (06 hrs)  Heisenberg's uncertainty principle for position and momentum (<math>x</math> and <math>p</math>), &amp; energy and time (<math>E</math> and <math>t</math>), Illustration of uncertainty principle using diffraction of beam of electrons (Diffraction by a single slit) and photons (Gamma ray microscope), Bohr's principle of complementarity.</p>	12
III	<p><b>5. Quantum (Wave) Mechanics:</b>(12 hrs)  Basic postulates of quantum mechanics, Schrodinger time independent and time dependent wave equations - Derivations, Physical interpretation of wave function, Eigen functions, Eigen values, Application of Schrodinger wave equation to one dimensional potential box of infinite height (Infinite Potential Well)</p>	12
IV	<p><b>6. Structure of Nuclei and Nuclear Models:</b> (06 hrs)  Nuclear Structure: General Properties of Nuclei, Mass defect, Binding energy; Nuclear forces, Characteristics of nuclear forces, Nuclear Models: Liquid drop model, Shell model, Magic numbers.</p> <p><b>7. Elementary Particle Physics</b> (06 hrs)  Elementary Particles and their classification, Fundamental Interactions – gravitational, electromagnetic, strong &amp; weak; Properties of Leptons, Mesons and Baryons</p>	12
V	<p><b>8. Crystal Structure</b> (07 hrs)  Amorphous and crystalline materials, unit cell, Miller indices, reciprocal lattice, types of lattices, diffraction of X-rays by crystals, Bragg's law, Laue's method and powder diffraction method</p> <p><b>9. Superconductivity:</b> (05 hrs)  Introduction – Properties of superconductors - critical temperature (<math>T_c</math>), critical magnetic field (<math>T_m</math>), Meissner effect, Type I and Type II superconductors, BCS theory (Qualitative), Applications of superconductors.</p>	12

## **TEXT BOOKS**

1. BSc Physics, Vol.4, Telugu Akademy, Hyderabad
2. Modern Physics by R. Murugesan and Kiruthiga Siva Prasath. S. Chand & Co.
3. Nano materials, A K Bandopadhyay, New Age International Pvt Ltd (2007)

## **REFERENCE BOOKS:**

1. Atomic Physics by J.B. Rajam; S. Chand& Co.,
2. Concepts of Modern Physics by Arthur Beiser. Tata McGraw-Hill Edition.
3. Nuclear Physics, D.C. Tayal, Himalaya Publishing House.
4. S.K. Kulkarni, Nanotechnology: Principles & Practices (Capital Publ.Co.)
5. K. K. Chattopadhyay & A.N. Banerjee, Introd.to Nanoscience and Technology (PHI Learning Priv. Limited).
6. Textbook of Nanoscience and Nanotechnology, BS Murthy, P Shankar, Baldev Raj, BB Rath and J Murday-Universities Press-IIM

## **LIBRARY ACTIVITY**

Student visit library to refer and gather information regarding seminar topics and assignments.

**Course Delivery method:** Face-to-face / Blended

**Course has focus on:** Foundation & Employability

**Course has focus on:** Employability

**Co-curricular Activities:**

1. Assignments
2. Student seminars
3. Quiz

## Model Question Paper

### Title of the Paper: MODERN PHYSICS

#### Section-A

Answer ALL questions

5X10=50M

1. a) Explain briefly the salient features of vector atom model. Explain the quantum numbers associated with vector atom model (CO1, L1)  
OR  
b) What is Raman effect? Describe the experimental arrangement to study Raman effect in liquids. Write any two applications of Raman effect. (CO1, L1)
2. a) What are matter waves? Describe the Davisson and Germer experiment on electron diffraction (CO2, L2)  
OR  
b) State and explain Heisenberg's uncertainty principal. Describe an experiment for verification of uncertainty principle. (CO2, L2)
3. a) Derive Schrodinger time dependent wave equation. (CO3, L1)  
OR  
b) Derive an expression for energy of free particle in one dimensional box of infinite height. (CO3, L2)
4. a) Write Liquid drop model (CO4, L2)  
OR  
b) Write a detailed note on elementary particles (CO4, L2)
5. a) Explain powder diffraction method. (CO5, L2)  
OR  
b) What is super conductivity? Give a qualitative description of the BCS theory. (CO5, L2)

#### Section-B

Answer any THREE of the following:

3X5=15M

6. Explain the coupling schemes (CO1, L1)
7. Write the properties of matter waves. (CO2, L1)
8. State the basic postulates of Quantum mechanics. (CO3, L1)
9. Write any three properties of nucleus (CO5, L2)
10. Explain Meissner effect. (CO5, L1)

#### Section-C

Answer any TWO of the following:

2X5=10M

11. If the uncertainty in position of an electron is  $4 \times 10^{-10}$  m. Calculate the uncertainty in its momentum. (CO1, L3)

12. Find the kinetic energy of an electron whose de-Broglie wavelength is  $0.3\text{\AA}$ . (Mass of electron =  $9.1 \times 10^{-31}$  kg, Planck's constant  $h = 6.6 \times 10^{-34}$  J-s) (CO2, L3)
13. Find the least energy of an electron moving in the dimension in an infinitely high potential box of width  $1\text{\AA}$  (given mass of electron =  $9.1 \times 10^{-31}$  kg, Planck's constant  $h = 6.6 \times 10^{-34}$  J-s) (CO3, L3)
14. Compute the approximate nuclear radius of  $\text{Al}^{27}$ . (Given  $r_0 = 1.2$  fermi) (CO4, L3)

**P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE:: VIJAYAWADA**  
**Semester-wise revised syllabus under CBCS, 2021-22**  
**MODERN PHYSICS**

**Course Code:** PHYP01  
**Domain Subject:** PHYSICS  
**Max.Marks :**50(CIA 10 + SEE: 40)  
**Year of Introduction:** 2020-21  
**Hours Taught:** 30 hrs. per Semester

**Offered to B.Sc (MPC&MPCS)**  
**Semester:** III/V  
**Theory Hrs./Week:** 2  
**Year of Revision:** NIL  
**Credits:** 01

**Objectives:**

- \* The primary objective of this course is to provide the fundamental knowledge and able to write down the band theory of Solids
- \* Describe the characteristics of semiconductors on the basis of band theory of solids
- \* Relate Cosmic activity and the environmental effect on the earth's surface

**COURSE OUTCOMES**

Upon successful completion of this course, students should have the knowledge and skills to:

- CO1 Measure the charge of an electron and  $e/m$  value of an electron by Thomson method.
- CO2 Understand how the Planck's constant can be determined using Photocell and LEDs.
- CO3 Study the absorption of  $\alpha$ -rays and  $\beta$ -rays, Range of  $\beta$ -particles and the characteristics of GM counter
- CO4 knowledge of Energy gap of a semiconductor using thermistor and junction diode.

**List of experiments**

1. Determination of  $M$  &  $H$ .
2. Energy gap of a semiconductor using junction diode.
3. Energy gap of a semiconductor using thermistor
4. Verification of inverse square law of light using photovoltaic cell.
5. Determination of the Planck's constant using LEDs of at least 3 different colours.
6.  $e/m$  of an electron by Thomson method.
7. Determination of Planck's Constant (photocell).
8. Analysis of powder X-ray diffraction pattern to determine properties of crystals.
9. GM counter characteristics
10. Determination of work function of material of filament of directly heated vacuum diode.
11. Study of absorption of  $\alpha$ -rays.
12. Study of absorption of  $\beta$ -rays.

### 13. Determination of Range of $\beta$ -particles.

Note :

1. 9 (NINE) experiments are to be done and recorded in the lab. These experiments will be evaluated in CIA.
2. For certification minimum of 7 (Seven) experiments must be done and recorded by student who had put in 75 % of attendance in the lab.
3. **Best 6 experiments are to be considered for CIA.**
4. 10 marks for CIA.
5. 40 marks for practical exam.

**The marks distribution for the Semester End practical examination is as follows:**

Formula/ Principle / Statement with explanation of symbols	05
Diagram/Circuit Diagram / Tabular Columns	05
Setting up of the experiment and taking readings/Observations	10
Calculations (explicitly shown) + Graph + Result with Units	05
Procedure and precautions	05
Viva-voce	05
Record	05
<b>Total Marks:</b>	<b>40</b>



**P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE:: VIJAYAWADA**  
**Semester-wise revised syllabus under CBCS, 2021-22**  
**APPLICATIONS OF ELECTRICITY AND ELECTRONICS**

**Course Code:** PHYSET01  
**Domain Subject:** PHYSICS  
**Max.Marks :**100(CIA 25 + SEE: 75)  
**Hours Taught:** 45 hrs. per Semester

**Offered to B.Sc (MPC&MPCS)**  
**Semester:** V/VI  
**Theory Hrs./Week:** 3  
**Credits: 03**

**Course Objectives:**

- To help students to understand the principles and laws of electricity which is essential to constantly emerging newest technologies
- To create interest among the students about the communication systems by studying electricity and electronics
- Students will be able to understand applications of passive elements, AC, DC circuits and power supplies

**Course Outcomes:**

At the end of this course, students should be able to:

- CO1 Understand the types of resistors, Inductors and capacitors and its applications
- CO2 Distinguish between AC and DC sources and understand about the batteries and Network theorems for DC circuits
- CO3 Explain the working principle and construction of Generators and transformers
- CO4 Learn the applications of EM induction and power supplies

**SYLLABUS**

**UNIT-I: INTRODUCTION TO PASSIVE ELEMENTS**

(9 hrs)

**a) Passive elements**

Resistor - Types of Resistors, Color coding, Combination of Resistors – Series combination (Voltage division), Parallel combination (Current division), Ohms Law and its limitation.

Inductor - Principle, Types of Inductors. Capacitor - Principle, Charging and discharging of a Capacitor, Types of Capacitors.

**b) Applications of Passive elements:**

- c)** Applications of a Resistor as a heating element in heaters and as a fuse element. Applications of Inductors, Application of choke in a fan and in a radio tuning circuit, Series resonance circuit as a Radio tuning circuit. Applications of Capacitor in power supplies, motors (Fans).

## **UNIT-II: POWER SOURCES (BATTERIES)**

(9 hrs)

### **a) Power sources:**

Types of power sources-DC & AC sources, Different types of batteries, Rechargeable batteries - Lead acid batteries, Li-ion batteries, Series, Parallel & Series-Parallel configuration of batteries

### **b) Network Theorems for DC circuits**

Thevenin's theorem, Norton's theorem, Maximum Power transfer theorem, Constant Voltage source - Constant Current Source - Application of Current sources & Voltage sources.

## **UNIT-III: ALTERNATING & DIRECT CURRENTS**

(9 hrs)

**a)** A.C Generator-Construction and its working principle, DC Generator-Construction and its working principle, advantages and disadvantages, Differences between DC and AC generators

**b)** Transformers- Construction and its working principle, Open circuit and short circuit tests, Types of Transformers - Step-down and Step-up Transformers, Relation between primary and secondary turns of the transformer with emf, Use of Transformer in a regulated Power supply

## **UNIT-IV: MODULATION CIRCUITS (Skill Based)**

(9 hrs)

### **a) Amplitude modulation:**

Amplitude modulation, modulation index, Waveforms, Power relations, AM transmitter, AM Receiver, Demodulation, Diode detector

### **b) Frequency modulation:**

Frequency modulation, modulation index, Waveforms, FM Transmitter, FM Receiver

## **Unit-V: Applications of EM Induction & Power Supplies (Skill Based)**

(9 hrs)

**a)** DC motor – Construction and operating principle, Calculation of power, voltage and current in a DC motor, Design of a simple Motor (Fan) with suitable turns of coil

**b)** Working of a DC regulated power supply, Construction of 5 volts regulated power supply, Design of a step-down (ex:220-12V) and step-up (ex:120-240V) transformers

## TEXT BOOKS

BSc Unified Physics: Applications of Electricity & Electronics, S.L Gupta & Sanjeev Gupta

### References:

1. Grob's Basic Electronics by [Mitchel Schultz](#) , TMH or McGraw Hill
2. Electronic and Electrical Servicing by Ian Robertson Sinclair, John Dunton, Elsevier Publications
3. Troubleshooting Electronic Equipment by R.S.Khandapur ,TMH
4. Web sources suggested by the teacher concerned and the college librarian including reading material.

## Question Paper Pattern

Semester-wise revised syllabus under CBCS, 2020-21

### APPLICATIONS OF ELECTRICITY & ELECTRONICS

Course Code: SECPHYT01

Offered to B.S.c MPC & MPCs

#### SECTION-A

Answer ANY FIVE of the following

5X5=25M

(At least 1 question should be given from each unit)

1. Explain Ohm's law. (CO1, L2)
2. Explain the Series resonance circuit as a Radio tuning circuit. (CO1, L2)
3. Explain series-parallel configuration of batteries. (CO2, L2)
4. Write the applications of current and voltage sources. (CO2, L1)
5. Distinguish between DC and AC generators. (CO3, L2)
6. Explain the concept of demodulation. (CO4, L2)
7. Write a note on transmitters and receivers. (CO4, L1)
8. Explain the measurement of power, current and voltage in DC motor. (CO5, L2)

#### SECTION-B

Answer ALL questions

5X10=50M

9. A) Briefly explain the different types of resistors and capacitors. (CO1, L3)  
(OR)  
B) Write a note on applications of passive elements. (CO1, L2)
10. A) Describe Li ion batteries. (CO2, L2)  
(OR)  
B) Briefly explain the Thevenin's theorem with equivalent circuit. (CO2, L2)
11. A) Explain the construction and working principle of AC generator. (CO3, L2)  
(OR)  
B) Explain the construction and working principle of Transformers. (CO3, L2)
12. A) What is amplitude modulation? Explain. (CO4, L2)  
(OR)  
B) What is frequency modulation? Explain. (CO4, L2)
13. A) Explain the construction and operating principle of DC motor. (CO5, L2)  
(OR)  
B) Explain the working of DC regulated power supply. (CO5, L2)

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**P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE:: VIJAYAWADA**  
**Semester-wise revised syllabus under CBCS, 2021-22**  
**APPLICATIONS OF ELECTRICITY AND ELECTRONICS**

**Course Code:** PHYSEP01  
**Domain Subject:** PHYSICS  
**Max.Marks :**50(CIA 10 + SEE: 40)  
**Hours Taught:** 45 hrs. per Semester

**Offered to B.Sc (MPC&MPCS)**  
**Semester:** V/VI  
**Theory Hrs./Week:** 3  
**Credits: 03**

**Course Outcomes**

- CO1** Recognizes the value of resistors, capacitors and Inductors
- CO2** Knowledge the usage of multimeter
- CO3** Know the practical difference of analog and digital multimeter
- CO4** Knowledge of different network theorems

**EXPERIMENTS LIST**

**Minimum SIX experiments are to be done and recorded**

1. Measurement of R using Color coding of Resistors and measurement of R using multimeter - **Resistors of different values, Multimeters**
2. Connect two or three resistors or capacitors or inductors and measure the Series, Parallel Combination values using a Multimeter and compare the values with the calculated values - **Capacitors of different values**
3. Use the Digital Multimeter and Analog Multimeter to measure the output voltage of an AC & DC power supply - **Digital Multimeters, Analog Multimeters**
4. Draw the characteristics of **FET**
5. Construct a series electric circuit with R, L and C having an AC source and study the frequency response of this circuit using **Function generator**
6. Construct a Parallel electric circuit with R, L & C having an AC source and study the frequency response of this circuit using **Function generator**
7. Efficiency of **TRANSFORMER**
8. Verification of **NETWORK THEOREMS** – Thevenin’s theorem, Norton’s theorem
9. AM Generation Kit
10. FM generation Kit

### Lab References:

1. Laboratory Manual for Introductory Electronics Experiments by Maheshwari, L.K. Anand, M.M.S., New Age International (P) Ltd.
2. Electricity-Electronics Fundamentals: A Text-lab Manual by Paul B. Zbar, Joseph Sloop, & Joseph G. Sloop , McGraw-Hill Education
3. Laboratory Manual Basic Electrical Engineering by Umesh Agarwal, Notion Press
4. Basic Electrical and Electronics Engineering by S.K. Bhattacharya , Pearson Publishers.
5. Web sources suggested by the teacher concerned.

### Note :

1. 9 (NINE) experiments are to be done and recorded in the lab. These experiments will be evaluated in CIA.
2. For certification minimum of 7 (Seven) experiments must be done and recorded by student who had put in 75 % of attendance in the lab.
3. **Best 6 experiments are to be considered for CIA.**
4. 10 marks for CIA.
5. 40 marks for practical exam.

### The marks distribution for the Semester End practical examination is as follows:

Formula/ Principle / Statement with explanation of symbols	05
Diagram/Circuit Diagram / Tabular Columns	05
Setting up of the experiment and taking readings/Observations	10
Calculations (explicitly shown) + Graph + Result with Units	05
Procedure and precautions	05
Viva-voce	05
Record	05
<b>Total Marks:</b>	<b>40</b>

# **P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE:: VIJAYAWADA**

**Semester-wise revised syllabus under CBCS, 2021-22**

## **ELECTRONIC INSTRUMENTATION**

**Course Code:** PHYSET02

**Offered to B.Sc (MPC&MPCS)**

**Domain Subject:** PHYSICS

**Semester:** V/VI

**Max.Marks :**100(CIA 25 + SEE: 75)

**Theory Hrs./Week:** 3

**Hours Taught:** 45 hrs. per Semester

**Credits:** 03

### **Course Objectives:**

1. Explain basic concepts and definitions in measurement.
2. Describe the bridge configurations and their applications.
3. Elaborate discussion about the importance of electronic instruments

### **COURSE OUTCOMES**

On successful completion of this course, the students will be able to:

- CO1** Understand the basic measurements of Instruments (accuracy, precision, range, resolution, sensitivity and errors). Understand the theory, working principle, specifications and significance of Multimeter.
- CO2** Describe the function of basic building blocks of Cathode Ray Oscilloscope. Measure the appropriate parameters (Voltage, Time Period, Frequency and Phase angle)
- CO3** Understand the A/D & D/A converters and display instruments
- CO4** Gain knowledge about amplifiers, oscillators
- CO5** Understand the fundamental theory of Transducers and bridges

## **SYLLABUS**

### **UNIT-I INTRODUCTION TO INSTRUMENTS**

(9 hrs)

#### **a) Basic of measurements:**

Instruments accuracy, precision, sensitivity, resolution, range, Types of errors, Classification of Instruments, Analog instruments & Digital Instruments, Construction and working of an Analog Multimeter and Digital Multimeter (Block diagram approach),

#### **b) DC Voltmeter and AC Voltmeter, Sensitivity, Sources of errors in the Measurement of resistance, voltage and current, Specifications of multimeter and their significance, Basic ideas on Function generator (brief explanation)**

### **UNIT-II OSCILLOSCOPE**

(9 hrs)

#### **a) Cathode ray oscilloscope – Principle and block diagram of CRO - Cathode Ray Tube – functioning – various controls**

#### **b) Applications CRO: Measurement of voltage (dc and ac), frequency & time period, Different types of oscilloscopes and their uses, Digital storage Oscilloscope**

### **UNIT-III TRANSDUCERS AND BRIDGES**

(9 hrs)

- a) Classification of Transducers, Resistive, Capacitive & Inductive transducers, Piezoelectric transducer, Photo transducer.
- b) DC bridge – Wheatstone’s bridge, AC Bridges - Measurement of Inductance and Capacitance – Maxwell’s bridge.

### **UNIT-IV ADC AND DAC & DISPLAY INSTRUMENTS**

(9 hrs)

- a) A/D & D/A converters - Binary ladder, A/D converters – continuous type, integrating type, successive approximation type.
- b) Introduction to Display devices, LED Displays, Seven Segment Displays, Construction and operation (Display of numbers).

### **UNIT-V OPERATIONAL AMPLIFIERS**

(9 hrs)

- a) Differential amplifier, IC 741 identification, Internal blocks of Op-Amp. Characteristics of ideal and practical Op-Amp, Inverting and Non-Inverting configuration.
- b) Applications of Op-Amp (IC 741): Summing and difference amplifiers, Differentiator and Integrator

### **TEXT BOOKS**

B.Sc Unified Physics: Electronic Instrumentation, S.L Gupta & Sanjeev Gupta

#### **Reference Books:**

1. Electronic Instrumentation by H.S.Kalsi ,TMH Publishers
2. Electronic Instrument Hand Book by Clyde F. Coombs ,McGraw Hill
3. Electronic Instrumentation – WD Cooper
4. Electrical and Electronic Instrumentation – AK Sawhany
5. A text book in electrical technology by B.L.Thereja (S.Chand&Co)
6. Electronic Measurements and Instrumentation by Kishor, K Lal, Pearson, New Delhi
7. Electrical and Electronic Measurements by Sahan, A.K., Dhanpat Rai, New Delhi
8. Electronic Instruments and Measurement Techniques by Cooper, W.D. Halfrick, A.B., PHI Learning, New Delhi
9. Web sources suggested by the teacher concerned and the college librarian including reading material.



## Question Paper Pattern

Semester-wise revised syllabus under CBCS, 2020-21

### ELECTRONIC INSTRUMENTATION

Course Code: SECPHYT02

Offered to B.S.c MPC & MPCs

#### SECTION-A

Answer ANY FIVE of the following

5X5=25M

(At least 1 question should be given from each unit)

1. Distinguish between accuracy and precession of a measurement. (CO1, L1)
2. What are the uses of function generator? (CO1, L1)
3. Write a short note on photo transducer. (CO2, L1)
4. What are the various applications of CRO? (CO2, L1)
5. Explain any two specifications of CRO. (CO3, L2)
6. Explain A/D Converter using successive approximation type. (CO3, L2)
7. Explain summing and difference amplifier? (CO5, L2)
8. What are the ideal characteristics of op-amp? (CO5, L1)

#### SECTION-B

Answer ALL questions

5X10=50M

9. A) Define error. Mention different types of Errors. Explain any three types of errors associated with measurements. (CO1, L2)  
(OR)  
B) What is a multimeter? What are the advantages of analog multimeter? How do we measure voltage using analog multimeter? (CO1, L2)
10. A) Describe the principle and working of CRO. (CO2, L3)  
(OR)  
B) Write a brief note on different types of oscilloscopes and their uses. (CO2, L2)
11. A) Explain in brief Piezoelectric transducer. (CO3, L2)  
(OR)  
B) Discuss about Wheatstone's bridge. (CO3, L2)
12. A) Explain A/D and D/A converters. (CO4, L2)  
(OR)  
B) Discuss about various display devices. (CO4, L2)
13. A) What is an op-amp? Explain Inverting and Non-Inverting configuration. (CO5, L2)  
(OR)  
B) Explain Integrator and Differentiator using op-amp. (CO5, L2)

**P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE:: VIJAYAWADA**  
**Semester-wise revised syllabus under CBCS, 2021-22**  
**ELECTRONIC INSTRUMENTATION**

**Course Code:** PHYSEP02  
**Domain Subject:** PHYSICS  
**Max.Marks :**50(CIA 10 + SEE: 40)  
**Hours Taught:** 45 hrs. per Semester

**Offered to B.Sc (MPC&MPCS)**  
**Semester:** V/VI  
**Theory Hrs./Week:** 3  
**Credits:** 03

**Course Outcomes**

- CO1** Recognizes the difference between AC & DC  
**CO2** Knowledge the usage of CRO  
**CO3** Understand the operation of basic differential amplifiers and their applications in Linear Integrated circuits. Learn the basic function of Operational Amplifier (IC741)  
**CO4** Understand the versatility of Operational Amplifier as summing amplifier, difference amplifier, integrator and differentiator

**Minimum SIX experiments are to be done and recorded**

1. Familiarization of digital multimeter and its usage in the measurements of (i) resistance (ii) current, (iii) AC & DC voltages
2. Measure the AC and DC voltages, frequency using a CRO and compare the values measured with other instruments like Digital multimeter.
3. Formation of Sine, Square wave signals on the CRO using Function Generator and measure their frequencies. Compare the measured values with actual values.
4. Display the numbers from 0 to 9 on a single Seven Segment Display module by applying voltages.
5. Summing amplifier
6. Difference amplifier
7. Integrator
8. Differentiator
9. Display the letters **a** to **h** on a single Seven Segment Display module by applying voltages.

**Lab References:**

1. Electronic Measurement and Instrumentation by J.P. Navani. ,S Chand & Co Ltd
2. Principles of Electronic Instrumentation by A De Sa, Elsevier Science Publ.
3. Electronic Measurements and Instrumentation by S.P.Bihari, Yogita Kumari, Dr. Vinay Kakka, Vayu Education of India .

4. Laboratory Manual For Introductory Electronics Experiments by Maheshwari, New Age International (P) Ltd., Publishers.
5. Electricity-Electronics Fundamentals: A Text-lab Manual by Paul B. Zbar ,Joseph Sloop, & Joseph G. Sloop , McGraw-Hill Education.
6. Web sources suggested by the teacher concerned.

Note :

1. 8 (EIGHT) experiments are to be done and recorded in the lab. These experiments will be evaluated in CIA.
2. For certification minimum of 7 (Seven) experiments must be done and recorded by student who had put in 75 % of attendance in the lab.
3. **Best 6 experiments are to be considered for CIA.**
4. 10 marks for CIA.
5. 40 marks for practical exam.

**The marks distribution for the Semester End practical examination is as follows:**

Formula/ Principle / Statement with explanation of symbols	05
Diagram/Circuit Diagram / Tabular Columns	05
Setting up of the experiment and taking readings/Observations	10
Calculations (explicitly shown) + Graph + Result with Units	05
Procedure and precautions	05
Viva-voce	05
Record	05
<b>Total Marks:</b>	<b>40</b>

**P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE:: VIJAYAWADA**  
**Semester-wise revised syllabus under CBCS, 2021-22**

**OPTICAL IMAGING AND PHOTOGRAPHY**

**Course Code:** PHYSET02

**Domain Subject:** PHYSICS

**Max.Marks :**100(CIA 25 + SEE: 75)

**Hours Taught:** 45 hrs. per Semester

**Offered to B.Sc (MPC&MPCS)**

**Semester:** V/VI

**Theory Hrs./Week:** 3

**Credits:** 03

**Course Objectives:**

Students after successful completion of the course will be able to:

1. Identify the different types of cameras and camera lenses according to different purposes.
2. Identify and understand the focal length of the different types of lenses
3. Acquire a critical knowledge on natural and artificial sources of light and their application in photography.
4. Demonstrate skills of camera usage especially Digital Cameras.
5. Understand the various Image development and editing techniques.
6. Comprehend the concept of different types of common shooting techniques.

**COURSE OUTCOMES**

On successful completion of this course, the students will be able to:

- CO1:** Explains the working mechanism and production of the camera at the basic level in the context of the historical process.
- CO2:** Understand the main parts of the photographic camera.
- CO3:** Explains the correct exposure in terms of light sensitive surface, light sensitivity, light metering, and qualities of light.
- CO4:** Explains technological features on the camera, the process of film and print, and digital photography. Defines the general composition rules of photography..
- CO5:** Use and adapt to a variety of computer software and hardware for both photographic and business purposes.

## **SYLLABUS**

### **Unit-I: INTRODUCTION TO PHOTOGRAPHY: (9 hrs)**

Photography-Introduction, working principle of a camera, Image formation in simple camera and human eye, Types of cameras - Pin-hole camera, Single Lens Reflex (SLR) camera, Twin Lens Reflex (TLR) camera, Digital Single-lens reflex camera (DSLR), Digital camera, Drone flying cameras, Care and maintenance of camera, Factors influencing choice of camera

### **Unit-II: DIGITAL PHOTOGRAPHY: (9 hrs)**

Different types of Digital cameras and their parts, Working of DSLR camera, Types of lenses- Normal, Wide angle, telephoto, Zoom lenses, Digital Image formation, Digital camera image sensors, Size of the image, Depth of focus, Depth of field, Exposure time, Aperture, Shutter speed, ISO, filters, knowledge on pixels and their uses, resolution, Camera accessories

### **Unit-III: PHOTOGRAPHIC LIGHT SOURCES: (9 hrs)**

Need for the light in photography, Light sources- Natural light, Sun light, Moon light, Ambient light, Artificial light sources-Flood light, Spot light, Halogen light, Halogen flash light, Digital lights, Exposure, Studio photography

### **Unit-IV: PHOTOGRAPHIC SHOOTING TECHNIQUES: (9 hrs)**

Significance and role of Camera lens in photo shooting, Arrangement of lenses in a Camera- Positioning, Techniques involved in the use of DSLR cameras, Usage of Filters, Techniques of Photomicrography, Basic ideas on Underwater Photography, Medical Photography, Astronomical Photography, Infra-Red (IR) Photography, Ultra Violet (UV) Photography and Forensic Photography.

### **Unit-V: PHOTO MANIPULATION: (9 hrs)**

Developing and printing the photographs, equipment and materials used in developing and printing, image mixing and printing, Image editing through image editing software's like Adobe Photoshop – Adjustment of Brightness, Contrast, Tonal and Colour Values, Factors influencing quality of digital image, Methods of storing and processing, Image transportation through Pendrive, CD, HDD and CLOUD [Internet]

### **Reference Books:**

1. Object and image; An introduction to photography by George M Craven, PHI
2. An Introduction to Digital Photo Imaging Agfa, 1994
3. Advance Photography by M. Langford.
4. Digital Photography-A hands on Introduction by Phillip Krejcarek, Delmer Publishers
5. Multimedia – An Introduction by John Villamil, PHI
6. <https://www.adobe.com/in/creativecloud/photography/discover/dslr-camera.html>
7. Web sources suggested by the teacher concerned and the college librarian including reading material.

## Question Paper Pattern

Semester-wise revised syllabus under CBCS, 2020-21

### OPTICAL IMAGING AND PHOTOGRAPHY

Course Code: SECPHYT03

Offered to B.S.c MPC & MPCs

#### SECTION-A

Answer ANY FIVE of the following

5X5=25M

(At least 1 question should be given from each unit)

1. Explain about drone flying camera. (CO1, L2)
2. Write a short note on factors influencing choice of camera. (CO1, L1)
3. Explain the procedure of digital image formation. (CO2, L2)
4. What do you mean by ISO? Explain. (CO2, L1)
5. Explain the concept of exposure. (CO3, L1)
6. What do you mean by studio photography. (CO3, L1)
7. Explain the significance and role of camera lens in photo shooting. (CO4, L2)
8. Explain image transportation through pendrive. (CO5, L2)

#### SECTION-B

Answer ALL questions

5X10=50M

9. A) Explain the working principle of a camera. Mention different types of cameras. (CO1, L2)  
(OR)  
B) Explain Twin Lens Reflex (TLR) camera, Digital Single-lens reflex camera (DSLR). (CO1, L2)
10. A) Explain different types of digital cameras and their parts. (CO2, L2)  
(OR)  
B) Give a brief account on pixels and write their uses. (CO2, L2)
11. A) What is light? Explain various light sources used in photography. (CO3, L2)  
(OR)  
B) Explain different artificial light sources. (CO3, L2)
12. A) Write a note on techniques involved in the use of DSLR cameras. (CO4, L1)  
(OR)  
B) Write about Infra-Red (IR) Photography, Ultra Violet (UV) Photography. (CO4, L1)
13. A) Explain the procedure of image editing through Adobe photoshop software. (CO5, L2)  
(OR)  
B) What are the factors influencing quality of digital image? (CO5, L1)

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**P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE:: VIJAYAWADA**  
**Semester-wise revised syllabus under CBCS, 2021-22**

**OPTICAL IMAGING AND PHOTOGRAPHY**

**Course Code:** PHYSEP03  
**Domain Subject:** PHYSICS  
**Max.Marks :**50(CIA 10 + SEE: 40)  
**Hours Taught:** 45 hrs. per Semester

**Offered to B.Sc (MPC&MPCS)**  
**Semester:** V/VI  
**Theory Hrs./Week:** 3  
**Credits: 03**

**Course Outcomes:**

On successful completion of this practical course, student shall be able to:

1. List out, identify and understand various image formation techniques including Eye.
2. Learn the procedures of using Analog and Digital cameras.
3. Demonstrate the focusing techniques of Analog and Digital cameras.
4. Acquire skills in the editing and development of photos and videos.
5. Perform some experimental skills related to images, videos using the equipment available in the lab or in a local studio.

**Minimum SIX experiments are to be done and recorded**

1. Construction of a simple pin hole Camera and study it's working.
2. Capture an image using a Digital Camera and apply editing techniques.
3. Understanding various image formats and convert one image format into other (For ex: JPEG to BMP)
4. Convert a video stream into image stream by using a suitable editing software.
5. Evaluate the number of pixels and size of digital Image.
6. Comparison of the quality of a 8-bit, 16-bit and 32 bit images.
7. Perform the reduction and enlargement of a given Digital Image.
8. Change the appearance of an image by applying the filters (For ex: from the IR image of the given digital Image by suitable IR filter)

**Lab References:**

1. DSLR Photography for Beginners by Brian Black
2. The Art of Photography by Bruce Barnbaum
3. Photoshop for Photographers by John Slavio
4. <https://www.youtube.com/channel/UCwWyFRy2l6aUFMsRemP51Sw>. You Tube resource.
5. <https://www.udemy.com/course/complete-photography-course/>
6. Web sources suggested by the teacher concerned.

Note :

1. 8 (EIGHT) experiments are to be done and recorded in the lab. These experiments will be evaluated in CIA.
2. For certification minimum of 7 (Seven) experiments must be done and recorded by student who had put in 75 % of attendance in the lab.

3. **Best 6 experiments are to be considered for CIA.**
4. 10 marks for CIA.
5. 40 marks for practical exam.

**The marks distribution for the Semester End practical examination is as follows:**

Formula/ Principle / Statement with explanation of symbols	05
Diagram/Circuit Diagram / Tabular Columns	05
Setting up of the experiment and taking readings/Observations	10
Calculations (explicitly shown) + Graph + Result with Units	05
Procedure and precautions	05
Viva-voce	05
Record	05
<b>Total Marks:</b>	<b>40</b>



**P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE:: VIJAYAWADA**  
**Semester-wise revised syllabus under CBCS, 2021-22**

**OPTICAL INSTRUMENTS AND OPTOMETRY**

**Course Code:** PHYSET02  
**Domain Subject:** PHYSICS  
**Max.Marks :**100(CIA 25 + SEE: 75)  
**Hours Taught:** 45 hrs. per Semester

**Offered to B.Sc (MPC&MPCS)**  
**Semester:** V/VI  
**Theory Hrs./Week:** 3  
**Credits: 03**

**Course Objective:**

Students at the successful completion of the course will be able to:

1. Understand the construction and working principles of various optical instruments used in daily life.
2. Acquire a critical knowledge on the various defects of eye and their correcting methods with suitable lenses.
3. Demonstrate skills of using biological microscope through hands on experience.
4. Understand the various techniques used in optometry and computer based eye testing.
5. Comprehend the various applications of microscopes and telescopes.

**COURSE OUTCOMES:**

On successful completion of this course, the students will be able to:

- CO1:** Recollect and identify and understand the principle components of a light microscope.
- CO2:** Gain the knowledge of different types of telescopes and their working principle.
- CO3:** Apply different microscopes according to their application.
- CO4:** Gain the knowledge of lenses and their importance day to day life.
- CO5:** Maintain ophthalmic appliances and instruments; and assess ocular motility disorders

## **Syllabus:**

### **UNIT-I OPTICAL MICROSCOPES (9hrs)**

Introduction to Microscopes, Need of a Microscope, Different types of microscopes and their uses, Simple microscope-Construction, Magnifying power, normal adjustment; Compound microscope-Construction, Magnifying power, normal adjustment, Phase contrast microscope-Operating principle, Travelling microscope-Construction, working and uses

### **UNIT-II TELESCOPES (9hrs)**

Introduction to Telescopes, Different types of Telescopes and their uses, Refracting Telescopes and Reflecting telescopes, Construction, working and magnifying power of Astronomical Telescope and Terrestrial Telescopes, Binoculars – working principle and applications.

### **UNIT-III APPLICATIONS OF OPTICAL INSTRUMENTS (9hrs)**

Introductory ideas and applications of various microscopes *viz.*, (i) Optical microscopes (Compound microscope, Stereo microscope, Confocal microscope) (ii) Electron microscopes (TEM, SEM), (iii) Scanning Probe microscope (iv) Scanning Acoustic microscope and (v) X-ray microscope.

### **UNIT-IV OPTICAL VISION (9hrs)**

Introduction to optical Vision, Eye as an optical instrument, Formation of image in the eye and the camera, Ophthalmic lenses, Power of the lenses, Far point and near points, Myopia and Hypermetropia defects, Removal of defects in vision using ophthalmic lenses, Contact lenses-Working principle, Different types of Contact lenses.

### **UNIT-V OPHTHALMIC TECHNIQUES AND OPTOMETRY (9hrs)**

Ophthalmoscope and keratometer and their working principles, Evaluation of eye disorders, Guidelines for standardized eye chart preparation, Simple phoropter and its working principle and its uses, Checking the power of lenses, Principles of Computer based eye testing

### **References:**

1. Optics and Optical Instruments: An Introduction by B. K. Johnson, Dover Publications.
2. Modern Optical Instruments and their construction by or ford Henry-Publisher: Biblio Life, LLC.
3. A Text Book of Optics by Brj Lal and N.Subramanyam, S.Chand & Co.
4. Practical Optics by Menn Naftly, Elsevier Science Publishing.
5. Applications of Optics in daily life | CK-12 Foundation. <https://flexbooks.ck12.org> ›
6. Web sources suggested by the teacher concerned and the college librarian including Reading material.

## Question Paper Pattern

Semester-wise revised syllabus under CBCS, 2020-21

### OPTICAL INSTRUMENTS AND OPTOMETRY

Course Code: SECPHYT03

Offered to B.S.c MPC & MPCs

#### SECTION-A

Answer ANY FIVE of the following

5X5=25M

(At least 1 question should be given from each unit)

1. What are the uses of travelling microscope? (CO1, L1)
2. Explain the need of microscope. (CO1, L2)
3. Explain the principle of Astronomical telescope. (CO2, L2)
4. Write any five uses of telescope. (CO2, L1)
5. Explain the principle of X-ray microscope. (CO3, L2)
6. Distinguish between Myopia and Hypermetropia defects. (CO4, L2)
7. How to remove defects in vision using ophthalmic lenses? (CO4, L2)
8. Write a short note on principles of computer-based eye testing. (CO5, L2)

#### SECTION-B

Answer ALL questions

5X10=50M

9. A) Explain the different types of microscopes. (CO1, L2)  
(OR)  
B) Explain the construction and working of travelling microscope. (CO1, L2)
10. A) Explain about Refracting and Reflecting telescopes. (CO2, L2)  
(OR)  
B) Explain working principle of Binoculars. Write the applications. (CO2, L2)
11. A) Explain working of Scanning Electron microscope with a neat diagram. (CO3, L2)  
(OR)  
B) Discuss the applications of various telescopes. (CO1, L2)
12. A) Explain the formation of image in the eye and the camera. (CO4, L2)  
(OR)  
B) Explain the working principle of contact lenses. (CO4, L2)
13. A) Explain the working principles of ophthalmoscope and keratometer. (CO5, L2)  
(OR)  
B) What are the guidelines for standardized eye chart preparation. (CO5, L2)

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**P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE:: VIJAYAWADA**  
**Semester-wise revised syllabus under CBCS, 2021-22**

**OPTICAL INSTRUMENTS AND OPTOMETRY**

**Course Code:** PHYSEP03

**Domain Subject:** PHYSICS

**Max.Marks :**50(CIA 10 + SEE: 40)

**Hours Taught:** 45 hrs. per Semester

**Offered to B.Sc (MPC&MPCS)**

**Semester:** V/VI

**Theory Hrs./Week:** 3

**Credits: 03**

**Course Outcomes:**

On successful completion of this practical course, student shall be able to:

1. List out, identify and handle various equipment like binoculars, telescopes and microscopes.
2. Learn the procedures of operation of various optical instruments.
3. Demonstrate skills on testing the power of lenses, improving the resolution of telescopes and microscopes.
4. Acquire skills in observing and measuring the power, focal length and different refractive errors of eye.
5. Perform some techniques related to testing the blood and other biological samples.
6. Understand the technique of operation of Computer eye testing and evaluation.

**Minimum SIX experiments are to be done and recorded**

1. Evaluation of magnifying power of simple microscope.
2. Measurement of reflection and transmission coefficient of certain materials using a microscope.
3. Resolving power of telescope
4. Determination of radii of different capillary tubes using travelling microscope.
5. Refractive index of a liquid (water) using (i) concave mirror and (ii) convex lens and a plane mirror.
6. Removal of refractive errors of eye using combination of lenses.
7. Determination of power of a convex lens by finding its focal length.

**Lab References:**

1. A Practical Guide to Experimental Geometrical Optics by Yuriy A. Garbovskiy-Cambridge Univ. Press
2. <https://physics.columbia.edu/sites/default/files/content/Lab%20Resources/1292%20Lab%20Manual.pdf>
3. [https://www.lnmiit.ac.in/Department/Physics/uploaded\\_files/lab-manual.pdf](https://www.lnmiit.ac.in/Department/Physics/uploaded_files/lab-manual.pdf)
4. Basic Optics Experiments -<http://www.phys.unm.edu> > Optics Lab > Basics
5. A Practical Guide to Experimental Geometrical Optics by Yuriy A. Garbovskiy, Anatoliy V. Glushchenko, Cambridge Univ. Press
6. Web sources suggested by the teacher concerned.  
[http://www.phy.olemiss.edu/~thomas/weblab/Optics\\_lab\\_Items/Telescope\\_Microscope\\_PROCED\\_Spring\\_2018.pdf](http://www.phy.olemiss.edu/~thomas/weblab/Optics_lab_Items/Telescope_Microscope_PROCED_Spring_2018.pdf)

Note :

1. 8 (EIGHT) experiments are to be done and recorded in the lab. These experiments will be evaluated in CIA.
2. For certification minimum of 7 (Seven) experiments must be done and recorded by student who had put in 75 % of attendance in the lab.
3. **Best 6 experiments are to be considered for CIA.**
4. 10 marks for CIA.
5. 40 marks for practical exam.

**The marks distribution for the Semester End practical examination is as follows:**

Formula/ Principle / Statement with explanation of symbols	05
Diagram/Circuit Diagram / Tabular Columns	05
Setting up of the experiment and taking readings/Observations	10
Calculations (explicitly shown) + Graph + Result with Units	05
Procedure and precautions	05
Viva-voce	05
Record	05
<b>Total Marks:</b>	<b>40</b>

**P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE:: VIJAYAWADA**  
**Semester-wise revised syllabus under CBCS, 2021-22**

**Low Temperature Physics & Refrigeration**

**Course Code:** PHYSET02

**Domain Subject:** PHYSICS

**Max.Marks :**100(CIA 25 + SEE: 75)

**Hours Taught:** 45 hrs. per Semester

**Offered to B.Sc (MPC&MPCS)**

**Semester:** V/VI

**Theory Hrs./Week:** 3

**Credits:** 03

**Course Objectives:**

1. To acquire the knowledge of producing refrigerating effect or cooling which is used in air Refrigeration cycles.
2. To understand the different methods of producing low temperatures & necessity of low Temperature in various fields.
3. To know the techniques of measuring low temperatures by using various thermometers with accuracy and to estimate the internal energy possessed by the system.
4. Gives the idea on Methodology involved in both refrigeration cycle, network of refrigerated Components to understand the transient simulations of whole system.
5. To acquire the knowledge on benefits of Cryogenics in various fields like Preservation of biological material & food, Macroscopic quantum phenomena, Cryo surgery, Medical field, Data centers, and Satellites

**Course Outcomes:**

Students after successful completion of the course will be able to

1. Identify various methods and techniques used to produce low temperatures in the Laboratory.
2. Acquire a critical knowledge on refrigeration and air conditioning.
3. Demonstrate skills of Refrigerators through hands on experience and learns about refrigeration components and their accessories.
4. Understand the classification, properties of refrigerants and their effects on environment.
5. Comprehend the applications of Low Temperature Physics and refrigeration.

**SYLLABUS**

**UNIT-I PRODUCTION OF LOW TEMPERATURE (9 hrs)**

(a) Production of low temperatures-Introduction, Freezing mixtures, Joule-Thomson effect (concept only), Regenerative cooling,

(b) Different methods of liquefaction of gases, liquefaction of air, Production of liquid hydrogen and nitrogen, Adiabatic demagnetization, Properties of materials at low temperatures. Superconductivity

**UNIT-II MEASUREMENT OF LOW TEMPERATURE (9 hrs)**

(a) Gas thermometer and its correction and calibration, Secondary thermometers, resistance thermometers, thermocouples.

(b) Vapour pressure thermometers, Magnetic thermometers, Advantages and drawbacks of each type of thermometer.

#### UNIT-III PRINCIPLES OF REFRIGERATION (9 hrs)

(a) Introduction to Refrigeration- Natural and artificial refrigeration, Stages of refrigeration, Types of refrigeration - Vapor compression and vapor absorption refrigeration systems, Refrigeration cycle and explanation with a block diagram, Introductory ideas on air-conditioning.

(b) Refrigerants-Introduction, Ideal refrigerant, Properties of refrigerant, Classification of refrigerants, commonly used refrigerants, Eco-friendly refrigerants

#### UNIT-IV COMPONENTS OF REFRIGERATOR (9 hrs)

(a) Refrigerator and its working, Block diagram, Coefficient of Performance (COP), Tons of refrigeration (TR) and Energy Efficiency Ratio (EER)

(b) Refrigerator components: Types of compressors, evaporators and condensers and their functional aspects, defrosting in a refrigerator, Refrigerant leakage and detection

#### UNIT-V: APPLICATIONS OF LOW TEMPERATURE & REFRIGERATION

(9 hrs.)

(a) Applications of Low temperatures: Preservation of biological material, Food freezing, liquid nitrogen and liquid hydrogen in medical field, Superconducting magnets in MRI- Tissue ablation (cryosurgery) - Cryogenic rocket propulsion system.

(b) Applications of refrigeration: Domestic refrigerators, Water coolers, Cold treatment of metals, Construction field, Cold storages, Ice plants, Food preservation methods, Chemical and Process industries, Desalination of water, Data centers (Field visit and it's report).

#### References:

1. Heat and Thermodynamics by Brij Lal & N. Subramanyam, S. Chand Publishers.
2. Thermal Physics by S C Garg, R M Bansal & C K Ghosh, McGrawHill Education, India
3. Heat and Thermodynamics by M M Zemansky, McGrawHill Education (India).
4. Low-Temperature Physics by Christian E. & Siegfried H., Springer.
5. Thermal Engineering by S. Singh, S. Pati, Ch:18 Introduction to Refrigeration.
6. The Physics Hyper Text Book. Refrigerators. <https://physics.info/refrigerators/>
7. Refrigeration and Air Conditioning by Manohar Prasad, New age international (P) limited, New Delhi
8. A course in Refrigeration and Air Conditioning by S.C. Arora and S. Domkundwar, Dhanpatrai and sons, Delhi

## Question Paper Pattern

Semester-wise revised syllabus under CBCS, 2020-21

### LOW TEMPERATURE PHYSICS & REFRIGERATION

Course Code: SECPHYT03

Offered to B.S.c MPC & MPCs

#### SECTION-A

Answer ANY FIVE of the following

5X5=25M

(At least 1 question should be given from each unit)

1. Explain Joule Thomson effect. (L2, CO1)
2. Explain the properties of materials at low temperatures. (L2, CO1)
3. Write about Resistance thermometer. L1, CO2
4. Explain the advantages and drawbacks of resistance thermometers. (L2, CO2)
5. Explain briefly refrigeration by vapor absorption method. (L2, CO3)
6. Explain the term Energy Efficiency ratio. (L1, CO4)
7. Explain various types of condensers involved in refrigerator. (L3, CO4)
8. Explain the working of water coolers. (L3, CO5)

#### SECTION- B

Answer all the questions:

5x10=50M

9. a. Explain the liquefaction of Air with neat diagram. (L2, CO1)  
OR  
b. Explain the production of low temperatures by adiabatic demagnetization method (L2, CO1)
10. a. Explain about gas thermometers and their calibration. (L3, CO2)  
OR  
b. Explain vapour pressure thermometer. (L3, CO2)
11. a. Explain Natural and artificial refrigeration & various stages involved in refrigeration (L2,CO3)  
OR  
b. Explain various types of refrigerants and their properties. (L2, CO3)
12. a. Explain the principle & working of refrigerator with block diagram (L3, CO4)  
OR  
b. Explain various types of compressors and evaporators (L3, CO4)
13. a. Explain the applications of low temperatures in various fields. (L3,CO5)  
OR  
b. Explain the working of domestic refrigerators. (L2,CO5)

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**P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE:: VIJAYAWADA**  
**Semester-wise revised syllabus under CBCS, 2021-22**

**Low Temperature Physics & Refrigeration**

**Course Code:** PHYSEP03

**Offered to B.Sc (MPC&MPCS)**

**Domain Subject:** PHYSICS

**Semester:** V/VI

**Max.Marks :**50(CIA 10 + SEE: 40)

**Theory Hrs./Week:** 3

**Hours Taught:** 45 hrs. per Semester

**Credits: 03**

**Course Objectives:**

On completion of practical course, student shall be able to

1. List out, identify and handle equipment used in refrigeration and low temperature lab.
2. Learn the procedures of preparation of Freezing Mixtures.
3. Demonstrate skills on developing various Freezing mixtures and materials and their applications in agriculture, medicine and day to day life.
4. Acquire skills in observing and measuring various methodologies of very low temperatures
5. Perform some techniques related to Refrigeration and Freezing in daily life.

**Minimum SIX experiments are to be done and recorded**

1. Record the Principles and applications of Refrigerators and Freezers.
2. Measure the temperatures below Melting point of Ice using a thermometer available in the Lab.
3. Make a freezing mixture by adding different salts viz., Sodium chloride, Potassium Hydrate (KOH), Calcium chloride to ice in different proportions and observe the temperature changes.
4. Study the operation of a refrigerator and understand the working of different parts.
5. Study the properties of refrigerants like chlorofluorocarbons-hydrochlorofluorocarbons and record the lowest temperatures obtained.
6. Consider a simple faulty refrigerator and try to troubleshoot the simple problems by understanding its working.
7. Understand the practical problem of filling the Freon Gas into the Refrigerator.
8. Get the Liquid Nitrogen or Liquid Helium from nearby Veterinary Hospital and measure their temperatures using chromel-alumel thermocouple or mercury thermometer and observe their physical properties like colour, smell etc and precautions to be taken for their safe handling.
9. Preparation of freeze drying food with Dry ice and liquid nitrogen
10. Preparation of freeze drying food with liquid nitrogen

Note :

1. 9 (NINE) experiments are to be done and recorded in the lab. These experiments will be evaluated in CIA.
2. For certification minimum of 7 (Seven) experiments must be done and recorded by student who had put in 75 % of attendance in the lab.
3. **Best 6 experiments are to be considered for CIA.**
4. 10 marks for CIA.
5. 40 marks for practical exam.

**The marks distribution for the Semester End practical examination is as follows:**

Formula/ Principle / Statement with explanation of symbols	05
Diagram/Circuit Diagram / Tabular Columns	05
Setting up of the experiment and taking readings/Observations	10
Calculations (explicitly shown) + Graph + Result with Units	05
Procedure and precautions	05
Viva-voce	05
Record	05
<b>Total Marks:</b>	<b>40</b>

**P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE:: VIJAYAWADA**  
**Semester-wise revised syllabus under CBCS, 2021-22**

**Solar Energy and Applications**

**Course Code:** PHYSET02

**Domain Subject:** PHYSICS

**Max.Marks :**100(CIA 25 + SEE: 75)

**Hours Taught:** 45 hrs. per Semester

**Offered to B.Sc (MPC&MPCS)**

**Semester:** V/VI

**Theory Hrs./Week:** 3

**Credits:** 03

**Course Objectives**

1. Acquire knowledge on solar radiation principles with respect to solar energy estimation.
2. Get familiarized with various collecting techniques of solar energy and its storage
3. Learn the solar photovoltaic technology principles and different types of solar cells for energy conversion and different photovoltaic applications

**Course Outcomes:**

After successful completion of the course, the student will be able to:

1. Understand Sun structure, forms of energy coming from the Sun and its measurement.
2. Acquire a critical knowledge on the working of thermal and photovoltaic collectors.
3. Understand testing procedures and fault analysis of thermal collectors and PV modules.
4. Comprehend applications of thermal collectors and PV modules.

**Syllabus:**

**Unit - I: BASIC CONCEPTS OF SOLAR ENERGY**

(a) Spectral distribution of solar radiation, Solar constant, zenith angle and Air-Mass, standard time, local apparent time, equation of time, direct, diffuse and total radiations.

(b) Pyro heliometer - working principle, direct radiation measurement, Pyrometer-working Principle, diffuse radiation measurement, Distinction between the two meters.

**Unit - II: SOLAR THERMAL COLLECTORS (10hrs)**

(a) Solar Thermal Collectors-Introduction, Types of Thermal collectors, Flat plate collector – liquid heating type, Energy balance equation and efficiency, Evacuated tube collector, collector overall heat loss coefficient.

(b) Definitions of collector efficiency factor, collector heat-removal factor and collector flow factor, Testing of flat-plate collector, solar water heating system, natural and forced circulation types. Concentrating collectors, Solar cookers, Solar dryers, Solar desalinators.

**Unit - III: FUNDAMENTALS OF SOLAR CELLS (10hrs)**

(a) Semiconductor interface, Types, homo junction, hetero junction and Schottky barrier, advantages and drawbacks, Photovoltaic cell, equivalent circuit, output parameters(Field Visit and its report), conversion efficiency, quantum efficiency

(b) Measurement of I-V characteristics, series and shunt resistance, their effect on efficiency,

Effect of light intensity, inclination and temperature on efficiency

**Unit -IV: TYPES OF SOLAR CELLS AND MODULES (10 hrs)**

(a) Types of solar cells, Crystalline silicon solar cells, I-V characteristics, poly-Si cells, Amorphous silicon cells, Thin film solar cells-CdTe/CdS and CuInGaSe<sub>2</sub>/CdS cell configurations, structures, advantages and limitations

(b) Multi junction cells – Double and triple junction cells. Module fabrication steps, Modules in series and parallel, Bypass and blocking diodes.

**Unit – V: SOLAR PHOTOVOLTAIC SYSTEMS (10hrs)**

(a) Energy storage in PV systems, Energy storage modes, electrochemical storage, Batteries, Primary and secondary.

(b) Solid-state battery, Molten solvent battery, lead acid battery and dry batteries, Mechanical storage – Flywheel, Electrical storage –Super capacitor

**References:**

1. Solar Energy Utilization by G. D. Rai, Khanna Publishers
2. Solar Energy- Fundamentals, design, modelling and applications by G.N. Tiwari, Narosa Publications, 2005.
3. Solar Energy-Principles of thermal energy collection & storage by S.P. Sukhatme, Tata Mc-Graw Hill Publishers, 1999.
4. Science and Technology of Photovoltaics, P. Jayarama Reddy, CRC Press (Taylor & Francis Group), Leiden &BS Publications, Hyderabad, 2009.
5. Solar Photovoltaics- Fundamentals, technologies and applications, Chetan Singh Solanki, PHI Learning Pvt. Ltd.,
6. Web sources suggested by the teacher concerned and the college librarian including reading material.

## Question Paper Pattern

Semester-wise revised syllabus under CBCS, 2020-21

### SOLAR ENERGY AND APPLICATIONS

Course Code: SECPHYT03

Offered to B.S.c MPC & MPCs

#### SECTION-A

Answer ANY FIVE of the following

5X5=25M

(At least 1 question should be given from each unit)

1. Distinguish direct and diffuse radiations. (L2, CO1)
2. How can you measure direct radiation? (L3, CO1)
3. What is collector heat removal factor and collector flow factor? (L3, CO2)
4. Testing of Flat Plate Collector-Explain. (L1, CO2)
5. Explain about I-V characteristics of solar cell. (L1, CO3)
6. Advantages and Limitations of solar cells. (L3, CO4)
7. Explain about bypass and blocking diodes.(L1, CO4)
8. What are primary and secondary batteries. (L1, CO5)

#### SECTION- B

Answer

all

the

questions:

5x10=50M

9. a. Explain spectral distribution of solar radiation. (L1, CO1)  
OR  
b. Describe the working of pyroheliometer. (L1, CO1)
10. a. Write about Flat plate collector and its efficiency. (L1, CO2)  
OR  
b. What are the types of solar water heating system? Explain natural circulation type. (L2, CO2)
11. a. Define homo junction and hetero junction. What are the advantages and drawbacks? (L2, CO3)  
OR  
b. Explain the effect of light intensity, inclination and temperature on efficiency of PVcell.(L1, CO3)
12. a. What are the types of solar cells? Write about CdTe solar cell. (L2, CO4)  
OR  
b. Explain about multi junction cells. (L1, CO4)
13. a. Write about various energy storage modes. (L2, CO5)  
OR  
b. Explain Led acid battery and dry battery. (L2, CO5)

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**P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE:: VIJAYAWADA**  
**Semester-wise revised syllabus under CBCS, 2021-22**

**Solar Energy and Applications**

**Course Code:** PHYSEP03

**Domain Subject:** PHYSICS

**Max.Marks :**50(CIA 10 + SEE: 40)

**Hours Taught:** 45 hrs. per Semester

**Offered to B.Sc (MPC&MPCS)**

**Semester:** V/VI

**Theory Hrs./Week:** 3

**Credits: 03**

**Course Outcomes :**

On successful completion of this practical course, students shall be able to:

1. List out and identify various components of solar thermal collectors and systems, solar photovoltaic modules and systems.
2. Learn the procedures for measurement of direct, global and diffuse solar radiation, I - V characteristics and efficiency analysis of solar cells and modules.
3. Demonstrate skills acquired in evaluating the performance of solar cell / module in connecting them appropriately to get required power output.
4. Acquire skills in identification and elimination of the damaged panels without affecting the output power in a module / array.
5. Perform procedures and techniques related to general maintenance of solar thermal and photovoltaic modules.

**Minimum SIX experiments are to be done and recorded**

1. Measurement of direct radiation using pyrheliometer.
2. Measurement of global and diffuse radiation using pyranometer.
3. Evaluation of performance of a flat plate collector
4. Evaluation of solar cell / module efficiency by studying the I – V measurements.
5. Determination of series and shunt resistance of a solar cell / module.
6. Determination of efficiency of two solar cells / modules connected in series.
7. Determination of efficiency of two solar cells / modules connected in parallel.
8. Study the effect of input intensity on the performance of solar cell / module.
9. Study the influence of cell / module temperature on the efficiency.
10. Study the effect of cell / module inclination on the efficiency.

Note :

1. 9 (NINE) experiments are to be done and recorded in the lab. These experiments will be evaluated in CIA.
2. For certification minimum of 7 (Seven) experiments must be done and recorded by student who had put in 75 % of attendance in the lab.
3. **Best 6 experiments are to be considered for CIA.**
4. 10 marks for CIA.
5. 40 marks for practical exam.

**The marks distribution for the Semester End practical examination is as follows:**

Formula/ Principle / Statement with explanation of symbols	05
Diagram/Circuit Diagram / Tabular Columns	05
Setting up of the experiment and taking readings/Observations	10
Calculations (explicitly shown) + Graph + Result with Units	05
Procedure and precautions	05
Viva-voce	05
Record	05
<b>Total Marks:</b>	<b>40</b>



# P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

Siddhartha Nagar, Vijayawada – 520 010

Autonomous -ISO 9001 – 2015 Certified

## Statistical Inference

**Offered to:** BA(EMS) & B.SC (MSCs, MSCA & MSDS) / STAT31C

**Course Type:** Core (Theory)

**Year of Introduction:** 2021-22

**Year of Revision:** 2022-23

**Percentage of Revision:** 50%

**Semester:** III

**Paper No. :** III

**Credits:** 4

**Hours Taught:** 60 periods. per Semester

**Max. Time:** 3 Hours

**Course Prerequisites (if any):** Student required basic knowledge in Probability and Distribution Theory

### Course Description:

This course helps the students to familiarize with the ways in which we talk about uncertainty and estimate their situations in which probability arises. Also this course aims at providing basic knowledge about theoretical and application to test according to situations.

### Course Objectives:

- 1) To describe many of the important estimation methods and characteristics of the estimators.
- 2) To understand the problem of statistical inference with specific reference to point estimation and interval estimation.
- 3) To differentiate between large and small samples and apply apt testing procedures.

**Learning Outcomes:** At the end of the course, the student will

- 1) Students will understand the distinguish between the parametric and Non Parametric situations.
- 3) The parameters describe an underlying physical setting in such a way that their value affects the distribution of the measured data..

S. No	Program Outcomes
PO1.	<b>Effective Communication:</b> Speak, read, write and listen clearly in person and through electronic media in English and in one Indian language, and make meaning of the world by connecting people, ideas, books, media and technology
PO2.	<b>Effective Citizenship:</b> Demonstrate empathetic social concern and equity centered national development, and the ability to act with an informed awareness of issues and participate in civic life through volunteering.
PO3.	<b>Ethics:</b> Recognize different value systems including your own, understand the moral dimensions of your decisions, and accept responsibility for them.
PO4.	<b>Environment and Sustainability:</b> Understand the issues of environmental contexts and sustainable development
PO5.	<b>Critical Thinking:</b> Take informed actions after identifying the assumptions that frame our thinking and actions, checking out the degree to which these assumptions are accurate and valid, and looking at our ideas and decisions (intellectual, organizational, and personal) from different perspectives.
PO6:	<b>Specialized Skills / Transferable Skills:</b> Acquisition of communication and soft, analytical and technological skills that aid in enhancing
PO7.	<b>Self-directed and Life-long Learning:</b> Acquire the ability to engage in independent and life-long learning in the broadest context socio-technological changes



<b>Course Outcomes:</b>		
<b>Course Outcome</b>	Upon successful completion of this course, students should have the knowledge and skills to:	<b>Program Outcomes Mapping</b>
CO 1	Obtain the knowledge on Exact sampling distributions and their application towards real world examples	PO - 5
CO 2	knowledge of point and interval estimation procedures and different methods of point estimation	PO - 6
CO3	Obtain the knowledge on various testing hypothetical statements and finding Uniformly Most Powerful Test	PO - 6
CO 4	a fundamental understanding of Parametric models for developing relevant inferences on associated parameters large and small samples.	PO - 6
CO 5	To obtain the knowledge and to know the applications of various Non-Randomized tests	PO - 6

### Syllabus

#### Course Details

<b>Unit</b>	<b>Learning Units</b>	<b>Lecture Hours</b>
<b>I</b>	<b>Exact Sampling Distributions</b> Concepts of Population, Sample, Parameter, Statistic, Sampling distribution, Standard error. law of large numbers, central limit theorem (statements only). Student's t- distribution, F – Distribution, $\chi^2$ - Distribution: Definitions, properties and their applications.	<b>9</b>
<b>II</b>	<b>Theory of estimation</b> Introduction, criteria of a good estimator – unbiasedness, consistency, efficiency, & sufficiency. Statement of Neyman's factorization theorem. Estimation of parameters by the method of moments and maximum likelihood (M.L), properties of MLE's (statements only). Binomial, Poisson & Normal population parameters estimate by MLE method. Interval estimation – construction of confidence intervals for population mean using normal distribution.	<b>15</b>
<b>III</b>	<b>Testing of Hypothesis</b> Concepts of Statistical hypotheses, Null and Alternative hypothesis, Critical region, Type I and II errors, level of significance and Power of a test. One and two tailed tests, p-value. Neyman-Pearson's lemma. Examples in case of Binomial, Poisson, Exponential and Normal distributions.	<b>12</b>
<b>IV</b>	<b>Large sample Tests</b> Test for single mean and difference of two means, test for single proportion and difference of proportions. Simple Problems. <b>Small Sample tests - I</b> t-test for single mean, difference of means and paired t-test. F-test for equality of population variances. Simple Problems.	<b>12</b>
<b>V</b>	<b>Small Sample tests - II</b> $\chi^2$ -test for goodness of fit and independence of attributes <b>Non – Parametric Tests</b> Non-parametric tests- Advantages and Disadvantages, Measurement scales - Nominal, Ordinal, Interval and Ratio. One sample tests – Sign and Run test.	<b>12</b>

**Text Book:**

Fundamentals of Mathematical Statistics, 11th Edition, 2010, S. C. Gupta and V. K. Kapoor, Sultan Chand & Sons, New Delhi

**Reference Books:**

1. B.A/B.Sc. Second Year Statistics(2010) , Telugu Akademi, Hyderabad.
2. Mathematical Statistics with Applications, 2009, K.M.Ramachandran and Chris P.Tsokos Academic Press(Elsevier), Haryana .
3. Probability and Statistics, Volume I & II, D. Biswas, New central book Agency (P) Ltd, NewDelhi.
4. An outline of Statistical theory, Volume II,3rd Edition,2010(with corrections) A.M.Goon,M.K. Gupta, B.Dasgupta ,The World Press Pvt.Ltd., Kolakota. Sanjay Arora and Bansi Lal:. New Mathematical Statistics, Satya Prakashan , New Delhi.

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## Model Question Paper Structure for SEE

Max.: 75 Marks

Min.Pass: 30 Marks

### Statistical Inference

#### Section – A

Answer any FIVE of the following

5 x 5M = 25Marks

1. Write the statements of Weak Law of large numbers and Central limit theorem.
2. Define F-distribution and write its applications.
3. Prove that sample mean is an unbiased and consistent estimator of population mean.
4. Define the following terms:  
(i) Null hypothesis (ii) Alternative hypothesis (iii) critical region.
5. Explain Type I and Type II errors.
6. Write the procedure for single mean in large sample tests.
7. Write the procedure of F-test for equality of population variances.
8. Explain the procedure of Sign test for single mean.

#### Section – B

Answer ALL questions

5 x 10M = 50Marks

9. a. Define student's t-distribution. Write its applications and their properties.  
(OR)  
b. Define chi-square distribution. Write its applications and their properties.
10. a. Explain the characteristics of a good estimator  
(OR)  
b. Find Maximum likelihood estimator for  $\mu$  and  $\sigma^2$  in normal population.
11. a. State and prove Neyman-Pearson's lemma.  
(OR)  
b. If  $x \geq 1$  is the critical region for testing  $H_0: \theta=2$  vs  $H_1: \theta=1$  on the basis of the single observation from an exponential distribution with probability density function  $f(x, \theta) = \theta e^{-\theta x}$ . Obtain the value of Type I and Type II errors.
12. a. In a Survey of buying habits, 400 women shoppers are chosen at random on supermarket 'A' located in a certain section of the city. Their average weekly food expenditure is Rs.250 with a S.D. of Rs. 40. For 400 women shoppers are chosen at random on Supermarket 'B' in another section of the city, the average weekly food expenditure is Rs.220 with a S.D. of Rs 55. Test at 1% level of significance whether the average weekly food expenditure of the populations of shoppers are equal.  
(OR)  
b. Explain the procedure of t- test for difference of means.
13. a. Out of 8,000 graduates in a town 800 are females, out of 1,600 graduate employees 120 are females. Use  $\chi^2$  to determine if any distinction is made in appointment the basis of sex.  
(OR)  
b. Explain the procedure of Wald-Wolfowitz run test for two samples.



# P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

Siddhartha Nagar, Vijayawada – 520 010

Autonomous -ISO 9001 – 2015 Certified

## Statistical Inference

**Offered to:** BA(EMS) & B.SC (MSCs, MSCA & MSDS) / STAP31C

**Course Type:** Core (Practical)

**Year of Introduction:** 2021

**Year of Revision:** 2022

**Percentage of Revision:** 50%

**Semester:** III

**Paper No.** III

**Credits:** 1

**Hours Taught:** 30 periods. per Semester

**Max.Time:** 2 Hours

**Course Prerequisites (if any):** Student required basic knowledge in computers

### Course Description:

This course gives a working knowledge of Excel to students with the aim of getting to use data analysis and testing.

### Course Objectives

- 1) To train students in SPSS Software
- 2) To expose the students to the analysis of statistical data and comparing data sets.

### Course Outcomes:

Course Outcome	Upon successful completion of this course, students should have the knowledge and skills to:	Programme Outcomes Mapping
CO 1	To Apply statistical analysis that can test hypotheses under parametric approaches.	PO –6
CO 2	To Apply statistical analysis that can test hypotheses under non-parametric approaches.	PO –6

### List of practical's

1. Small sample test (t-test): One Sample, Independent Sample and Paired Sample.
2. Large sample tests: One Sample, Independent Sample, Paired Sample (Using Excel)
3. Small sample test (F-test): Equality of population variances (Using Excel)
4. Chi square Test: Test of Independence
5. Chi square Test: Goodness of fit
6. Chi square Test: Test of Independence, 2X2, 3X3, ..., mXn Cross tabulation (Using Excel)
7. Non Parametric Tests: Mann Whitney U test and Wilcoxon Signed ranks test
8. Non Parametric Tests: Kruskal Wallis Test and Friedman test (Using Excel)

### Structure of the Practical Examination

External examination for 50 Marks

- (i) For Continuous evaluation – 10 Marks
- (ii) For examination – 40 Marks

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# P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

Siddhartha Nagar, Vijayawada – 520 010

Autonomous -ISO 9001 – 2015 Certified

## Inferential Statistics

**Offered to: B.SC (AI&ML)/ STAT37**

**Course Type:** Core (Theory)

**Year of Introduction:** 2022

**Semester:** III

**Paper No. :** III

**Percentage of Revision:** Nil

**Credits:** 4

**Hours Taught:** 60 periods. per Semester

**Max. Time:** 3 Hours

**Course Prerequisites (if any):** Student required basic knowledge in Probability and Distribution Theory

### Course Description:

This course helps the students to familiarize with the ways in which we talk about uncertainty and estimate their situations in which probability arises. Also this course aims at providing basic knowledge about theoretical and application to test according to situations.

### Course Objectives:

- 1) To understand the problem of statistical inference with specific reference to point estimation and interval estimation.
- 2) To differentiate between large and small samples and apply apt testing procedures.

**Learning Outcomes:** At the end of the course, the student will

- 1) Students will understand the distinguish between the parametric and Non Parametric situations.
- 2) The parameters describe an underlying physical setting in such a way that their value affects the distribution of the measured data..

Course Outcomes:		
Course Outcome	Upon successful completion of this course, students should have the knowledge and skills to:	Program Outcomes Mapping
CO 1	knowledge of point and interval estimation procedures and different methods of point estimation	PO - 5
CO 2	various basic concepts on sampling distributions and large sample tests based on normal distribution	PO - 6
CO3	Obtain the knowledge on various testing hypothetical statements and finding Uniformly Most Powerful Test	PO - 6
CO 4	a fundamental understanding of Parametric models for developing relevant inferences on associated parameters large and small samples.	PO - 6
CO 5	To obtain the knowledge and to know the applications of various Non-Randomized tests	PO - 6

## Syllabus

### Course Details

Unit	Learning Units	Lecture Hours
I	<b>Theory of Estimation:</b> Parameter, Statistic, Standard Error of the statistic, concept of bias and mean square error of an estimate, Criteria of good estimator - unbiasedness, consistency, efficiency, and sufficiency. Maximum Likelihood estimator (MLE) . ML estimates of $\mu$ & $\sigma^2$ . Concepts of confidence interval	12
II	<b>Testing of Hypothesis</b> Statistical hypotheses, critical region, level of significance and power of a test, types of errors. Neyman Pearson lemma (Statement only) and its applications.	12
III	<b>Exact Sampling distributions</b> Student's t-distribution, Chi-square distribution, Snedecor's F-distribution – definitions, properties and applications. <b>Small Sample tests - I</b> Chi-square test for goodness of fit and independence of attributes. t-test for single mean, difference of means and paired t-test.	12
IV	<b>Large sample Tests</b> Procedure for testing of hypothesis - Test for single mean and difference of two means, test for single proportion and difference of proportions. <b>Small Sample tests - II</b> F-test for equality of two population variances, ANOVA I- way and II-way classifications	12
V	<b>Non - Parametric methods</b> Definition, advantages and disadvantages. Advantages and Disadvantages, Measurement scales - Nominal, Ordinal, Interval and Ratio. One sample test- Sign test, Run test Two independent sample tests: Median test, Wilcoxon- Mann Whitney U - test, Kruskal Wallis test - Simple Problems	12

### Text Book:

Fundamentals of Mathematical Statistics, 11th Edition, 2010, S. C. Gupta and V. K. Kapoor, Sultan Chand & Sons, New Delhi

### Reference Books:

1. B.A/B.Sc. Second Year Statistics(2010) , Telugu Akademi, Hyderabad.
2. Mathematical Statistics with Applications, 2009, K.M.Ramachandran and Chris P.Tsokos Academic Press(Elsevier), Haryana .
3. Probability and Statistics, Volume I & II, D. Biswas, New central book Agency (P) Ltd, NewDelhi.
4. An outline of Statistical theory, Volume II,3rd Edition,2010(with corrections) A.M.Goon,M.K. Gupta, B.Dasgupta ,The World Press Pvt.Ltd., Kolakota. Sanjay Arora and Bansil Lal:. New Mathematical Statistics, Satya Prakashan , New Delhi.

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## Model Question Paper Structure for SEE

Max.: 75 Marks

Course Code : STAT37

Min.Pass : 30 Marks

### Inferential Statistics

Answer ALL the following questions

5 X 15M = 75Marks

1.
  - a. Explain the criteria of good estimator. (10M) (Co-1, L-2)
  - b. Define the terms population and parameter with examples. (5M) (Co-1, L-1)

(OR)

  - c. Derive the MLE of the parameter  $\lambda$  in Poisson distribution. (10M) (Co-1, L-2)
  - d. Define the terms sample and statistics with examples. (5M) (Co-1, L-1)
  
2.
  - a. Define Chi-square distribution and write its applications. (5M) (Co-2, L-1)
  - b. Out of 8,000 graduates in a town 800 are females, out of 1,600 graduate employees 120 are females. Use  $\chi^2$  to determine if any distinction is made in appointment the basis of sex. (10M) (Co-2, L-3)

(OR)

  - c. Define F-distribution and write its applications. (5M) (Co-2, L-1)
  - d. In one sample of 8 observations the sum of squares of deviations of the sample values from the sample mean was 84.4 and in the other sample of 10 observations it was 102.6. Test whether this difference is significant at 1% level. (10M) (Co-2, L-3)
  
3.
  - a. In order to test a coin is perfect or unbiased it is tossed 5 times the null hypothesis of perfectness is rejected if and only if more than 4 heads are obtained then calculate (i) Critical region (ii) Probability of Type I error (iii) Probability Type II error (when the corresponding probability of getting head is 0.2) (15M) (Co-3, L-4)

(OR)

  - b. Explain Critical region, Types of errors. (5M) (Co-3, L-2)
  - c. Let  $p$  be the probability that a coin will follow head in a single toss. In order to test  $H_0 : p = \frac{1}{2}$  against  $H_1 : p = \frac{3}{4}$ , the coin is tossed five times.  $H_0$  is rejected if more than three heads appeared. Find the probability of Type I error and Type II error. (10M) (Co-3, L-4)
  
4.
  - a. The marketing manager of a consumer product company wanted to know whether it is worth investing money and efforts in designing different sizes of package design with different color. He was wondering if the factors color and size of package could enhance the sale significantly. He performed the following experiment. The data matrix containing the response variable in 1000 is given below.

	Size of Package		
Color	Large	Medium	Small
Blue	90	96	116
Red	90	110	126
Pink	98	125	149

Perform the two-way ANOVA and test whether the mean sales are influenced by package size and color. What are your findings? (15M) (Co-4, L-4)

(OR)

b. A sales manager of a large company conducted a sample survey in states A and B taking 400 and 500 samples respectively. The results were

	State A	State B
Average Sales	Rs. 2500	Rs. 2200
Standard Deviation	Rs. 400	Rs. 550

Test Whether the average sales is the same in the 2 states at 1% level.(8M) (Co-4, L-4)

c. A filling machine is expected to fill 5kg of powder into bags. A sample of 10 bags gave the weights 4.7, 4.9, 5.0, 5.1, 5.4, 5.2, 4.6, 5.1, 4.6 and 4.7. test whether the machine is working properly. (7M) (Co-4, L-4)

5. a. Explain the Non-Parametric methods also write its merits and demerits.(7M) (Co-5, L-4)

b. The number of defective items produced from two machines are observed as follows.

Machine 1	26, 27, 31, 26, 19, 21, 20, 25, 30
Machine 2	23, 28, 26, 24, 22, 19

Test whether these two samples are drawn from the same population by using median test. (8M) (Co-5, L-4)

(OR)

c. Define nominal, ordinal, interval and ratio data. (5M) (Co-5, L-1)

d. From a company trainers are selected randomly and divided into 3 groups and each group containing 10 members and there are given a course in the management skills by three different methods. At the end of the training period scores are as follows.

Method A	99	64	101	85	79	88	97	95	90	100
Method B	83	102	125	61	91	96	94	89	93	75
Method C	89	98	56	105	87	90	87	101	76	89

By using Kruskalwallis test to determine if the three methods are equally effective (or) not at 5% level. (10M) (Co-5, L-4)

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# P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

Siddhartha Nagar, Vijayawada – 520 010

Autonomous -ISO 9001 – 2015 Certified

## Statistical Data Analysis using SPSS-II

**Offered to:** B.SC (AI&ML)/ STAP37

**Course Type:** Core (Practical)

**Year of Introduction:** 2022-23

**Semester:** III **Credits:** 1

**Hours Taught:** 30 periods

**Max.Time:** 2 Hours

**Course Prerequisites :** Student required basic knowledge in computers

### Course Description:

This course gives a working knowledge of SPSS software to students with the aim of getting to use data analysis. Students will be able to apply appropriate statistical tool for given data set using SPSS Software and get the output and report the finding.

### Course Objectives

- 1) To train students in SPSS Software
- 2) To expose the students to the analysis of statistical data.

Course Outcomes:		
Course Outcome	Upon successful completion of this course, students should have the knowledge and skills to:	Programme Outcomes Mapping
CO 1	To Apply statistical analysis that can test hypotheses under parametric approaches.	PO –6
CO 2	To Apply statistical analysis that can test hypotheses under non-parametric approaches.	PO –6

### List of practical's

1. Small sample test (t-test): One Sample, Independent Sample and Paired Sample.
2. Large sample tests: One Sample, Independent Sample, Paired Sample (Using SPSS)
3. Analysis of variance: One-way and Two- way classification (Using SPSS)
4. Chi square Test: Test for Independence of Attributes
5. Chi square Test: Goodness of fit
6. Chi square Test: Test of Independence, 2X2, 3X3,..., mXn Cross tabulation (Using SPSS)
7. Non Parametric Tests: Mann Whitney U test and Wilcoxon Signed ranks test
8. Non Parametric Tests: Kruskal Wallis Test and Friedman test (Using SPSS)

### Structure of the Practical Examination

External examination for 50 Marks

(i) For Continuous evaluation – 10 Marks

(ii) For examination – 40 Marks

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# P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

Siddhartha Nagar, Vijayawada – 520 010

Autonomous -ISO 9001 – 2015 Certified

## Statistical Data Analysis Using SPSS

**Offered to:** B.SC (CSCS-Computer Science with Cognitive Systems)/ STAAOCP01

**Course Type:** Add-on (Practical)

**Year of Introduction:** 2022-23

**Semester:** III

**Hours Taught:** 30 periods per Semester

**Percentage of Revision:** Nil

**Credits:** 1

**Max.Time:** 2 Hours

**Course Prerequisites:** Students required basic knowledge in handling computers.

**Course Description:** This course gives a working knowledge of SPSS software to students with the aim of getting to use data analysis. Students will be able to apply appropriate statistical tool for given data set using SPSS Software and get the output and report the finding.

### Course Objectives:

- 1) To train students in SPSS Software.
- 2) To expose the students to the analysis of statistical data.

**Learning Outcomes:** At the end of the course, the student will

- 1) able to do data analysis using SPSS
- 2) known to represent the data visualization

Course Outcomes:		
Course Outcome	Upon successful completion of this course, students should have the knowledge and skills to:	Programme Outcomes Mapping
CO 1	To understand the SPSS packages and describing a variety of statistical variables and enter the data in the statistical Packages.	PO - 5
CO 2	To integrate and access the data base from different source of file format.	PO - 5
CO3	To analyse and apply the appropriate Charts and graphs and functions for the given data	PO – 6
CO 4	To recommend the best statistical tool for basic statistical analysis.	PO - 6
CO 5	To Apply statistical analysis that can test hypotheses under parametric approaches.	PO - 7

## Course Details

Unit	List of Practicals	Lab hours
I	Overview of SPSS. Open and save SPSS data file - Import from other data source - Data entry - Labeling for dummy numbers and recode in to same variable - Recode in to different variable and transpose of data - Insert variables and cases merge variables and cases - Split data - Select cases - Compute total scores.	6
II	Simple Bar diagram and Multiple bar diagram - Subdivided Bar diagram - Pie Diagram – Histogram - Scatter diagram & Box plot –	6
III	Measure of central tendency and Dispersion - Karl Pearson's and Spearman's Rank Correlation – Simple and Multiple Regression, $R^2$	6
IV	One sample & Two sample Independent t test - Paired t test	6
V	Chi-square test – Goodness fit and Independence of attributes. One way and Two way ANOVA.	6

Text Book:

1. Andy Field, 2017, Discovering Statistics Using IBM SPSS Statistics, Fifth Edition, SAGE Publications Ltd

### Reference Books

1. Jesus Salcedo, Keith McCormick, Jon Peck and Andrew Wheeler, 2017, SPSS Statistics for Data Analysis and Visualization, First Edition, Wiley.

### Websites of Interest:

[https://students.shu.ac.uk/lits/it/documents/pdf/analysing\\_data\\_using\\_spss.pdf](https://students.shu.ac.uk/lits/it/documents/pdf/analysing_data_using_spss.pdf)

#### Structure of the Practical Examination

External examination for 50 Marks

- (i) For Continuous evaluation – 10 Marks
- (ii) For examination – 40 Marks

\*\*\*



**Parvathaneni Brahmaya**  
**Siddhartha College of Arts & Science, Vijayawada**

Course Code: **STASET01**

Offered to: Offered to: **B.A(EMS)/B.Sc. (M.S.Cs., Ca.M.S., M.S.Ds)**

Domain Subject: **STATISTICS**

Semester – **V**

Max. Marks: **100** (CCIA: 25+ SEE:75)

Theory Hrs./Week: **3**

**Title of the paper: OPERATIONS RESEARCH-I**

Type of the Course: **Skill Enhancement Course** (Elective Theory),

Credits: **04**

**Course Outcomes: Students at the successful completion of the course will be able to:**

CO1: Develop the basic knowledge in Operation research (O.R.,) and describe the Nature, Scientific methods and Decision making (O.R.,)able to understand the application of OR and frame a Linear Programming Problem (LPP) with solution using graphical methodology.(PO-5)

CO2: Knowledge to minimize or maximize the objective function value of LPP using simplex method.(PO-5)

CO3: know to solve the LPP by using Big- method and Two phase methods(PO-6)

CO4: To solve the problems in logistics (PO-5)

CO5: To minimize the total elapsed time in an industry by efficient allocation of jobs to the suitable persons. (PO-6)

**Syllabus**

**(Total Theory Hours: 45)**

**UNIT-I**

**(9 Periods)**

**Operations Research - An overview**

Origin, Nature and features of O.R. Advantages and limitations of models, General solution methods for O.R. models, Applications.

**Linear Programming Problem – Mathematical formulation and graphical solution**

Definition, components, basic assumptions, Mathematical formulation of the problem, Illustrations on mathematical formulation of L.P.P. (two and three variables) L.P.P - graphical solution method (search approach method).solution and infeasible solution

**UNIT-II**

**(9Periods)**

**Linear Programming Problem-Simplex Method-I**

General LPP-Objective function, constraints, non-negative restrictions, Solution of LPP, feasible solution and optimum solution, Canonical and Standard forms of LPP.Basic solution-definition, degenerate solution, basic feasible solution. Associated cost vector, improved basic feasible solution, optimum basic feasible solution and net evaluation. The computational procedure- Simplex Algorithm. Simple linear programming problems on 2 and 3 variables using Simplex Method

**UNIT-III**

**( 9 Periods)**

**Linear Programming Problem-Simplex Method-II**

Artificial Variable Technique (2 and 3 variables only).The Big *M* Method or Method of Penalties.The Two-phase Simplex Method. Special cases in simplex method (2 and 3 variables only) – Degeneracy, Alternative optima, Unbounded solutions and Non existing or infeasible solutions

#### **UNIT-IV**

**(9 Periods)**

**Transportation Problem-** Introduction, Mathematical formulation of Transportation problem. Definition of Initial Basic feasible solution of Transportation problem- North-West corner rule, Lowest cost entry method, Vogel's approximation method. Method of finding optimal solution- MODI method(U-V method). Degeneracy in transportation problem, Resolution of degeneracy, Unbalanced transportation problem. Maximization TP. Transshipment Problem.

#### **UNIT-V**

**(9 Periods)**

**Assignment Problem** -Introduction, Mathematical formulation of Assignment problem, Reduction theorem (statement only), Hungarian Method for solving Assignment problem, Unbalanced Assignment problem. The Traveling salesman problem, Formulation of Traveling salesman problem as an Assignment problem and Solution procedure.

#### **Text Book:**

1. KantiSwarup, P.K.Gupta , Man Mohan,Operations Research, 15<sup>th</sup> Edition, 2010, Sultan Chand & Sons, New Delhi.

#### **List of Reference Books:**

1. Quality,Reliability& Operations Research, First Edition (2010), Published by Telugu Akademi,Hyderabad.
2. Operations Research Theory, Methods and Applications, S.D. Sharma, Himanshu Sharma, improved and enlarged edition, KedarNathRamNath& Co., Meerut.
3. Kirshna's Operations Research, Dr. R. K. Gupta, 27 thEdition , 2010, Krishna Prakashan Media (P) Ltd., Meerut.
4. Operations Research: Theory and Applications, J.K.Sharma, 5<sup>th</sup> Edition, 2013, Macmillan.
5. Operations Research: An Introduction, Hamdy. A. Taha, 9th edition ,2010, Prentice Hall.

#### **Co-Curricular Activities**

**(a) Mandatory: (Training of students by teacher in field related skills:**

**(lab:10 + field: 05)**

**For Teacher:** Training of students by the teacher (if necessary, by a local expert) in laboratory/field for a total of not less than 15 hours on the field techniques/skills on the familiarization of various operating systems and program softwares.

**For Student:** Students shall (individually) operating the computers and execution of their programmes for data analysis

**Student shall write the observations and submit a hand-written Fieldwork/Project work not exceeding 10 pages in the given format to the teacher.**

1. Max marks for Fieldwork/Project work: 10.
2. Suggested Format for Fieldwork/Project work: Title page, student details,
3. index page, details of place visited, observations, findings and acknowledgements.
4. Comprehensive Continuous Internal Assessment (CCIA): (2 tests will be conducted, each carries 30 Marks, consider Average Mark: 15)

\*\*\*\*



**Parvathaneni Brahmaya**  
**Siddhartha College of Arts & Science, Vijayawada**

**Model paper**

**Course Code: STASET01**

**OPERATIONS RESEARCH-I**  
**SECTION A**

**Answer any FIVE questions.**

**5 X 5M = 25M**

1. What are the characteristics of a good model for O.R?
2. What are the advantages and disadvantages of operational research model.
3. Explain graphical procedure in solving linear programming problems.
4. Explain the slack variables and surplus variables.
5. Explain about transportation problem.
6. Explain mathematical formulation of assignment problem
7. Explain i) north- west corner ii) least cost methods
8. Explain balance and unbalance transportation method.

**SECTION B**

**Answer the following questions.**

**5 X 10M = 50M**

9. (a) Discuss the various phases in solving an OR problem.  
(OR)

(b) Use the graphical method to solve the following L.P.P

$$\text{Min } Z = 1.5x_1 + 2.5x_2$$

*Subject to conditions*

$$x_1 + 3x_2 \geq 3$$

$$x_1 + x_2 \geq 2$$

$$\text{and } x_1, x_2 \geq 0.$$

10. (a) Using simple method to

$$\text{Minimum } z = x_2 - 3x_3 + 2x_5$$

subject to the constraints:

$$3x_2 - x_3 + 2x_5 \leq 7,$$

$$-2x_2 + 4x_3 \leq 12,$$

$$-4x_2 + 3x_3 + 8x_5 \leq 10,$$

$$x_2, x_3, x_5 \geq 0$$

(OR)

- (b) Using simplex method to

$$\text{Maximize } Z = 2x_1 + 4x_2 + x_3 + x_4$$

Subject to the constraints

$$x_1 + 3x_2 + x_4 \leq 4,$$

$$2x_1 + x_2 \leq 3,$$

$$x_2 + 4x_3 + x_4 \leq 3,$$

$$x_1, x_2, x_3, x_4 \geq 0$$

11. (a) Solve the following LPP by penalty (BIG-M)

$$\text{Maximize } Z = 3x_1 - x_2$$

Subject to the constraints

$$2x_1 + x_2 \geq 2$$

$$x_1 + 3x_2 \leq 3$$

$$x_2 \leq 4$$

$$x_1, x_2 \geq 0$$

(OR)

(b) Use Two - phase simplex method to Maximize  $Z = 5x_1 + 2x_2 - 3x_3$

Subject to the constraints:

$$2x_1 + 2x_2 - x_3 \geq 2,$$

$$3x_1 - 4x_2 \leq 3,$$

$$x_2 + 3x_3 \leq 5,$$

$$x_1, x_2, x_3 \geq 0$$

12. (a) Solve the following transportation problem in which cell entries represent unit costs

	DI	DII	D III	Availability
A	2	7	4	5
B	3	3	1	8
C	5	4	7	7
D	1	6	2	14
Requirement	7	9	18	

(OR)

(b) Determine the optimum basic feasible solution to the following transportation problem

	A	B	C	Availability
A	50	30	220	1
B	90	45	170	3
C	250	200	50	4
Requirement	4	2	2	

13. (a) a department head has four subordinates, and four tasks have to be performed. Subordinates differ in efficiency and tasks differ in their intrinsic difficulty. Time each man would take to perform each task is given in effectiveness matrix. How the task should be allotted to each person so as to minimize the total man-hours?

	Subordinates			
	I	II	III	IV
A	8	26	17	11
B	13	28	4	26
C	38	19	18	15
D	19	26	24	10

(OR)

(b) A certain equipment needs five repair jobs which have to be assigned to five machines. The estimated time (in hours) that each machine requires to complete the repair job is given in the following table

MAN \ JOB	I	II	III	IV	V
A	2	9	2	7	1
B	6	8	7	6	1
C	4	6	5	3	1
D	4	2	7	3	1
E	5	3	9	5	1

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**Parvathaneni Brahmayya  
Siddhartha College of Arts & Science, Vijayawada**

Course Code: **STASEP01**

Offered to: Offered to: **B.A(EMS)/B.Sc. (M.S.Cs., Ca.M.S., M.S.Ds)**

Domain Subject: **STATISTICS**

Semester: **V**

Max. Marks: **50** (CCIA: 10+ SEE: 40)

Practical Hrs./Week : **3**

<b>Practical No</b>	<b>Theme</b>	<b>Key Topics</b>
<b>SPSS TECHNIQUES</b>		
<b>1</b>	Univariate Analysis of data (categorical variable)	Data Entry, Frequency table, Chart Builder – Bar Chart and Pie Chart
<b>2</b>	Univariate Analysis of data (Continuous variable)	Data Entry, Frequency table, Descriptive, Exploratory, Chart Builder - Histogram, Box Plots, Cluster Bar, Stacked Bar, Editing graphs and axes
<b>3</b>	Bivariate Analysis of Data	Data Entry, Descriptive, Relation between variable through Scatter diagram and correlation coefficient. Linear Regression.
<b>4</b>	Bivariate Analysis of Data (Categorical Variables)	Data Entry, Frequency table, Cross Table, Spearman Correlation, Association between variables
<b>OPERATION RESEARCH TECHNIQUES</b>		
<b>5</b>	Linear Programming Problem – I	Simplex Method – Minimization and Maximization with all constraints are less than or equal to type
<b>6</b>	Linear Programming Problem – II	Big - M and Two Phase Methods
<b>7</b>	Transportation problem	Minimization and Maximization
<b>8</b>	Assignment problem	Minimization and Maximization

**Structure of the Practical Examination**

External examination for 50 Marks

(i) For Continuous evaluation – 10 Marks

(ii) For examination – 40 Marks

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**Parvathaneni Brahmaya**  
**Siddhartha College of Arts & Science, Vijayawada**

Course Code: **STASET02**

Offered to: Offered to: **B.A(EMS)/B.Sc. (M.S.Cs., Ca.M.S., M.S.Ds)**

Domain Subject: **STATISTICS**

Semester – **V**

Max. Marks: **100** (CCIA: 25+ SEE:75)

Theory Hrs./Week: **3**

**Title of the paper: OPERATIONS RESEARCH-II**

Type of the Course: **Skill Enhancement Course** (Elective Theory),

Credits: **04**

**Course Outcomes: Students at the successful completion of the course will be able to:**

CO1: Obtain the knowledge and applications of sequencing models.(PO-5)

CO2: Understand the concepts of replacement.(PO-5)

CO3: Develop the different models of game strategies(PO-6)

CO4: Develop skills in construction of network diagram, apply the techniques of CPM and PERT  
(PO-5)

CO5: Explain clearly the Distinguishes features of Queuing models. (PO-6)

**Syllabus**  
**(Total Theory Hours: 45)**

**UNIT-I**

**(9 Periods)**

**Problem of Sequencing:**

Introduction, Principal Assumptions, Solution of Sequencing Problem- Processing  $n$  jobs through 1-Machine, Processing  $n$  jobs through 2-Machines and Processing  $n$  jobs through 3-Machines- Johnson's Optimal sequence Algorithm. Processing  $n$  jobs through  $k$ -Machines- Johnson's Optimal sequence Algorithm. Simple problems.

**UNIT-II**

**(9Periods)**

**Replacement Problem**

Introduction, Replacement of items that deteriorate- Replacement policy for items whose maintenance cost increases with time and money value is constant. And money Value changes with constant rate. Replacement of items that fail completely - Group replacement of items that fail completely.

**UNIT-III**

**( 9 Periods)**

**Game Theory**

Two-person zero-sum games. Pure and Mixed strategies. Maximin and Minimax Principles - Saddle point and its existence.Games without Saddle point-Mixed strategies.Solution of  $2 \times 2$  rectangular games.Graphical method of solving  $2 \times n$  and  $m \times 2$  games.Dominance Property.

**UNIT-IV**

**(9 Periods)**

**Network Scheduling by PERT/CPM**

Basic steps in PERT/CPM techniques, Basic components, Logical sequencing (errors in drawing networks), Rules for network construction, Critical path analysis, Forward pass Method, Backward pass Method Determination of floats and slack times. Probability considerations in PERT (Project

Evaluation and Review Technique). Distinction between PERT and CPM, Applications of network techniques, Limitations and difficulties in using Network. Simple problems.

## UNIT-V

(9 Periods)

### Queuing theory

Classification of queuing models- Probabilistic Queuing Models, Solution of Queuing models, Limitation for application of Queuing models, Poisson queuing systems-**Model I:**(M/M/1):(  $\infty$  / FIFO)- Birth and Death Model. Characteristics of (M/M/1): (  $\infty$  / FIFO),  $E(L_q), E(L_s), E(L/L > 0), V(\text{Queue Length})$  . PDF of Waiting time distribution for (M/M/1): (  $\infty$  / FIFO), Characteristic of waiting time distribution(M/M/1): (  $\infty$  / FIFO), 1.  $E(w_q), E(w_s)$ , 2.  $E(W/W > 0)$  . Inter- Relationship between  $E(L_q), E(L_s), E(w_q), E(w_s)$  Simple problems.

### Text Book:

1. Kanti Swarup, P.K.Gupta, Man Mohan, Operations Research, 15<sup>th</sup> Edition, 2010, Sultan Chand & Sons, New Delhi.

### List of Reference Books:

1. Quality, Reliability & Operations Research, First Edition (2010), Published by Telugu Akademi, Hyderabad.
2. Operations Research Theory, Methods and Applications, S.D. Sharma, Himanshu Sharma, improved and enlarged edition, Kedar Nath Ram Nath & Co., Meerut.
3. Kirshna's Operations Research, Dr. R. K. Gupta, 27<sup>th</sup> Edition, 2010, Krishna Prakashan Media (P) Ltd., Meerut.
4. Operations Research: Theory and Applications, J.K. Sharma, 5<sup>th</sup> Edition, 2013, Macmillan.
5. Operations Research: An Introduction, Hamdy. A. Taha, 9<sup>th</sup> edition, 2010, Prentice Hall.

### Co-Curricular Activities

#### (a) Mandatory: (Training of students by teacher in field related skills:

(lab:10 + field: 05)

**For Teacher:** Training of students by the teacher (if necessary, by a local expert) in laboratory/field for a total of not less than 15 hours on the field techniques/skills on the familiarization of various operating systems and program softwares.

**For Student:** Students shall (individually) operating the computers and execution of their programmes for data analysis

**Student shall write the observations and submit a hand-written Fieldwork/Project work not exceeding 10 pages in the given format to the teacher.**

1. Max marks for Fieldwork/Project work: 10.
2. Suggested Format for Fieldwork/Project work: Title page, student details,
3. index page, details of place visited, observations, findings and acknowledgements.
4. Comprehensive Continuous Internal Assessment (CCIA): (2 tests will be conducted, each carries 30 Marks, consider Average Mark: 15)

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**Parvathaneni Brahmaya  
Siddhartha College of Arts & Science, Vijayawada**

**Model paper**

**Course Code: STASET02**

**OPERATIONS RESEARCH-II**

**SECTION A**

**Answer any FIVE questions.**

**5 X 5M=25M**

1. Describe the method of processing  $n$  jobs through two machines?
2. What are the objectives of sequencing problem?
3. Write a short note on i) PERT ii) CPM iii) project duration evaluation.
4. Write a short note on characteristics of Game theory.
5. Write a short note on individual replacement and group replacement?
6. Define (i) Competitive Game, (ii) Payoff Matrix, (iii) Pure and Mixed Strategies
7. Write the basic characteristics of queue system
8. What are Transient and Steady states cases in queuing theory?

**SECTION B**

**Answer the following questions.**

**5 X 10M =50M**

9. (a) five jobs have to processed through two machines in the order AB. Determine the optimal sequence.

Job	1	2	3	4	5
Machine A	1	9	5	3	8
Machine B	2	5	6	8	4

(OR)

- (b) What is a sequencing analysis? Illustrate with some practical examples.
10. (a) A manufacturer is offered two machines A and B. A is priced at Rs.5,000, and running costs are estimated at Rs.800 for each of the first five years, increasing by Rs.200 per year in the sixth and subsequent years. Machine B, which has the same capacity as A, costs Rs.2,500 but will have running costs of Rs.1,200 per year for six years, increasing by Rs.200 per year thereafter. If money is worth 10% per year, which machine should be purchased? (Assume that the machine will eventually sold for scrap at a negligible price.)

(OR)

- (b) The following failure rates have been observed for a certain type of light bulbs:

week	:	1	2	3	4	5
% failing by end of week:		10	25	50	80	100

There are 1,000 bulbs in use, and it costs Rs 2 to replace an individual bulb which has burnt out. If all bulbs were replaced simultaneously, it would cost 50 paise per bulb. It is proposed to replace all bulbs at fixed intervals, whether or not they have burnt out, and to continue replacing burnt out bulbs as they fail. At what interval should all the bulbs be replaced?

11. (a) Solve the following game using dominance property

<i>player B</i>			<i>I</i>	<i>II</i>	<i>III</i>	<i>IV</i>
	<i>I</i>	3	2	4	0	
<i>Player A</i>	<i>II</i>	3	4	2	4	
	<i>III</i>	4	2	4	0	
	<i>IV</i>	0	4	0	8	

(OR)

- (b) Solve the game whose payoff matrix is given by

$$\begin{bmatrix} -2 & 0 & 0 & 5 & 3 \\ 3 & 2 & 1 & 2 & 2 \\ -4 & -3 & 0 & -2 & 6 \\ 5 & 3 & -4 & 2 & -6 \end{bmatrix}$$

12. (a) A project consists of a series of tasks A, B, ..., H, I with the following relationships (W < X, Y means X and Y cannot start until W is completed; X, Y < W means W cannot start until both X and Y are completed). With this notation construct the network diagram having the following constraints:

A < D, E;	B, D < F;	C < G;	B, G < H;	F, G < I
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Find also the minimum time of completion of the project, when the time of completion of each task is as follows:

<b>TASK</b>	A	B	C	D	E	F	G	H	I
<b>TIME</b>	23	8	20	16	24	18	19	4	10

(OR)

- (b) A small project consists of seven activities, the details of which are given below:

<b>Activity</b>	A	B	C	D	E	F	G
<b>Most likely</b>	3	6	3	10	7	5	4
<b>Optimistic</b>	1	2	3	4	3	2	4
<b>Pesimistic</b>	7	14	3	22	15	14	4
<b>Preceding Activities</b>	-	-	B	C	A, D	D	A, D
<b>Duration</b>	6	5	2	2	2	1	6

- (i) Draw the network, number the nodes, find the critical path, the expected project completion time and the next most critical path.  
(ii) What project duration will have 95% confidence of completion?

13. (a) Prove that (i)  $E(L_q)$  (ii)  $E(L_s)$ , for model (M/M/1): ( $\infty$  / SIRO)

(OR)

- (b) In a railway marshalling yard, goods trains arrive at a rate of 30 trains per day. Assuming that the inter - arrival time follows an exponential distribution and the service time ( the time taken to hump a train) distribution is also exponential with an average 36 minutes. If the yard can admit 9 trains at a time (there being 10 lines, one of which is reserved for shunting purposes), calculate the probability that the yard is empty and find the average queue length.



**Parvathaneni Brahmaya  
Siddhartha College of Arts & Science, Vijayawada**

Course Code: **STASEP02**

Offered to: Offered to: **B.A(EMS)/B.Sc. (M.S.Cs., Ca.M.S., M.S.Ds)**

Domain Subject: **STATISTICS**

Semester: **V**

Max. Marks: **50** (CCIA: 10+ SEE: 40)

Practical Hrs./Week : **3**

<b>Practical No</b>	<b>Theme</b>	<b>Key Topics</b>
<b>SPSS TECHNIQUES</b>		
<b>1</b>	Parametric Tests	One Sample, Independent Samples and Paired test
<b>2</b>	Multiple Comparison Tests	One way ANOVA and Two way ANOVA
<b>3</b>	Chi-Square Test	Independence of attributes and Goodness of Fit
<b>4</b>	Non-Parametric Test	Mann Whitney U test, Wilcoxon Signed ranks test, Kruskal Wallis Test and Friedman test
<b>OPERATION RESEARCH TECHNIQUES</b>		
<b>5</b>	Queuing theory	Based on (M/M/1):(∞/FIFO)
<b>6</b>	Game Theory	Solve the game problem by using LPP method, Algebraic Method and graphical method
<b>7</b>	Networking	1. Finding of critical path 2. Project evaluation technique
<b>8</b>	Replacement Problem	Replacement policy for items whose maintenance cost increases with time and money value changes with constant rate and replacement of items that fail completely

**Structure of the Practical Examination**

External examination for 50 Marks

(i) For Continuous evaluation – 10 Marks

(ii) For examination – 40 Marks

\*\*\*



**Parvathaneni Brahmayya**  
**Siddhartha College of Arts & Science, Vijayawada**

Course Code: **STASET03**

Offered to: **B.A(EMS)/B.Sc. (M.S.Cs., Ca.M.S., M.S.Ds)**

Domain Subject: **STATISTICS**

Semester – **V**

Max. Marks: **100** (CCIA: 25+ SEE:75)

Theory Hrs./Week: **3**

**Title of the paper : REGRESSION ANALYSIS**

Type of the Course: **Skill Enhancement Course** (Elective Theory), Credits: **04**

**Course Outcomes: Students at the successful completion of the course will be able to:**

CO1: To outline the vital area of regression models applicable in a wide variety of real time situations (PO – 5)

CO2: To draw out the unknown values of predictive variables with given inputs of independent variables and use them for finding the forecasted values for future. (PO – 6)

CO3: To formulate predictive models for the real time data and check validity of the model and if needed, modify the model to suit application problems. (PO – 6)

CO4: To assess the underlying assumptions of the model, learn how to test whether the data satisfy those assumptions. (PO – 6)

CO5: To evaluate on those assumptions are met, and develop strategies for building best models. (PO – 7)

**Syllabus**

**(Total Theory Hours: 45)**

**UNIT-I**

**(9 Periods)**

Introduction to Regression – Mathematical and Statistical Equation – Meaning of Intercept and Slope – Error term – Measure for Model Fit –  $R^2$  – MAE – MAPE – Testing Significance of Model Coefficients, Confidence interval for model coefficients

**UNIT-II**

**(9 Periods)**

Model diagnostics - Mean predicted value, Testing normality of error term, QQ-plot, PP-plot, Anderson Darling, Kolmogorov Smirnov tests.

**UNIT-III**

**(9 Periods)**

Introduction to Multiple Linear Regression Model, Partial Regression Coefficients, Testing Significance overall significance of Overall fit of the model, Testing for Individual Regression Coefficients. Coefficient of determination, adjusted  $R^2$ .

**UNIT-IV**

**(9 Periods)**

Dummy Variable trap, Study of Interaction Effects, Varying Intercept and Slope using dummy variable, Detection and Removal of Outliers

## UNIT-V

(9 Periods)

Study of Normality of Error Term using graphical and testing procedures, Testing for Multicollinearity using VIF, Testing for assumption of Homoscedasticity

### Text Book

1. Gujarati, D.(2004): Introduction to Econometrics. McGraw Hill, New Delhi,

### References

1. Anderson T. W: An Introduction to Multivariate Statistical Analysis, 3/e, , WileyInterscience
2. Montgomery,D.C. ,Peck E.A, & Vining G.G.(2003). Introduction to Linear Regression Analysis. John Wiley and Sons,Inc.NY.

### Co-Curricular Activities

**(a) Mandatory: (Training of students by teacher in field related skills:**

**(lab:10 + field: 05)**

**For Teacher:** Training of students by the teacher in laboratory/field for a total of not less than 15 hours on the field techniques/skills on the familiarization of various concepts used in regression and its application

**For Student:** Students shall (individually) visit and practice the lab techniques.

**Student shall write the observations and submit a hand-written Fieldwork/Project work not exceeding 10 pages in the given format to the teacher.**

1. Max marks for Fieldwork/Project work: 10.
2. Suggested Format for Fieldwork/Project work: Title page, student details,
3. index page, details of place visited, observations, findings and acknowledgements.
4. Comprehensive Continuous Internal Assessment (CCIA): (2 tests will be conducted, each carries 30 Marks, consider Average Mark: 15)



**ParvathaneniBrahmayya**  
**Siddhartha College of Arts & Science, Vijayawada**

**Model paper**

**Course Code: STASET03**

**REGRESSION ANALYSIS**

**SECTION – A**

**Answer any FIVE of the following**

**5 x 5M = 25Marks**

1. Distinguish between  $R^2$  and adjusted  $R^2$  (Co-1, L-1)
2. Explain QQ plots. (Co-2, L-2)
3. Explain MAPE. (Co-1, L-2)
4. Explain multiple linear regressions. (Co-3, L-2)
5. What are the conditions satisfied by the residuals in a multiple linear regression model.  
(Co-3, L-1)
6. Write a note on outliers. (Co-4, L-1)
7. Write a short note on interaction effects in multiple regressions. (Co-4, L-1)
8. Explain multicollinearity in multiple regression. (Co-5, L-2)

**Section – B**

**Answer ALL questions**

**5 x 10M = 50Marks**

9. (a). Derive the least square estimators of simple linear regression model. (Co-1, L-4)

OR

- (b) Find MAE for the following (Co-1, L-4)

Time Period	1	2	3	4	5	6	7
Observed y	58	54	60	55	62	62	65
Forecast y	60	67	56	65	63	63	64

10. (a) Explain residual plots in detail (Co-2, L-2)

OR

- (b) Explain Kolmogrov Smirnov test (Co-2, L-2)

11. (a) Describe the test procedure for testing the overall significance of a multiple regression model.

(Co-3, L-5)

OR

- (b) Build a Multiple linear regression model for the following data: (Co-3, L-5)

Sales in thousands(Y)	10	6	5	12	10	15	5
Price per Gallon ( $X_1$ )	1.3	2	1.7	1.5	1.6	1.2	1.6



Advertising ('00rs)(X<sub>2</sub>)      9      7      5      14      15      12      6

12. (a) Discuss the role of dummy variable trap in the study of interaction effects (Co-4, L-2)

OR

(b) What are dummy variables? State their uses (Co-4, L-2)

13 (a) What are the sources of multicollinearity? Explain variance inflation factor method of diagnosing multicollinearity (Co-5, L-2)

OR

(b) Write a note on detection and removal of outliers (Co-5, L-2)

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**Parvathaneni Brahmayya**  
**Siddhartha College of Arts & Science, Vijayawada**

Course Code: **STASEP03**

Offered to: Offered to: **B.A(EMS)/B.Sc. (M.S.Cs., Ca.M.S., M.S.Ds)**

Domain Subject: **STATISTICS**

Semester – **V**

Max. Marks: **100** (CCIA: 10+ SEE:40)

Theory Hrs./Week: **3**

**Course : Statistics Data Analysis using SPSS**

Type of the Course: **Skill Enhancement Course** (Elective Practical), Credits: **04**

**Course Outcomes: Students at the successful completion of the course will be able to:**

CO1: To understand the SPSS packages and describing a variety of statistical variables and enter the data in the statistical Packages.(PO – 5)

CO2: To integrate and access the data base from different source of file format, apply the appropriate Charts and graphs and functions for the given data. (PO – 6)

CO3: To recommend the best statistical tool for basic statistical analysis. (PO – 7)

CO4: To Apply statistical analysis that can test hypotheses under parametric approaches. (PO – 7)

Practical No	Theme	Key Topics
1	Descriptive Statistics	Data Entry, Frequencies, Descriptive, Cross Tabs, Exploratory, Custom Tables (Co-1)
2	Visual Statistics	Chart Builder, Histogram, Box Plots, Bar charts, Cluster Bar, Stacked Bar, Error bar, Pie chart, Editing graphs and axes (Co-2)
3	Correlation	Pearson Correlation, Spearman Correlation, Scatter Plots (Co-3)
4	Model building	Simple Linear Regression (Co-3)
5	Model building	Multiple Linear Regression (Co-3)
6	Model building with dummy variable	Multiple Linear Regression with categorical variable (Co-3)
7	Model testing	Testing for Multicollinearity using VIF (Co-3)
8	Parametric tests	Single Mean, Difference of Means and Paired Test (Co-4)
9	Chi-Square Test	Goodness of Fit and Independence of attributes (CO – 4)
10	F – Test	One Way and Two Way Analysis of Variance (CO – 4)

**Structure of the Practical Examination**

External examination for 50 Marks

(i) For Continuous evaluation – 10 Marks

(ii) For examination – 40 Marks



**Parvathaneni Brahmayya**  
**Siddhartha College of Arts & Science, Vijayawada**

Course Code: **STASET04**

Offered to: Offered to: **B.A(EMS)/B.Sc. (M.S.Cs., Ca.M.S., M.S.Ds)**

Domain Subject: **STATISTICS**

Semester – **V**

Max. Marks: **100** (CCIA: 25+ SEE:75)

Theory Hrs./Week: **3**

**Title of the paper : MULTIVARIATE TECHNIQUES**

Type of the Course: **Skill Enhancement Course** (Elective Theory),

Credits: **04**

**Course Outcomes: Students at the successful completion of the course will be able to:**

CO1: Get the knowledge regarding multivariate data and its types and also acquire the knowledge of its applications (PO-5)

CO2: Study of theoretical concepts of Multivariate Normal distribution with their properties(PO-6)

CO3: Get the knowledge in orthogonal projections and characterization of components(PO-6)

CO4: Understand the factors to be analyzed and acquire the knowledge about different analysis techniques (PO-6)

CO5: Get the knowledge in grouping the similar objectives in multi way directions we use cluster analysis (PO-6)

**Syllabus:**

**(Total Theory Hours: 45)**

**UNIT-I Introduction to Multivariate Analysis (9 Periods)**

Meaning of Multivariate Analysis, classification of multivariate techniques (Dependence Techniques and Inter-dependence Techniques), Applications of Multivariate Techniques in different disciplines. Scaling methods

**UNIT-II Multivariate normal distribution (9Periods)**

Multivariate normal density and its properties, sampling from MVN distribution and MLE, assessing the assumption of normality, estimation of Mean and Var-Cov matrix

**UNIT-III Principal Component Analysis (9 Periods)**

Introduction – Definition – Properties – population principal components- sample principle components- Distribution of characteristic roots – testing –large samples .  $T^2$  chart for quality checking

**UNIT-IV Factor Analysis (9 Periods)**

Introduction to Factor Analysis – Meaning, Objectives and Assumptions – factor model- Methods of estimation – principle factor method, maximum likelihood method.

**UNIT-V Cluster Analysis (9 Periods)**

Hierarchical Clustering Methods – Single linkage, complete linkage and average linkage, and Ward's method. Non-Hierarchical Methods – K Means

### **Text Book**

1. Joseph F Hair, William C Black etl , 7th edition, 2013 “Multivariate Data Analysis” , Pearson Education,
2. Johnson, Richard A and. Wichern D.W, 2007, Applied Multivariate Statistical Analysis, 6 /e, Pearson edition

### **References**

1. Anderson T. W: An Introduction to Multivariate Statistical Analysis, 3/e, , WileyInterscience
2. Alvin C. Rencher (2003): Methods of Multivariate Analysis, 2/e, Wiley Interscience
3. Affifi, Abdelmonem., May, Susanne. and A. Clark., Virginia. (2012) Practical Multivariate Analysis 5 / e, CRC Press, Taylor & Francis Group.

### **Co-Curricular Activities**

**(a) Mandatory: (Training of students by teacher in field related skills:  
(lab:10 + field: 05)**

**For Teacher:** Training of students by the teacher (if necessary, by a local expert) in laboratory/field for a total of not less than 15 hours on the field techniques/skills on the familiarization of advanced multivariate techniques

**For Student:** Students shall (individually) visit the lab and do practise the techniques learn in theory by using R programming

**Student shall write the observations and submit a hand-written Fieldwork/Project work not exceeding 10 pages in the given format to the teacher.**

1. Max marks for Fieldwork/Project work: 10.
2. Suggested Format for Fieldwork/Project work: Title page, student details,
3. index page, details of place visited, observations, findings and acknowledgements.
4. Comprehensive Continuous Internal Assessment (CCIA): (2 tests will be conducted, each carries 30 Marks, consider Average Mark: 15)

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**Parvathaneni Brahmaya**  
**Siddhartha College of Arts & Science, Vijayawada**

**Model paper**

**Course Code: STASET04**

**Multivariate Techniques**

**SECTION – A**

**Answer any Five questions.**

**5 X 5M = 25M**

1. Briefly explain the interdependence models in multivariate analysis (L-2, CO-1)
2. Briefly explain the dependence models in multivariate analysis (L-2, CO – 1)
3. Explain the properties of multivariate normal distribution ((L-2, CO- 2)
4. Write a short notes on multivariate techniques (L-3, CO-1)
5. Write the properties of principle component analysis (L-3, CO-3)
6. Explain clustering and also explain its types (L-2, CO-3)
7. Explain the objectives of factor analysis (L-2, CO-4)
8. Explain Ward's method of cluster analysis (L-2, CO-5)

**SECTION B**

**Answer all questions.**

**5 X 10M = 50M**

9. (a) Differentiate hierarchical and non-hierarchical cluster analysis. Explain k-means clustering method in brief (L-2, CO-5)  
(OR)  
(b). Explain single, average and complete linkage methods (L-2, CO-5)
10. (a) Obtain the maximum likelihood estimator  $\Sigma$  of p-variate normal distribution.  
(L-3, CO-2)  
(OR)  
(b) Derive the m.g.f of multivariate normal distribution (L-3, CO-2)
11. (a) Define orthogonal factor model with an assumptions. Also explain the terms factor loading and specific variance (L-3, CO-4)  
(OR)  
(b) Suppose the random variable  $X_1, X_2$  and  $X_3$  have the covariance matrix.

$$\Sigma = \begin{bmatrix} 5 & -4 & 0 \\ -4 & 3 & 0 \\ 0 & 0 & 2 \end{bmatrix}$$

Assume  $m=1$  factor model calculate the loading matrix  $L$  (L-3, CO-4)

- 12 (a) State and prove that any two properties of Principal Component Analysis (L-3, CO-3)  
(OR)  
(b) Determine the principal components  $Y_1$ ,  $Y_2$  and  $Y_3$  for the covariance matrix (L-3, CO-3)

$$\Sigma = \begin{bmatrix} 1 & -2 & 0 \\ -2 & 5 & 0 \\ 0 & 0 & 2 \end{bmatrix}$$

Also, calculate the proportion of total population variance explained by the first principal component

13. (a) Explain different scaling methods with examples (L-2, CO-1)  
(OR)  
(b) Explain the applications of multivariate techniques (L-2, CO-1)

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**Parvathaneni Brahmayya**  
**Siddhartha College of Arts & Science, Vijayawada**

Course Code: **STASEP04**

Offered to: **B.A(EMS)/B.Sc. (M.S.Cs., Ca.M.S., M.S.Ds)**

Domain Subject: **STATISTICS**

Semester – **V**

Max. Marks: **50** (CCIA: 10+ SEE:40)

Theory Hrs./Week: **3**

**Multivariate Data Analysis Using ‘R’**

Type of the Course: **Skill Enhancement Course** (Elective Practical), Credits: **02**

**Course Outcomes: Students at the successful completion of the course will be able to:**

CO1: understand the application of different test procedures.(PO – 5)

CO2: application of R on multivariate concepts (PO – 5)

**List of Practicals**

1. Multivariate Analysis. (Multivariate normality, Marginal, Conditional, Q-Q plot)
2. Categorical modelling
3. Exploratory Multivariate data Analysis. (Sample mean, variance and covariance matrix, Correlation Matrix )
4. Cluster Analysis – Hierarchical method with different linkages
5. Cluster Analysis – K-Means method.
6. Principal component Analysis (covariance & Correlation technique and their interpretation )
7. Factor analysis ( PCA., MLE, all Rotations and their interpretation )

**Structure of the Practical Examination**

External examination for 50 Marks

(i) For Continuous evaluation – 10 Marks

(ii) For examination – 40 Marks

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**Parvathaneni Brahmaya**  
**Siddhartha College of Arts & Science, Vijayawada**

Course Code: **STASET05**

Offered to: **B.A(EMS)/B.Sc. (M.S.Cs., Ca.M.S., M.S.Ds)**

Domain Subject: **STATISTICS**

Semester – **V**

Max. Marks: **100** (CCIA: 25+ SEE:75)

Theory Hrs./Week: **3**

**Title of the paper : SQC & RELIABILITY**

Type of the Course: **Skill Enhancement Course** (Elective Theory),

Credits: **04**

**Course Outcomes: Students at the successful completion of the course will be able to:**

CO1: Understand the sampling inspection plans and different concepts regarding inspection plans (PO-6)

CO2: Develop the single or double inspection sampling plans and to make a comparative study. (PO-6)

CO3: Understanding the basic concepts of reliability, hazard function, bathtub curve and their applications (PO-6)

CO4: Enhance the knowledge on some reliability estimation and testing the linear models (PO-6)

CO5: Understand the concept of system reliability namely series and parallel configuration methods (PO-6)

**Syllabus**

**(Total Theory Hours: 45)**

**UNIT-I Acceptance Sampling Plans**

**(9 Periods)**

Introduction, reasons of sampling inspection plans, advantages and disadvantages, 100% inspection. Definitions of AQL, LTPD, Consumer's risk and Producer's risk, AOQ, AOQL, ATI and ASN, OC curve. characteristics of OC curve

**UNIT-II Single and Double sampling Plans**

**(9Periods)**

Introduction, types of sampling plans, single and double sampling plans and their OC curves, characteristics of a good sampling plan, comparison of single and double sampling plans

**UNIT-III Reliability Measures**

**( 9 Periods)**

Introduction, meaning and concept of reliability, Modes of failure -Bath tub curve, Reliability customer satisfaction. Means of failure – Causes of failure, categories of failures, failure density, failure rate, probability of failure, mean failure rate, mean time to failure rate (MTTF), mean time between failures (MTBF). Exponential law

**UNIT-IV Reliability Function and Estimation**

**(9 Periods)**

Introduction, derivation of reliability function. Failure models – constant hazard model, linear hazard model. Life testing- reliability estimation, estimation of parameter of failure distribution (exponential).

**UNIT-V System Reliability**

**(9 Periods)**

Introduction, types of a system, systems with series configuration, system with parallel configuration, An r-out-of-n system



### **Text Book**

1. Statistics – Quality, Reliability & Operations Research, Dr.T.C. Ravichandra kumar, Telugu Akademi (2010)
2. Introduction to Statistical Quality Control, Montgomery, D.C., John Wiley (Asia) 2001

### **References**

1. R.C.Gupta (2001): Statistical Quality Control. 9<sup>th</sup> Edition. Khanna Publishers.
1. Duncan Acheson (1986): Quality Control and Industrial Statistics. 5<sup>th</sup> Edition. Irvin.

### **Co-Curricular Activities**

**(a) Mandatory: (Training of students by teacher in field related skills:**

**(lab:10 + field: 05)**

**For Teacher:** Training of students by the teacher (if necessary, by a local expert) in laboratory/field for a total of not less than 15 hours on the field techniques/skills on the familiarization of various statistical quality control and reliability techniques.

**For Student:** Students shall (individually) operating the computers and execution of their labs manually and also technically

**Student shall write the observations and submit a hand-written Fieldwork/Project work not exceeding 10 pages in the given format to the teacher.**

1. Max marks for Fieldwork/Project work: 10.
2. Suggested Format for Fieldwork/Project work: Title page, student details,
3. index page, details of place visited, observations, findings and acknowledgements.
4. Comprehensive Continuous Internal Assessment (CCIA): (2 tests will be conducted, each carries 30 Marks, consider Average Mark: 15)

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**Parvathaneni Brahmayya**  
**Siddhartha College of Arts & Science, Vijayawada**

**Model paper**

**Course Code: STASET05**

**SQC & RELIABILITY**

**SECTION – A**

**Answer any Five questions.**

**(25 Marks: 5 x 5)**

1. Explain the advantages and disadvantages of sampling inspection (L-2, CO-1)
2. Define producer's risk and consumer's risk in accepting sampling plan (L-1, CO-1)
3. Explain the various types of sampling (L-2, CO-2)
4. Explain the characteristics of a good sampling plan (L-2, CO-2)
5. Explain the difference between single sampling plan and double sampling plan (L-2, CO-2)
6. Define hazard rate, probability of failure and mean failure rate (L-1, CO-3)
7. Explain the applications of reliability models (L-2, CO-4)
8. Explain series configuration model (L-2, CO-5)

**SECTION B**

**Answer all questions.**

**5 x 10 = 50 Marks**

9. a. Explain the objective and construction procedure of operating characteristic curve  
(L-2, CO-2)  
(OR)  
b. Explain the situations where 100% inspection is needed (L-2, CO-2)
10. a. Define Single sampling plan. Explain its OC curve. (L-1, CO-2)  
(OR)  
b. Define Double Sampling plan. Explain its OC curve (L-1, CO-2)
11. a. Explain any three different modes of failure with the help of bath tub curve (L-2, CO-3)  
(OR)  
b. Define failure and density of failure. Explain the procedure to compute failure density (L-1, CO-3)
12. a. Explain the procedure to estimate the parameters of reliability functions in the case of exponential failures (L-2, CO-4)  
(OR)  
b. Explain the types of failure models in reliability. (L-2, CO-4)
13. a. Explain the method of computation of system reliability in parallel configuration  
(L-2, CO-5)  
(OR)  
b. Explain the procedure to compute the reliability of an r-out-of-n system (L-2, CO-5)

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**Parvathaneni Brahmayya**  
**Siddhartha College of Arts & Science, Vijayawada**

Course Code: **STASEP05**

Offered to: **B.A(EMS)/B.Sc. (M.S.Cs., Ca.M.S., M.S.Ds)**

Domain Subject: **STATISTICS**

Semester: **V**

Max. Marks: **50** (CCIA: 10+ SEE: 40)

Practical Hrs./Week : **3**

<b>Practical No</b>	<b>Theme</b>	<b>Key Topics</b>
<b>Manual</b>		
<b>1</b>	SQC	Computations of AOQ, AOQL, ATI and construct OC curve
<b>2</b>	SQC	Designing of Single Sampling Plan and Construct their OC curve
<b>3</b>	SQC	Designing of Double Sampling Plan and Construct their OC curve.
<b>4</b>	Reliability	Computations of Reliability for Series, Parallel and r-out-of-n systems.
<b>5</b>	Reliability	Computations of failure density, failure rate and reliability, probability of failure
<b>Ex - Cell</b>		
<b>6</b>	SQC	Designing of Single Sampling Plan and Construct their OC curve
<b>7</b>	SQC	Designing of Double Sampling Plan and Construct their OC curve.
<b>8</b>	Reliability	Computations of Reliability for Series, Parallel and r-out-of-n systems

**Structure of the Practical Examination**

External examination for 50 Marks

(i) For Continuous evaluation – 10 Marks

(ii) For examination – 40 Marks

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**Parvathaneni Brahmaya**  
**Siddhartha College of Arts & Science, Vijayawada**

Course Code: **STASET06**

Offered to: Offered to: **B.A(EMS)/B.Sc. (M.S.Cs., Ca.M.S., M.S.Ds)**

Domain Subject: **STATISTICS**

Semester – **V**

Max. Marks: **100** (CCIA: 25+ SEE:75)

Theory Hrs./Week: **3**

**Title of the paper : Computational Techniques and R Programming**

Type of the Course: **Skill Enhancement Course** (Elective Theory),

Credits: **04**

**Course Outcomes: Students at the successful completion of the course will be able to:**

CO1: To navigate the operating system and start applications. To perform basic functions of file management (PO-5)

CO2: To understand the Excel package and describing a variety of statistical variables and enter the data in the statistical Packages. (PO-5)

CO3: To analyze and apply the appropriate Charts and graphs and functions for the given data. To recommend the best statistical tool for basic statistical analysis. To Apply statistical analysis that can test hypotheses under parametric and Non Parametric approaches Get the knowledge in orthogonal projections and characterization of components(PO-6)

CO4: To Understand the basics in R in terms of construct, control statements and string functions Perform various operations and apply common function to manipulate and analyze data using basic R syntax (PO-5)

CO5: To Apply R programming for data analytics for statistical testing (PO-6)

**Syllabus**

**(Total Theory Hours: 45)**

**UNIT-I**

**(9 Periods)**

Computer basics: Basic applications of computer, components of computer system, Central Processing Unit (CPU), input and output units, computer memory and mass storage devices. Programming languages and their applications. Concept of files and folders. Software and types of software. Operating System like Windows and Linux

**UNIT-II**

**(9Periods)**

Data processing using spreadsheets – Data entry and editing features in Excel, copy, paste, paste special options, sort and filter options, auto sum, steps of finding average and standard deviation of data using statistical functions. Matrix operations like transpose, multiply and inverse using Excel functions. Simple graphs like bar chart, line chart and pie chart in Excel. Exporting Excel output to word processors like MS-Word and slide presentations like Power Point

**UNIT-III**

**( 9 Periods)**

Scatter diagram, fitting of straight line, polynomial and power curves using Excel – Reading R-square value and equation from the graph. Predicting future values using ‘forecast’ and ‘trend’ functions. Data Analysis Pak and its features. Performing Student’s t-test and one-way Analysis of Variance using Data Analysis Pak. P-value and its interpretation

#### UNIT-IV

(9 Periods)

Programming with R: Introduction to R, Data types in R (numeric, logical, character, complex etc.), R objects: vector, matrix, array, list, data frame, factor, and time series. Arithmetic, logical and relational operators, Few important mathematical, statistical and graphical functions in R. Descriptive Statistics with R software: Calculations with R software such as descriptive statistics, frequency distribution, Graphics and plots, statistical functions of central tendency, variation, skewness and kurtosis and illustration with examples

#### UNIT-V

(9 Periods)

Statistical Hypothesis Testing Parametric and Non Parametric testing of Statistical Hypothesis – One Sample t test – two group t test – paired t test – one way ANOVA- two way ANOVA – Latin Square Design – Sign Test – Wilcoxon – Mann Whitney – Kruskal Wallis tests

#### Text Book

1. Chambers, J. (2008). Software for Data Analysis: Programming with R, Springer.
2. Crawley, M.J. (2017). The R Book, John Wiley & Sons.
3. Eckhouse, R.H. and Morris, L.R. (1975). Minicomputer Systems Organization, Programming and Applications, Prentice-Hall

#### References

1. Dr. Mark Gardener(2012): Beginning R The statistical Programming Languages, John Wiley & Sons.
2. K.V.S. Sarma (2010), Statistics Made Simple – Do it yourself on PC, 2<sup>nd</sup> Edition, Prentice Hall India
3. Sudha G. Purohit, SharadD.Gore, and ShailajaR.Deshmukh (2008), Statistics Using R, Narosa Publishing House, India.

#### Co-Curricular Activities

**(a) Mandatory: (Training of students by teacher in field related skills:**

**(lab:10 + field: 05)**

**For Teacher:** Training of students by the teacher (if necessary, by a local expert) in laboratory/field for a total of not less than 15 hours on the field techniques/skills on the familiarization of various operating systems and program softwares.

**For Student:** Students shall (individually) operating the computers and execution of their programmes for data analysis

**Student shall write the observations and submit a hand-written Fieldwork/Project work not exceeding 10 pages in the given format to the teacher.**

1. Max marks for Fieldwork/Project work: 10.
2. Suggested Format for Fieldwork/Project work: Title page, student details,
3. index page, details of place visited, observations, findings and acknowledgements.
4. Comprehensive Continuous Internal Assessment (CCIA): (2 tests will be conducted, each carries 30 Marks, consider Average Mark: 15)

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**Parvathaneni Brahmaya  
Siddhartha College of Arts & Science, Vijayawada**

**Model paper**

**Course Code: STASET06**

**Computational Techniques and R Programming**

**SECTION – A**

**Answer any Five questions.**

**5 x 5M=25Marks**

1. Write down the applications of computers. (Co-1, L-1)
2. Define software and explain different types of software. (Co-1, L-1)
3. What are the different types of operators in excel? (Co-2, L-1)
4. Illustrate cell formatting in excel. (Co-2, L-)
5. Write a note on predicting future values using 'forecast' and 'trend' functions. (Co-3, L-1)
6. Write a note on R object. (Co-4, L-1)
7. Write a note on R command on one-way ANOVA. (Co-5, L-1)
8. Illustrate test for difference means command in R with an example. (Co-5, L-)

**SECTION B**

**Answer all questions.**

**5 x 10M = 50 Marks**

9. Explain block diagram of computers. (Co-1, L-5)  
(OR)  
Explain generations of programming languages. (Co-1, L-5)
10. Explain about creating charts in MS – Excel. Also discuss about various types of charts in MS – Excel. (Co-2, L-5)  
(OR)  
What is function? Explain different types of function in Excel. (Co-2, L-5)
11. Write down the procedure for analysis of variance in Excel using data analysis pak (Co-3, L-2)  
(OR)  
Write down the procedure for Descriptive Statistics in Excel using data analysis pak (Co-3, L-2)
12. Explain the data types in R with examples. (Co-4, L-5)  
(OR)  
Explain the descriptive statistics using R command with examples. (Co-4, L-5)
13. Explain the test procedures of t-test for single mean & paired t-test using R command. (Co-5, L-5)  
(OR)  
Explain the test procedures of Mann Whitney and Kruskal Wallis tests using R command. (Co-5, L-5)

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**Parvathaneni Brahmayya  
Siddhartha College of Arts & Science, Vijayawada**

Course Code: **STASEP06**

Offered to: Offered to: **B.A(EMS)/B.Sc. (M.S.Cs., Ca.M.S., M.S.Ds)**

Domain Subject: **STATISTICS**

Semester: **V**

Max. Marks: **50** (CCIA: 10+ SEE: 40)

Practical Hrs./Week : **3**

Practical No	Theme	Key Topics
<b>EXCEL - TECHNIQUES</b>		
<b>1</b>	Descriptive Statistics	Data Entry, Frequencies, Descriptive, Cross Tabs, Exploratory, Custom Tables
<b>2</b>	Visual Statistics	Chart Builder, Histogram, Box Plots, Bar charts, Cluster Bar, Stacked Bar, Error bar, Pie chart, Editing graphs and axes
<b>3</b>	Matrix	Calculating Matrix Inverse
<b>4</b>	Correlation and Regression	Pearson Correlation, Spearman Correlation, Scatter Plots, Linear Regression.
<b>5</b>	Statistical Testing	t-test, one way ANOVA & two way ANOVA
<b>R - TECHNIQUES</b>		
<b>6</b>	Visual Statistics	Chart Builder, Histogram, Box Plots, Bar charts, Cluster Bar, Stacked Bar, Error bar, Pie chart, Editing graphs and axes
<b>7</b>	Descriptive Statistics	Central Tendencies, Dispersions, Moments, Skewness and Kurtosis.
<b>8</b>	Correlation and Regression	Pearson Correlation, Spearman Correlation, Scatter Plots, Linear Regression.
<b>9</b>	Control Charts	Variable Charts & Attributes Charts

**Structure of the Practical Examination**

External examination for 50 Marks

(i) For Continuous evaluation – 10 Marks

(ii) For examination – 40 Marks

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తేది: 22.08.2022

1. ది.22.08.2022న ఉదయం 11.00 గం.లకు పర్వతనేని బ్రహ్మయ్య స్వయంప్రతిపత్తి సిద్ధార్థ కళాశాల తెలుగు శాఖాధ్యక్షులు డాక్టర్. వై. పూర్ణచంద్రరావు అధ్యక్షతన “బోర్డు ఆఫ్ స్టడీస్ ఇన్ తెలుగు” సమావేశంలో పరిశీలనాంశ ములు మరియు 2021-22 విద్యాసంవత్సరంలో తెలుగు పరీక్షా ప్రశ్నపత్రాల నమూనా పరిశీలన గురించి.
2. 2021-22 విద్యా సంవత్సరంలో చేరిన బి.ఎ., బి.కాం.-జనరల్, సి.ఎ.,టాక్స్, ఏ & ఎఫ్, బి.పి.ఎం., బి.బి.ఎ., బి.బి.ఎ. -బిజినెస్ ఎనలటిక్స్, బి.ఎస్.సి., సిఎస్. సిఎస్., విద్యార్థులకు III/IV సెమిస్టరు పాఠ్యాంశములు మరియు కోర్స్ కోడ్ TE LT01Aకు సంబంధించిన సిలబస్ను బోధించుటకు నిర్ణయం గురించి.
3. 2022-23 విద్యాసంవత్సరంలో చేరు బి.ఎ., బి.కాం.-జనరల్, సి.ఎ.,టాక్స్, ఏ & ఎఫ్, బి.పి.ఎం., బి.ఎఫ్.ఎస్.ఐ., బి.బి.ఎ., బి.బి.ఎ.-బిజినెస్ ఎనలటిక్స్, బి.బి.ఎ- రిటైల్ మేనేజ్మెంట్, బి.ఎస్.సి. మరియు ఏ .ఐ. & ఎం.ఎల్. విద్యార్థులకు I సెమిస్టరు పాఠ్యాంశములు మరియు కోర్స్ కోడ్ TELT11Aకు సంబంధించిన సిలబస్ను బోధించుటకు నిర్ణయం గురించి.
4. అధ్యక్షుల అనుమతితో తెలుగుశాఖకు సంబంధించిన ఏవైనా ఇతర అంశాలు.

**హాజరైన సభ్యులు :**

1. డా. వై. పూర్ణచంద్రరావు,  
చైర్మన్, బి.ఓ.ఎస్., అధ్యక్షులు,  
తెలుగు శాఖాధిపతి, పి.బి.సిద్ధార్థ స్వయం ప్రతిపత్తి కళాశాల, విజయవాడ - 10
2. డా.జి.బి.ఆనంద కుమార్,  
నామిని, కృష్ణా యూనివర్సిటీ, మచిలీపట్నం
3. డా.పి. విజయకుమార్, విషయనిపుణులు,  
తెలుగుశాఖ, వైస్ ప్రిన్సిపాల్,  
ఎస్.ఎం.ఎల్. ప్రభుత్వ డిగ్రీ కళాశాల,  
ఎమ్మిగనూరు, కర్నూలు
4. డా. ఏ.జ్యోతి,  
పొయిట్ & క్రిటిక్, తెలుగుశాఖాధిపతి,  
కాకతీయ విశ్వవిద్యాలయం, వరంగల్, టి.ఎస్.
5. శ్రీ జి. వెంకటేశ్వరరావు, పూర్వ విద్యార్థి,  
జర్నలిస్టు, విజయవాడ-2.
6. ఆర్. జితేంద్ర కుమార్,  
అసిస్టెంట్ ప్రొఫెసర్,  
పి.బి.సిద్ధార్థ స్వయం ప్రతిపత్తి కళాశాల, విజయవాడ - 10
7. కె. అనిల్బాబు,  
అసిస్టెంట్ ప్రొఫెసర్,  
పి.బి.సిద్ధార్థ స్వయం ప్రతిపత్తి కళాశాల, విజయవాడ - 10
8. డా. ఎన్. శివకుమార్,  
అసిస్టెంట్ ప్రొఫెసర్,  
పి.బి.సిద్ధార్థ స్వయం ప్రతిపత్తి కళాశాల, విజయవాడ - 10



## ఆమోదించిన తీర్మానాలు :

**మొదటి తీర్మానం:-** ది. 22.08.2022న ఉదయం 11.00 గం.లకు పర్వతనేని బ్రహ్మయ్య సిద్ధార్థ స్వయం ప్రతిపత్తి కళాశాల “బోర్డు ఆఫ్ స్టడీస్ ఇన్ తెలుగు” ఆన్లైన్ సమావేశంలో పరిశీలనాంశములు మరియు 2021-22 విద్యా సంవత్సరంలోని తెలుగు పాఠ్యగ్రంథాల బోధనానుభవమును సమీక్షించిన అనంతరం, పరీక్షా ప్రశ్న పత్రాలను, పాఠ్య ప్రణాళికకు అనుగుణంగా ఉన్నాయని, విద్యార్థుల స్థాయికి తగినట్లుగా ఉన్నాయని నిర్ణయించి ఏకగ్రీవంగా తీర్మానించడమైంది.

**రెండో తీర్మానం:-** 2021-22 విద్యా సంవత్సరంలో చేరిన బి.ఏ., బి.కాం.-జనరల్, సి.ఏ.,టాక్స్, ఏ & ఎఫ్, బి.పి.ఎం., బి.బి.ఏ., బి.బి.ఏ-బిజినెస్ ఎనలటిక్స్, బి.ఎస్.సి., సిఎస్. సిఎస్., విద్యార్థులకు III/IV సెమిస్టరు పాఠ్యాంశములు మరియు కోర్సెస్ TELT01Aకు సంబంధించిన సిలబస్ను బోధించుటకు నిర్ణయించడమైంది.

**మూడో తీర్మానం:-** 2022-23 విద్యాసంవత్సరంలో చేరు బి.ఏ., బి.కాం.-జనరల్, సి.ఏ.,టాక్స్, ఏ & ఎఫ్, బి.పి.ఎం., బి.ఎఫ్. ఎస్.ఐ. బి.బి.ఏ., బి.బి.ఏ.-బిజినెస్ ఎనలటిక్స్, బి.బి.ఏ- రిటైల్ మేనేజ్మెంట్, బి.ఎస్.సి. మరియు ఏ.ఐ. & ఎం. ఎల్. విద్యార్థులకు I సెమిస్టరు పాఠ్యాంశములు మరియు కోర్సెస్ TELT11Aకు సంబంధించిన సిలబస్ను బోధించుటకు నిర్ణయించడమైంది.

TELUGU	TELT11A	2022-2023	B.A., B.Com., B.B.A., B.B.A.-Ana, B.Com.-CA, B.C.A., & B.Sc.,
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SEMESTER-I

CREDITS – 3

### TELUGU-I

**యూనిట్-I రాజనీతి - నన్నయ మహాభారతము - సభాపర్వం - ప్రథమాశ్వాసంలో 26వ పద్యము “మీవంశమున.....**  
..... నీవు వారిదైన నేర్పెఱింగి” నుండి 57వ పద్యము “నాయథాశక్తి .... వాని ననుష్ఠితు భ్రీయముతోడ” వరకు.

**యూనిట్-II దక్షయజ్ఞం - నన్నెచోడుడు కుమార సంభవం - ద్వితీయాశ్వాసంలో 49వ వచనం “అంతకమున్ను.....**  
.....భయంకరాకారంబుదాల్చిన” నుండి 86వ పద్యం “ప్రమథగణము.... కనిరిశంభు” వరకు.

**యూనిట్-III ధామ్యధర్మోపదేశము - తిక్కన మహాభారతము - విరాటపర్వము - ప్రథమాశ్వాసంలో 116వ పద్యం “**  
ఎఱిగెడు వారికినైనను.....వలయు దగియెడు బుద్ధుల్” నుండి 146వ పద్యం “అతడు నియతితోడ .....  
.....సంచయములు దగ జపించుచుండె” వరకు.

**యూనిట్-IV మధుర స్నేహం - పోతన ఆంధ్రమహాభాగవతము - దశమస్కంధము - కుచోలోపాఖ్యానంలో 962వ**  
పద్యం “లలిత పతివ్రతాతిలకంబు.....కుపాయమూహింప వైతి” నుండి 983వ పద్యం  
“తన మృదుతల్పమందు..... ధరణీసురు డెంతటి భాగ్యవంతుడో” వరకు.

**యూనిట్-V సీతారావణ సంవాదం - మొల్ల రామాయణము - సుందరకాండములో 40వ వచనం “ఆరామంజూచి....**  
..... వృక్షం బారోహించి యందు” నుండి 87వ పద్యం “కావున నిక్కోమలియెడ.....  
మనకు దిక్కుగు మీదన్” వరకు.

#### వ్యాకరణము :

- 1. సంధులు:-** సవర్ణ, గుణ, యణాదేశ, వృద్ధి, అకార, ఇకార, ఉకార, త్రిక సంధులు.
- 2. సమాసములు:-** తత్పరుష, కర్మధారయ, ద్వంద్వ, ద్విగు, బహువ్రీహి సమాసములు.
- 3. ఛందస్సు:-** వృత్త పద్యాల్లో ఉత్పలమాల, చంపకమాల, శార్దూలము, మత్తేభము.  
జాతులు, ఉపజాతుల్లో కందము, తేటగీతి, ఆటవెలది మరియు ముత్యాలసరాలు.
- 4. అలంకారములు:-** శబ్దాలంకారాల్లో అనుప్రాసాలైన వృత్త్యనుప్రాస, ఛేకానుప్రాస, లాటానుప్రాస, అంత్యాను  
ప్రాసములు. అర్థాలంకారాల్లో ఉపమ, ఉత్పేక్ష, రూపక, శ్లేషలు.

**I Semester Model Question Paper, 2022-23 Batch**

**No. of Pages: 1**

**Roll No.:**

**Max. Marks: 70M**

**Time: 3 Hrs.**

**No. of Questions: 08**

**Pass Min. : 28M**

అక్షరాలను ఉపయోగించి సరియైన పదాలను గుర్తించండి.

**I. క్రింది వానిలో ఒకదానికి ప్రతి పదార్థ తాత్పర్యమును వ్రాయండి:**

**1×10 = 10మా**

1. బహుధనధాన్య సంగ్రహము బాణశరాసన యోధవీర సం  
గ్రహము నిరంతరాంతరుదకంబులు ఘోసరసేందనాఘ సం  
గ్రహము ననేక యంత్రములు గల్గియ సాధ్యములై ద్విషద్భయా  
వహు లగుచుండ నొప్పునె భవత్పురి రక్ష్యములైన దుర్గముల్.

(లేదా)

2. కలలోనందను మున్నెఱుంగని మహా కష్టాత్ముడై నట్టి దు  
ర్బలు దౌపత్యమయంబునన్ నిజ పదాబ్జాతంబులు ల్లంబులోన్  
దలపన్నంతనె మెచ్చి యార్తి హరుడై తన్నెన నిచ్చున్ సు ని  
శ్చల భక్తిన్ భజియించువారి కిడడే సంపద్విశేషోన్నతుల్.

**II. క్రింది వానిలో 2టికి సందర్భసహిత వ్యాఖ్యలు వ్రాయండి:**

**2 × 5 = 10మా**

1. వార్త నిర్వహింపవలయు బతికి.
2. నన్ను బనుపు దక్షు బట్టి తెచ్చెదన్.
3. పురుషార్థంబునకు హాని పుట్టక యున్నే?

**III. క్రింది వానిలో 2టికి సంగ్రహరూప సమాధానాలు వ్రాయండి:**

**2 × 5 = 10మా**

1. రాజు చేయకూడని పనుల్ని తెల్పుండి?
2. ప్రమథులు దక్షుని బంధించిన తీరును తెల్పుండి?
3. ధౌమ్యుని ఉపదేశానంతరం ఏమి జరిగింది?

**IV. క్రింది వానికి వ్యాసరూప సమాధానాలు వ్రాయండి:**

**2 × 10 = 20మా**

1. ప్రజాపాలనలో రాజులు పాటించాల్సిన ధర్మాలేవి? (లేదా)  
'దక్షయజ్ఞం' సారాంశాన్ని వ్రాయండి.
2. ధౌమ్యుడు పాండవులకు చేసిన ధర్మోపదేశాన్ని వివరించండి. (లేదా)  
'మధురస్నేహం' పాఠ్య సారాంశాన్ని తెల్పుండి?

V. క్రింది వానిలో మూడింటిని విడదీసి, సంధి కార్యము వ్రాయండి: 3×2=6 మా

1. శత్రైకవృద్ధి      2. జగమెల్ల      3. మనుజేంద్రుడు  
4. కష్టాత్ముడు      5. ఇక్కోమలి

VI. క్రింది వానిలో మూడింటికి విగ్రహ వాక్యాలు వ్రాసి, సమాస నాములు తెల్పండి: 3×2=6 మా

1. అష్టాంగాలు      2. ఆశ్రయము      3. భీమార్జునులు  
4. మధుర స్నేహం      5. తోయాజాక్షి

VII. క్రింది పద్య పాదాన్ని గణ విభజన చేసి, యతిని గుర్తించి ఏపద్యపాదమో తెల్పండి: 1×4 = 4 మా

తన మృదుతల్పమందు వనితామణియైన రమాలలామ పొం

(లేదా)

క్రింది వానిలో ఒకదానికి లక్ష్య, లక్షణ సమన్వయం చేయండి.

1. తేటగీతి      2. ముత్యాలసరాలు      3. ఆటవెలది

VIII. క్రింది పద్యంలోని అలంకారమును గుర్తించి లక్ష్య, లక్షణ సమన్వయం చేయండి: 1×4 = 4 మా

బాల సఖుడైన యప్పద్మ పత్రనేత్రు

గాన నేగి దరిద్రాంధకార మగ్ను

లయిన మము నుద్ధరింపుము హరి కృపాక

టాక్ష రావిదీప్తి వడసి మహాత్మ! నీవు.

(లేదా)

క్రింది వానిలో ఒకదానికి లక్ష్య, లక్షణ సమన్వయం చేయండి.

1. వ్రత్యానుప్రాసము      2. లాటానుప్రాసము



V. క్రింది వానిలో మూడింటిని విడదీసి, సంధి కార్యము వ్రాయండి: 3×2=6 మా

1. శత్రైకవృద్ధి      2. జగమెల్ల      3. మనుజేంద్రుడు  
4. కష్టాత్ముడు      5. ఇక్కోమలి

VI. క్రింది వానిలో మూడింటికి విగ్రహ వాక్యాలు వ్రాసి, సమాస నాములు తెల్పండి: 3×2=6 మా

1. అష్టాంగాలు      2. ఆశ్రయము      3. భీమార్జునులు  
4. మధుర స్నేహం      5. తోయాజాక్షి

VII. క్రింది పద్య పాదాన్ని గణ విభజన చేసి, యతిని గుర్తించి ఏపద్యపాదమో తెల్పండి: 1×4 = 4 మా

తన మృదుతల్పమందు వనితామణియైన రమాలలామ పొం

(లేదా)

క్రింది వానిలో ఒకదానికి లక్ష్య, లక్షణ సమన్వయం చేయండి.

1. తేటగీతి      2. ముత్యాలసరాలు      3. ఆటవెలది

VIII. క్రింది పద్యంలోని అలంకారమును గుర్తించి లక్ష్య, లక్షణ సమన్వయం చేయండి: 1×4 = 4 మా

బాల సఖుడైన యప్పద్మ పత్రనేత్రు

గాన నేగి దరిద్రాంధకార మగ్ను

లయిన మము నుద్ధరింపుము హరి కృపాక

టాక్ష రావిదీప్తి వడసి మహాత్మ! నీవు.

(లేదా)

క్రింది వానిలో ఒకదానికి లక్ష్య, లక్షణ సమన్వయం చేయండి.

1. వ్రత్యానుప్రాసము      2. లాటానుప్రాసము

## **Department of Zoology**

### **Board of Studies for the academic Year 2022 -2023 (Odd Semesters)**

#### **Agenda**

1. To evaluate the syllabus in relation to its socio-economic relevance.
  2. To explore the possibilities of introducing any new subjects as additional optional subjects, or new combinations of subjects.
  3. To assess the potential of the courses against the employment prospects, necessary certification courses.
  4. To make academic flexibilities like honors with extra credits acquired through either advanced study of same courses or with procuring additional credits from additional courses.
- Minutes of meeting of Board of studies in Zoology held on 24 -08-2022 at 2.00 p.m.  
in the Department of Botany.

#### **Members present:**

1	Sri.Ch.Venkateswarlu	<b>Chairman</b>	<b>Sd/-</b>
2	Associate.Prof.L.Suseela	<b>University Nominee</b>	<b>Sd/-</b>
3	Prof.K.Veeraiah	<b>Subject Expert</b>	<b>Sd/-</b>
4	Prof.B.Kishore	<b>Subject Expert</b>	<b>Sd/-</b>
5	M.Lakshmi Prasad	<b>Industrialist</b>	<b>Sd/-</b>
6	Ch.Sai Krishna	<b>Alumnus</b>	<b>Sd/-</b>
7	V.Babu Rao	<b>Special Invitee</b> <b>Internal Member</b>	<b>Sd/-</b>
8	Dr.A.Samba Naik	<b>Member</b>	<b>Sd/-</b>

Department of Zoology							
List of the Courses Introduced in V Semester : 2022-23							
S.NO	Title of the course	Course code	Offered in	Type of the paper	Year of introduction	OBE with BTL	Offered to
1	Sustainable Aquaculture Management	ZOOSSET01	V	SEC ELECTIVE A	2022-23	YES	BSc(BZC)
2	Sustainable Aquaculture Management Lab	ZOOSSEP01	V		2022-23	YES	BSc(BZC)
3	Post-Harvest Technology of Fish and Fisheries	ZOOSSET02	V	SEC ELECTIVE A	2022-23	YES	BSc(BZC)
4	Post-Harvest Technology of Fish and Fisheries Lab	ZOOSSEP02	V		2022-23	YES	BSc(BZC)
5	Live Stock Management-I (biology of dairy animals)	ZOOSSET03	V	SEC ELECTIVE B	2022-23	YES	BSc(BZC)
6	Live Stock Management-I (biology of dairy animals) Lab	ZOOSSEP03	V		2022-23	YES	BSc(BZC)
7	Live Stock Management -II (dairy production and management)	ZOOSSET04	V	SEC ELECTIVE B	2022-23	YES	BSc(BZC)
8	Live Stock Management -II (dairy production and management) Lab	ZOOSSEP04	V		2022-23	YES	BSc(BZC)
9	Poultry Management- I (poultry farming)	ZOOSSET05	V	SEC ELECTIVE C	2022-23	YES	BSc(BZC)
10	Poultry Management- I (poultry farming) Lab	ZOOSSEP05	V		2022-23	YES	BSc(BZC)
11	Poultry Management -II (poultry production and management)	ZOOSSET06	V	SEC ELECTIVE C	2022-23	YES	BSc(BZC)
12	Poultry Management -II (poultry production and management) Lab	ZOOSSEP06	V		2022-23	YES	BSc(BZC)
13	Seri Culture-I (biology and cultivation of mulberry)	ZOOSSET07	V	SEC ELECTIVE D	2022-23	YES	BSc(BZC)
14	Seri Culture-I (biology and cultivation of mulberry) Lab	ZOOSSEP07	V		2022-23	YES	BSc(BZC)
15	Seri Culture-II (biology and cultivation of mulberry)	ZOOSSET08	V	SEC ELECTIVE D	2022-23	YES	BSc(BZC)
16	Seri Culture-II (biology and cultivation of mulberry) Lab	ZOOSSEP08	V		2022-23	YES	BSc(BZC)

The following resolutions are made in Board of Studies in Botany for ODD Semesters to recommend to the 46<sup>th</sup> Academic Council for its approval.

1. It is resolved and recommend to introduce Sustainable Aquaculture Management with course code ZOOSSET01 in V semester of B.Sc. (BZC) for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 4 to 7 .
2. It is resolved and recommend to introduce Sustainable Aquaculture Management Lab with course code ZOOSSEP01 in V semester of B.Sc. (BZC) for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 8 to 10.
3. It is resolved and recommend to introduce Post-Harvest Technology of Fish and Fisheries with course code ZOOSSET02 in V semester of B.Sc. (BZC) for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 11 to 13.
4. It is resolved and recommend to introduce Post-Harvest Technology of Fish and Fisheries Lab with course code ZOOSSEP02 in V semester of B.Sc. (BZC) for the batch of students



admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 14 to 15.

5. It is resolved and recommend to introduce Live Stock Management-I (biology of dairy animals) with course code ZOOSSET03 in V semester of B.Sc. (BZC) for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 16 to 17 .
6. It is resolved and recommend to introduce Live Stock Management-I (biology of dairy animals) Lab with course code ZOOSEP03 in V semester of B.Sc. (BZC) for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 18 to 19 .
7. It is resolved and recommend to introduce Live Stock Management -II (dairy production and management) with course code ZOOSSET04 in V semester of B.Sc. (BZC) for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 20 to 21 .
8. It is resolved and recommend to introduce Live Stock Management -II (dairy production and management) Lab with course code ZOOSEP04 in V semester of B.Sc. (BZC) for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 22 to 23 .
9. It is resolved and recommend to introduce Poultry Management- I (poultry farming) with course code ZOOSSET05 in V semester of B.Sc. (BZC) for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 24 to 25.
10. It is resolved and recommend to introduce Poultry Management- I (poultry farming) Lab with course code ZOOSEP05 in V semester of B.Sc. (BZC) for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 26 to 27 .
11. It is resolved and recommend to introduce Poultry Management -II (poultry production and management) with course code ZOOSSET06 in V semester of B.Sc. (BZC) for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 28 to 29.
12. It is resolved and recommend to introduce Poultry Management -II (poultry production and management) Lab with course code ZOOSEP06 in V semester of B.Sc. (BZC) for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 30 to 31.
13. It is resolved and recommend to introduce Seri Culture-I (biology and cultivation of mulberry) with course code ZOOSSET07 in V semester of B.Sc. (BZC) for the batch of

students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 32 to 34 .

14. It is resolved and recommend to introduce Seri Culture-I (biology and cultivation of mulberry) Lab with course code ZOOSEP07 in V semester of B.Sc. (BZC) for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 35 to 36 .
15. It is resolved and recommend to introduce Seri Culture-II (biology and cultivation of mulberry) with course code ZOOSSET08 in V semester of B.Sc. (BZC) for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 37 to 39 .
16. It is resolved and recommend to introduce Seri Culture-II (biology and cultivation of mulberry) Lab with course code ZOOSEP08 in V semester of B.Sc. (BZC) for the batch of students admitted in 2020-21 and onwards. For the syllabus and model question paper vide page number from 40 to 41 .

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## P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE: VIJAYAWADA

Semester-wise Revised Syllabus under CBCS, 2020-21

Course Code: ZOOSSET01.	Offered to B.Sc. (B.Z.C)
Domain Subject: ZOOLOGY	Semester – V
Max. Marks: 75(CCIA: 10+ SEE: 40)	Practical Hrs./Week : 3

### Course 6A: SUSTAINABLE AQUACULTURE MANAGEMENT

#### I. Course Outcomes: Students at the successful completion of the course will be able to:

- CO1: Aquaculture is a rapidly growing fisheries sector in India with an annual growth rate of over 7%.
- CO2: A fertilizer for fishponds comes in tablets and will provide a slow release of nutrients that is gentle and easy on your pond's citizens.
- CO3: Pre-stocking management aims at proper preparation of ponds to remove the causes of poor survival, unsatisfactory growth, etc.
- CO4: Sustainable, productive fisheries and aquaculture improve food and nutrition security, increase income and improve livelihoods, promote economic growth and protect our environment and natural resources.
- CO5: Many of the disorders and diseases that are known to occur in fish are the result of stress, poor water quality, overcrowding, and failure to quarantine any new or sick fish.

#### II. Syllabus:

##### UNIT-I:

- 1.1. Present status of Aquaculture – Global and National scenario.
- 1.2. Major cultivable species for aquaculture: freshwater, brackish water and marine, criteria for selection of species for culture.
- 1.3. Culture practices and culture systems Traditional, extensive, modified extensive, semi-intensive and intensive, ponds, race ways, cages and pens.

##### UNIT-II:

- 2.1 Functional classification of ponds – nursery, rearing, stocking and quarantine ponds.
- 2.2 Pond preparation, fertilizer and manure application in culture ponds.
- 2.3 Physio-chemical conditions of soil and water optimal for culture (Temperature, depth, turbidity, PH, BOD, CO<sub>2</sub>, N, P, K and C:N ratio)

##### UNIT-III:

- 3.1. Induced breeding in carps (Catla -Labio) and shrimp (peneaus and vannamei – P.monodon).
- 3.2. Culture of Indian major carps – Pre Stocking management.
- 3.3. Culture of Indian major carps – Stocking management.
- 3.4. Culture of Indian major carps - post-stocking management.

##### UNIT-IV:

- 4.1 Commercial importance of shrimp & prawn.
- 4.2 *Macrobrachium rosenbergii*- biology, seed production.
- 4.3 Culture of *P. vannamei* – hatchery technology and culture practices.
- 4.4 Mixed culture of fish and prawns

## UNIT-V:

- 5.1 Viral diseases of Fin Fish & shell fish.
- 5.2 Fungal diseases of Fin & Shell fish.
- 5.3 Bacterial diseases of Finfish & Shell fish
- 5.4. Protozoan and metazoan diseases of fin fish and shell fish.

### III Text Book

1. S. Armugam, A text book of Aquaculture: ISBN: 978-93-82459-99-6.
2. Kondaiah .A and Vijayalaxmi, A text book of Aquaculture.

### Web links:

<https://www.youtube.com/watch?v=rv8fzewn2gu>

<https://www.youtube.com/watch?v=w9oy1loucvw>

### IV Co-Curricular Activities:

1. Preparation of Model/Charts of Cultivable species of fin fish shell fish
2. Preparation of Model/Chart of Ideal fish Pond- with the standards prescribed.
3. Observation of aquaculture activities in their area (Observation of any activity related to aquaculture in the vicinity of the college/village)
4. Preparation of Model – charts of Fin /Shell fish Diseases with eco-friendly material.
5. Assignments, Group discussion, Seminar, Quiz, Collection of Material, Video preparation etc., Invited lecture

Mandatory :( Training of students by teacher in field related skills:(lab:10 + field: 05)

For Teacher: Training of students by the teacher (if necessary, by a local expert) in laboratory/field for a total of not less than 15 hours on the field techniques/skills on the familiarization of various optical instruments available in the laboratory; construction of different types of telescopes and their comparison in construction, operation and their utility and limitations; the details of construction of eye and various defects in the eye sight, emerging techniques in the design of eye lenses including contact lenses and making the student to understand on the testing of a biological sample using a clinical microscope

For Student: Students shall (individually) visit and observe the functioning of optical instruments at any one of the following places /centres like

Pathological laboratory or

A local ophthalmologist or

A local optician to understand the various types of eye lenses or

A local computer based eye testing center or

An optician, who fixes contact lenses or

A local cinema theatre or

A planetarium.

**Student shall write the observations and submit a hand-written Fieldwork/Project work not exceeding 10 pages in the given format to the teacher.**

1. Max marks for Fieldwork/Project work: 10.
2. Suggested Format for Fieldwork/Project work: Title page, student details, index page, details of place visited, observations, findings and acknowledgements.
3. Comprehensive Continuous Assessment Test (CCIA): (2 tests will be conducted, each carries 30 Marks, consider Average Mark: 15)

## Model Question Paper

Course Code: ZOOSSET01

Offered to B.Sc. (B.Z.C)

Title of the Course: Sustainable Aquaculture management

### SECTION – A (Total: 25 Marks) Short Answer Questions (25 Marks: 5 x5)

**Answer any five questions. Each answer carries 5 marks.**

1. Explain Semi-intensive culture. CO1, L2.
2. Describe Major cultivable species for aquaculture. CO1, L1.
3. Give a short note on Pond preparation. CO2, L2.
4. Illustrate Post stocking management. CO2, L4.
5. Explain Seed production. CO3, L2.
6. Describe Culture practices. CO4, L1.
7. Give a short note on viral diseases of Fin Fish. CO4, L2.
8. Describe Bacterial diseases of shell fish. CO5, L1.

### SECTION B (Total: 5 x 10 = 50 Marks)

**Answer all questions. Each answer carries 10 marks.**

- 9(a). Give a detailed on cultivable fishes of brackish water. CO1, L2  
Or  
(b) Describe the Processes extensive and intensive cultures. CO1, L1
- 10(a). Explain the Functional classification of ponds. CO2, L2  
Or  
(b). Illustrate pond preparation. CO2, L4
- 11(a). Explain Induced breeding in carps. CO3, L2  
Or  
(b). Describe post stocking management of Indian major carps.CO3, L1
- 12(a). Give a detailed note on Commercial importance of prawn. CO4.L2  
Or  
(b). describe the process of Hatchery technology. CO4, L1
- 13(a). Explain fungal diseases of shell fish. CO5, L2  
Or  
(b). Illustrate protozoan diseases of fin fish. CO5, L4

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## **P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE: VIJAYAWADA**

Semester-wise Revised Syllabus under CBCS, 2020-21

Course Code: ZOOSEP01.

Offered to B.Sc. (B.Z.C)

Domain Subject: ZOOLOGY

Semester – V

Max. Marks: 50(CCIA: 10+ SEE: 40)

Practical Hrs./Week : 3

### **Course 6A: SUSTAINABLE AQUACULTURE MANAGEMENT**

Type of the Course: Skill Enhancement Course (Elective: Practical),

Credits: 01

#### **I. Course Outcomes: Students at the successful completion of the course will be able to:**

CO1: Aquaculture is a rapidly growing fisheries sector in India with an annual growth rate of over 7%.

CO2: A fertilizer for fishponds comes in tablets and will provide a slow release of nutrients that is gentle and easy on your pond's citizens.

CO3: Pre-stocking management aims at proper preparation of ponds to remove the causes of poor survival, unsatisfactory growth, etc.

CO4: Sustainable, productive fisheries and aquaculture improve food and nutrition security, increase income and improve livelihoods.

CO5: Many of the disorders and diseases that are known to occur in fish are the result of stress, poor water quality, overcrowding, and failure.

#### **II: Practical syllabus: (30 Periods): At least 8 Practical**

1. Fresh water Cultivable species any (Fin & Shell Fish Specimens – Observation of morphological characters by observation and drawings)-5.
2. Brackish water cultivable species (Fin & Shell fish- Specimens- Observation of Morphological Character by observing drawing) -5.
3. Hands on training on the use of kits for determination of water quality in aquaculture (DO, Salinity, pH, Turbidity- Testing kits to be used for the estimation of various parameters/ Standard procedure can be demonstrated for the same).
4. Demonstration of Hypophysation (Procedure of hypophysation to be demonstrated in the practical lab with any edible fish as model).
5. Viral diseases of Fin & Shell Fish (Observation of his to pathological slides / Charts/

Models of viral pathogens in fin/ shell fish – one edible specimen can be used for observation of same in the laboratory).

6. Bacterial diseases of Fin & Shell Fish (Observation of his to pathological slides / Charts/ Models of Bacterial pathogens in fin/ shell fish – One edible specimen can be used for observation of same in the laboratory).
7. Fungal diseases of Fin & Shell Fish (Observation of his to pathological slides / Charts/ Models of Bacterial pathogens in fin/ shell fish – One edible specimen can be used for observation of same in the laboratory)

### **III. Lab References:**

1. Chakraborty C & Sadhu AK. 2000. *Biology Hatchery and Culture Technology of Tiger Prawn and Giant Freshwater Prawn*. Daya Publ. House.

1. ICAR. 2006. *Handbook of Fisheries and Aquaculture*. ICAR.
2. Jhingran VG & Pullin RSV. 1985. *Hatchery Manual for the Common, Chinese and Indian Major Carps*. ICLARM, Philippines.

**V SEMESTER PRACTICAL END EXAMINATIONS  
SUSTAINABLE AQUACULTURE MANAGEMENT**

**SEE MODEL PAPER**

Time: 3hrs.

Max. Marks 40M

1. Identify and write the morphological characters of shell fish and draw a neat labeled diagram.  
10M
  
2. Estimate the DO of the water sample. Write the procedure and tabulate the results.  
10M
  
3. Identify one viral and one fungal disease and write note on them.  
5M
  
4. Determine the PH of water sample A, B &C with Universal Indicator. Write the procedure and tabulate the results  
5M
  
5. Viva voce  
5M
  
6. Practical record & field note book  
5M



## **P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE: VIJAYAWADA**

Semester-wise Revised Syllabus under CBCS, 2020-21

Course Code: ZOOSET02.

Offered to B.Sc. (B.Z.C)

Domain Subject: ZOOLOGY

Semester – V

Max. Marks: 50(CCIA: 10+ SEE: 40)

Practical Hrs./Week : 3

Course6 A: **POST HARVEST TECHNOLOGY OF FISH AND FISHERIES**  
(Skill Enhancement Course (Elective), -Credits: 04) Max Marks: 75

### **I. Course Outcomes: Students at the successful completion of the course will be able to:**

- CO1:** Before refrigerating a fish, wash it in cold water and dry it with a clean cloth or paper Towels.
- CO2:** Fish are preserved through such traditional methods as drying, smoking and salting. The oldest traditional way of preserving fish was to let the wind and sundry it.
- CO3:** The traditional fishery byproducts are fishmeal, fish body and liver oils, fish maw, isinglass etc.
- CO4:** Proper personal hygiene, including frequent hand and arm washing and covering cuts; Proper cleaning and sanitizing of all food contact surfaces.
- CO5:** HACCP is a management system in which food safety is addressed through the analysis and control of biological, chemical, and physical hazards.

### **SYLLUBUS:**

#### **Unit – I Handling and Principles of fish Preservation**

1. 1 Handling of fresh fish, storage and transport of fresh fish, post mortem changes (rigor mortis andspoilage), microbial ,spoilage in fish and their prevention , process value calculation.
- 1.2 Principles of preservation – cleaning, lowering of temperature, rising of temperature, denudation,use of salt, use of fish preservatives, exposure to low radiation of gamma rays.

#### **Unit – II Methods of fish Preservation**

- 2.1 Traditional methods - sun drying, salt curing, pickling and smoking.
- 2.2. Advanced methods – chilling or icing, refrigerated sea water, freezing, canning, irradiation and Accelerated Freeze drying (AFD).

### **Unit – III Processing and preservation of fish and their by-products**

- 3.1 Fish products – fish minced meat, fish meal, fish oil, fish liquid (ensilage), fish protein concentrate, fish cake, fish sauce, fish salads, fish powder, pet food from trash fish, fish manure.
- 3.2 Fish by-products – fish glue, isin glass, chitosan, pearl essence, shark fins, fish Leather and fish maws.

### **Unit – IV Sanitation and Quality control**

- 4.1 Sanitation in processing plants - Environmental hygiene and Personal hygiene in processing plants.
- 4.2 Quality Control of fish and fishery products – pre-processing control, control during processing and control after processing.

### **Unit – V Quality Assurance, Management and Certification**

- 5.1. Seafood Quality Assurance and Systems: Good Manufacturing Practices (GMPs); Good Laboratory Practices (GLPs); Standard Operating Procedures (SOPs); Concept of Hazard Analysis and Critical Control Points (HACCP) in seafood safety traceability.
- 5.2 National and International standards – ISO 9000: 2000 Series of Quality Assurance System, Codex Alimentarius, detection of antibiotics and heavy metals in fishery products.

### **References:**

1. Santharam R, N Sukumaran and P Natarajan 1987. A manual of aquaculture, Oxford-IBH, New Delhi.
2. Lakshmi Prasad's, Fish Processing Technology 2012, Arjun Publishing House
3. Dr Sunitha Rai, Fish Processing Technology, 2015, Random Publications

### **Web Resources:**

1. <http://ecoursesonline.iasri.res.in/mod/page/view.php?id=145743>
2. [https://ecourses.icar.gov.in/e-Learningdownload3\\_new.aspx?Degree\\_Id=03](https://ecourses.icar.gov.in/e-Learningdownload3_new.aspx?Degree_Id=03)

### **Co –curricular activities:**

1. Observation of fish/shrimp processing plants – visit web sites of processing companies and records the details of that Unit.
2. Interaction with local fishermen to know the method of preservation and details with the available traditional technology
3. Collection of web resources on the Quality assurance, quality control measures in Aqua Industries- cross checking the standards during the visit to any processing units.
4. Assignments, Seminar, Group discussion. Quiz, Collection of Material, Invited lecture, Videopreparation etc.,

## Model Question Paper

Course Code: ZOOSET02

Offered to B.Sc. (B.Z.C)

Title of the Course: POST HARVEST TECHNOLOGY OF FISH AND FISHERIES

### SECTION – A (Total: 25 Marks)

#### Short Answer Questions (25 Marks: 5 x5)

**Answer any five questions. Each answer carries 5 marks.**

1. Explain Rigor Mortise. CO1, L2.
2. Describe lowering of temperature. CO1, L1.
3. Give a short note on pickling and smoking. CO2, L2.
4. Illustrate Accelerated freeze drying. CO2, L4.
5. Explain any two fish byproducts. CO3, L2.
6. Describe personal hygiene in processing plant. CO3, L1.
7. Give a short note on pre-processing control. CO4, L2.
8. Describe HACCP. CO5, L1.

### SECTION B (Total: 5 x 10 = 50 Marks)

**Answer all questions. Each answer carries 10 marks.**

9(a). Give a detailed on handling of fresh fish and storage fish. CO1, L2

Or

(b) Describe the Processes principles of preservation. CO1, L1

10(a). Explain Traditional methods of fish drying. CO2, L2

Or

(b). Illustrate Advanced methods of fish drying. CO2, L4

11(a). Explain any four fish products. CO3, L2

Or

(b). Describe any four fish by products. CO3, L1

12(a). Give a detailed note on sanitation in processing plant. CO4.L2

Or

(b). describe the process quality control in processing plants. CO4, L1

13(a). Explain GMP's and GLP's. CO5, L2

Or

(b). Illustrate national and international standards for quality control. CO5, L4

## **P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE: VIJAYAWADA**

Semester-wise Revised Syllabus under CBCS, 2020-21

Course Code: ZOOSEP02.

Offered to B.Sc. (B.Z.C)

Domain Subject: ZOOLOGY

Semester – V

Max. Marks: 50(CCIA: 10+ SEE: 40)

Practical Hrs./Week : 3

### **Course 6A: POST HARVEST TECHNOLOGY OF FISH AND FISHERIES**

Type of the Course: Skill Enhancement Course (Elective: Practical),

Credits: 01

CO1: Before refrigerating a fish, wash it in cold water and dry it with a clean cloth or paper towels.

CO2: Fish are preserved through such traditional methods as drying, smoking and salting. The Oldest traditional way of preserving fish was to let the wind and sundry it.

CO3: The traditional fishery byproducts are fishmeal, fish body and liver oils, fish maw, Isin glass etc.

CO4: Proper personal hygiene, including frequent hand and arm washing and covering cuts; Proper cleaning and sanitizing.

CO5: HACCP is a management system in which food safety is addressed through the analysis and control of biological, chemical, and physical hazards from raw material.

### **Practical Syllabus:**

1. Evaluation of fish/ fishery products for organoleptic, chemical and microbial quality.
2. Preparation of dried, cured and fermented fish products For detailed procedure method visit sites:
3. Examination of salt, protein, moisture in dried / cured products
4. Examination of spoilage of dried / cured fish products, marinades, pickles, sauce.
5. Preparation of isinglass, collagen and chitosan from shrimp and crab shell.
6. Developing flow charts and exercises in identification of hazards – preparation of hazard analysis worksheet
7. Corrective action procedures in processing of fish- flow chart- work sheet preparation.

### **References:**

1. Balachandran KK. 2001. *Post-harvest Technology of Fish and Fish Products*. Daya Publ.

2. Bond, et al. 1971. *Fish Inspection and Quality Control*. Fishing News Books, England.

**Websites of Interest:**

[https://www.youtube.com/watch?v=xyf\\_g7fku-4](https://www.youtube.com/watch?v=xyf_g7fku-4)

[https://www.youtube.com/watch?v=bvtqb\\_ccmy4](https://www.youtube.com/watch?v=bvtqb_ccmy4)

**V SEMESTER PRACTICAL END EXAMINATIONS  
POSTHARVEST TECHNOLOGY OF FISH AND FISHERIES**

**SEE MODEL PAPER**

Time: 3hrs.

Max. Marks 40M

1. Identify fishery products from given fish, write the procedure and tabulate the results. 10M
2. Estimate the protein content from given dried fish tissue. 10M
3. Project Report 10M
4. Viva voce 05M
5. Practical record & field note book 05M

**P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE: VIJAYAWADA**

Semester-wise Revised Syllabus under CBCS, 2020-21

Domain Subject: ZOOLOGY

Semester –V

Course Code: ZOOSSET03.

Offered to B.Sc. (B.Z.C)

**Course6 B: LIVE STOCK MANAGEMENT-I(BIOLOGY OF DAIRY ANIMALS)**

(Skill Enhancement Course (Elective), - Credits: 05)

**I. Learning Outcomes:**

- Students at the successful completion of the course will be able to
- Select the suitable breeds of livestock for rearing
- Relate the anatomy of udder with letdown of milk
- Identify and manipulate the reproductive behavior of cattle
- Inspect the economics of dairy farming
- Apprise the various breeding techniques employed in live stock

**II. Syllabus:** (*Total Hours: 90 including Teaching, Lab, Field Skills Training, Unit tests etc.*)

Unit 1: Livestock census; Breeds of Dairy cattle, Buffaloes and Goats. Indigenous, Exotic and Crossbred Cattle breeds

Unit 2: Anatomy of Udder; Development of udder; Lacto genesis and Galactopoisies; Letdown of milk.

Unit 3: Artificial insemination; Oestrous cycle; Symptoms of heat in cows and buffaloes. Conception, Pregnancy diagnosis in cattle. Multi ovulation and embryo transfer technique. Cloning.

Unit 4: Economic traits of Dairy cattle. Methods of selection of dairy animals.

Unit 5: Systems of Dairy cattle breeding. Inbreeding, out breeding, Cross breeding, Grading up. Breeding systems (Cross breeding of cattle and Grading up of buffaloes).

**III. References:**

1. Textbook of Animal Husbandry-GC Benarjee
2. Handbook of Animal Husbandry –ICAR Edition
3. Principles and practices of Dairy Farm–

Jagdish Prasad Web resources:

1. <http://ecoursesonline.iasri.res.in/course/index.php?categoryid=42>
2. <https://vetsebooks.blogspot.com/p/e-books.html>
3. <https://www.basu.org.in/study-materials/veterinary-science/>
4. <https://vikaspedia.in/agriculture/livestock/cattle-buffalo/breeds-of-cattle-buffalo>

## Model Question Paper

Course Code: ZOOSSET03                      Offered to B.Sc. (B.Z.C)

Title of the Course: **livestock management-1**

### SECTION – A (Total: 25 Marks)

Short Answer Questions (25 Marks: 5 x5)

**Answer any five questions. Each answer carries 5 marks.**

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.

### SECTION B (Total: 5 x 10 = 50 Marks)

**Answer all questions. Each answer carries 10 marks.**

9(a).

Or

(b)

10(a).

Or

(b).

11(a).

Or

(b).

12(a).

Or

(b).

13(a).

Or

(b).

## P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE: VIJAYAWADA

Semester-wise Revised Syllabus under CBCS, 2020-21

Course Code: ZOOSEP03  
(B.Z.C)

Offered to B.Sc.

Domain Subject: ZOOLOGY  
V

Semester –

Max. Marks: 50(CCIA: 10+ SEE: 40)

Practical Hrs./Week : 3

### Course 6A: livestock management - I

#### I. Learning Outcomes:

On successful completion of this practical course, student shall be able to

1. Examine the points of dairy cow
2. Understand the behavioral changes of cow during the reproductive period
3. Differentiate the merits and demerits of cross breeds in cattle

#### II. Practical(Laboratory) Syllabus:(30hrs) (Max.50Marks)

1. Points dairy cow. (Explanation with observation of charts- Model evaluation to be performed by the student in the laboratory )
2. Identification of different breeds of dairy cattle and buffaloes.( Observation of Charts of breeds in the laboratory- at least 3 breeds should be identified by the students in their locality with video, photo )
3. Male and female reproductive systems of cow – Model/ Chart (Student has to draw a labeled diagram of the male and female reproductive systems of cow – acquire skill to identify the parts).
4. Symptoms of heat in cow (Study and Understanding the physiological symptoms during heat).
5. Artificial in semi nation (Flow chart of implements – Procedure- precautions)
6. Pregnancy diagnosis in cattle.
7. Study comparative merits of cows and buffaloes; zebu and cross bred cows (Examination of merits)

#### III. Lab References:

1. Principles and practices of Dairy Farm–Jadish Prasad
2. Dairy cow points: <https://www.icar.org/Guidelines/05-Conformation-Recording.pdf>
3. Pregnancy test protocol:  
<https://cgspace.cgiar.org/bitstream/handle/10568/109408/Milk%20testing%20lab%20protocol.pdf?sequence=1&isAllowed=y>

Web resources suggested by the teacher concerned and the college librarian including reading material

#### IV. Co-Curricular Activities

a) **Mandatory:**(Lab/field training of students by teacher :(lab:10 + filed: 05):

1. For Teacher: Training of students by the teacher in laboratory/field for not less than 15 hours on principles and practices of dairy industry- breeds –artificial



- insemination- reproductive behavior of cows etc. as per the syllabus above.
2. For Student: Students shall individually visit to any of the nearby cattle rearing centers/ veterinary hospital/Raithu Bharosa Kendra and make observations of the procedure and quality enhancement activities and submit a handwritten Fieldwork/Project work Report in 10pages.
  3. Max marks for Fieldwork/Project work Report: 05.
  4. Suggested Format for Fieldwork/Project work Report: *Title page, student details, index page, details of place visited, observations made, findings and acknowledgements*
  5. (IE)Unit tests,

**b) Suggested Co-Curricular Activities**

1. Collection of various cattle breed images from the web to prepare a album
2. Visit the sites of Veterinary colleges in India and preparation of brief report on the videosand content/ employment details
3. Sketch a model dairy farm with details
4. Invited lecture and presentation on related topics by experts
5. Seminar, Assignment, Group discussion. Quiz, Collection of Material, Invited lecture, Videopreparation etc.

**SEE MODEL PAPER**

*Time Allowed: Three hours*

*Max. Marks: 40*

<b>Evaluation Scheme</b>	<b>Marks</b>
<b>One Major Experiment (Experiment No : )</b>	<b>15</b>
<b>One Minor Experiment (Experiment No : )</b>	<b>10</b>
<b>Slide Preparation, if any</b>	<b>5</b>
<b>Practical Record + Viva Voce</b>	<b>10</b>
<b>Total</b>	<b>40</b>

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P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE: VIJAYAWADA  
Semester-wise Revised Syllabus under CBCS, 2020-21

Domain Subject: ZOOLOGY  
Course Code: ZOOSSET04.

Semester –V  
Offered to B.Sc. (B.Z.C)

**Course 7B: LIVE STOCK MANAGEMENT -II (DAIRY PRODUCTION AND MANAGEMENT)**  
(Skill Enhancement Course (Elective), - Credits: 05)

Learning Outcomes:

Students at the successful completion of the course will be able to

- Identify and suggest the suitable housing system for the dairy farming
- Understand management practices for the dairy farming
- Learn the process of milk pasteurization
- Prepare cream from milk

**Syllabus:** (Total Hours: 90 including Teaching, Lab, Field Skills Training, Unit tests etc.)

**Unit1:**

Systems of Housing of Dairy cattle- Loose Housing and Conventional Dairy Barns. Drawing of layouts for dairy cattle dwellings; Criteria for selecting site for establishing Dairy farm buildings; Water requirement of dairy animals.

**Unit2:**

Management of different classes of Dairy animals- Milk producing animals, pregnant animals, dry animals, heifers and calves. Management practices for Dairy farm; Identification, Dehorning, Castration, Deworming, Vaccination, Disinfection, and Milking.

**Unit 3:**

(a) Pasteurization of milk: Definition, objects of pasteurization, objections to pasteurization, Principles of heat exchange. Methods of pasteurization: LTLT, HTST and Uperization.  
(b) Sterilization of milk. Homogenization: Factors influencing homogenization

**Unit 4:**

Market milk: Toned milk, double toned milk, Reconstituted milk, Standardized milk and full cream milk–Standards and methods of manufacture.

**Unit 5:**

Cream: Types of cream, composition, methods of cream separation, gravity and centrifugal methods, types of cream separators, factors affecting fat losses in skim milk and fat percentage in cream.

I. References:

1. Textbook of Animal Husbandry-G C Benarjee
2. Handbook of Animal Husbandry –ICAR Edition

3. Principles and practices of Dairy Farm–Jagdish Prasad
4. <http://ecoursesonline.iasri.res.in/course/index.php?categoryid=42>
5. <https://vetsebooks.blogspot.com/p/e-books.html>
6. <https://www.basu.org.in/study-materials/veterinary-science/>
7. <https://vikaspedia.in/agriculture/livestock/cattle-buffalo/breeds-of-cattle-buffalo>

## Model Question Paper

Course Code: ZOOSET04

Offered to B.Sc. (B.Z.C)

Title of the Course: **livestock management-II**

### SECTION – A (Total: 25 Marks)

Short Answer Questions (25 Marks: 5 x 5)

**Answer any five questions. Each answer carries 5 marks.**

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.

### SECTION B (Total: 5 x 10 = 50 Marks)

**Answer all questions. Each answer carries 10 marks.**

9(a).

Or

(b)

10(a).

Or

(b).

11(a).

Or

(b).

12(a).

Or

(b).

13 (a).

Or

(b).

## P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE: VIJAYAWADA

Semester-wise Revised Syllabus under CBCS, 2020-21

Course Code: ZOOSEP04  
(B.Z.C)

Offered to B.Sc.

Domain Subject: ZOOLOGY

Semester – V

Max. Marks: 50(CCIA: 10+ SEE: 40)  
3

Practical Hrs./Week :

### Course 6A: LIVESTOCK MANAGEMENT - II

#### I. Learning Outcomes:

On successful completion of this practical course, student shall be able to:

- Design a model dairy farm layout
- Understand procedure of milk pasteurization at milk processing centers
- Identify various important management practices in dairy farming

#### Practical (Laboratory) Syllabus:(30hrs)

(Max.50Marks)

1. Dairy Farm layout ( In the laboratory student has to sketch a dairy farm with all its components )
2. Identification of cows (students have to identify the breeds of cows from the images/charts –have to identify any two breeds in the vicinity of the college/ their locality).
3. Dehorning of calves : (Method - protocol- precautions)
4. Castration of bulls (Method – Apparatus- Time-importance)
5. Deworming of dairy cattle : (Schedule – method- benefits )
6. Pasteurization of milk (Batch Method- procedure- Observation)
7. Sterilization of milk ( In bottle sterilization- procedure – protocol)
8. Cream separation (By gravity method- procedure- hands on experiment)

#### II. Lab References

1. Handbook of Animal Husbandry –ICAR Edition
2. Dairy farm layout : <https://www.youtube.com/watch?v=dmukHUEUvKc>
3. Dehorning procedure : <http://www.omafra.gov.on.ca/english/livestock/dairy/facts/09-003.htm>
4. Castration of bulls: <https://vikaspedia.in/agriculture/livestock/general-management-practices-of-livestock/castration-of-ruminants>
5. Deworming: [https://kvk.icar.gov.in/API/Content/PPupload/k0347\\_10.pdf](https://kvk.icar.gov.in/API/Content/PPupload/k0347_10.pdf)
6. Pasteurization of milk : <http://www.jnkvv.org/PDF/08042020170652part%203.pdf>
7. <http://ecoursesonline.iasri.res.in/mod/page/view.php?id=1690>
8. Cream separation: <http://ecoursesonline.iasri.res.in/mod/page/view.php?id=147910>

Web resources suggested by the teacher concerned and the college librarian including reading material

**III. Co-Curricular Activities**

a) **Mandatory:** (*Lab/field training of students by teacher; lab 10+ field :05*)

1. For Teacher: Training of students by the teacher in laboratory and field for not less than 15 hours on skills of dairy management – housing-management of dairy animals of various stages- procedure of preparation of marketable milk with procedures like sterilization, pasteurization and other techniques)
2. For Student: Student shall (individually) visit a nearby dairy farm- house hold cattle rearing – make observations on aspects like housing – management – feed- milk- revenue- breed selection- qualities of breed –etc. A handwritten Fieldwork/Project work Report to be submitted in the given format.
3. Max marks for Fieldwork/Project work Report: 05.
4. Suggested Format for Fieldwork/Project work Report: *Title page, student details, index page, details of place visited, observations made, findings and acknowledgements.*
5. (IE) Unit tests.

b) Suggested Co-Curricular Activities

1. Sketch model dairy house with details
2. Web resources on Protocols in the management of stages of cattle
3. Properties of varieties of milk from the market observation
4. Assignment, Seminar, Invited lecture, Group discussion. Quiz, Collection of Material, Video preparation etc.

**SEE MODEL PAPER**

*Time Allowed: Three hours*

*Max. Marks: 40*

<b>Evaluation Scheme</b>	<b>Marks</b>
<b>One Major Experiment (Experiment No : )</b>	<b>15</b>
<b>One Minor Experiment (Experiment No : )</b>	<b>10</b>
<b>Slide Preparation, if any</b>	<b>5</b>
<b>Practical Record + Viva Voce</b>	<b>10</b>
<b>Total</b>	<b>40</b>

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**P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE: VIJAYAWADA**

Semester-wise Revised Syllabus under CBCS, 2020-21

Domain Subject: ZOOLOGY

COURSE CODE:ZOOS05

IV Year B. Sc.(Hons)–Semester –V

Max. Marks: 100

**Course6 C: POULTRY MANAGEMENT- I (POULTRY FARMING)**

(Skill Enhancement Course (Elective), - Credits: 05 (3+2))

**I. Learning Outcomes:**

Students at the successful completion of the course will be able to

- Evaluate the status of Indian Poultry Industry
- Explain the Scientific Poultry keeping
- Compare the diversified Poultry practices
- Inspect the different breeds of chicken

**II. Syllabus: (Total Hours: 90 including Teaching, Lab, Field Skills Training, Unit tests etc.)**

**Unit 1 Indian poultry Industry**

1.1 Importance of poultry farming and poultry development in India.

1.2 Present status and future prospectus of poultry Industry

1.3 Classification of poultry based on genetics Utility

**Unit -2Scientific Poultry Keeping**

2.1 Modern breeds of Chicken

2.2 Present day egg production lines- meat production lines

2.3 Mini breeds- dwarfism in mini-Leghorns

**Unit-3Diversified Poultry**

3.1 Ducks and Geese-classification- rearing system-classification-advantages

3.2 Guinea fowls - guinea fowl farming in India-Production-varieties

3.3 Emu-rearing- Economical aspects-commercial products

**Unit-4Desi Chickens:**

4.1 Indigenous breeds and economical aspects of desi chicken

4.2 Indigenous breeds-Aseel-Chittagong-Kadakhnath-Bursa

4.3 Improved varieties in India – Giriraja-Vanaraja-Girirani-Kalinga brown, Gramapriya, Swarnandhra

**Unit -5 Breeds from Central Avian Research Institute – Izatnagar**

5.1 CARI Nirbheek - CARI- Shyama-HITCARI (Naked Neck Cross)

5.2 CARI- Priya Layer, CARI- Sonali Layer,

5.3 CARIBRO-VISHAL, CARI-RAINBRO,

5.4 Nandanam chicken-I, Nandanam Chicken-II, Nandanm-Quail

**III. References:**

1. Text Book of Poultry Science, P V Sreenivasaiah, Write and Print Publications, ISBN No. 9788192970592, 8192970590
  2. Poultry Science Practices, Nilothpal Ghosh, CBS Publication & Distributions, 2015
  3. Principles of Poultry Science, 1996, CAB Publishers, ISBN 9780851991221
  4. A Text Book of Animal Husbandry, C. C. Banerjee, Oxford and IBH, Publish Co, ISBN: 9788120412606
- Web sources

1. <https://www.drvet.in/p/e-books.html>

2. <https://byjus.com/biology/animal-husbandry-poultry-farming/>
3. [https://www.helpforag.app/2018/02/livestock-production-and-management-lpm\\_14.html?m=1](https://www.helpforag.app/2018/02/livestock-production-and-management-lpm_14.html?m=1)

## **Model Question Paper**

Course Code: ZOOSET05

Offered to B.Sc. (B.Z.C)

Title of the Course: **Poultry management-I**

### **SECTION – A (Total: 25 Marks)**

Short Answer Questions (25 Marks: 5 x5)

**Answer any five questions. Each answer carries 5 marks.**

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.

### **SECTION B (Total: 5 x 10 = 50 Marks)**

**Answer all questions. Each answer carries 10 marks.**

9 (a).

Or

(b)

10(a).

Or

(b).

11(a).

Or

(b).

12 (a).

Or

(b).

13(a).

Or

(b).

## P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE: VIJAYAWADA

Semester-wise Revised Syllabus under CBCS, 2020-21

Course Code: ZOOSEP05

Offered to B.Sc. (B.Z.C)

Domain Subject: ZOOLOGY

Semester – V

Max. Marks: 50(CCIA: 10+ SEE: 40)

Practical Hrs./Week : 3

Course6 C: **POULTRY MANAGEMENT- I (POULTRY FARMING)**

### PRACTICAL SYLLABUS

I. Learning Outcomes: On successful completion of this practical course, student shall be able to:

- Identify different types of Poultry rearing practices
- Evaluate the efficacy of different types of poultry practices in maximizing yield
- Understand the importance of different hybrid breeds in poultry

II. Practical(Laboratory) Syllabus:(30hrs) (Max.50Marks)

1. Different types of Poultry rearing (Students has to observe and draw the different types of poultry rearing systems)
2. Different types of poultry Housing - Models / Images/charts
3. Different layer breeds images/charts/ Models (Observation of characters)
4. Types of broilers images/charts/ Models (Identification of important Characters)
5. CARI breeds characters –images/charts
6. Nandanam breeds- images/charts (Identification of characters)

\*\*\* (This practical is 70 % (Web based /virtual) 30% physical: student and teachers must browse the web for the specimens models – write down the important characters based on the web resources)

III. Lab references

1. A Text Book of Animal Husbandry, C. C. Banerjee, Oxford and IBH, Publish Co, ISBN:9788120412606

Web resources suggested by the teacher concerned and the college librarian including reading material

IV. **Co-Curricular Activities:**

a) **Mandatory:**(*Student training by teacher in field skills: total 15 hours (lab:10, field 05)*)

1. For Teacher: Training of students by the teacher in laboratory and field for not less than 15 hours on the techniques of identification of layers, broilers and management practices in poultry.
2. For Student: Students shall individually visit a Poultry farm, make observations and report on the Rearing, Housing, Brooding, Feeding and water management activities. The student shall submit a handwritten Fieldwork/Project work Report on the observations along with pictures in the given format not exceeding 10 pages to



teacher.

3. Max marks for Fieldwork/Project work Report: 05.
  4. Suggested Format for Fieldwork/Project work: *Title page, student details, index page, detailsof place visited, observations made, findings and acknowledgements.*
  5. Unit tests. (IE)
- b) Suggested Co-Curricular Activities
1. Web resources – visiting the web sites of CARI-IZATNAGAR-<https://cari.icar.gov.in>procuring additional information on the poultry breeds
  2. Web resources- visiting the web site of NANADANAM[http://www.tanuvac.ac.in/ippmmadhavaram\\_tech.html](http://www.tanuvac.ac.in/ippmmadhavaram_tech.html)
  3. Collection of additional data on different types of Poultry breeds
  4. Seminar, Assignment, Group discussion. Quiz, Collection of Material, Invited Lecture, Videopreparation etc.

**SEE MODEL PAPER**

*Time Allowed: Three hours*

*Max. Marks: 40*

<b>Evaluation Scheme</b>	<b>Marks</b>
<b>One Major Experiment (Experiment No : )</b>	<b>15</b>
<b>One Minor Experiment (Experiment No : )</b>	<b>10</b>
<b>Slide Preparation, if any</b>	<b>5</b>
<b>Practical Record + Viva Voce</b>	<b>10</b>
<b>Total</b>	<b>40</b>

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Domain Subject: ZOOLOGY                      IV Year B. Sc–Semester –V  
Course Code: ZOOSSET06

Course 7 C: **POULTRY MANAGEMENT -II**                      Max. Marks: 100+50  
**(POULTRY PRODUCTION AND MANGEMENT)**  
(Skill Enhancement Course (Elective), - Credits: 05)

**Learning Outcomes:**

Students at the successful completion of the course will be able to

- Suggest measure for Health care in Poultry
- Evaluate the economics of poultry production
- Elaborate the poultry Breeder flock management
- Differentiate the poultry hatchery practices

**Syllabus:** (Total Hours: 90 including Teaching, Lab, Field Skills Training, Unit tests etc.)

**Unit-1 HEALTH CARE**

- 1.1 Common poultry diseases: bacterial, viral, fungal, parasitic and nutritional deficiencies.
- 1.2 Vaccination schedule for commercial layers and broilers: factors that govern vaccination schedule; vaccination principles type, methods, pre and post vaccination care.
- 1.3 Disinfection: Types of disinfectants; mode of action; recommended procedure; precaution and handling.

**Unit-2 ECONOMICS**

- 2.1 Economics of layer and broiler production
- 2.2 Projects reports in different systems of rearing for layer & broilers.
- 2.3 Feasibility studies on poultry rearing- in context of small units and their profitability.
- 2.4 Export/import of poultry and poultry products.

**Unit-3 BREEDER FLOCK MANAGEMENT**

- 3.1 Layer and broiler breeder flock management housing & space requirements.
- 3.2 Different stage of management during life cycle; Light management during growing and laying period, Artificial insemination.
- 3.3 Feeding: Feed restriction, separate male feeding. Nutrient requirement of layer and broiler breeders of different age groups.

**Unit-4 BREEDER HEALTHCARE**

- 4.1 Vaccination of breeder flock; difference between vaccination schedule of broilers and commercial birds.
- 4.2 Common diseases of breeders (Infectious and metabolic disorders)-prevention.
- 4.3 Fertility disorder- etiology, diagnosis and corrective measures. Selection and culling of breeder flocks

**Unit-5 HATCHERY PRACTICES**

- 5.1 Management principles of incubation.
- 5.2 Factors affecting fertility and hatchability. Selection, care and incubation of hatching eggs. Fumigation; sanitation and hatchery hygiene.
- 5.3 Importance of hatchery records, break even analysis of unhatched eggs.
- 5.4 Computer applications for hatchery management

**I. References:**

1. HVS Chauhan, S. Roy, Poultry Diseases, Diagnosis and Treatment, New Age International

Publishers-2018

2. <https://www.drvet.in/p/e-books.html>
3. <https://byjus.com/biology/animal-husbandry-poultry-farming/>
4. [https://www.helpforag.app/2018/02/livestock-production-and-management-lpm\\_14.html?m=1](https://www.helpforag.app/2018/02/livestock-production-and-management-lpm_14.html?m=1)

## Model Question Paper

Course Code: ZOOSSET06

Offered to B.Sc. (B.Z.C)

Title of the Course: **Poultry management-II**

### SECTION – A (Total: 25 Marks)

Short Answer Questions (25 Marks: 5 x5)

**Answer any five questions. Each answer carries 5 marks.**

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.

### SECTION B (Total: 5 x 10 = 50 Marks)

**Answer all questions. Each answer carries 10 marks.**

9 (a).

Or

(b)

10(a).

Or

(b).

11(a).

Or

(b).

12 (a).

Or

(b).

13(a).

Or

(b).

## P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE: VIJAYAWADA

Semester-wise Revised Syllabus under CBCS, 2020-21

Course Code: ZOOSEP06

Offered to B.Sc. (B.Z.C)

Domain Subject: ZOOLOGY

Semester – V

Max. Marks: 50(CCIA: 10+ SEE: 40)

Practical Hrs./Week : 3

### Course 7C: POULTRY MANAGEMENT –II- PRACTICAL SYLLABUS (POULTRY PRODUCTION AND MANGEMENT)

#### I. Learning Outcomes:

On successful completion of this practical course, student shall be able to:

- Identify Poultry diseases by observation
- Analyze Poultry establishment feasibility
- Understand the Poultry Records

#### II. Practical(Laboratory) Syllabus:(30hrs) (Max.50Marks)

1. Poultry Viral diseases – Observation of histopathological slides
2. Poultry Fungal Diseases- Observation of histopathological slides
3. Poultry Bacterial Diseases-Observation of histopathological slides
4. Feasibility study of Poultry establishment: (Preparation of feasibility study report with given parameters )
5. Rearing of Layers – (Preparation of Flow chart
6. Rearing of broiler- Flow chart
7. Hatchery records- Model study/analysis- Report with modified data

#### III. Lab references :

1. HVS Chauhan, S. Roy, Poultry Diseases, Diagnosis and Treatment, New Age International Publishers-2018
2. Flow chart hatchery : <http://lms.tanuvas.ac.in/mod/resource/view.php?id=45106>
3. Feasibility report:  
<https://www.manage.gov.in/stry&fcac/content/19.%20Project%20Report%20on%20Layer%20Poultry.pdf>

Web resources suggested by the teacher concerned and the college librarian including reading material

#### IV. Co-Curricular Activities

a) **Mandatory:**(Lab/filed training of students by teacher: (lab10+ field 05)

1. For Teacher: Training of students by the teacher laboratory and field for not less than 15 hours on skills in different practices employed in poultry with regard to the disease management – analysis of poultry project- preparation of flow chart – Observation of Poultry records – computerization activities
2. For Student: students shall (individually) visit a Layer/ Broiler Poultry farming places (small scale/corporate), make observations on practices- resources –

management and marketing - analysis and submit a handwritten Fieldwork/Project work Report of 10 pages with necessary images.

3. Max marks for Fieldwork/Project work Report: 05.
4. Suggested Format for Fieldwork/Project work: *Title page, student details, index page, detailsof place visited, observations made, findings and acknowledgements.*
6. (IE): Unit tests.

**b) Suggested Co-Curricular Activities**

1. Preparation of Poultry diseases charts
2. Preparation of feasibility report poultry establishment with different variables
3. Seminar, Assignment, Group discussion. Quiz, Collection of Material, Invited Lecture, Videopreparation etc.

**SEE MODEL PAPER**

*Time Allowed: Three hours*

*Max. Marks: 40*

<b>Evaluation Scheme</b>	<b>Marks</b>
<b>One Major Experiment (Experiment No : )</b>	<b>15</b>
<b>One Minor Experiment (Experiment No : )</b>	<b>10</b>
<b>Slide Preparation, if any</b>	<b>5</b>
<b>Practical Record + Viva Voce</b>	<b>10</b>
<b>Total</b>	<b>40</b>

Four – year B.Sc.

Domain Subject: ZOOLOGY

COURSE CODE:ZOOSET07

IV Year B. Sc.Semester –V

Max. Marks: 100+50

Course6 D: **SERI CULTURE -I\***  
**(BIOLOGY AND CULTIVATION OF MULBERRY)**  
(Skill Enhancement Course (Elective), Credits: 05)

I. Learning Outcomes:

- Students at the successful completion of this course will be able to
- Evaluate the general status of Sericulture in India
- Understand the development of sericulture Botany
- Evaluate the use of Silk worm breeds
- Differentiate among various silkworm breeds
- Apprise the economics of silk rearing

II. Syllabus: *(Total Hours: 90 including Teaching, Lab, Field Skills Training, Unit tests etc.)*

Unit-1

A general introduction to Sericulture

1.1 Sericulture map of India: Components of Sericulture.

1.2 Textile fibers: Types- natural and synthetic fibers- types of silk produced in India; Importance of mulberry silk:

1.3 Sericulture organization in India; role of state departments of Sericulture, Central Silk Board and NGOs in Sericulture development.

**Unit-2 :Sericultural Botany.**

2.1 Taxonomy of mulberry and food plants of silkworms: Study of salient features of the families- Marceau.

2.2 Morphology of mulberry: different varieties of mulberry.

2.3 Anatomy of mulberry: internal structure of stem, root and leaf; secondary growth in root and stem.

Unit 3: Floral biology of mulberry

3.1 Floral biology of mulberry: Sexual behavior, different types of anthers and ovule in mulberry; micro- and megaspore genesis.

3.2 Development of male and female gametophytes; pollination, fertilization

3.3 Development of endosperm, embryo and seed; poly embryony and partheno carpy in mulberry.

Unit-4 Silkworm Biology.

4.1 Characteristic features of the order Lepidoptera; detailed study of the families- Saturnidae and Bombycid. Classification of sericigenous insects.

4.2 Classification of silkworms based on moultnism, voltinism and geographical distribution; popular silkworm breeds and hybrids of Karnataka; their economic traits

Unit-5 Morphology and anatomy of reproductive systems of silk moth.

5.1 Life cycle of *Bombyx Mori*; morphology of egg, larva, pupa and adult.

**\* This course shall be completely taught by Zoology faculty.**

### III. References:

1. Hortmann and Kesler (1993) Plant Propagation, principles and practices. Prentice Hall, Hemel Nemstead.
2. Krishna Murthy, N.(1981) Plant growth substances including application in Agriculture. TataMcGraw Hill Pub. Co. Ltd. New Delhi.
3. Shankar, M.A (1998) Handbook on mulberry Nutrition, Multiplex, Bangalore.
4. Subbarao, N.S (1998) Bio fertilizers in Agriculture. Oxford & IBH Pub. Co, Pvt. Ltd, NewDelhi.
5. A text Book on Mulberry Crop Protection. Govindaiah, V.P Gupta, D.D Sharma, S. Rajadurai and V. Nishitha Naik, Published by Central Silk Board, Bangalore-68, India.2005.
6. Rajanna L, Das P.K, Ravindra S, Bhogेश K , Mishra R.K, Singhvi N.R, Katigar R.S and Jayaram H. Mulberry Cultivation and Physiology Central Silk Board, Bangalore, Dec.2005

### Web resources:

1. <http://www.fao.org/3/ad108e/ad108e0a.htm>
2. [https://onlinecourses.swayam2.ac.in/cec19\\_bt05/preview](https://onlinecourses.swayam2.ac.in/cec19_bt05/preview)
3. <https://www.skuastkashmir.ac.in/DisplaySInformation.aspx?id=16&pid=20592>
4. <http://www.fao.org/3/x9895E/x9895e04.htm>
5. <https://www.notesonzoology.com/sericulture/moriculture/common-indian-mulberry-plants-and-their-morphological-characteristics/347>

Web resources suggested by the teacher concerned and the college librarian including reading material

## Model Question Paper

Course Code: ZOOSSET07                      Offered to B.Sc. (B.Z.C)

Title of the Course: **Poultry management-II**

### SECTION – A (Total: 25 Marks) Short Answer Questions (25 Marks: 5 x5)

**Answer any five questions. Each answer carries 5 marks.**

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.

### SECTION B (Total: 5 x 10 = 50 Marks)

**Answer all questions. Each answer carries 10 marks.**

9.(a)

Or

(b)

10.(a).

Or

(b).

11 (a).

Or

(b).

12 (a).

Or

(b).

13 (a).

Or

(b).



## P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE: VIJAYAWADA

Semester-wise Revised Syllabus under CBCS, 2020-21

Course Code: ZOOSEP07

Offered to B.Sc. (B.Z.C)

Domain Subject: ZOOLOGY

Semester – V

Max. Marks: 50(CCIA: 10+ SEE: 40)

Practical Hrs./Week : 3

### Course6 D: SERI CULTURE -I – PRACTICAL SYLLABUS

#### I. Learning Outcomes:

On successful completion of this practical course, student shall be able to:

- Develop sericulture map of India
- Develop charts on production of silk
- Examine the popular varieties of mulberry
- Display the silk glands of silk worm

#### II. Practical(Laboratory) Syllabus:(30hrs) (Max.50Marks)

1. Sericulture map of India and Karnataka.
2. Preparation of histograms and pie charts on:
3. Production of textile fibers in India.
4. Pie chart on mulberry and non-mulberry silk production in India.
5. Life cycle of *Bombyx mori*- Morphology of egg, larva, pupa and adult of *Bombyx mori*.
6. Sex separation in larva, pupa and adult of the silkworm *Bombyx mori*.
7. Dissection and display of: Digestive system of larva. Silk glands.

#### III. Lab References :

1. Rajanna L, Das P.K, Ravindra S, Bhogesha K , Mishra R.K, Singhvi N.R, Katigar R.S and Jayaram H. Mulberry Cultivation and Physiology Central Silk Board, Bangalore, Dec.2005

Web sources suggested by the teacher concerned and the college librarian including reading material

#### IV. Co-Curricular Activities :

a) **Mandatory:** (Student training by teacher in field skills: total 15hrs, Lab: 10+ filed 05):

1. For Teacher: Training of students by the teacher in the laboratory and field for not less than 15 hours on the skills of preparation of Sericulture Map of India – identification of Mulberry plants – plantation- observation of Silk worm reproductive biology- observation of silk glands
2. **For Student:** Students shall (individually) visit any local Mulberry Plantation area and Silk worm Rearing center – make observations on plants, procedures and yield.

Observations and outcomes shall be submitted as Fieldwork/Project work Report not exceeding 10 pages to teacher in the given format.

3. Max marks for Fieldwork/Project work Report: 05.
4. Suggested Format for Fieldwork/Project work: *Title page, student details, index page, details of place visited, observations made, findings and acknowledgements.*
5. (IE)Unit tests.

**6. b) Suggested Co-Curricular Activities**

1. Webbased : Collection of additional information of mulberry plants
2. Charts /Models preparation of silkworm developmental stages
7. Seminar, Invited lecture, .Assignment, Group discussion. Quiz, Collection of Material, Videopreparation etc.

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**SEE MODEL PAPER**

*Time Allowed: Three hours*

*Max. Marks: 40*

<b>Evaluation Scheme</b>	<b>Marks</b>
<b>One Major Experiment (Experiment No : )</b>	<b>15</b>
<b>One Minor Experiment (Experiment No : )</b>	<b>10</b>
<b>Slide Preparation, if any</b>	<b>5</b>
<b>Practical Record + Viva Voce</b>	<b>10</b>
<b>Total</b>	<b>40</b>

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\*  
\*

**P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE: VIJAYAWADA**

(An autonomous college in the jurisdiction of Krishna University)

**SEMESTER- V**

**PAPER- IX**

**TITLE OF THE PAPER: SERICULTURE -II  
(BIOLOGY AND REARING OF SILKWORM)**

**NO OF HOURS: 45**

**CREDITS: 05**

**WEF: 2022-2023**

**COURSE CODE: ZOOS08**

**COURSE OUTCOMES:**

**Students at the successful completion of the course will be able to:**

CO 1	<b>Design low cost rearing house preparation for silk worm rearing</b>
CO 2	<b>Formulate procedure of sanitation of rearing house</b>
CO 3	<b>Make use of Chawki rearing practice</b>
CO 4	<b>Decide and suggest the correct time for harvest</b>

**SYLLABUS**

**UNIT-1**

1.1 Rearing house: Location, orientation, plan and utilities; model rearing house; low-cost rearing house.

1.2 Rearing appliances-shelf and shoot rearing; requirements of rearing appliances (per unit rearing of 100dfls).

**UNIT-2**

2.1 Disinfection of rearing house and rearing appliances; (disinfectants formalin, bleaching powder, chlorine dioxide, slaked lime and iodine compounds);

2.2 Rearing and personal hygiene.

**UNIT-3**

3.1 Incubation- definition, requirement of environmental conditions, incubation devices;

identification of stages of development; black boxing and its importance.

3.2 Chawki rearing: Preparation; brushing and its methods; types of chawki rearing - traditional and improved method; optimum environmental conditions; methods and frequency of feeding; methods of bed cleaning; spacing; moulting and care during moult.

**UNIT -4**

4.1 Late age silkworm rearing: Methods; optimum environmental conditions; feeding quantity and frequency; methods of bed cleaning; spacing; moulting and care during moult.

4.2. Identification of spinning larva; spinning; mounting and mounting density; types of mountages, their advantages and disadvantages; environmental requirements during spinning.

### **UNIT -5**

5.1 Harvesting: Time of harvesting; sorting, storage/ preservation

5.2 Packaging and transport of cocoons; leaf-cocoon ratio; Maintenance of rearing records.

#### **REFERENCES:**

1. Charley, S.R. (1982). Culture and Sericulture. Academic Press Inc., New York, U.S.A
2. Chowdhury, S.N. (1998) Muga Culture. Central Silk Board, Bangalore, India
3. Dokuhon, Z.S. (1998). Illustrated Textbook on Sericulture. Oxford & IBH publishing Co., Pvt. Ltd. Calcutta.
4. Hamamura, Y. (2001). Silkworm rearing on Artificial Diet. Oxford & IBH publishing Co., Pvt. Ltd. New Delhi.
5. Hasao Aruga (1994). Principles of Sericulture (Translated from Japanese) Oxford & IBH publishing Co., Pvt. Ltd. New Delhi.

#### **WEB RESOURCES:**

1. <http://www.fao.org/3/ad108e/ad108e0a.htm>
2. [https://onlinecourses.swayam2.ac.in/cec19\\_bt05/preview](https://onlinecourses.swayam2.ac.in/cec19_bt05/preview)
3. <https://www.skuastkashmir.ac.in/DisplaySInformation.aspx?id=16&pid=20592>

**SEMESTER END EXAMINATION MODEL PAPER**

**Time: 3 Hours**

**Max. Marks: 75**

**SECTION –A**

Answer any **FIVE** of the following

**5x5=25**

**Marks**

Draw neat labeled diagrams wherever necessary.

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.

**SECTION – B**

Answer the following

**5X10=50 Marks**

Draw neat labeled diagrams wherever necessary.

9. (a).

Or

(b).

10. (a).

Or

(b).

11. (a).

Or

(b).

12. (a).

Or

(b).

13. (a).

Or

(b).

**P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE: VIJAYAWADA.**

(An autonomous college in the jurisdiction of Krishna University)

**PRACTICAL- VI** (At the end of V Semester)

Title: **SERICULTURE -II**

**(BIOLOGY AND REARING OF SILKWORM)**

No of Hours: 45

WEF: 2022-2023

Credits: 02

Course Code: ZOOSEP08

**Learning Outcomes**

- On successful completion of this practical course, student shall be able to :
- Appreciate the morphology of silkworm
- Realize the importance of and initiate measures to disinfect the importance of disinfection of rearing houses and rearing appliances
- Differentiate the methods of incubation of silkworm eggs
- Prioritize the records in silkworm rearing

**Practical(Laboratory) Syllabus:** (30hrs)(Max.50Marks)

1. Morphology and structure of silkworm egg, fertilization, Diapause development
2. Rearing house: Location, orientation, plan and utilities; model rearing house; low-cost rearing house.
3. Disinfection of rearing house and rearing appliances;
4. Incubation of silkworm eggs- Methods; black boxing; maintenance of temperature and humidity; Brushing: Methods; chawki rearing; use of paraffin paper and blue polythene sheet.
5. Bed cleaning: use of bed cleaning net and disposal of bed refuses and silkworm litter.
6. Moulting: Identification of moulting larva, care during moulting; mounting and mounting density; harvesting of cocoons; assessment of cocoons; types of mountages;
7. Study the mulberry leaf by graph paper method : ( for calculating the leaf area)

**Lab References**

1. Hasao Aruga (1994). Principles of Sericulture (Translated from Japanese) Oxford & IBH publishing Co., Pvt. Ltd. New Delhi.

Web resources suggested by the teacher concerned and the college librarian including reading material

**Co-Curricular Activities**

a) **Mandatory:** (*Lab/field training of students by teacher ( lab10+filed5)*)

1. For Teacher: Training of students by the teacher in laboratory and field for not less than 15 hours on the skills/techniques of Rearing of Silk moth
2. For Student: Students shall (individually) visit to Silk worm rearing center and observe all the procedures. He/she shall prepare a Fieldwork/Project work Report on the observations made in the given format not exceeding 10 pages and submit to teacher.
3. Max marks for Fieldwork/Project work Report: 05.
4. Suggested Format for Fieldwork/Project work Report: *Title page, student details, index page, details of place visited, observations made, findings and acknowledgements.*
5. (IE). Unit tests.

b) **Suggested Co-Curricular Activities**

1. Model Chart preparation of chawki rearing
2. Cocoon collection and observation of characteristics
3. Mountage images / charts preparation
4. Seminar, Invited Lecture, Assignment, Seminar, Group discussion. Quiz, Seminar, Quiz, Collection of Material, Video preparation etc.

**SEE MODEL PAPER**

**Time: 3hrs.**

**Max. Marks 40M**

- |    |     |
|----|-----|
| 1. | 10M |
| 2. | 10M |
| 3. | 10M |
| 4. | 05M |
| 5. | 05M |



**PARVATHANENI BRAHMAYYA  
SIDDHARTHA COLLEGE OF ARTS & SCIENCE : : VIJAYAWADA – 10**

**DEPARTMENT OF MATHEMATICS**

Minutes of the **online meeting** of the members of Board of Studies in Mathematics held on 8<sup>th</sup> November 2022 through Zoom App at 11.00 a.m.

**Members Present**

- |   |                             |
|---|-----------------------------|
| 1. Prof. V. Lakshmi Prasannam<br>Professor & Head                         | Chairman                    |
| 2. Dr. K. Jaya Lakshmi<br>Department of Mathematics<br>Krishna University | University Nominee          |
| 3. Prof. K.K.M. Sarma<br>Department of Mathematics<br>Andhra University   | Subject Expert              |
| 4. Prof. Y.N.Reddy<br>Department of Mathematics<br>NIT, Warangal.         | Subject Expert              |
| 5. Dr. V. Amarendra Babu<br>Department of Mathematics, ANU                | Subject Expert<br>(Alumnus) |
| 6. Dr. J. L. Rama Prasad, Asst. Professor                                 | Member                      |
| 7. Smt. T. Anuradha, Asst. Professor                                      | Member                      |



# DEPARTMENT OF MATHEMATICS

## LIST OF THE COURSES REVISED/ INTRODUCED - I SEMESTER 2022-23

S.NO	TITLE OF THE COURSE	Course Code	Offered in SEM	Type of the Paper	Year of Introduction	Year of Revision	OBE with BTL	Offered to (Name of the Programme)
1	Real Analysis -I	22MA1T1	I	CORE	2020-2021	2022-23	YES	M.Sc.Mathematics
2	Ordinary Differential Equations	22MA1T2	I	CORE	2020-2021	2022-23	YES	M.Sc.Mathematics
3	Algebra	22MA1T3	I	CORE	2020-2021	2022-23	YES	M.Sc.Mathematics
4	Topology	22MA1T4	I	CORE	2020-2021	2022-23	YES	M.Sc.Mathematics
5	C Programming	22MA1T5	I	CORE	2020-2021	2022-23	YES	M.Sc.Mathematics
6	Personality Development through Life Enlightenment Skills	22PG101	I	CORE	2022-2023	---	YES	M.Sc.Mathematics
7	C Programming Lab	22MA1L1	I	CORE	2020-2021	2022-23	YES	M.Sc.Mathematics

### RESOLUTIONS (PG):

1. It is resolved to recommend the revised Syllabus & Model question paper of **REAL ANALYSIS-I with course code 22MA1T1** in I semester of M.Sc. Mathematics for the batch of students admitted in 2022 – 23 and onwards, in place of REAL ANALYSIS-I with course code 20MA1T1. For Syllabus and Model question paper vide page number from 1 to 4.
2. It is resolved to recommend the revised Syllabus & Model question paper of **ORDINARY DIFFERENTIAL EQUATIONS with course code 22MA1T2** in I semester of M.Sc. Mathematics for the batch of students admitted in 2022 – 23 and onwards, in place of ORDINARY DIFFERENTIAL EQUATIONS with course code 20MA1T2. For Syllabus and Model question paper vide page number from 5 to 8.
3. It is resolved to recommend the revised Syllabus & Model question paper of **ALGEBRA with course code 22MA1T3** in I semester of M.Sc. Mathematics for the batch of students admitted in 2022 – 23 and onwards, in place of ALGEBRA with course code 20MA1T3. For Syllabus and Model question paper vide page number from 9 to 12.
4. It is resolved to recommend the revised Syllabus & Model question paper of **TOPOLOGY with course code 22MA1T4** in I semester of M.Sc. Mathematics for the batch of students admitted in 2022 – 23 and onwards, in place of TOPOLOGY with course code 20MA1T4. For Syllabus and Model question paper vide page number from 13 to 16.

5. It is resolved to recommend the revised Syllabus & Model question paper of **C PROGRAMMING with course code 22MA1T5** in I semester of M.Sc. Mathematics for the batch of students admitted in 2022 – 23 and onwards, in place of C PROGRAMMING with course code 20MA1T5. For Syllabus and Model question paper vide page number from 17 to 20.
6. It is resolved to recommend to introduce **PERSONALITY DEVELOPMENT THROUGH LIFE ENLIGHTENMENT SKILLS with course code 22PG101** in I semester of M.Sc. Mathematics in line with the guidelines of OBE following the Bloom's Taxonomy for the batch students admitted in the academic year 2022 – 23 and onwards.
7. It is resolved to recommend the revised Syllabus & Model question paper of **C PROGRAMMING LAB with course code 22MA1L1** in I semester of M.Sc. Mathematics for the batch of students admitted in 2022 – 23 and onwards, in place of C PROGRAMMING LAB with course code 20MA1L2. For Syllabus and Model question paper vide page number from 21.
8. The Syllabus and Model question papers for III semester M.Sc. Mathematics students admitted in the academic year 2021-22 are same as that of 2020-21 admitted batch as per the modified programme structure approved in October 2021.
9. The III semester students of M.Sc. Mathematics admitted in the academic year 2021-22 will select the course OPEN ELECTIVE –II offered by other departments.

## Programme Structure for M.Sc. Mathematics

(For the batch of students admitted during 2022-2023 and onwards - R22 Regulations)

### SEMESTER-I

Course Code	Title of the Course	Teaching hours per Week			No. of Credits	CORE/IDC/ /DSE/SEC/ OEC/ MOOCS	Evaluation		
		L	P	T			CIA MARKS	SEE	
								MARKS	DURATION
22MA1T1	Real Analysis -I	4	0	0	4	Core	30	70	3 hrs
22MA1T2	Ordinary Differential Equations	4	0	0	4	Core	30	70	3 hrs
22MA1T3	Algebra	4	0	0	4	Core	30	70	3 hrs
22MA1T4	Topology	4	0	0	4	Core	30	70	3 hrs
22MA1T5	C Programming	4	0	0	4	Core	30	70	3 hrs
22PG101 (Compulsory)	Personality Development through Life Enlightenment Skills	3	1	0	3	Core	30	70	3 hrs
<b>LAB PRCTICALS</b>									
22MA1L1	C Programming Lab	0	6	0	3	Core	30	70	3 hrs
<b>Total for I Semester</b>		30			26		210	490	

### SEMESTER-II

Course Code	Title of the Course	Number of Periods per Week			Credits	CORE/IDC/ DSE/SEC/ OEC/ MOOCS	Evaluation		
		L	P	T			CIA MARKS	SEE	
								MARKS	DURATION
22MA2T1	Complex Analysis	4	0	0	4	Core	30	70	3 hrs
22MA2T2	Numerical Methods	4	0	0	4	Core	30	70	3 hrs
22MA2T3	Partial Differential Equations	4	0	0	4	Core	30	70	3 hrs
22MA2T4	Lattice Theory	4	0	0	4	Core	30	70	3 hrs
22PG201 (Compulsory)	Research Methodology and IPR	3	1	0	3	SEC	30	70	3 hrs
<b>DOMAIN SPECIFIC ELECTIVE COURSES (CHOOSE ANY ONE)</b>									
22MA2D1	Algebraic Coding Theory	4	0	0	4	DSE	30	70	3 hrs
22MA2D2	Graph Theory	4	0	0	4	DSE	30	70	3 hrs
22MA2D3	Discrete Mathematical Structures	4	0	0	4	DSE	30	70	3 hrs
<b>LAB PRACTICALS</b>									
22MA2L1	Numerical Methods Lab	0	6	0	3	Core	30	70	3 hrs
<b>Total for II Semester</b>		30			26		210	490	
At the end of the 2 <sup>nd</sup> Semester every student must undergo summer internship/Apprenticeship/Project work/ Industrial Training/Research based project work for six weeks and must prepare a report concerned as per approved project guidelines and submit the same to the University before the commencement of Third semester end examinations.									

## SEMESTER-III

Course Code	Title of the Course	Number of Periods per Week			Credits	CORE/IDC/DSE/SEC/OEC/MOOCs	Evaluation		
		L	P	T			CIA MARKS	SEE	
								MARKS	DURATION
22MA3T1	Measure and Integration	4	0	0	4	Core	30	70	3 hrs
22MA3T2	Mathematical Methods	4	0	0	4	Core	30	70	3 hrs
<b>DOMAIN SPECIFIC ELECTIVE COURSES(CHOOSE ANY THREE)</b>									
22MA3D1	Galois Theory	4	0	0	4	DSE	30	70	3 hrs
22MA3D2	Linear Programming	4	0	0	4	DSE	30	70	3 hrs
22MA3D3	Functional Analysis	4	0	0	4	DSE	30	70	3 hrs
22MA3D4	Real Analysis-II	4	0	0	4	DSE	30	70	3 hrs
22MA3D5	Fuzzy Sets and Fuzzy Logic	4	0	0	4	DSE	30	70	3 hrs
22MA3D6	Linear Algebra	4	0	0	4	DSE	30	70	3 hrs
<b>LAB PRACTICALS</b>									
22MA3L1	MS Office/SCILAB	0	6	0	3	Core	30	70	3 hrs
<b>OPEN ELECTIVE COURSES(INTERDISCIPLINARY/MULTIDISCIPLINARY)COURSES(CHOOSE ANY ONE)</b>									
22OE	Matrix Theory	3	0	0	3	OE	30	70	3 hrs
22OE	Numerical Methods	3	0	0	3	OE	30	70	3 hrs
22OE	Quantitative Aptitude and Logical Reasoning	3	0	0	3	OE	30	70	3 hrs
<b>Total for III Semester</b>		29			26		210	490	

## SEMESTER-IV

Course Code	Title of the Course	Number of Periods per Week			Credits	CORE/IDC/DSE/SEC/OEC/MOOCs	Evaluation		
		L	P	T			CIA MARKS	SEE	
								MARKS	DURATION
22MA4T1	Rings and Modules	4	0	0	4	Core	30	70	3 hrs
<b>DOMAIN SPECIFIC ELECTIVE COURSES(CHOOSE ANY THREE)</b>									
22MA4D1	Operations Research	4	0	0	4	DSE	30	70	3 hrs
22MA4D2	Analytical Number Theory	4	0	0	4	DSE	30	70	3 hrs
22MA4D3	Probability & Statistics	4	0	0	4	DSE	30	70	3 hrs
22MA4D4	Semigroups	4	0	0	4	DSE	30	70	3 hrs
22MA4D5	Operator Theory	4	0	0	4	DSE	30	70	3 hrs
22MA4D6	Numerical Linear Algebra	4	0	0	4	DSE	30	70	3 hrs

<b>LAB PRACTICALS</b>									
22MA4L1	MATLAB/Python lab	0	6	0	3	Core	30	70	3 hrs
<b>ENTERPRENURAL&amp;INNOVATION/IT SKILL RELATED TO DOMAIN SPECIFIC ELECTIVE COURSES (CHOOSE ANY ONE)</b>									
22MA4T2	Cryptography and Network Security	3	0	0	3	SEC	30	70	3 hrs
22MA4T3	Mathematical Modelling	3	0	0	3	SEC	30	70	3 hrs
22MA4T4	Introduction to Industrial Mathematics	3	0	0	3	SEC	30	70	3 hrs
<b>CHOOSE MOOCS FROM SWAYAM/NPTEL SOURCES</b>									
22MA4M1	MOOCS				4	MOOCS			
22MA4P1	Project Work Evaluation and Viva –Voce				4			100	
<b>Total for IV Semester</b>		25		30			180	520	

**Note:** Students may be allowed to register and appear for MOOCS from the third semester itself. However, students are to complete the MOOCS successfully and submit pass certificate of the same to the university through the principal of the college concerned for approval and endorsement of the same on grade cards and PCs and ODs as per the regulations of the University.

**L: Lecture, P: Practical, T:Tutorial**



## P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

Siddhartha Nagar, Vijayawada – 520 010

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**Title of the Course: REAL ANALYSIS-I**

**Semester : I**

Course Code	<b>22MA1T1</b>	Course Delivery Method	Blended Mode
Credits	4	CIA Marks	30
No. of Lecture Hours / Week	4	Semester End Exam Marks	70
Total Number of Lecture Hours	60	Total Marks	100
Year of Introduction : 2020-2021	Year of offering : 2022-2023	Year of Revision: 2022-23	Percentage of Revision : 10%

**Course Objective:** The main objective of this course is to develop problem solving skills and knowledge on some of the basic concepts in limits, continuity, derivatives, Riemann-Stieltjes integrals, sequences of functions, test the convergence of improper integrals and study properties of functions of several variables.

**Course Outcomes:** After successful completion of this course, students will be able to

CO1: understand the properties of continuous and differentiable functions. (PO1)

CO2: test the Riemann- Stieltjes integrability of bounded functions and study their properties. (PO4)

CO3: differentiate point wise and uniform convergence of sequences of functions and illustrate the effect of uniform convergence on the limit function with respect to continuity, differentiability and integrability.(PO5)

CO4: test the convergence of improper integrals. (PO4)

CO5: analyze the properties of functions of several variables. (PO4)

## UNIT-I

**Continuity & Differentiation:** Limits of functions- continuous functions- Continuity and Compactness- Continuity and Connectedness- Discontinuities - Derivative of a Real Function- Mean value theorems- The Continuity of Derivatives- L' Hospital's rule- Derivatives of higher order- Taylor's theorem.

[4.1 to 4.27 of chapter 4 & 5.1 to 5.15 of chapter 5 of Text Book1]

## UNIT-II

**The Riemann - Stieltjes Integral:** Definition and Existence of Integral-Properties of the integral -Integration and Differentiation –Integration of vector-valued functions - Rectifiable Curves. [Chapter-6 of Text Book-1]

## UNIT-III

**Sequences and Series of functions:** Discussion of main problem - Uniform convergence – Uniform convergence and continuity – Uniform Convergence and Integration – Uniform Convergence and Differentiation – Equicontinuous families of functions – The Stone - Weierstrass Theorem.[7.1 to 7.26 of Text Book 1]

## UNIT-IV

**Improper Integrals:** Introduction – Integration of unbounded Functions with Finite limits of

Integration – Comparison Tests for Convergence at a of  $\int_a^b f dx$  - Infinite range of Integration –

Integrand as a Product of Functions. [Chapter-11 of Text Book-2]

## UNIT-V

**Functions of several variables:** Explicit and Implicit Functions - Continuity - Partial Derivatives – Differentiability – Partial Derivatives of Higher Order – Differentials of Higher order- Functions of Functions – Change of variables – Taylor's Theorem – Extreme Values: Maxima and Minima – Functions of Several Variables. [Chapter-15 of Text Book-2]

## PRESCRIBED BOOKS:

1. Walter Rudin, “**Principles of Mathematical Analysis**”, Student Edition 1976, McGraw-Hill International Publishers.
2. S.C. Malik and Savita Aurora, “**Mathematical Analysis**”, Fourth edition, New Age International Publishers.

## REFERENCE BOOK:

1. Tom. M. Apostol, “**Mathematical Analysis**” second Edition, Addison Wesley Publishing Company.

**Course has Focus on :** Foundation

- Websites of Interest:**
1. [www.nptel.ac.in](http://www.nptel.ac.in)
  2. [www.epgp.inflibnet.ac.in](http://www.epgp.inflibnet.ac.in)
  3. [www.ocw.mit.edu](http://www.ocw.mit.edu)

**P B SIDDHARTHA COLLEGE OF ARTS AND SCIENCE::VIJAYAWADA**  
(An Autonomous college in the jurisdiction of Krishna University)  
**M. Sc. Mathematics**  
**First Semester**  
**REAL ANALYSIS -22MA1T1**

**Time: 3 Hours**

**Max. Marks : 70**

**SECTION- A**

**Answer all questions.**

**(5 X 4=20)**

1 (a) Let  $f(x) = (1/x), x \neq 0$   
 $= 0, x = 0.$

Examine the continuity of the function  $f(x)$  on  $\mathbb{R}$ . (CO1, L2)  
(OR)

(b) Prove that every differentiable function on  $(a, b)$  is continuous on  $(a, b)$ . (CO1, L2)

2 (a) Show that  $\int_a^b f d\alpha \leq \int_a^{\bar{b}} f d\alpha$ . (CO2, L2)

(OR)

(b) State and prove fundamental theorem of calculus. (CO2, L2)

3 (a) Differentiate Pointwise convergence and Uniform convergence of sequence of functions. (CO3, L3)

(OR)

(b) Prove that the sum of two uniformly convergent sequences is also uniformly convergent. (CO3, L3)

4 (a) Examine the convergence of  $\int_0^1 \frac{dx}{\sqrt{1-x}}$  (CO4, L4)

(OR)

(b) Examine the convergence of  $\int_0^{\infty} \sin x dx$  (CO4, L4)

5 (a) Examine the continuity of the function  $f(x, y) = \frac{xy}{\sqrt{x^2 + y^2}}$ , if  $(x, y) \neq (0, 0)$  and

$f(x, y) = 0$ , if  $(x, y) = (0, 0)$  at the origin. (CO5, L4)

(OR)

(b) If  $z = x^2 + y^2$ ,  $x = r \cos \theta$ ,  $y = r \sin \theta$ , then find  $\partial z / \partial r$  and  $\partial z / \partial \theta$ . (CO5, L4)



## SECTION- B

Answer all questions. All questions carry equal marks.

(5X10=50)

- 6 (a) Show that a mapping  $f$  of a metric space  $X$  into a metric space  $Y$  is continuous if and only if  $f^{-1}(V)$  is open in  $X$ , for every open set  $V$  in  $Y$ . (CO1, L3)

(OR)

- (b) State and Prove Taylor's theorem. (CO1, L3)

- 7 (a) If  $f$  is monotonic on  $[a, b]$  and if  $\alpha$  is continuous on  $[a, b]$  then show that  $f \in R(\alpha)$ . (CO2, L3)

(OR)

- (b) If  $\gamma^1$  is continuous on  $[a, b]$  then show that  $\gamma$  is rectifiable and  $\wedge(\gamma) = \int_a^b |\gamma^1(t)| dt$ . (CO2, L3)

8. (a) If  $\{f_n\}$  is sequence of continuous functions on  $E$  and if  $f_n \rightarrow f$  uniformly on  $E$ , then show that  $f$  is continuous on  $E$ . (CO3, L4)

(OR)

- (b) State and prove Stone – Weierstrass theorem. (CO3, L4)

9. (a) Test the convergence of the integral  $\int_0^1 \frac{dx}{(x-a)^n}$  for  $n < 1$ . (CO4, L4)

(OR)

- (b) Show that if  $f$  and  $g$  are positive and  $f(x) \leq g(x)$ , for all  $x$  in  $[a, X]$  and  $\int_a^\infty g(x) dx$  converges, then  $\int_a^\infty f(x) dx$  converges. (CO4, L4)

- 10(a) State and prove Schwarz's theorem. (CO5, L2)

(OR)

- (b) State and prove Taylor's theorem for two variable functions. (CO5, L2)

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### Title of the Course: ORDINARY DIFFERENTIAL EQUATIONS

Semester : I

Course Code	22MA1T2	Course Delivery Method	Blended Mode
Credits	4	CIA Marks	30
No. of Lecture Hours / Week	4	Semester End Exam Marks	70
Total Number of Lecture Hours	60	Total Marks	100
Year of Introduction : 2020-2021	Year of offering : 2022-2023	Year of Revision: 2022-23	Percentage of Revision :10%

**Course Objectives :** The main objective of this course is to learn various methods for finding solutions of an ordinary differential equation and to study the characteristics of solutions of differential equations.

**Course Outcomes:** After successful completion of this course, students will be able to

CO1: formulate and solve linear differential equations of first and second order. (PO3)

CO2: solve linear differential equations of order n with constant /variable coefficients.(PO6)

CO3: determine the power series solutions of differential equations and study the properties of Legendre and Bessel functions.(PO1)

CO4: solve the system of linear equations. (PO1)

CO5: find the approximate solutions and understand the concept of existence and uniqueness of solutions. (PO6)

### UNIT-I

**Linear Equation of the first order:** Introduction, Linear equations of the first order, The equation  $y' + ay = 0$ , The equation  $y' + ay = b(x)$ , The general linear equations of the first order, Linear Equations with constant coefficients, The homogeneous equation of order n, Initial value problems for nth order equations.

[Chapter 1 of Text Book(1) and Sections 7, 8 of Chapter 2 of Text book(1)]

**UNIT-II Linear Equations with Constant Coefficients:** The non - homogeneous equation of order  $n$ , A special method for solving the non homogeneous equation.

**Linear equations with variable coefficients:** Introduction, Initial value problems for the homogeneous equations, Solution of the homogeneous equations, The Wronskian and linear independence.

[Sections 10,11 of Chapter 2 and Sections 1,2,3,4 of Chapter 3 of Text book(1)]

### **UNIT-III:**

**Solutions in Power series:** Introduction– Second order Linear Equations with Ordinary points – Legendre equation and Legendre Polynomials – Second order equations with regular singular points – Properties of Bessel functions.

[Sections 3.1 to 3.5 of Chapter 3 of Text Book(2)]

### **UNIT-IV:**

**Systems of Linear Differential Equations:** Introduction - Systems of first order equations - Model of arms competitions between two nations - Existence and uniqueness theorem - Fundamental Matrix - Non homogeneous linear systems - Linear systems with constant coefficients.[ Sections 4.1 to 4.7 of Chapter 4 of Text Book (2)]

### **UNIT-V:**

**Existence and Uniqueness of solutions:** Introduction – Successive approximations – Picard’s theorem. [Sections 5.1 to 5.4 of chapter 5 of Text Book(2)]

### **PRESCRIBED BOOKS :**

1. Earl.A. Coddington “*An Introduction to Ordinary Differential Equations*” , PHI.
2. S.G. Deo, V. Lakshmi kantham and V. Raghavendra “*Text Book of Ordinary Differential Equations*, Second edition, Tata McGraw Hill Pub., New Delhi, 1997.

### **REFERENCE BOOKS :**

1. G.F. Simmons, **Differential equations with Applications and Historical Notes**, Second Edition , Tata McGraw Hill, 2003.
2. D. Somasundaram, “**Theory of Ordinary Differential Equations**”, Narosa Publications, 2001.

**Course has Focus on :** Foundation

**Websites of Interest:** 1. [www.nptel.ac.in](http://www.nptel.ac.in)  
2. [www.epgp.inflibnet.ac.in](http://www.epgp.inflibnet.ac.in)  
3. [www.ocw.mit.edu](http://www.ocw.mit.edu)

**P B SIDDHARTHA COLLEGE OF ARTS AND SCIENCE::VIJAYAWADA**

(An autonomous college in the jurisdiction of Krishna University)

**M. Sc. Mathematics**

**First Semester**

**ORDINARY DIFFERENTIAL EQUATIONS – 22MA1T2**

**Time: 3 hours**

**Max. Marks: 70**

**SECTION-A**

**Answer all questions.**

**(5x4=20)**

1 a) Solve  $y' - 2y = 1$

(CO1, L3)

(OR)

b) Solve  $y' + e^x y = 3e^x$

(CO1, L3)

2 a) Write the characteristic polynomial of  $y''' - 3y'' + 3y' - y = 0$  and find its roots.

(CO2, L2)

(OR)

b) Define homogeneous and non-homogeneous differential equations with examples.

(CO2, L2)

3 a) Express  $f(t) = 1 + t + t^2$  in terms of Legendre series.

(CO3, L3)

(OR)

b) Show that  $P_n(1) = 1$  and  $P_n(-1) = (-1)^n$ .

(CO3, L3)

4 a) Define fundamental matrix of the system of linear differential equations and give an example.

(CO4, L1)

(OR)

b) State Existence and uniqueness theorem for first order linear differential equation.

(CO4, L1)

5 a) State Lipschitz condition.

(CO5, L2)

(OR)

b) Compute first two successive approximations of the equation  $x' = x$ ,  $x(0) = 1$  (CO5, L2)

**SECTION – B**

**Answer all questions. All questions carry equal marks.**

**(5X10=50)**

6. a) Find the solution  $\phi$  of  $x^2 y' + 2xy = 1$  satisfying  $\phi(2) = 2\phi(1)$

(CO1, L2)

(OR)

b) Consider the equation  $y''' - 4y' = 0$ . Compute three linearly independent solutions and

Wronskian of the solutions. Also find the solution  $\Phi$  satisfying  $\Phi(0) = 0$ ,  $\Phi'(0) = 1$ ,  $\Phi''(0) = 0$ .

(CO1, L2)

7.a) Compute the solution of the equation  $y''' + y'' + y' + y = 1$ , satisfying

$$\psi(0) = 0, \psi'(0) = 1 \text{ and } \psi''(0) = 0. \quad (\text{CO2, L3})$$

(OR)

b) Find two linearly independent solutions of the equation

$$y^{11} + \frac{1}{x} y' - \frac{1}{x^2} y = 0. \quad (\text{CO2, L3})$$

8 a) Show that the Legendre polynomials are given by

$$P_n(t) = \frac{1}{2^n n!} \frac{d^n}{dt^n} (t^2 - 1)^n \quad (\text{CO3, L2})$$

(OR)

b) Show that  $\frac{d}{dt} [t^p J_p(t)] = t^p J_{p-1}(t)$

$$\text{and } \frac{d}{dt} [t^{-p} J_p(t)] = -t^{-p} J_{p+1}(t) \quad (\text{CO3, L2})$$

9 a) Find the fundamental matrix for  $x' = Ax$  where  $A = \begin{bmatrix} 3 & -2 \\ -2 & 3 \end{bmatrix}$  (CO4, L3)

(OR)

b) Determine  $e^{At}$  for the system  $x' = Ax$  where  $A = \begin{bmatrix} 1 & 1 & 1 \\ 0 & -2 & 3 \\ 0 & 1 & 0 \end{bmatrix}$  (CO4, L3)

10. a) State and prove Picard's theorem. (CO5, L2)

(OR)

b) Find the first three successive approximations of the equation  $x' = e^x$ ,  $x(0) = 0$ . (CO5, L2)

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**Title of the Course: ALGEBRA**

**Semester : I**

Course Code	22MA1T3	Course Delivery Method	Blended Mode
Credits	4	CIA Marks	30
No. of Lecture Hours / Week	4	Semester End Exam Marks	70
Total Number of Lecture Hours	60	Total Marks	100
Year of Introduction : 2020-2021	Year of offering : 2022-2023	Year of Revision: 2022-23	Percentage of Revision :10%

**Course Objectives:** The main objective of this course is to acquire knowledge on the basic concepts of Group theory and Ring theory.

**Course Outcomes:** After successful completion of this course, students will be able to

CO1: understand the properties of Groups and homomorphisms. (PO1)

CO2: study permutation groups and Cayley's theorem.(PO6)

CO3: study the applications of Sylow's theorems.(PO4)

CO4: understand the properties of ideals in rings, Quotient rings, integral domains and fields.  
(PO3)

CO5: illustrate the properties of Euclidean rings and polynomial rings.(PO1)

### UNIT-I

**Group Theory:** Definition of a Group, Some Examples of Groups, Some Preliminary Lemmas, Subgroups, A Counting Principle, Normal Subgroups and Quotient Groups, Homomorphisms, Automorphisms. [Sections 2.1 to 2.8 of the prescribed book]

### UNIT-II

**Group Theory Continued:** Cayley's theorem, Permutation groups, Another counting principle. [Sections 2.9 to 2.11 of the prescribed book]

### **UNIT-III**

**Group Theory Continued:** Sylow's theorem, direct products, finite abelian groups.

[Sections 2.12 to 2.14 of the prescribed book]

### **UNIT-IV**

**Ring Theory:** Definition and Examples of Rings, Some special classes of Rings, Homomorphisms, Ideals and quotient Rings, More Ideals and quotient Rings, The field of quotients of an Integral domain. [Sections 3.1 to 3.6 of the prescribed book]

### **UNIT-V**

**Ring Theory Continued:** Euclidean rings, A particular Euclidean ring, Polynomial Rings, Polynomials over the rational field, Polynomial Rings over Commutative Rings.

[Sections 3.7 to 3.11 of the Prescribed book].

### **PRESCRIBED BOOK:**

1. I.N. Herstein, **Topics in Algebra**, Second Edition, Wiley Eastern Limited, New Delhi, 1988.

### **REFERENCE BOOKS:**

1. Bhattacharya P.B., Jain S.K., Nagpaul S.R., "**Basic Abstract Algebra**", Second Edition, Cambridge Press.
2. David S Dummit and Richard M Foote, "**Abstract Algebra**", Wiley Publications, Third Edition.
3. C. Musili, "**Introduction to Rings and Modules**", Narosa Publications.

**Course has Focus on :** Foundation

- Websites of Interest:**
1. [www.nptel.ac.in](http://www.nptel.ac.in)
  2. [www.epgp.inflibnet.ac.in](http://www.epgp.inflibnet.ac.in)
  3. [www.ocw.mit.edu](http://www.ocw.mit.edu)

**P B SIDDHARTHA COLLEGE OF ARTS AND SCIENCE::VIJAYAWADA**  
(An Autonomous college in the jurisdiction of Krishna University)  
**M. Sc. Mathematics**  
**First Semester**  
**ALGEBRA-22MA1T3**

**Time: 3 Hours**

**Max Marks: 70**

**SECTION - A**

**Answer all questions**

**(5X4 = 20)**

- 1 (a) If  $G$  is a finite group and  $a \in G$  then prove that  $a^{o(G)} = e$ . (CO1, L2)  
(OR)  
(b) Define a subgroup and a normal subgroup. (CO1, L2)
- 2 (a) If  $G$  is a group of order 36 and  $H$  is a subgroup of order 9, prove that  $G$  can not be simple. (CO2, L3)  
(OR)  
(b) Find the product of the permutations  $\Phi = (1\ 2\ 3\ 4)$  and  $\psi = (3\ 4\ 5\ 1)$  (CO2, L3)
- 3 (a) Define a  $p$ -sylow subgroup and give an example. (CO3, L1)  
(OR)  
(b) Define external direct product and internal direct product of groups. (CO3, L1)
- 4 (a) Prove that a finite integral domain is a field. (CO4, L2)  
(OR)  
(b) Define a homomorphism of rings and give an example. (CO4, L2)
- 5 (a) Define Euclidean Ring and give an example. (CO5, L1)  
(OR)  
(b) Define an irreducible polynomial and a primitive polynomial over a field  $F$ . (CO5, L1)

**SECTION - B**

**Answer all questions. All questions carry equal marks.**

**(5X10 = 50)**

- 6 (a) If  $H$  and  $K$  are finite subgroups of  $G$  of orders  $o(H)$  and  $o(K)$  respectively, then show that  $o(HK) = o(H)o(K) / o(H \cap K)$ . (CO1, L2)  
(OR)  
(b) State and prove the fundamental theorem of homomorphism in groups. (CO1, L2)
- 7 (a) Show that every group is isomorphic to a subgroup of  $A(S)$ , for some appropriate  $S$ . (CO2, L2)  
(OR)  
(b) State and prove Cauchy's theorem. (CO2, L2)

**(P.T.O.)**



8 (a) Show that any two Sylow subgroups of a group  $G$  are conjugate. (CO3, L2)

(OR)

(b) Show that If  $G$  and  $G^1$  are isomorphic abelian groups, then show that  $G(s)$  and  $G^1(s)$  are isomorphic, for every integer  $s$ . (CO3, L2)

9 (a) If  $U$  is an ideal of a ring  $R$ , then show that  $R/U$  is a ring and is a homomorphic image of  $R$ . (CO4, L2)

(OR)

(b) If  $R$  is a commutative ring with unity and  $M$  is an ideal of  $R$ , then prove that  $M$  is maximal if and only if  $R/M$  is a field. (CO4, L2)

10(a) Prove that  $J[i]$ , the ring of Gaussian integers is a Euclidean ring. (CO5, L2)

(OR)

(b) State and prove Gauss Lemma. (CO5, L2)

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**Title of the Course: TOPOLOGY**

**Semester : I**

Course Code	22MA1T4	Course Delivery Method	Blended Mode
Credits	4	CIA Marks	30
No. of Lecture Hours / Week	4	Semester End Exam Marks	70
Total Number of Lecture Hours	60	Total Marks	100
Year of Introduction : 2020-2021	Year of offering : 2022-2023	Year of Revision: 2022-23	Percentage of Revision : 10%

**Course Objectives :** The main objective of this course is to generalize the concepts of distance, open sets, closed sets in real line and to learn concepts in Metric Spaces, Topological Spaces, compact spaces and connected spaces.

**Course Outcomes:** After successful completion of this course, students will be able to

CO1: understand the basic concepts of metricspaces and complete metric spaces.(PO1)

CO2: discuss the properties of Topological spaces, open bases and open subbases.(PO3)

CO3:characterize compactspaces and understand Ascolis theorem.(PO5)

CO4: differentiate  $T_1$ -spaces and Hausdorffspaces and study Urysohn's lemma, Tietze extension theorem.(PO5)

CO5: understand the concepts of connectedspaces, components and totally disconnected spaces.(PO1)

### UNIT-I

**Metric Spaces:** The Definition and some examples, Open sets, Closed sets, Convergence, Completeness and Baire's theorem. [Sections 9 to 12 of chapter 2 of the Prescribed book]

### UNIT-II

**Topological spaces :** The Definition and some examples, Elementary concepts, Open bases and Open subbases. [Sections 16 to 18 of chapter 3 of the Prescribed book]

### UNIT-III

**Compactness:** Compact spaces, Products of spaces, Tychonoff's theorem and Locally Compact spaces, Compactness for Metric Spaces, Ascoli's theorem.

[Sections 21 to 25 of chapter 4 of the Prescribed book]

### UNIT-IV

**Separation:**  $T_1$  spaces and Hausdorff spaces, Completely regular spaces and normal spaces, Urysohn's Lemma and the Tietze extension theorem.

[Sections 26 to 28 of chapter 5 of the Prescribed book]

### UNIT-V

**Connectedness:** Connected spaces, The components of a space, Totally disconnected spaces. [sections 31 to 33 of chapter 6 of the Prescribed book]

### PRESCRIBED BOOK:

1. G.F. Simmons, "**Introduction to Topology and Modern Analysis**", Mc.Graw Hill Book Company, New York International student edition.

### REFERENCE BOOKS:

1. James R Munkers, "**Topology**", Second Edition, Pearson Education.
2. John L Kelly, "**General Topology**", Springer, 2005.

**Course has Focus on :** Foundation

- Websites of Interest:**
1. [www.nptel.ac.in](http://www.nptel.ac.in)
  2. [www.epgp.inflibnet.ac.in](http://www.epgp.inflibnet.ac.in)
  3. [www.ocw.mit.edu](http://www.ocw.mit.edu)

**P B SIDDHARTHA COLLEGE OF ARTS AND SCIENCE::VIJAYAWADA**  
(An Autonomous college in the jurisdiction of Krishna University)  
**M. Sc. Mathematics**  
**First Semester**  
**TOPOLOGY –22MA1T4**

**Time: 3 Hours**

**Max. Marks : 70**

**SECTION-A**

- Answer all questions** **(5X4=20)**
- 1 a) Define a Metric space and give an example. (CO1, L1)  
(OR)  
b) Define Convergent sequence and Cauchy sequence in a metric space. (CO1, L1)
- 2 a) Define Topological space and give an example. (CO2, L1)  
(OR)  
b) Show that  $\bar{A} = A \cup D(A)$ . (CO2, L1)
- 3 a) Define a Compact space and give an example. (CO3, L1)  
(OR)  
b) State Ascoli's theorem. (CO3, L1)
- 4 a) Define  $T_1$  space and Hausdorff space. (CO4, L1)  
(OR)  
b) Define a normal space and a completely regular space. (CO4, L1)
- 5 a) Define a connected space and totally disconnected space. (CO5, L2)  
(OR)  
b) Show that every discrete space is totally disconnected. (CO5, L2)

**SECTION-B**

- Answer all questions. All questions carry equal marks.** **(5X10=50)**
- 6 a) Let  $X$  be a metric space. Then prove that (i) Any finite intersection of open sets is open. (ii) Each open sphere is an open set. (CO1, L2)  
(OR)  
b) State and prove the Cantor's intersection theorem. (CO1, L2)
- 7 a) State and Prove Lindelof's theorem. (CO2, L2)  
(OR)  
b) Show that every separable metric space is second countable. (CO2, L2)

8 a) State and Prove Tychonoff's Theorem. (CO3, L2)

(OR)

b) Show that every sequentially compact metric space is compact. (CO3, L2)

9 a) State and prove Urysohn's lemma. (CO4, L3)

(OR)

b) Show that every compact Hausdorff space is normal. (CO4, L3)

10 a) Prove that the product of any non-empty class of connected spaces is connected.

(CO5, L2)

(OR)

b) Let  $X$  be a Hausdorff space. If  $X$  has an open base whose sets are also closed, then prove that  $X$  is totally disconnected. (CO5, L2)

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## P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

Siddhartha Nagar, Vijayawada – 520 010

Reaccredited at 'A+' level by NAAC

Autonomous & ISO 9001:2015 Certified

**Title of the Course: C PROGRAMMING**

**Semester : I**

Course Code	22MA1T5	Course Delivery Method	Blended Mode
Credits	4	CIA Marks	30
No. of Lecture Hours / Week	4	Semester End Exam Marks	70
Total Number of Lecture Hours	60	Total Marks	100
Year of Introduction : 2020-2021	Year of offering : 2022-2023	Year of Revision: 2022-23	Percentage of Revision :10%

**Course Objectives:** The aim of this course is to provide basic the concepts of C-language including flow charts, algorithms, pointers, functions, structures and simple applications.

**Course Outcomes:** After successful completion of this course, students will be able to

CO1: understand the basic concepts of C programming.(PO1)

CO2: implement the algorithms and draw flowcharts for solving mathematical problems.(PO3)

CO3:work with arrays and character strings of complex objects within the framework of functional model.(PO5)

CO4: write C programs with pointers and functions.(PO4)

CO5: create C programs for simple applications using Structures, Unions and understand file operations.(PO5)

### UNIT-I

Over view of C – Constants, variables and Data types - Operators and Expressions.

[Chapters 2, 3& 4 of the prescribed book]

### UNIT-II

Managing Input and output operations - Decision making and branching - Decision making and Looping.[Chapters 5, 6 & 7 of the prescribed book]

### UNIT-III

Arrays - Handling of character strings.[Chapters 8 & 9 of the prescribed book]

#### **UNIT-IV**

User defined functions – Pointers.

[Chapters 10&11 of the prescribed book]

#### **UNIT-V**

Structures and Unions - File management in C.

[Chapter 12 and 13 of the prescribed book]

#### **PRESCRIBED BOOK:**

1. E. Balaguruswamy, “**C Programming and Data Structures**” Second Edition, Tata McGraw- Hill Publishing Company.(Refer 4<sup>th</sup> edition also)

#### **REFERENCE BOOKS:**

1. E. Balaguruswamy, “**Computing Fundamentals and C Programming**”, McGrawHill, 2008.

2. D. Ravichandran, “**Programming in C**”, New Age International, 1998.

3. Ashok N. Karthane, “**C and Data Structures**”, Pearson Education.

**Course has Focus on :** Foundation

**Websites of Interest:**

1. [www.nptel.ac.in](http://www.nptel.ac.in)
2. [www.epgp.inflibnet.ac.in](http://www.epgp.inflibnet.ac.in)
3. [www.ocw.mit.edu](http://www.ocw.mit.edu)

**P B SIDDHARTHA COLLEGE OF ARTS AND SCIENCE::VIJAYAWADA**  
(An Autonomous college in the jurisdiction of Krishna University)  
**M. Sc. Mathematics**  
**First Semester**  
**C PROGRAMMING -22MA1T5**

**Time: 3 Hours**

**Max.Marks:70**

**SECTION -A**

**Answer all questions**

**(5x4=20)**

- 1 (a) Write history of C programming language. (CO1, L2)  
(OR)  
(b) Explain increment and decrement operators with examples. (CO1, L2)
- 2 (a) Explain increment and decrement operators with examples. (CO2, L2)  
(OR)  
(b) Explain differences between while and do while loops in C. (CO2, L2)
- 3 (a) Explain single dimensional arrays. (CO3, L2)  
(OR)  
(b) Explain any two string functions with examples. (CO3, L2)
- 4 (a) Explain user defined functions. (CO4, L2)  
(OR)  
(b) What is a pointer? Write two differences between pointers and Arrays. (CO4, L2)
- 5 (a) Explain Unions in C. (CO5, L2)  
(OR)  
(b) Write the uses of structures in C. (CO5, L2)

**SECTION – B**

**Answer all questions. All questions carry equal marks**

**(5X10=50)**

6. a) Explain structure of C program with example. (CO1, L2)  
(OR)  
b) Explain data types in C. (CO1, L2)
7. a) Write a program to check whether the given number is palindrome. (CO2, L3)  
(OR)  
b) Explain Simple if, if-else, nested if statements with example programs. (CO2, L3)

**(P.T.O.)**



8. a) Write a program in C for the addition of two matrices using arrays. (CO3, L3)

(OR)

b) Explain the following with example programs.

i)strupr      ii)strlen      iii)strrev (CO3, L3)

9. a) Write a program in C to find biggest of three numbers using function. (CO4, L3)

(OR)

b) Explain the terms (i) call by reference (ii) call by value with example programs.

(CO4, L3)

10. a) Write the differences between structures and unions. (CO5, L3)

(OR)

b) Explain how the file open and file close functions are handled in C.

(CO5, L3)

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## P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

Siddhartha Nagar, Vijayawada – 520 010

Reaccredited at 'A+' level by NAAC

Autonomous & ISO 9001:2015 Certified

**Title of the Course: C PROGRAMMING LAB**

**Semester : I**

Course Code	22MA1L1	Course Delivery Method	Blended Mode
Credits	3	CIA Marks	30
No. of Lecture Hours / Week	6	Semester End Exam Marks	70
Total Number of Lecture Hours	90	Total Marks	100
Year of Introduction : 2020-2021	Year of offering : 2022-2023	Year of Revision: 2022-23	Percentage of Revision :10%

**Course Objectives:** This course is designed to develop the programming skills of C-language through problem solving.

### LIST OF C – PROGRAMS :

1. To find factorial of a number.
2. To reverse a number.
3. To find GCD of two numbers using Euclidean algorithm.
4. To find Fibonacci numbers up to "N"
5. To find perfect numbers up to "N"
6. To find prime numbers up to "N"
7. To find sum of digits of a number.
8. To check a number palindrome or not.
9. To find the sum of squares of first ten natural numbers using function.
10. To find biggest of three numbers using function.
11. To find biggest element in an array.
12. To find the transpose of a Matrix.
13. To find the sum of the matrices.
14. To find the product of the matrices.
15. To find string length using user defined function.

**Board of Studies for the academic Year 2022-23 (I and III Semester)**  
**Department of Physics (PG)**

Minutes of the meeting was held on 09<sup>th</sup> NOVEMBER 2022 for PG Physics program in the ONLINE MODE

- Agenda:** To discuss and approve I and III SEM syllabus and model question papers in the Board of Studies meeting.
- List of Members in BOS**

1.	Dr. T. Srinivasa Reddy, HOD, Physics	Chairman
2.	Dr. P. B. Sandhya Sri	University Nominee
3.	Dr. R. P Vijaya Lakshmi	Subject Expert
4.	Dr. D. Haranath	Outside Subject Expert
5.	Sri N. Mallikarjuna	Industrialist
6.	Dr. T. Srikumar	Alumni
7.	Smt. M. Tasneem, Assistant Professor	Member
8.	Sri. S. Vijaya Krishna, Assistant Professor	Member

**M.Sc Physics 2022-23 (R22 Regulations)**  
**Course structure**

**I SEMESTER**

Course Code	Course Name	Teaching Hours/ week			CORE	Internal Marks	External Marks	No. of Credits
		L	P	T				
22PH1T1	Classical Mechanics	4	0	0	Core	30	70	4
22PH1T2	Mathematical Physics	4	0	0	Core	30	70	4
22PH1T3	Atomic and Molecular Physics	4	0	0	Core	30	70	4
22PH1T4	Electronics	4	0	0	Core	30	70	4
22PH101	Personality Development through Life Enlightenment Skills	3	1	0	Core	30	70	3
22PH1L1	General Physics – I	0	6	0	Core	30	70	3
22PH1L2	Electronics Lab	0	6	0	Core	30	70	3
<b>TOTAL FOR FIRST SEMESTER</b>						<b>210</b>	<b>490</b>	<b>25</b>

**II SEMESTER**

Course Code	Course Name	Teaching Hours/ week			CORE / DSE/SEC	Internal Marks	External Marks	No. of Credits
		L	P	T				
22PH2T1	Statistical Mechanics	4	0	0	Core	30	70	4
22PH2T2	Quantum Mechanics –I	4	0	0	Core	30	70	4
22PH2T3	Solid State Physics	4	0	0	Core	30	70	4
22PH201	Research Methodology & IPR	3	1	0	SEC	30	70	3

**DOMAIN SPECIFIC ELECTIVE COURSES (CHOOSE ANY ONE)**

22PHD21	Computational Methods and Programming - Matlab	4	0	0	DSE	30	70	4
22PHD22	Applied Spectroscopy	4	0	0	DSE	30	70	4
22PHD23	Photonics	4	0	0	DSE	30	70	4

**LAB PRACTICALS**

22PH2L1	General Physics – II	0	6	0	Core	30	70	3
22PH2L2	Computational Methods – Matlab	0	6	0	Core	30	70	3

**TOTAL FOR SECOND SEMESTER** **210** **490** **25**

At the end of 2<sup>nd</sup> semester, every student must undergo summer Internship/Apprenticeship/Project work/Industrial training/Research based Project work for Six weeks and must prepare a report concerned as per approved project guidelines, and submit the same to the University 14 days before the commencement of third semester end examinations.

### III SEMESTER

Course Code	Course Name	Teaching Hours/ week			CORE / ID/DS/ SE/OE/ MOOCS	Internal Marks	External Marks	No. of Credits
		L	P	T				
22PH3T1	Quantum Mechanics –II	4	0	0	Core	30	70	4
<b>DOMAIN SPECIFIC ELECTIVE COURSES (CHOOSE ANY THREE)</b>								
22PHD31	Electromagnetic Theory	4	0	0	DSE	30	70	4
22PHD32	Lasers and Non linear Optics	4	0	0	DSE	30	70	4
22PHD33	Condensed Matter Physics – I	4	0	0	DSE	30	70	4
22PHD34	Thin Film Physics and Technology	4	0	0	DSE	30	70	4
22PHD35	Microprocessors and Microcontrollers	4	0	0	DSE	30	70	4
22PHD36	Optical System Design	4	0	0	DSE	30	70	4
<b>LAB PRACTICALS</b>								
22PH3L1	Advanced Physics and Optics	0	6	0	Core	30	70	3
22PH3L2	Electronics IC – Version	0	6	0	Core	30	70	3
<b>OPEN ELECTIVE (INTERDISCIPLINARY/MULTIDISCIPLINARY) COURSES (CHOOSE ANY ONE)</b>								
22OE	Principles of Analytical Instruments	3	0	0	OEC	30	70	3
22OE	Introduction to nanomaterials	3	0	0	OEC	30	70	3
22OE	Physics in everyday life	3	0	0	OEC	30	70	3
<b>TOTAL FOR III SEMESTER</b>						<b>210</b>	<b>490</b>	<b>25</b>

### IV SEMESTER

Course Code	Course Name	Teaching Hours/ week			CORE/ID /DS/S/OE/ MOOCS	Internal Marks	External Marks	No. of Credits
		L	P	T				
22PH4T1	Nuclear and Particle Physics	4	0	0	Core	30	70	4
<b>DOMAIN SPECIFIC ELECTIVE COURSES (CHOOSE ANY THREE)</b>								
22PHD41	Analytical Techniques	4	0	0	DSE	30	70	4
22PHD42	Advances in Materials Science	4	0	0	DSE	30	70	4
22PHD43	Condensed Matter Physics – II	4	0	0	DSE	30	70	4
22PHD44	Atmospheric Physics	4	0	0	DSE	30	70	4
22PHD45	Quantum Field Theory	4	0	0	DSE	30	70	4
22PHD46	Optical Materials Production and Testing	4	0	0	DSE	30	70	4
<b>LAB PRACTICALS</b>								
22PH4L1	Condensed Matter Physics Lab	0	6	0	Core	30	70	3
<b>ENTREPRENEURIAL &amp; INNOVATION/IT SKILL RELATED TO DOMAIN SPECIFIC ELECTIVE COURSES (CHOOSE ANY ONE)</b>								
22PHS41	Optoelectronic devices	3	0	0	SEC	30	70	3
22PHS42	Introduction to fiber optics	3	0	0	SEC	30	70	3
22PHS43	Medical Physics	3	0	0	SEC	30	70	3
<b>* CHOOSE MOOCS FROM SWAYAM/NPTEL SOURCES</b>								
22PH4M1								4
<b>22PH4P1- PROJECT WORK EVALUATION AND VIVA-VOCE</b>							100	4
<b>TOTAL FOR IV SEMESTER</b>						<b>180</b>	<b>520</b>	<b>30</b>

**Note:** Students may be allowed to register and appear for MOOCS from the third semester itself. However, students are to complete the MOOCS successfully and submit pass certificate of the same to the University through the Principal of the College concerned for approval and endorsement of the same on grade cards and PCs and ODs as per the regulations of the University.

**L – Lecture, T- Tutorial & P – Practicals**

**List of courses to be introduced/revised in Semester –I (R 22 regulations)**

<b>DEPARTMENT OF PHYSICS</b>								
<b>LIST OF THE COURSES INTRODUCED/REVISED IN I SEMESTER -2022-23</b>								
<b>S. No</b>	<b>Course</b>	<b>COURSE CODE</b>	<b>Offered in SEM</b>	<b>Type of the paper</b>	<b>Year of introduction</b>	<b>Year of revision</b>	<b>OB E with BTL</b>	<b>Offered to</b>
1	Classical Mechanics	22PH1T1	I	Core	2020-21	NO REVISION	YES	M.SC (PHYSICS)
2	Mathematical Physics	22PH1T2	I	Core	2020-21	2022-23 (20%)	YES	M.SC (PHYSICS)
3	Atomic and Molecular Physics	22PH1T3	I	Core	2020-21	NO REVISION	YES	M.SC (PHYSICS)
4	Electronics	22PH1T4	I	Core	2021-22	NO REVISION	YES	M.SC (PHYSICS)
5	Personality development through Life Enlightenment Skills	22PH101	I	Core	2022-23	....	No	M.SC (PHYSICS)
6	General Physics - I	22PH1L1	I	Core Lab	2021-22	2022-23 (10%)	YES	M.SC (PHYSICS)
7	Electronics Lab	22PH1L2	I	Core Lab	2021-22	2022-23 (10%)	YES	M.SC (PHYSICS)

The following resolutions are made in board of studies meeting for PG Physics program of first and third semesters for the year 2022-23 to recommend to the Academic Council for its approval.

**RESOLUTIONS\RECOMENDATIONS**

1. It is resolved to adopt the course structure according to new regulations (R22) of Krishna University for the academic year 2022-23.
2. It is resolved and recommend revision of syllabus and model question paper of title “Classical Mechanics” with revised course code 22PH1T1 in I semester of M.Sc. (Physics) from the batch of students admitted in 2022-23 and onwards, in place of Classical Mechanics, course code 20PH1T1. For the syllabus and model question paper wide page no. from 9 to 10.
3. It is resolved and recommend revision of syllabus and model question paper of title “Mathematical Physics” with revised course code 22PH1T2 in I semester of M.Sc. (Physics) from the batch of students admitted in 2022-23 and onwards, in place of Mathematical Physics, course code 20PH1T1. For the syllabus and model question paper wide page no. from 12 to 13
4. It is resolved and recommend revision of syllabus and model question paper of title “Atomic and Molecular Physics ” with revised course code 22PH1T3 in I semester of M.Sc. (Physics) from the batch

of students admitted in 2022-23 and onwards, in place of Atomic and Molecular Physics, course code 20PH1T3. For the syllabus and model question paper wide page no. from 15 to 16

5. It is resolved and recommend revision of syllabus and model question paper of title “Electronics” with revised course code 22PH1T4 in I semester of M.Sc. (Physics) from the batch of students admitted in 2022-23 and onwards, in place of Electronics, course code 20PH1T3. For the syllabus and model question paper wide page no. from 18 to 19
6. It is resolved and recommended to introduce “Personality Development through Life Enlightenment Skills” with course code 22PG101 for the I semester of M.Sc. (Physics). For the syllabus question paper wide page no. from 21 to 24
7. It is resolved and recommend revision of “General Physics - I” lab with revised course code 22PH1L1 in I semester of M.Sc. (Physics) from the batch of students admitted in 2022-23 and onwards, in place of General Physics - I, course code 20PH1L1. For the syllabus paper wide page no. 26
8. It is resolved and recommend revision of “Electronics” lab with revised course code 22PH1L2 in I semester of M.Sc. (Physics) from the batch of students admitted in 2022-23 and onwards, in place of Electronics Lab, course code 20PH1L1. For the syllabus paper wide page no. 27
9. It is resolved and recommended to continue the course structure, syllabus and model papers for III semester of M.Sc. Physics according to R 20 regulations with course codes 20PH3T1, 20PH3T2, 20PH3T3, 20PH3T4, 20PH3L1, 20PH3L1, 20OE08.



**P.B SIDDHARTHA COLLEGE OF ARTS & SCIENCE  
VIJAYAWADA**

***Under Choice Based Credit System***

Board of studies of

**M.Sc., PHYSICS**

***Semester - I***

(With effect from 2022-23)

## **M.Sc. Physics**

**(With effect from 2022-23 admitted batch)**

**Name of the Department: PHYSICS**

**Name of the Programme: Master of Science., Physics**

The M.Sc. (Physics) course shall be of two years' duration, extended over four semesters and grading system is followed in line with national policies and international practices. The candidate shall be allowed a maximum of four years (8 semesters) of duration to be eligible for the award of M.Sc. (Physics) degree, failing which he / she shall have to register once again as a fresh candidate.

### **PROGRAMME OUTCOMES (POs)**

On successful completion of the M.Sc Physics programme the student will be able to:

PO1	Understand of the basic concepts of physics systematically
PO2	Apply physical principles and concepts to solve wide range of practical problems.
PO3	Plan and execute physics related investigations to analyze and evaluate the information using suitable methods.
PO4	Able to execute theoretical and experimental project work
PO5	Excel in research related to Physics and Material Characterization
PO6	Develop the ability to work independently and also in a group
PO7	Engage in life long learning and adapt to changing professional and societal needs



## M. Sc PHYSICS

*(With effect from 2022-23 admitted batch)*

### Course Summary:

#### Semester – I

Course Code	Course Name	Teaching Hours/ week			CORE	Internal Marks	External Marks	No. of Credits
		L	P	T				
22PH1T1	Classical Mechanics	4	0	0	Core	30	70	4
22PH1T2	Mathematical Physics	4	0	0	Core	30	70	4
22PH1T3	Atomic and Molecular Physics	4	0	0	Core	30	70	4
22PH1T4	Electronics	4	0	0	Core	30	70	4
22PH101	Personality Development through Life Enlightenment Skills	3	1	0	Core	30	70	3
22PH1L1	General Physics – I	0	6	0	Core	30	70	3
22PH1L2	Electronics Lab	0	6	0	Core	30	70	3
<b>TOTAL FOR FIRST SEMESTER</b>						<b>210</b>	<b>490</b>	<b>25</b>

L - Lecture, T- Tutorial & P – Practicals



## P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

Siddhartha Nagar, Vijayawada – 520 010

*Autonomous -ISO 9001 - 2015 Certified*

### CLASSICAL MECHANICS

**Offered to :** M.Sc.(PHYSICS)

**Course Code:** 22PH1T1

**Course Type :** Core

**Course:** CLASSICAL MECHANICS

**Year of Introduction :** 2004

**Year of offering :** 2022

**Year of Revision :** 2022

**Percentage of Revision :** Nil

**Semester :** I

**Credits :** 4

**Hours Taught :** 60 hrs. per Semester

**Max.Time :** 3 Hours

**Course Description :** Classical mechanics (22PH1T1) is introduced for describing the motion of macroscopic objects as well as astronomical objects under the influence of a system of forces. It is concerned with the set of physical laws describing the motions of bodies mathematically and is highly essential for the enhancing the logical and analytical thinking of the students. For objects governed by classical mechanics, if the present state is known, it is possible to predict how it will move in the future as well as how it has moved in the past. The classical mechanics was based the foundational works of Sir Isaac Newton, and the mathematical methods by Leibniz, Lagrange, Leonhard Euler, etc., in the 17th century. Later, more abstract methods were developed, leading to the reformulations of classical mechanics known as Lagrangian mechanics and Hamiltonian mechanics. They are used in all areas of modern physics.

#### **Course Objectives:**

1. To understand the Lagrangian equations for simple classical systems
2. To learn the concept of Hamiltonian mechanics for classical systems
3. To learn the Hamilton-Jacobi formalism of simple classical systems.
4. To understand the canonical transformations and poisson bracket relations
5. To impart the methods of solving rigid body dynamics

**Course Outcomes:** At the end of this course, students should be able to:

CO1: Understand the concepts of Lagrangian formulation and can describe the motion of mechanical systems using Lagrangian formulation.

CO2: Apply the Hamilton formalism to solve problems.

CO3: Apply the concepts of canonical transformations and poisson brackets formulation on physical systems

CO4: Understand the formulation of Hamilton-Jacobi equation.

CO5: Apply knowledge the concept of rigid body dynamics and rotating frames on different systems.

<b>Syllabus</b>		
<b>Unit</b>	<b>Learning Units</b>	<b>Lecture Hours</b>
I	<b>Newtonian Mechanics and Lagrangian mechanics</b> Newton's laws, Mechanics of a particle: Conservation laws, Mechanics of a system of particles: Conservation laws, Constraints, D'Alembert's principle and Lagrange's equations, Velocity Dependent potentials and the Dissipation function, L-C Circuit, Lagrangian for a Charged Particle Moving in an Electromagnetic field. (CO1)	12
II	<b>Variational principles</b> Hamilton's principle, Deduction of Hamilton's equations from modified Hamilton principle, Derivation of Lagrange's equations from variational Hamilton's principle, Simple applications of the Hamilton principle Formulation-Simple pendulum, Principle of Least Action. (CO2)	12
III	<b>Canonical transformations</b> Legendre transformations, Equations of canonical transformation, Examples of Canonical transformations, The harmonic Oscillator, Poisson brackets and other Canonical invariants, Equations of motion, Infinitesimal canonical transformations, and conservation theorems in the Poisson bracket formulation, the angular momentum Poisson bracket relations. (CO3)	12
IV	<b>Hamilton – Jacobi Method</b> Hamilton – Jacobi equation of Hamilton's principal function, The Harmonic oscillator problem as an example of the Hamilton – Jacobi Method, Hamilton –Jacobi equation for Hamilton's characteristic function, Action – angle variables in systems of one degree of freedom. (CO4)	12
V	<b>Dynamics of a rigid body</b> Independent coordinates of rigid body, The Euler angles, infinitesimal rotations as vectors (angular velocity), components of angular velocity, angular momentum and inertia tensor, principal moments of inertia, rotational kinetic energy of a rigid body, Symmetric bodies, Euler's equations of motion for a rigid body, Torque-free motion of a rigid body. (CO5)	12

**Reference Books:**

1. Classical Mechanics, H.GOLDSTEIN (Addison Wesley) 2005.
2. Classical Mechanics, J. C.UPADHYAYA (Himalaya Publishing House) 2010.
3. Classical Mechanics, Gupta, Kumar and Sharma, Pragati Prakashan, 2001
4. Classical Mechanics, G. Aruldass, PHI Learning Private Ltd, 2009

**Course Delivery method :** Face-to-face / Blended

**Course has focus on :** Employability

**Websites of Interest :** <https://nlist.inflibnet.ac.in/vsearch.php>

**Co-curricular Activities** Quiz.

**P.B. Siddhartha College of Arts & Science, Vijayawada - 520 010.**  
**(An Autonomous College in the jurisdiction of Krishna University)**  
**M.Sc., (PHYSICS) Programme – I Semester**  
**Course Code: 20PH1T1 Title: CLASSICAL MECHANICS**  
**(w.e.f admitted batch 2022-23)**

**Time: 3 Hours**

**Max. Marks: 70**

**SECTION-A**

Q.NO	Answer All Questions		5x4=20M
1.	(A) Explain the concept of generalized co-ordinates (Or) (B) Explain Newton's laws of motions with examples	(CO1)	L2
2.	(A) Discuss about Hamiltonian function (H) (Or) (B) Explain variational principle	(CO2)	L2
3.	(A) What are Legendre transformations? (Or) (B) Define Poisson Bracket.	(CO3)	L1
4.	(A) What is Hamilton's principle function? (Or) (B) What are action-angle variables?	(CO4)	L1
5.	(A) Define inertia tensor with examples (Or) (B) What are space coordinate systems?	(CO5)	L1

**SECTION-B**

**Answer All Questions**

**5x10=50M**

- |     |  |       |    |
|-----|--|-------|----|
| 6.  | What are constraints? Classify them with suitable examples.<br>(Or)<br>State D'Alembert's principle and simply Lagrange's equation of motion from it.                      | (CO1) | L2 |
| 7.  | A) State and explain the Hamilton's principle.<br>(Or)<br>B) Demonstrate Hamilton's equations from modified Hamilton's principle.  | (CO2) | L2 |
| 8.  | A) Apply canonical transformations to the harmonic oscillator problem.<br>(Or)<br>B) Solve the that Poisson's brackets and their properties from canonical transformations | (CO3) | L3 |
| 9.  | A) Explain the harmonic oscillator problem using Hamilton-Jacobi method.<br>(Or)<br>B) Explain the significance of Hamilton's characteristic function.                     | (CO4) | L2 |
| 10. | A) Explain Euler's angles and obtain transformation matrix.<br>(Or)<br>B) Explain the rotational kinetic energy of a rigid body.   | (CO5) | L2 |

**Note: Question paper contains 5 short answers with internal choice from each unit and 5 long answer questions with internal choice from each unit.**



# P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

Siddhartha Nagar, Vijayawada – 520 010

*Autonomous -ISO 9001 - 2015 Certified*

## MATHEMATICAL PHYSICS

**Offered to :** M.Sc.(PHYSICS)

**Course Code:** 22PH1T2

**Course Type :** Core

**Course:** MATHEMATICAL PHYSICS

**Year of Introduction :** 2020-21

**Year of offering :** 2022-23

**Year of Revision :** 2022

**Percentage of Revision :** 20%

**Semester :** I

**Credits :** 4

**Hours Taught :** 60 hrs. per Semester

**Max.Time :** 3 Hours

**Course Description :** Mathematical Physics (22PH1T2) course is introduced to give emphasis on Special Functions, Laplace and Fourier Transforms and complex variables as they have wide applications in solving the various problems of physics, electrical engineering, optics, and signal processing. The mathematical methods are developed for solving the problems in physics as well as formulation of physical theories and to inculcate the mathematical vigor/rigor in the students.

### Course Objectives:

1. To learn the special type of differential equations with their properties and their solutions.
2. To learn the fundamentals and applications of Laplace transformation
3. To understand the fundamentals and applications of Fourier transformation.
4. To understand the basic properties of complex functions and related theorem.
5. To learn the fundamentals and applications of Tensor analysis.

**Course Outcomes :** At the end of this course, students should be able to:

CO1: Understand the basic concepts of special functions and apply these functions to solve the solution of problems

CO2: Apply the concept of different transforms and applications in different fields.

CO3: Apply the concepts of Fourier series and its applications

CO4: Understand the basic concepts of complex analysis and evaluation of the contour integrals.

CO5: Understand the concept of tensor analysis.

<b>Syllabus</b>		
<b>Unit</b>	<b>Learning Units</b>	<b>Lecture Hours</b>
I	<b>Special Functions</b> Beta and Gamma Functions – Definitions and properties – Evaluation of integrals- Legendre, Bessel, Hermite and Laguerre differential equations – Solutions - Generating functions, Orthogonal properties of Legendre, Bessel and Hermite Functions (Qualitatively) –Recurrence relations. (CO1)	12
II	<b>Laplace Transforms</b> Definition and notation, Properties of Laplace transforms – First and Second shifting theorems - Change of scale property - Laplace transform of derivatives - Laplace transform of integral, Laplace transforms of Dirac delta function and Laplace transform of periodic functions (Square wave, saw tooth wave). Inverse Laplace transforms: Definition, Null function, Properties, Solution of linear differential equations with constant coefficients. (CO2)	12
III	<b>Fourier Transforms</b> Fourier series: Evaluation of Fourier coefficients, Half range series, Uses of Fourier series. Fourier Transforms: Infinite Fourier transforms - Fourier sine and cosine transforms, Relationship between Fourier transform and Laplace transform, Properties of Fourier transform and Problems. Finite Fourier Transform - Fourier sine and cosine transforms, Fourier integral theorem. (CO3)	12
IV	<b>Complex Variables</b> Complex numbers and their algebra, Variables and Functions – Complex differentiation - Analytic function - Cauchy – Reimann equations –Derivatives of elementary functions – Singular points and classification. Complex integration - Cauchy’s integral theorem – Cauchy’s integral formula – Taylor’s and Laurent’s theorem – Residues - calculations of Residues - Residue theorem – evaluation of definite integrals.(CO4)	12
V	<b>Tensor Analysis</b> Definition – Occurrence of tensors in physics – Notation and conventions - Contra variant vector - Covariant vector – Tensors of second rank (mixed tensors).The algebra of tensors: Equality and null tensor - Addition and subtraction of tensors - Outer product of tensors - Inner product of tensors – Contraction of a tensor - Symmetric and anti-symmetric tensors - Quotient law – Fundamental tensor. (CO5)	12

**Reference Books:**

1. Special Functions, J.N. Sharma & R.K. Gupta (Krishna Prakashan Media (P) Ltd.)
2. Laplace and Fourier Transforms, J.K. GOYAL and K.P. GUPTA (Pragati Prakashan, Meerut).
3. Mathematical Physics, B.D. GUPTA (Vikas Pub.House).
4. Complex Variables, MURRAY R. SPIEGEL (Schaum’sOutlines).
5. Matrices and Tensors in Physics, A.W. JOSHI (Wiley Eastern Ltd.).
6. GERD KEISER Optical Fiber Communications, TataMcGraw-HillBook, 2000

**Course Delivery method :** Face-to-face / Blended

**Course has focus on :** Employability

**Websites of Interest :** <https://nlist.inflibnet.ac.in/vsearch.php>

**Co-curricular Activities :** Quiz.

**P.B. Siddhartha College of Arts & Science, Vijayawada - 520 010.**  
**(An Autonomous College in the jurisdiction of Krishna University)**  
**M.Sc., (PHYSICS) Programme – I Semester**  
**Course Code: 22PH1T2 Title: MATHEMATICAL PHYSICS**  
**(w.e.f admitted batch 2022-23)**

**Time: 3 Hours**

**Max. Marks: 70**

**SECTION-A**

Q.No	Answer All Questions	5x4=20M
1.	(a) Define Beta and Gamma functions. Or (b) Define orthogonal property of Hermite differential equations.	(CO1) L1
2.	(a) Define Laplace Transform. Or (b) show that $L\{1\} = \frac{1}{s}$	(CO2) L1
3.	(a) Define periodic functions. Or (b) Define Fourier Transform.	(CO3) L1
4.	(a) Define analytic function. Or (b) Discuss about singular points.	(CO4) L1
5.	(a) Define Tensor. Or (b) Define dummy suffix notation of Tensors.	(CO5) L1

**SECTION-B**

Q.No	Answer All Questions	5x10=50M
6.	(a) Obtain the series solution of Legendre differential equations (Or) (b) Discuss the series solution of Hermite differential equations	(CO1) L1
7.	(a) Explain first and second shifting theorem of Laplace Transform. (Or) (b) Discuss the solution of linear differential equations with constant coefficients	(CO2) L1
8.	(a) Explain the properties of Fourier Transforms. (Or) (b) Find the Fourier Transform of impulse function.	(CO3) L2
9.	(a) State and prove Cauchys-Reimann equation (Or) (b) State and explain Cauchy's residue theorem.	(CO4) L2
10.	(a) Explain about contravarian and covariant with examples. (Or) (b) Explain Tensor theory of thermal expansion.	(CO5) L2

**Note: Question paper contains 5 short answers with internal choice from each unit and 5 long answer questions with internal choice from each unit.**



## P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

Siddhartha Nagar, Vijayawada – 520 010

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### ATOMIC AND MOLECULAR PHYSICS

**Offered to :** M.Sc.(PHYSICS)

**Course Code:** 22PH1T3

**Course Type :** Core

**Course:** ATOMIC AND MOLECULAR PHYSICS

**Year of Introduction :** 2004

**Year of offering :** 2022

**Year of Revision :** 2022

**Percentage of Revision :** Nil

**Semester :** I

**Credits :** 4

**Hours Taught :** 60 hrs. per Semester

**Max.Time :** 3 Hours

**Course Description :** Atomic and Molecular Physics (22PH1T3) course deals the interaction between matter and electromagnetic radiation. It covers rotational, vibrational and electronic transitions responsible for atomic and molecular spectra. The atomic absorption and emission spectroscopic techniques are introduced for their wide applications in research and development, technology and medicine. A crucial component of this course is to understand, the behaviour of the electrons that surround the atomic nucleus, the way atoms and molecules interact with their environment.

#### Course Objectives:

1. To learn principles, instrumentation and applications of atomic absorption spectroscopy
2. To learn principles, instrumentation and applications of atomic emission spectroscopy
3. To understand the rotational motion of diatomic molecules and role of dipole moment in molecular spectroscopy
4. To learn the vibration rotation spectra of diatomic molecules
5. To learn the electronic spectroscopy of diatomic molecules

#### Course Outcomes:

At the end of this course the students should be able to:

CO1: Understand the principle and applications of atomic absorption, emission spectrometer.

CO2: Apply the techniques of the atomic emission spectroscopy and flame photometry to the materials.

CO3: Apply the concept of rotational spectra to find the bond lengths of different molecules.

CO4: Understand the concept of vibrational spectra of different molecules.

CO5: Understand the electronic spectra of diatomic molecules.



<b>Syllabus</b>		
<b>Unit</b>	<b>Learning Units</b>	<b>Lecture Hours</b>
I	<b>Atomic Absorption Spectroscopy</b> Introduction – Principle – Differences between Atomic Absorption Spectroscopy and Flame Emission Spectroscopy– Advantages of Atomic Absorption Spectroscopy over Flame Emission Spectroscopy–Disadvantages of Atomic Absorption Spectroscopy– Instrumentation– Single and Double beam Atomic Absorption Spectroscopy—Applications of Atomic Absorption Spectroscopy. (CO1)	12
II	<b>Atomic Emission Spectroscopy and Flame Photometry</b> Introduction – Theory of Emission Spectroscopy –Instrumentation –Spectrographs – Applications of Emission Spectroscopy– Advantages and Disadvantages of Emission Spectroscopy– principle and instrumentation of Inductively coupled plasma - atomic emission spectroscopy (ICP-AES) Principle and Instrumentation of Flame Photometry –Applications of Flame Photometry (CO2)	12
III	<b>Rotational Spectroscopy</b> Introduction – Classification of molecules – Rotational spectra of a diatomic molecule – rigid rotator – Isotopic effect in Rotational spectra–Intensity of rotational lines– non-rigid rotor – linear polyatomic molecules – Symmetric top molecules. Moment of Inertia and bond lengths of linear tri-atomic molecule– Microwave spectrometer. Applications of Rotational Spectroscopy - Microwave Oven. (CO3)	12
IV	<b>Vibrational Spectroscopy</b> Introduction – Diatomic molecule as simple harmonic oscillator – Anharmonic oscillator – vibrating rotator - Energy levels and spectrum, Effect of isotopic substitution on vibrational bands, Sample handling techniques– FTIR spectroscopy – Principle – FTIR Spectrometer - Applications of vibrational spectroscopy (CO4)	12
V	<b>Electronic Spectroscopy of Diatomic Molecules</b> Introduction– Vibrational coarse structure– Vibrational analysis of band systems: Deslandres table – Progressions and sequences information derived from vibrational analysis – Morse potential energy curve – Frank-Condon principle – Rotational fine structure of electronic vibranic spectra- Fortrat Parabolae – Dissociation – Predissociation. (CO5)	12

**Text and Reference Books:**

1. Atomic and Molecular Spectroscopy, Gurdeep Chatwal, Sharma Anand, Himalaya Publishing House
2. Molecular Structure and Spectroscopy, G. Aruldas, Prentice- Hall of India, Pvt, New Delhi, (2014).
3. Fundamentals of Molecular Spectroscopy, C.N. BANWELL and E.M. McCASH (Tata McGraw-Hill - 2013).
4. Modern Spectroscopy, J.M. HOLLAS (John Wiley & Sons).
5. Molecular Spectroscopy, J.M. Brown, Oxford Science Publications, Oxford. (1998).

**Course Delivery method :** Face-to-face / Blended

**Course has focus on :** Employability

**Websites of Interest :** <https://nlist.inflibnet.ac.in/vsearch.php>

**Co-curricular Activities :** Quiz.

**P.B. Siddhartha College of Arts & Science, Vijayawada - 520 010.**  
**(An Autonomous College in the jurisdiction of Krishna University)**  
**M.Sc., (PHYSICS) Programme – I Semester**  
**Course Code: 22PH1T3 Title: ATOMIC AND MOLECULAR PHYSICS**  
**(w.e.f admitted batch 2022-23)**

**Time: 3 Hours**

**Max. Marks: 70**

**SECTION-A**

**Answer all questions**

**5x4=20 M**

1. (A) What are the difference between atomic absorption spectroscopy and flame emission spectroscopy?  
(Or) CO1, L1  
(B) What are applications of atomic absorption spectroscopy?
2. (A) What are the applications of emission spectroscopy? CO2, L1  
(Or)  
(B) What are the applications of photometry?
3. (A) What are the conditions for pure rotational spectrum of a diatomic molecule?  
(Or)  
(B) What are the features of pure rotational spectrum? CO3, L1
4. (A) What change does the interaction between vibration and rotation cause in the spectrum of a diatomic molecule?  
(Or) CO4, L1  
(B) What are applications of vibrational spectroscopy?
5. (A) Explain Morse potential energy curve. CO5, L1  
(Or)  
(B) What are Fortrat parabolae?

**SECTION-B**

**Answer all questions**

**5x10=50M**

6. (A) Explain the principle of atomic absorption spectroscopy. CO1,L2  
(Or)  
(B) With a neat schematic diagram explain the construction and working of atomic absorption spectrometer
7. A) Explain the theory of emission spectroscopy with neat diagram. CO2, L2  
(Or)  
B) Explain the principle of flame photometry and discuss the instrumentation of flame photometry with neat diagram
8. A )Explain the rotational spectrum of a diatomic molecule treating it as a rigid rotator. CO3,L2  
(Or)  
B) With the help of neat block diagram explain the set up and working of microwave spectrometer.
9. A) Explain the vibrational spectrum of a diatomic molecule treating it as harmonic oscillator and explain isotopic effect in vibration bands.  
(Or)  
B) Explain the set up and working of FTIR spectrometer with a neat block diagram. CO4, L2
10. A) Explain deslandres table for the band spectrum of a diatomic molecule. CO5, L2  
(Or)  
B) Explain the fine structure of electronic vibrational transitions

**Note: Question paper contains 5 short answers with internal choice from each unit and 5 long answer questions with internal choice from each unit.**



# P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

Siddhartha Nagar, Vijayawada – 520 010

*Autonomous -ISO 9001 - 2015 Certified*

## ELECTRONICS

**Offered to :** M.Sc.(PHYSICS)

**Course Type :** Core(TH)

**Year of Introduction :** 2004

**Year of Revision :** 2022

**Semester :** I

**Hours Taught :** 60 hrs. per Semester

**Course Code:** 22PH1T4

**Course:** Electronics

**Year of offering :** 2022

**Percentage of Revision :** Nil

**Credits :** 4

**Max.Time :** 3 Hours

**Course Description :** Electronics (22PH1T4) is designed to help the students in enhance the expertise in designing of electronic circuits & integrated circuits and operation of electronic systems. This course comprises subjects like Operational Amplifiers, Communication Electronics, Digital Electronics and Microprocessor. This course deals with control of electron flow by amplification and rectification, which has influenced highly the modern society. Practical applications started with the invention of the diode and the triode in the early 1900s, which made the detection of small electrical voltages. They were responsible for the electronics revolution of the first half of the twentieth century. They enabled the construction of equipment that used current amplification and rectification to give us radio, television, radar, long-distance telephony, broadcasting and communications, the music recording industry and many more..

### Course Objectives:

1. To know the basic concepts of operational amplifier.
2. To understand the practical op-Amp circuits.
3. To understand the importance of communication electronics.
4. To learn the digital electronic circuits.
5. To learn the working of 8085 microprocessor.

**Course Outcomes :** At the end of this course, students should be able to:

- CO1: Understand the concepts of differential amplifier.
- CO2: Analyze the practical applications of Op-Am
- CO3: Understand the process in communication electronics.
- CO4: Understand the fundamentals of digital electronics.
- CO5: Analyze the architecture of 8085 micro processor.

<b>Syllabus</b>		
<b>Unit</b>	<b>Learning Units</b>	<b>Lecture Hours</b>
I	<p><b>Operational Amplifiers</b></p> <p>Differential Amplifier – circuit configurations – DC analysis – Ac analysis, inverting and non-inverting inputs, CMRR, Block diagram of a typical Op-Amp-analysis. Op -Amp Architecture, Open loop configuration inverting and non-inverting amplifiers. Op-amp with negative feedback- voltage series feedback – effect of feedback on closed loop gain, input resistance, output resistance,- voltage follower. (CO1)</p>	12
II	<p><b>Practical Op-amps</b></p> <p>Input offset voltage- input bias current-input offset current, total output offset voltage, CMRR frequency response. Summing amplifier, Scaling and Averaging amplifiers, integrator and differentiator. Oscillators principles – oscillator types –The phase shift oscillator, Wein bridge oscillator, LC tunable oscillators – Multivibrators- Monostable and astable –comparators – square wave and triangular wave generators- Voltage regulators. (CO2)</p>	12
III	<p><b>Communication Electronics</b></p> <p>Introduction to communication system–Need for modulation – Amplitude modulation– Generation of AM waves – Demodulation of AM waves – DSBSC modulation. Generation of DSBSC waves. Coherent detection of DSBSC waves, SSB modulation, Generation and detection of SSB waves. Vestigial side band modulation, Frequency Division Multiplexing (FDM). (CO3)</p>	12
IV	<p><b>Digital Electronics</b></p> <p>Combinational Logic gates- Decoder- encoders- Multiplexer (data selectors)-application of multiplexer - De multiplexer (data distributors), Sequential Logic gates- Flip-Flops; the R-S Flip – Flop, JK Flip-Flop –JK master slave Flip-Flops – T- Flip – Flop – D Flip – Flop , Registers; Buffer registers- Shift registers – synchronous and asynchronous counters, application of counter.(CO4)</p>	12
V	<p><b>Microprocessors</b></p> <p>Introduction to microcomputers – Input /Output devices – ALU, Timing and Control Unit – registers memory — Pin configuration Description- Architecture and its operations – Address and Data Busses – generating control signals – instruction set – addressing modes - assembly language Programs –looping, counting and indexing – counters and timing delays – stack and subroutine. (CO5)</p>	12

**Text and Reference Books:**

1. Op-Amps & Linear integrated circuits, RAMAKANTH A.GAYAKWAD (PHI).
2. Electronic Communication Systems, George Kennedy (PHI)
3. Semiconductor Electronics, A.K.SHARMA (New Age International Publishers).
4. Fundamentals of Digital Circuits, A. ANANDA KUMAR, (PHI).
5. Digital principles and applications, MALVINO AND LEECH (TMH).

**Course Delivery method :** Face-to-face / Blended

**Course has focus on :** Employability

**Websites of Interest :** <https://nlist.inflibnet.ac.in/vsearch.php>

**Co-curricular Activities :** Quiz

**P.B. Siddhartha College of Arts & Science, Vijayawada - 520 010.**  
**(An Autonomous College in the jurisdiction of Krishna University)**  
**M.Sc., (PHYSICS) Programme – I Semester**  
**Course Code: 22PH1T4 Title: ELECTRONICS**  
**(w.e.f admitted batch 2022-23)**

**Time: 3 Hours**

**Max. Marks: 70**

**SECTION-A**

**Answer All Questions**

**5x4=20M**

- 1 (A) Explain the construction of differential amplifier CO1 L1  
(Or)  
(B) What are applications of differential amplifier ?
- 2 (A) Discuss the typical Op-Amp block diagram CO2 L1  
(Or)  
(B) What are the applications of operational amplifier ?
- 3 (A) Explain modulation and de modulation with examples CO3 L2  
(Or)  
(B) Discuss frequency division multiplexing
- 4 (A) Explain the construction and working of D and T- flip flops CO4 L2  
(Or)  
(B) What are the application for shift registers
- 5 (A) Explain stack and sub routine. CO5 L2  
(Or)  
(B) What are the addressing modes of 8085 MP?
- SECTION - B**
6. (A) Discuss the AC analysis of differential amplifier CO1 L2  
(Or)  
(B) With the help of neat circuit diagram explain the working of voltage-series feedback amplifier and derive expression for closed loop voltage gain
7. (A) Discuss the construction and working of Integrator CO2 L2  
(Or)  
(B) Explain the construction and working of RC-phase shift oscillator
- 8 (A) Write a note on generation and detection of AM waves CO3 L2  
(Or)  
(B) What are the different methods to produce SSB waves? Explain.
- 9 (A) Explain the construction and working of JK flip flop CO4 L2  
(Or)  
(B) Discuss the construction and working of synchronous counters.
- 10 (A) Discuss the architecture of 8085 micro processor CO5 L2  
(Or)  
(B) Explain the instruction set and addressing modes of 8085

**Note: Question paper contains 5 short answers with internal choice from each unit and 5 long answer questions with internal choice from each unit.**



## P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

Siddhartha Nagar, Vijayawada – 520 010

*Autonomous -ISO 9001 - 2015 Certified*

### Personality Development through Life Enlightenment Skills

**Offered to :** M.Sc.(PHYSICS)

**Course Type :** Core(TH)

**Course Code:** 22PG101

**Course:** Personality Development through Life Enlightenment Skills

**Year of Introduction :** 2004

**Year of Revision :** 2022

**Semester :** I

**Hours Taught :** 60 hrs. per Semester

**Year of offering :** 2022

**Percentage of Revision :** 100%

**Credits :** 3

**Max.Time :** 3 Hours

**Course Prerequisites (if any) :**

**Course Description :** Personality development is the development of your behavior patterns and attitude. It is the result of where we are born, the circle we interact with and our personal temperament. Every person is different. There are some characteristics traits that make you „you“. Personality development through life enlightenment course aims to help students identify negative behaviors which may be stopping them from reaching their desired goals. This course will help students both in their personal and desired professional life. The other purposes of personality development through life enlightenment course are to enable you lead stress-free and healthier life, ethical decision making ability, enhanced confidence level, and building a more pleasing personality.

**Course Objectives:**

1. To learn for achieve the highest goal happily.
2. To become a person with stable mind, pleasing personality and determination.
3. To learn build positive attitude, self-motivation, enhancing self-esteem and emotional intelligence
4. To learn develop coping mechanism to manage stress through Yoga and meditation techniques
5. To awaken wisdom among them.

**Course Outcomes :** At the end of this course, students should be able to:

CO1: Understand their personality and achieve their highest goals of life.

CO2: Understand the nation and mankind to peace and prosperity

CO3: Understand a versatile personality

CO4: Understand emotional self regulation.

CO5: Understand a positive approach to work and duties

<b>Syllabus</b>		
<b>Unit</b>	<b>Learning Units</b>	<b>Lecture Hours</b>
I	<p><b>Introduction to Personality Development</b>            The concept of personality - Dimensions of Personality – Theories of Personality development (Freud &amp; Erickson) – The concept of Success and Failure – Factors responsible for Success –Hurdles in achieving Success and Overcoming Hurdles — Causes of failure – Conducting SWOT (Strengths, Weaknesses, Opportunities and Threats) analysis. ( CO1)</p>	12
II	<p><b>Attitude, Motivation and Self-esteem</b>            Conceptual overview of Attitude – Types of Attitudes – Attitude Formation – Advantages/ Disadvantages of Positive/Negative Attitude - Ways to Develop Positive Attitude.  <b>Concept of motivation:</b> Definition and Nature of Motivation/Motive – Internal and external motives –Theories of Motivation – Importance of self- motivation- Factors leading to de-motivation.<b>Self-esteem</b> - Definition and Nature of self-esteem – Do's and Don'ts to develop positive self- esteem –Low self esteem - Personality having low self esteem - Positive and negative self esteem.(CO2)</p>	12
III	<p><b>Other Aspects of Personality Development</b>            Body language - Problem-solving - Conflict Management and Negotiation skills - Decision-making skills - Leadership and qualities of a successful leader – Character building - Team-work – Time management - Work ethics – Good manners and etiquette – Emotional Ability/Intelligence – Dimensions of Emotional Intelligence – Building Emotional Intelligence.</p>	12
IV	<p><b>Neetisatakam-Holistic Development of Personality</b>            Verses- 19,20,21,22 (wisdom) – Verses- 29,31,32 (pride and heroism) – Verses- 26,28,63,65(virtue)  <b>Personality of Role Model – Shrimad Bhagwadgeeta</b>            Chapter2-Verses 17, Chapter 3-Verses 36,37,42 – Chapter 4-Verses 18, 38,39            Chapter18 –            Verses 37,38,63 (CO4)</p>	12
V	<p><b>Yoga &amp; Stress Management</b>            Meaning and definition of Yoga - Historical Perspective of Yoga - Principles of Astanga Yoga by Patanjali – Meaning and Definition of Stress - Types of Stress - Eustress and Distress –Stress Management – Pranayama- Pranayama: Anulom and Vilom Pranayama - Nadishudhi Pranayama– Kapalabhati-Pranayama - Bhramari Pranayama - Nadasandhana Pranayama – Meditation techniques: Om Meditation - Cyclic meditation : Instant Relaxation technique (QRT), Quick Relaxation Technique (QRT), Deep Relaxation Technique (DRT) (Theory &amp; Practical). ( CO5)</p>	12

## PRACTICAL COMPONENTS:

1. Students should identify different types of personality to know their own personality. Students are to describe the characteristics of their personalities and submit the same for assessment.
2. Students are to form in groups (a group consists of 4-6 students) to identify and write a brief note on famous personalities of India and World.
3. Students are required to identify different types of attitudes and give any five examples of each.
4. Students are expected to check their attitudes and develop ways to improve their attitudes at work place and home.
5. Students are required to identify keys to self-motivation to achieve their goals.
6. Students are expected to identify at least seven types of body language and conduct activities with the following:

S. No.	Pose	Possible Interpretations
1	Standing with your hands on your hips	Aggressive, disgusted
2	Standing upright	Confidence
3	Arms crossed on your chest	Defensive
4	Resting your hand on your cheek	Thinking
5	Touching or rubbing your nose	Doubt, lying
6	Resting your head in your hands	Boredom, tired
7	Tapping your fingers	Impatience
8	Biting your nails	Nervous, insecure
9	Playing with your hair	Insecure
10	Rubbing your eyes	Disbelief, doubt

## Conduct the following exercise to develop communication skills –Negotiation Skills and Empathy Exercise: Card Pieces

In this activity, team members trade pieces of playing cards to put together complete cards.

**Uses-** This exercise is useful for showing team members others' perspectives. It builds communication and negotiation skills, and helps people to develop empathy.

### People and Materials

- i) Enough people for at least three teams of two.
- ii) Playing cards – use between four and six for each person.
- iii) A private room.

**Time -15 minutes.**

### **Instructions:**

1. Cut each playing card into half diagonally, then in half diagonally again, so you have four triangular pieces for each card.
2. Mix all the pieces together and put equal numbers of cards into as many envelopes as you have teams.
3. Divide people up into teams of three or four. You need at least three teams. If you're short of people, teams of two will work just as well.
4. Give each team an envelope of playing card pieces.
5. Each team has three minutes to sort its pieces, determine which ones it needs to make complete cards, and develop a bargaining strategy.
6. After three minutes, allow the teams to start bartering for pieces. People can barter on their own or collectively with their team. Give the teams eight minutes to barter.
7. When the time is up, count each team's completed cards. Whichever team has the most cards wins the round.



## Advice for the Teacher/Facilitator

After the activity, ask your team members to think about the strategies they used.

Discuss these questions

- 1) Which negotiation strategies worked? Which didn't?
- 2) What could they have done better?
- 3) What other skills, such as **active listening** or **empathy**, did they need to use?

## Conduct following Time management activity - Ribbon of Life

Take a colored ribbon length of approximately 1 meter/100 cm. and scissors. Start with the following questions:

1. If the life span of an individual is say, 100 years. Consider that each cm represents one year. The response will be that few live that long. Assuming a life of 75 to 90 years, cut 10 to 25 cm off the ribbon, accordingly.
2. What is the average age of the participants sitting here, the response would be 25 to 30 depending on the group, in that case, cut another 25 cms of the ribbon and say that is gone you cannot do anything.
3. What is left is 50 years? People will say, "Yes," but the answer is NO.
4. Every year we have 52 weeks, that is 52 Sundays. If we multiply that by 50 years, it comes to 7.14 years. Reduce the ribbon by another 7.14 cm.
5. We also usually have Saturdays off, so reduce another 7. cms.
6. Public/National holidays are 10 multiple with 50 years. That comes to another 1.5 years. Reduce ribbon by another 1.5 cms.
7. Your casual leave, sick leave, and annual holidays approx. 40 days a year, multiplied by 50. Cut off another 5 cms. Now you are left with about 29.5 years. But, the calculation is not over yet.
8. You sleep an average of 8 hours daily; multiply that by 365 days and again by 50 years (i.e. 122 days X 50 = almost 17 years). Cut off another 17 cm.
9. You spend time eating lunch, breakfast, snacks, and dinner total 2 hours daily (i.e. 30 days a year X 50 years = 4 years or so). Cut off another 4 cm.
10. Last, let's figure we spend about 1 hour a day traveling from place to place for activities and such. (that's about 2 more years). We're down to 6 (SIX) years of life to make it or break it.

- **Exercise Decision making skills - Create Your Own**

In this exercise, teams must create their own, brand new, problem-solving activity.

**Uses:** This game encourages participants to think about the problem-solving process. It builds skills such as creativity, negotiation and decision making, as well as communication and time management. After the activity, teams should be better equipped to work together, and to think on their feet.

## What You'll Need

- Ideally four or five people in each team.
- A large, private room.
- Paper, pens and flip charts.

## Time -Around one hour.

### Instructions:

1. As the participants arrive, you announce that, rather than spending an hour on a problem-solving team building activity, they must design an original one of their own.
2. Divide participants into teams and tell them that they have to create a new problem-solving team building activity that will work well in their organization. The activity must not be one that they have already participated in or heard of.
3. After an hour, each team must present their new activity to everyone else, and outline its key benefits.

## Advice for the Teacher/Facilitator:

There are four basic steps in problem solving : defining the problem, generating solutions,

evaluating and selecting solutions, and implementing solutions. Help your team to think creatively at each stage by getting them to consider a wide range of options. If ideas run dry, introduce an alternative brainstorming technique, such as brain writing. This allows your people to develop one others' ideas, while everyone has an equal chance to contribute.

After the presentations, encourage teams to discuss the different decision-making processes they followed. You might ask them how they communicated and managed their time. Another question could be about how they kept their discussion focused. And to round up, you might ask them whether they would have changed their approach after hearing the other teams' presentations.

- i) Students are asked to recite verses: 26,28,63,65 (virtue) of Neetisatakam- Holistic development of personality.
- ii) Students are asked to identify personality of role models from Shrimad Bhagwadgita and portray the roles of the same.
- iii) Students are asked to practice Yoga and meditation techniques

### **Text and Reference Books:**

1. Hurlock, E.B. Personality Development, 28th Reprint. New Delhi: Tata McGraw Hill, 2006.
2. Gopinath, Rashtriya vairagya, New Delhi, 2010
3. Swami Swarupananda Sanskrit Sansthanam P, Bhartrihari's Three Satakam, Niti-sringar-
4. , Srimad Bhagavad Gita, Advaita Ashram, Publication Department, Kolkata, 2016.
5. Lucas, Stephen. Art of Public Speaking. New Delhi. Tata - Mc-Graw Hill. 2001
6. Mile, D.J Power of positive thinking. Delhi. Rohan Book Company, (2004).
7. Pravesh Kumar. All about Self- Motivation. New Delhi. Goodwill Publishing House. 2005.
8. Smith, B. Body Language. Delhi: Rohan Book Company. 2004
9. Yogic Asanas for Group Training - Part-I: Janardhan Swami Yogabhyasi Mandal, Nagpur.
10. Rajayoga or Conquering the Internal Nature by Swami Vivekananda, Advaita Ashrama (Publication Department), Kolkata.
11. Nagendra H.R nad Nagaratna R, Yoga Perspective in Stress Management, Bangalore, Swami Vivekananda Yog



# P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

Siddhartha Nagar, Vijayawada – 520 010  
*Autonomous -ISO 9001 - 2015 Certified*

## GENERAL PHYSICS – I

**Offered to :** M.Sc.(PHYSICS)

**Course Type :** Core (P)

**Year of Introduction :** 2004

**Year of Revision :** 2022

**Semester :** I

**Course Code:**

**Course:** GENERAL PHYSICS – I

**Year of offering :** 2022

**Percentage of Revision :** 10%

**Credits :** 4

**Course Description :** This course (22PH1L1) will provide practical knowledge on the topics include electrical, magnetical and optical properties of the materials.

### Course Objectives:

1. To understand the various magnetic material properties.
2. To learn the electrical properties of the semiconductor materials.
3. To learn the dielectric properties of properties materials.

**Course Outcomes :** At the end of this course, students should be able to:

CO1: Understand the different concepts of physics through experiments.

CO2: To apply the concepts of condensed mater physics to understand the properties of different materials

CO3: To analyse the results obtained from different experiments through graphical analysis.

### List of Experiments (Minimum 10 experiments are to be done)

1. Characteristics of electromagnetic coils (a) by varying distance between the coils and(b) byvarying current CO1 L3
2. Measurement of band gap of semiconductor CO2 L3
3. Determination of dielectric constant of a solids CO2 L3
4. Determination of Planck's constant using photodiode CO1 L3
5. Stefan's constant CO2 L3
6. |B – H Curve CO3 L3
7. Hall effect CO3 L3
8. Heat Capacity of solids CO2 L3
9. Lattice dynamics CO2 L3
10. I-V characteristics of solar cells. CO3 L3
11. Diffraction grating – determination of wavelength of laser.CO1 L3
12. Two Probe Method for Resistivity Measurement CO2 L3
13. Any two online virtual lab experiments with in the syllabus have to be carried out (using MHRD web resource).CO2 L3

Continuous Internal Assessment will be done for each student on basis of performance for each practical. The total marks for CIA is evaluated for 20 marks. An internal will be conducted after the completion of course for 10 marks, Total marks for CIA will be 30 marks (continues assessment 20+ internal 10).The external examination is evaluated for 70 marks. Total marks 70(External)+30(CIA)=100 marks



## P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

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### ELECTRONICS LAB

**Offered to :** M.Sc.(PHYSICS)

**Course Type :** Core (P)

**Year of Introduction :** 2004

**Year of Revision :** 2022

**Semester :** I

**Course Prerequisites (if any) :**

**Course Code:** 22PH1L2

**Course:** ELECTRONICS LAB

**Year of offering :** 2022

**Percentage of Revision :** 10%

**Credits :** 4

**Course Description :** This course will be focuses on the construction and verification of electronic circuits using transistor ,IC Op-Amp 741

#### **Course Objectives:**

1. To understand the construction of logic gates
- 2 To learn the construction and working of transistors
- 3 To learn the working of IC-741 in various circuits

**Course Outcomes :** At the end of this course, students should be able to:

CO1: To apply the concepts of electronics for different circuits

CO2: To analyze the the variation between theoretical and practical circuits.

CO3 To analyze the results obtained from different experiments through graphical analysis

#### **List of Experiments (Minimum 10 experiments are to be done)**

1. Verification of truth tables of various logic gates: AND, OR, NOR and NOT using NAND gate and NOT gate. CO2, L3
2. Construction and verification of the truth tables for De Morgan's theorems CO2, L3  
Verification of truth tables of R-S, J-K, flip-flops CO3, L3
3. R-C Phase shift oscillator CO2, L3
4. Astable Multivibrator using transistor.CO1, L3
5. Determination of practical op amp parameters CO1, L3
6. Op amp Inverting amplifier CO2, L3
7. Op amp non-inverting configurations.CO2, L3
8. Astable Multivibrator using Op-amp.CO1, L3
9. Summing and difference amplifier CO2, L3
10. Any two online virtual lab experiments with in the syllabus have to be carried out (using IIMHRD web resource)., L3
12. Wien's Bridge Oscillator.CO1, L3
13. JFET based amplifier.CO2, L3
14. UJT-Characteristics CO1, L3
15. Zener Diode as voltage Regulator CO1, L3

Continuous Internal Assessment will be done for each student on basis of performance for each practical. The total marks for CIA is evaluated for 20 marks. An internal will be conducted after the completion of course for 10 marks, Total marks for CIA will be 30 marks (continues assessment 20+ internal 10).The external examination is evaluated for 70 marks. Total marks 70(External)+ 30(CIA)=100 marks.

Parvathaneni Brahmayya Siddhartha College of Arts & Science, Vijayawada – 520 010.  
(An Autonomous College in the jurisdiction of Krishna University)

## DEPARTMENT OF CHEMISTRY

### **Board of Studies for the academic Year 2023-24 (Even Semesters)**

#### **1. Agenda**

**Agenda for Board of studies in Chemistry on 13-03-2023 through online mode at 04:00P.M.**

1. Approval of programme structure II Semester for the batch of students admitted in the year 2022-2023 onwards.
2. Approval of syllabus for II semester for the batch of students admitted in the year 2022 – 2023 as per revised guidelines / curriculum of Krishna University and with no revision of syllabus of IV semester for the batch of students admitted in the year 2021-2023 batch.
3. Approval of the syllabus of semester – II & IV with course outcomes drafted in line with levels of blooms taxonomy.
4. Approval of modified model question papers for II semester & unmodified model question papers for IV semester in line with Bloom's taxonomy.
5. Any other with the permission of the chair.

## Members Present

S.No	Member	Position	Signature
1	<b>Dr.M. Manoranjani,</b> Assoc.Prof. & HOD, Dept. of Chemistry, P.B.Siddhartha College of Arts & Science, Vijayawada	Chairman	
2	<b>Dr.D.Rama Sekhara Reddy,</b> Dept. of Chemistry, Krishna University, Machilipatnam.	University Nominee	
3	<b>Prof.C. Suresh Reddy,</b> Dept. of Chemistry(Organic), Sri Venkateswara University, Tirupathi.	Subject Expert	
4	<b>Prof.Ch.Subrahmanyam ,</b> Professor & Dean of Academics, IIT, Hyderabad.	Subject Expert	
5	<b>Sri.Ch.Sekhar,</b> Director, CIPET, Vijayawada	Industry Expert	
6	<b>Dr.M. Sivanadh,</b> HOD, Dept of Chemistry, ANR College, Gudivada.	Alumnus	
7	<b>Dr.M.David Raju,</b> Assoc. Professor, Dept. of Chemistry, P.B.Siddhartha College of Arts & Science Vijayawada	Member	
8	<b>Dr.T.N.V.S.S Satya Dev,</b> Assistant Professor, Dept. of Chemistry, P.B.Siddhartha College of Arts & Science, Vijayawada	Member	

**P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE  
DEPARTMENT OF CHEMISTRY**

**PROPOSED COURSE STRUCTURE FOR PG PROGRAMS (SCIENCE STREAM)  
UNDER CHOICE BASED CREDIT SYSTEM (CBCS)  
W.E.F 2022-23 (R22 Regulations)**

**I SEMESTER**

Course Code	Course Name	Teaching Hours/ week			CORE / IDC/DSE/ SEC/OEC/ MOOCS	Internal Marks	External Marks	No. of Credits
		Lecture	Practical	Tutorial				
22CH1T1	General Chemistry	4	0	0	Core	30	70	4
22CH1T2	Inorganic Chemistry	4	0	0	Core	30	70	4
22CH1T3	Introductory Organic Chemistry	4	0	0	Core	30	70	4
22CH1T4	Physical Chemistry	4	0	0	Core	30	70	4
<b>COMPULSORY 22PG101</b>	<b>Personality Development through Life Enlightenment Skills</b>	3	1	0	Core	30	70	3
22CH1L1	Inorganic chemistry Practical	0	6	0	Core	30	70	3
22CH1L2	Organic chemistry Practical -I	0	6	0	Core	30	70	3
<b>TOTAL FOR FIRST SEMESTER</b>						<b>210</b>	<b>490</b>	<b>25</b>

**II SEMESTER**

Course Code	Course Name	Teaching Hours/ week			CORE / IDC/DSE/ SEC/OEC /MOOCS	Internal Marks	External Marks	No. of Credits
		Lecture	Practical	Tutorial				
22CH2T1	Advanced Inorganic Chemistry	4	0	0	Core	30	70	4
22CH2T2	Advanced Organic Chemistry	4	0	0	Core	30	70	4
22CH2T3	Advanced Physical Chemistry	4	0	0	Core	30	70	4
<b>COMPULSORY 22PG201</b>	<b>Research Methodology &amp; IPR</b>	3	1	0	SEC	30	70	3
<b>DOMAIN SPECIFIC ELECTIVE COURSES (CHOOSE ANY ONE)</b>								
22CH2E1	Molecular Spectroscopy	4	0	0	DSE	30	70	4
22CH2E2	Instrumental methods of Analysis	4	0	0	DSE	30	70	4
22CH2E3	Analysis of foods & Drugs	4	0	0	DSE	30	70	4
<b>LAB PRACTICALS</b>								
22CH2L1	Physical chemistry Practical	0	6	0	Core	30	70	3
22CH2L2	Organic chemistry Practical-II	0	6	0	Core	30	70	3
<b>TOTAL FOR SECOND SEMESTER</b>						<b>210</b>	<b>490</b>	<b>25</b>
At the end of 2 <sup>nd</sup> semester, every student must undergo summer Internship/ Apprenticeship/Project work/Industrial training/Research based Project work for Six weeks and must prepare a report concerned as per approved project guidelines, and submit the same to the University 14 days before the commencement of third semester end examinations.								

**III SEMESTER**

Course Code	Course Name	Teaching Hours/ week			CORE / IDC/DSE/ SEC/OEC/ MOCS	Internal Marks	External Marks	No. of Credits
		Lecture	Practical	Tutorial				
22CH3T1	Organic Spectroscopy	4	0	0	Core	30	70	4
<b>DOMAIN SPECIFIC ELECTIVE COURSES (CHOOSE ANY THREE)</b>								
22CH3E1	Organic Reaction mechanism	4	0	0	DSE	30	70	4
22CH3E2	Organic Synthesis	4	0	0	DSE	30	70	4
22CH3E3	Natural Products	4	0	0	DSE	30	70	4
22CH3E4	Separation Techniques & Electro analytical techniques	4	0	0	DSE	30	70	4
22CH3E5	Marine Chemistry or Chemistry of Drugs	4	0	0	DSE	30	70	4
22CH3E6	Antibiotics, Drugs, Vitamins & Steroid hormones	4	0	0	DSE	30	70	4
<b>LAB PRACTICALS</b>								
22CH3L1	Organic Preparations	0	6	0	Core	30	70	3
22CH3L2	Organic Binary mixture Analysis.	0	6	0	Core	30	70	3
<b>OPEN ELECTIVE (INTERDISCIPLINARY/MULTIDISCIPLINARY) COURSES (CHOOSE ANY ONE)</b>								
22OE301	Polymer Chemistry	3	0	0	OEC	30	70	3
22OE302	Basic Bio Chemistry	3	0	0	OEC	30	70	3
22OE303	Basic Analytical Chemistry	3	0	0	OEC	30	70	3
		3	0	0	OEC	30	70	3
		3	0	0	OEC	30	70	3
<b>TOTAL FOR III SEMESTER</b>						<b>210</b>	<b>490</b>	<b>25</b>

#### IV SEMESTER

Course Code	Course Name	Teaching Hours/ week			CORE / IDC/DSE/ SEC/OEC/MOCS	Internal Marks	External Marks	No. of Credits
		Lecture	Practical	Tutorial				
22CH4T1	Advanced Organic Spectroscopy	4	0	0	Core	30	70	4
<b>DOMAIN SPECIFIC ELECTIVE COURSES (CHOOSE ANY THREE)</b>								
22CH4E1	Green Chemistry	4	0	0	DSE	30	70	4
22CH4E2	Techniques for Modern Industrial applications	4	0	0	DSE	30	70	4
22CH4E3	Nano Chemistry	4	0	0	DSE	30	70	4
22CH4E5	Bio-organic chemistry	4	0	0	DSE	30	70	4
22CH4E6	Bio-Inorganic Chemistry	4	0	0	DSE	30	70	4
22CH4E7	Environmental chemistry	4	0	0	DSE	30	70	4
<b>LAB PRACTICALS</b>								
22CH4L1	Organic Estimations	0	6	0	Core	30	70	3
<b>ENTREPRENEURIAL &amp; INNOVATION/IT SKILL RELATED TO DOMAIN SPECIFIC ELECTIVE COURSES (CHOOSE ANY ONE)</b>								
22CH4E8	Asymmetric Synthesis	3	0	0	SEC	30	70	3
22CH4E4	Organo metallic Chemistry	3	0	0	SEC	30	70	3
22CH4E9	Heterocyclic chemistry	3	0	0	SEC	30	70	3
<b>* CHOOSE MOOCs FROM SWAYAM/NPTEL SOURCES</b>								
MOOCs	22CH4M1							4
<b>PROJECT WORK EVALUATION AND VIVA-VOCE - 22CH4P1</b>							100	4
<b>TOTAL FOR IV SEMESTER</b>						<b>180</b>	<b>520</b>	<b>30</b>

**Note:** Students may be allowed to register and appear for MOOCs from the third semester itself. However, students are to complete the MOOCs successfully and submit pass certificate of the same to the University through the Principal of the College concerned for approval and endorsement of the same on grade cards and PCs and ODs as per the regulations of the University.



**Table: List of Courses to be Introduced/ Revised**

S.N O	TITLE OF THE COURSE	Course Code	Offered in SEM	Type of the Paper	Year of Introduction	Year of Revision	OB E with BTL	Offered to (Name of the Programme)
1	Advanced Inorganic Chemistry	22CH2T1	I	CORE	2017-18	nil	YES	M.Sc
2	Advanced organic Chemistry	22CH2T2	I	CORE	2017-18	nil-	YES	M.Sc
3	Advanced Physical Chemistry	22CH2T3	I	CORE	2017-18	-	YES	M.Sc
4	Molecular Spectroscopy	22CH2E1	I	CORE	2017-18	2022-23 20%	YES	M.Sc
5	Research Methodology & IPR	22PG201	I	CORE	2022-23	introduce -	YES	M.Sc
6	Organic Chemistry Practical	22CH2L1	I	CORE Pr	2020-21	-nil	YES	M.Sc
7	Physical Chemistry Practical	22CH2L2	I	CORE Pr	2020-21	nil-	YES	M.Sc

**Resolutions/ Recommendations****Resolution –I**

1. It is resolved and recommended to implement the course structure for the batch of students admitted during 2022-23 onwards, as per R 22 regulations of Krishna University.

**Resolution –II**

2. a) It is resolved and recommended to continue with the same syllabus for the course code 22CH2T1. However here after the course title will be referred as Advanced Inorganic chemistry instead of Inorganic chemistry – II.  
b) It is resolved and recommended to continue with the same syllabus for the course code 22CH2T2. However here after the course title will be referred as Advanced organic chemistry instead of Organic chemistry –II.  
c) It is resolved and recommended to continue with the same syllabus for the course code 22CH3T3. However here after the course title will be referred as Advanced Physical chemistry instead of Physical chemistry – II.  
d) Resolved and recommended to implement the revised syllabus Molecular Spectroscopy with course code 22CH2E1 in semester – II for the batch of students admitted during 2022-23 onwards. For syllabi and model paper refer page no  
e) It is resolved and recommended to introduce Research Methodology & IPR with course code 22PG201 for the batch of students admitted in 2022-23 and onwards. For syllabi and model paper refer page no

**Resolution –III**

3. It is resolved to recommend to introduce MOOCS– Analytical Chemistry, with course code 20CH4M2 in IV semester for the batch of students admitted in 2021-22.

**P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE**  
**DEPARTMENT OF CHEMISTRY**  
**M.Sc – CHEMISTRY (ORGANIC CHEMISTRY)**  
**II SEMESTER**  
**W.E.F 2022-23 (R22 Regulations)**

**Title of the Paper: ADVANCED INORGANIC CHEMISTRY**

Course Code	<b>22CH2T1</b>	Course Delivery Method	Class Room / Blended Mode - Both
Credits	4	CIA Marks	30
No. of Lecture Hours / Week	4	Semester End Exam Marks	70
Total Number of Lecture Hours	60	Total Marks	100
Year of Introduction :2017- 18	Year of Offering:	Year of Revision:	Percentage of Revision: 0 %

S.No	COURSE OUTCOMES	PO'S
	After completion of the course, the student will be able to :	
1	Memorize the fundamental concepts of Metallic & non metallic clusters, Inorganic reaction mechanisms, organo metallic chemistry, electronic spectra & magnetic properties of complexes and bioinorganic chemistry.	2,7
2	Comprehend the basic and advanced concepts of metallic & non metallic clusters, Inorganic reaction mechanisms, organo metallic chemistry, electronic & magnetic properties of complexes and bioinorganic chemistry.	1,2,6
3	Apply the conceptual knowledge gained in the areas of metallic & nonmetallic clusters, inorganic reaction mechanisms, organo metallic chemistry, electronic & magnetic properties of complexes and bio inorganic chemistry in other fields of chemistry as well as in research.	1,2,7
4	Analyze the role of metallic & non metallic clusters / cages, inorganic Reaction mechanisms, organo metallic chemistry, electronic & magnetic properties of complexes and bio inorganic chemistry in understanding the similarities and differences among the concepts of chemistry.	1,3,2

**Syllabus**

**Course Details:-**

Unit	Learning Units	Lecture Hours
I	<b>Non-metal cages and metal clusters:</b> Structure and bonding in phosphorous-oxygen, phosphorous-Sulphur cages; structure and bonding in higher boranes with (special reference to B <sub>12</sub> icosahedra). Carboranes, metalloboranes, metallocarboranes. Classification- LNCs and HNCs, Isolectronic and Isolobal relationships, electron counting rules: Wade's and Lauher's rules. M-M multiple bonding; preparation, structure and bonding in dinuclear [Re <sub>2</sub> Cl <sub>8</sub> ] 2- ion, trinuclear [Re <sub>3</sub> Cl <sub>9</sub> ], tetra nuclear W <sub>4</sub> (OR) <sub>16</sub> , hexa nuclear [Mo <sub>6</sub> Cl <sub>8</sub> ] <sup>4+</sup> and [Nb <sub>6</sub> Cl <sub>12</sub> ] <sup>2-</sup> .	12
II	<b>Organometallic chemistry of transition metals:</b> Classification and electron counting rules, hapticity, synthesis, structure and bonding of Olefinic complexes, Acetylene complexes, ferrocene, dibenzene chromium, cyclo heptatriene and tropylium complexes of transition metals. Reactions of organometallic compounds - oxidative addition	12

	reductive elimination, insertion and elimination. Applications of organometallic compounds, Catalytic hydrogenation, Hydroformylation, alkene polymerization.	
III	<b>Reaction mechanism of transition metal complexes:</b> Kinetics of octahedral substitution, acid hydrolysis, base hydrolysis-conjugate base (CB) mechanism. Direct and indirect evidences in favour of CB mechanism. Anation reactions. Reactions without metal-ligand bond cleavage. Factors affecting the substitution reactions in octahedral complexes. Trans effect on substitution reactions in square planar complexes. Mechanism of redox reactions, outer sphere mechanism, cross reactions and Marcus –Hush equation, inner sphere mechanism.	12
IV	<b>Term symbols and Electronic spectra: Term symbols:</b> Term symbols and their derivation, Microstates, Hund's rules to predict ground terms and ground states. List of ground energy and higher energy terms from d1 to d9 configurations; <b>Electronic spectra of transition metal complexes:</b> Spectroscopic terms. Selection rules, Slater–Condon parameters, Racah parameters, Term separation energies for dn configurations, Orgel diagrams. Tanabe-Sugano diagrams for d1 to d9 configurations. Calculations of Dq, B and $\beta$ parameters. Charge transfer spectra.	12
V	<b>Bio-inorganic chemistry and Magnetic properties of complexes:</b> Storage and transport of dioxygen by Hemoglobin and Myoglobin, Vitamin B12 and its importance. <b>Magnetic properties of transition metal complexes:</b> Types of magnetism, factors affecting Para magnetism, anomalous magnetic moments - Orbital and spin contribution, spin-orbit coupling and magnetic moments chiro optical properties, Cotton effect and Faraday effect.	12

**Text books/ Reference books:**

1. Inorganic Chemistry by Huheey. Harper and Row.
2. Concise inorganic chemistry by J. D. Lee, ELBS.
3. Inorganic chemistry, K.F. Purcell and J.C. Kotz, Holt Saunders international
4. Organometallic chemistry by R.C. Mehrotra and A. Singh. New Age International.
5. Advanced Inorganic Chemistry by Cotton and Wilkinson, Wiley Eastern
6. Inorganic reaction mechanism by Basolo and Pearson, Wiley Eastern
7. Bioinorganic Chemistry by K. Hussan Reddy
8. Biological Aspects of inorganic chemistry by A. W. Addison, W. R. Cullen, D. Dolphin and G. J. James. Wiley Interscience.
9. Photochemistry of coordination compounds by V. Balzani and V. Carassiti. Academic Press.
10. Text book of Coordination chemistry by K. Soma Sekhara Rao and K.N.K. Vani, Kalyani Publishers.

**Course Focus: Employability.**

**P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE**  
**DEPARTMENT OF CHEMISTRY**  
**M.Sc – CHEMISTRY (ORGANIC CHEMISTRY)**  
**II SEMESTER**  
**W.E.F 2022-23 (R22 Regulations)**

**Title of the Paper: ADVANCED ORGANIC CHEMISTRY**

Course Code	<b>22CH2T2</b>	Course Delivery Method	Class Room / Blended Mode - Both
Credits	4	CIA Marks	30
No. of Lecture Hours / Week	4	Semester End Exam Marks	70
Total Number of Lecture Hours	60	Total Marks	100
Year of Introduction :2017-18	Year of Offering:	Year of Revision:	Percentage of Revision: 0%

S.No	COURSE OUTCOMES	PO'S
	After completion of the course, the student will be able to :	
1	Understand the basic and advanced concepts of stereochemistry, conformational analysis, green chemistry, nanochemistry and named reactions.	2,7
2	Apply the concepts related to stereochemistry, conformational analysis, green and nano chemistry in establishing the mechanism of the reaction.	1,2,3
3	Assess that how far the knowledge gained in stereochemistry, green chemistry and nanochemistry is useful in understanding the nature of product.	1,5,6
4	Evaluate the role of stereochemistry, green principles and nano chemistry in establishing the mechanism of a reaction as well as in other areas of chemistry.	1,4,7

**Syllabus**

**Course Details**

Unit	Learning Units	Lecture Hours
I	<b>Named reactions:</b> Aldol condensation, Benzoin condensation, Cannizzaro condensation, Claisen condensation, Dieckmann condensation, Perkin condensation, Stobbe condensation, Reformatsky reaction, Mannich reaction, Reimer-Tiemann reaction, Vilsmeier-Haack reaction, Shapiro reaction, McMurray reaction, Michael addition reaction, Wittig reaction, Stork – Enamine reaction, Acyloin condensation, Robinson ring annulation and Simmon-Smith reaction.	12
II	<b>Stereo Chemistry-I:</b> Concept of chirality, Recognition of Symmetry elements. Definition and classification of Stereoisomers, Enantiomer, Diastereomer, Homomer, Epimer, Anomer, Configuration and Conformation, Configurational nomenclature: D,L and R, S nomenclature. Molecular representation of organic molecules: Fischer, Newman and Sawhorse projections and their inter-conversions. Geometrical Isomerism. Cis-trans, E, Z- and Syn and anti nomenclature, Methods of determining configuration of Geometrical isomers using physical, spectral and chemical methods.	12
III	<b>Stereo Chemistry-II:</b> Definition of Conformation, Conformational analysis of acyclic molecules – alkanes and substituted alkanes. Conformational analysis of monocyclic molecules – cyclohexane – chair, boat and twist boat - mono and disubstituted cyclohexanes and	12

	conformation around carbon hetero atom bonds having C–O & C–N. Confirmation and intramolecular hydrogen bonding.	
IV	<b>Green chemistry &amp; Phase transfer catalysis:</b> Introduction to Green chemistry, Principles and concepts of Green chemistry, Green Catalysis, Biocatalysis, renewable resources, Green Reagents, examples of green reactions-synthesis of Ibuprofen, Clean Fischer-Indole synthesis comparison of the above with conventional methods. Introduction to Microwave organic synthesis: introduction, advantages and disadvantages. Applications: solvents (water and organic solvents), solvent free reactions (Solid state reactions).	12
V	<b>Chemistry of Nanomaterials:</b> Introduction, carbon nanotubes: structure of single and multi-walled carbon nanotubes, synthesis-solid and gaseous carbon source-based production techniques, synthesis with controlled orientation. Growth mechanism of carbon nano tubes-catalyst free growth, catalyst activated growth, general properties and applications.	12

**Reference Text books:**

1. Advanced organic chemistry –Reaction, mechanism and structure, Jerry March, John Wiley.
2. A guide book to Mechanism in organic chemistry, Peter Sykes, Longman.
3. Organic chemistry, I.L. Finar, Vol. I & II, Fifth ed. ELBS, 1975.
4. Stereo Chemistry of carbon compounds – E.L. Eliel.
5. Nano, The Essentials: T. Pradeep, The Mc. Graw Hill & Co.
6. Principles of organic synthesis, R.O.C. Norman and J.M. Coxon, Blakie Academic & Professional.
7. Reaction Mechanism in organic chemistry, S.M. Mukherji and S.P. Singh, Macmillan.
8. Green chemistry Theory and Practice by Paul T. Anastas and John C. Warner, Oxford University press.
9. Methods and reagents for Green chemistry, PietroTundo, Alvis Perosa, Fulvio Zecchini, John Willey& sons Inc.

**Course Focus: Employability.**

**P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE**  
**DEPARTMENT OF CHEMISTRY**  
**M.Sc – CHEMISTRY (ORGANIC CHEMISTRY)**  
**II SEMESTER**  
**W.E.F 2022-23 (R22 Regulations)**

**Title of the Paper: ADVANCED PHYSICAL CHEMISTRY**

Course Code	<b>22CH2T3</b>	Course Delivery Method	Class Room / Blended Mode - Both
Credits	4	CIA Marks	30
No. of Lecture Hours / Week	4	Semester End Exam Marks	70
Total Number of Lecture Hours	60	Total Marks	100
Year of Introduction :2017-18	Year of Offering:	Year of Revision:	Percentage of Revision: 0%

S.No	COURSE OUTCOMES	PO'S
	After completion of the course, the student will be able to :	
1	Remember the concepts of thermodynamics, polymer chemistry, electro chemistry, chemical kinetics, photo chemistry and Radio chemistry.	1,2,7
2	Understand the concepts of thermodynamics, polymer chemistry, electro chemistry, chemical kinetics, photo chemistry and Radio chemistry.	1,2,7
3	Apply the concepts of thermodynamics, polymer chemistry, electro chemistry, chemical kinetics, photo chemistry and Radio chemistry in research and other allied fields.	1,2,4
4	Analyze the role and significance of concepts of thermodynamics, polymer chemistry, electro chemistry, chemical kinetics, photo chemistry and Radio chemistry.	1,2,7
5	Evaluate the role of concepts of thermodynamics, polymer chemistry, electro chemistry, chemical kinetics, photo chemistry and Radio chemistry in understanding the named concepts in chemistry.	1,2,7

## Syllabus

### Course Details

Unit	Learning Units	Lecture Hours
I	<b>Third law of Thermodynamics and Statistical thermodynamics:</b> Nernst Heat theorem - Third law of thermodynamics - Its limitations - Determination of absolute entropy -Thermodynamic probability and most probable distribution, Entropy and probability - Boltzmann-Plank equation. Ensembles, Maxwell-Boltzmann distribution, Fermi-Dirac statistics, Bose Einstein statistics. Partition function - calculation of thermodynamic properties in terms of partition function - Chemical equilibrium and partition function - Translational, rotational and electronic partition function - Entropy of Monoatomic gases (Sackur-Tetrode equation).	12

II	<b>Polymer chemistry and Raman Spectroscopy:</b> Classification of polymers - Free radical, ionic and Zeigler -Natta Polymerization - kinetics of free radical polymerization -Techniques of polymerization - Glass transition temperature - Factors influencing the glass transition temperature. Number average and Weight average, Molecular weights –molecular weights determinations – Membrane Osmometry, Light scattering phenomenon. Classical and quantum theories of Raman effects, pure rotational, vibrational and Vibrational- rotational Raman spectra, selection rules, mutual exclusion principle.	12
III	<b>Electro Chemistry-II:</b> Reference electrode - Standard hydrogen electrode. Calomel electrode -Indicator electrodes: Metal-metal ion electrodes - Inert electrodes -Membrane electrodes - theory of glass membrane potential, potentiometric titrations, advantages of potentiometric titrations, Conductometric titrations. Electrode potentials - Double layer at the interface - rate of charge transfer - Decomposition potential - Over potential - Tafel plots - Derivation of Butler- Volmer equation for one electron transfer - electro chemical potential.	12
IV	<b>Chemical kinetics and Photo chemistry:</b> Branching Chain Reactions – Hydrogen-oxygen reaction - lower and upper explosion limits - Fast reactions - Study of kinetics by flow methods - Relaxation methods - Flash photolysis. Acid base catalysis – protolytic and prototropic mechanism. Enzyme catalysis - Michelis-Menten kinetics. <b>Photochemistry:</b> Quantum yield and its determination, Actinometry, Reactions with low and high quantum yields, Photo sensitization, Exciplexes and Excimers, Photochemical equilibrium, Kinetics of collisional quenching - Stern- Volmer equation.	12
V	<b>Radioactivity and Isotopes:</b> Introduction to radioactivity, properties of alpha rays, beta rays and gamma rays, theory of radioactive disintegration, rate of disintegration, Geiger – Nuttal rule, radioactive equilibrium. Isotopes - radioactive and non-radioactive isotopes, group displacement law. Analysis of isotopes – Aston's mass spectrograph, Dempster's method, Bainbridge's method. Separation methods of isotopes. Applications of Radio isotopes in Industry and medicine.	12

**Text books/ Reference books:**

1. Physical chemistry, G.K. Vemulapalli (Prentice Hall of India).
2. Physical chemistry, P.W. Atkins. ELBS.
3. Chemical kinetics - K.J. Laidler, McGraw Hill Pub.
4. Text book of Physical Chemistry, Samuel Glasstone, Macmillan pub.
5. Statistical Thermodynamics - M.C.Gupta.
6. Polymer Science, Gowriker, Viswanadham, Sreedhar.
7. Quantitative Analysis, A.I. Vogel, Addison Wesley Longmann Inc.
8. Physical Chemistry by G.W.Castellan, Narosa Publishing House, Prentice Hall.
9. Physical Chemistry by W.J. Moore, Prentice Hall.
10. Polymer Chemistry by Billmeyer.
11. Fundamentals of Physical Chemistry by K K. Rohatgi-Mukherjee. Wiley Eastern Ltd publications.
12. Statistical Thermodynamics by M.Dole.
13. Fundamentals of photochemistry by Rohatgimukherjee, New Age international Publications.
14. Essentials of Nuclear chemistry by H.J.Armikar, New Age international Publications

**Course Focus: Employability & Entrepreneurship.**

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**II SEMESTER**  
**W.E.F 2022-23 (R22 Regulations)**

**Title of the Paper: RESEARCH METHODOLOGY & INTELLECTUAL PROPERTY RIGHTS (IPR)**

Course Code	<b>22PG201</b>	Course Delivery Method	Class Room / Blended Mode - Both
Credits	4	CIA Marks	30
No. of Lecture Hours / Week	4	Semester End Exam Marks	70
Total Number of Lecture Hours	60	Total Marks	100
Year of Introduction:2017-2018	Year of Offering:	Year of Revision:----	Percentage of Revision: 100 %

S.No	COURSE OUTCOMES	PO'S
	After the completion of the course, Students will be able to	
1	Memorize the basic concepts of research and its methodologies.	2,7
2	Understand some basic and advanced concepts of research and its methodologies.	1,4,7
3	Demonstrate the ability to choose methods appropriate to research aims and objectives.	1,3,6
4	Analyze the role of research methodologies in designing the new strategies.	1,4,5

## Syllabus

### Course Details

Unit	Learning Units	Lecture Hours
I	<b>Foundations of Research:</b> Meaning of Research – Definitions of Research – Motivation in Research – General Characteristics of Research – Criteria of Good Research – Types of Research – Research Process – Research Methods vs. Methodology – Defining and Formulating the Research Problem – Review of Literature – Approaches to Critical Literature Review – Importance of Literature Review in Identifying Research Gaps and Defining a Problem – Development of Working Hypothesis.	12
II	<b>Research Design, Sampling Concepts, and Data Collection Methods:</b> Meaning, Significance and Characteristics of Good Research Design – Types of Research Design: Exploratory, Conclusive Research and Experimental – Sampling Theory: Types of Sampling and Errors in Sampling – Data Collection: Types of Data – Data Collection Methods and Techniques for Primary and Secondary Data.	12



III	<b>Measurement &amp; Scaling Techniques, Hypothesis Formulation and Testing, Overview of Data Analysis and Report Writing:</b> Basic measurement scales – Reliability & Validity – Definition and Types of Hypothesis – Hypothesis Formulation and Testing Procedure – Overview of Data Analysis: Methods, Process and Types – Report Writing: Significance of Report Writing, Different Steps in Writing Report, Layout of the Research Report, Types of Reports, Oral Presentation, Mechanics of Writing a Research Report, Precautions for Writing Research Reports – How to Write a Research Proposal, Research Ethics, Conflict of Interest and Plagiarism.	12
IV	<b>Intellectual Property Rights (IPR):</b> Definition and Nature and Features of Intellectual Property Rights (IPR) – Types of Intellectual Property Rights – Procedure for Grants of Patents – Rights of a Patent – Scope of a Patent Rights – Licensing and Transfer of Technology – Why protection of intellectual property is important? – Enforcement of IPR – Infringement of IPR.	12
V	<b>Indian and International Scenario and New Developments in IPR:</b> IPR Developments in India for the past Five Years – Development of IPR Laws in India – International Cooperation on IPR – New Developments in IPR – Administration of Patent System – International Patent protection – Case Studies in Indian and Global Contexts.	12

#### REFERENCE BOOKS:

1. Garg, B.L., Karadia, R., Agarwal, F. and Agarwal, U.K., 2002, An introduction to Research Methodology, RBSA Publishers.
2. Cohen, L. Lawrence, M., & Morrison, K. (2005), Research Methods in Education (5th edition). Oxford: Oxford University Press.
3. Kothari, C.R., 1990, Research Methodology: Methods and Techniques, New Age International.
4. Dornyei, Z. (2007). Research Methods in Applied Linguistics. Oxford: Oxford University Press.
5. Anthony, M., Graziano, A.M. and Raulin, M.L., 2009, Research Methods: A Process of Inquiry, Allyn and Bacon.
6. Fink, A., 2009, Conducting Research Literature Reviews: From the Internet to Paper. Sage Publications.
7. Day, R.A., 1992, How to Write and Publish a Scientific Paper, Cambridge University Press.
8. Wadehra, B.L. 2000, Law relating to patents, trade marks, copyright designs and geographical indications. Universal Law Publishing.
9. Coley, S.M. and Scheinberg, C. A., 1990, Proposal Writing, Sage Publications.
10. Carlos, C.M., 2000. Intellectual property rights, the WTO and developing countries: the TRIPS agreement and policy options, Zed Books, New York.
11. Leedy, P.D. and Ormrod, J.E., 2004, Practical Research: Planning and Design, Prentice Hall.
12. Satarkar, S.V., 2000. Intellectual property rights and Copy right. Ess Ess Publications.

**Course Focus:** Employability.

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**II SEMESTER**  
**W.E.F 2022-23 (R22 Regulations)**

**Title of the Paper: MOLECULAR SPECTROSCOPY**

Course Code	<b>22CH2E1</b>	Course Delivery Method	Class Room / Blended Mode - Both
Credits	<b>4</b>	CIA Marks	30
No. of Lecture Hours / Week	<b>4</b>	Semester End Exam Marks	70
Total Number of Lecture Hours	<b>60</b>	Total Marks	100
Year of Introduction:2017-2018	Year of Offering:	Year of Revision:----	Percentage of Revision: 20 %

S.No	COURSE OUTCOMES	PO'S
	After the completion of the course, Students will be able to	
1	Memorize the basic principles and theory involved in molecular absorption spectroscopy.	2,7
2	Comprehend the advanced concepts of molecular absorption spectroscopy.	1,2,5
3	Apply the knowledge of spectroscopy in calculating the bond length, identifying the functional group present in molecules.	1,5,6
4	Identify the role UV – visible spectroscopy in the determination of absorption maximum and ESR spectroscopy in studying the properties of paramagnetic substances.	1,3,4

### Syllabus

Unit	Learning Units	Lecture Hours
I	<b>Introduction to Molecular Spectroscopy:</b> Motion of molecules- Degrees of freedom – Energy associated with the degrees of freedom-Type of spectra. <b>Microwave spectroscopy:</b> Classification of molecules, rigid rotator model, effect of isotopic substitution on the transition frequencies, Intensities non-rigid rotator-Microwave spectra of polyatomic molecules.	12
II	<b>Infrared spectroscopy:</b> Harmonic oscillator, vibrational energies of diatomic molecules, zero point energy, force constant and bond strengths, anharmonicity Morse potential energy diagram. Vibration – rotation spectroscopy. PQR branches, Born – openheimer approximation, Break down Born – openheimer approximation, normal modes of vibration group frequencies, overtones, hot bands, application of IR spectra to polyatomic molecules.	12
III	<b>Raman Spectroscopy:</b> Classical and quantum theories of Raman effects, pure rotational, vibrational and Vibrational- rotational Raman spectra, selection rules, mutual exclusion principle, Resonance Raman spectroscopy, coherent antistokes Raman Spectroscopy (CARS).	12

IV	<b>UV- Visible Spectroscopy:</b> Electronic Spectra of diatomic molecules, vibrational structure of an electronic transition, classification of bands, rotational fine structure of electronic vibrational transition. Electronic Spectra of Polyatomic Molecules.	12
V	<b>Electron Spin Resonance Spectroscopy:</b> Basic Principles, zero field splitting and kranners's degeneracy, factors affecting the 'g' value. Istropic and anisotropic hyperfine coupling constants, spin hamiltenia, spin densities measurement techniques - simple applications like methyl radical, ethyl radical etc.,	12

**Text books/ Reference books:**

1. Introduction to Spectroscopy – D. L. Pavia, G.M. Lampman, G. S. Kriz, 3rd Ed. (Harcourt college publishers).
2. Absorption spectroscopy of organic molecules – V. M. Parikh
3. Nuclear Magnetic Resonance – Basic Principles- Atta-Ur-Rehman, Springer-Verlag (1986).
4. Molecular spectroscopy by Kalidas & B.K.Sharma
5. Vibrational Spectroscopy by D.N.Sathyanarayana New Age Int. Pub.
6. Spectroscopy by Aruldas.
7. Symmetry & Spectroscopy of molecules by K.Veerareddy

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**II SEMESTER**  
**W.E.F 2022-23 (R22 Regulations)**

**Title of the Paper: INSTRUMENTAL METHODS OF ANALYSIS**

Course Code	<b>22CH2E2</b>	Course Delivery Method	Class Room / Blended Mode - Both
Credits	<b>4</b>	CIA Marks	30
No. of Lecture Hours / Week	<b>4</b>	Semester End Exam Marks	70
Total Number of Lecture Hours	<b>60</b>	Total Marks	100
Year of Introduction:2017-2018	Year of Offering:	Year of Revision:----	Percentage of Revision: ---

S.No	COURSE OUTCOMES	PO'S
	After the completion of the course, Students will be able to	
1	Memorize the basic principles of the modern methods of analysis.	2,7
2	Understand the basic and advanced concepts of modern methods (i.e Instrumental methods) of analysis.	1,2,7
3	Apply the instrumental methods of analysis in any chosen job role.	1,4,5
4	Interpret the role of these instrumental methods in the quantitative determination of constituents.	1,3,6

### Syllabus

Unit	Learning Units	Lecture Hours
I	<p><b>Spectro-analytical methods of analysis: Flame photometry:</b> Theory, instrumentation, combustion flames, detectors and analysis of Na, K, Ca, Mg.</p> <p><b>Atomic Absorption Spectrometer:</b> theory, instrumentation, flame and non-flame techniques, resonance line sources, hollow cathode lamp, chemical and spectral interferences, applications with special reference to analysis of trace metals in oils, alloys and toxic metals in drinking water and effluents.</p> <p><b>Inductively coupled plasma spectrometer (ICP-AES, ICP-MS):</b> Principles, instrumentation, plasma, AES detectors, quadrupole mass spectrometers, difference between the two detectors, applications.</p>	12
II	<p><b>Thermal methods of Analysis: Thermo gravimetry:</b> Theory, instrumentation, applications with special reference to <math>\text{CuSO}_4 \cdot 5\text{H}_2\text{O}</math>, <math>\text{CaC}_2\text{O}_4 \cdot 2\text{H}_2\text{O}</math>, <math>\text{CaCO}_3</math>, <math>(\text{COOH})_2 \cdot 2\text{H}_2\text{O}</math></p> <p><b>Differential thermal analysis:</b> Principle, instrumentation, difference between TG and DTA - applications with special reference to the clays and minerals, coals (fuels).</p> <p><b>Differential scanning calorimetry :</b> Principle, instrumentation, applications to inorganic materials like chlorates and per</p>	12

	chlorates, ammonium nitrate, organic compounds and drugs.	
III	<p><b>Electro analytical Methods-1: Polarographic analysis:</b> Principle and Instrumentation, Dropping mercury electrode (DME), advantages and disadvantages of DME, qualitative and quantitative analysis of inorganic ions-Cu, Bi, Pb, Cd, Zn, AC polarography, pulse polarography.</p> <p><b>Anode stripping voltametry:</b> Principle, instrumentation, Hanging mercury drop electrode, application in the analysis of Pb and Cd in environmental samples, principle of cathode stripping voltametry.</p>	12
IV	<p><b>Electro analytical methods -2 Electro gravimetric analysis:</b> Principle, important terms in electrogravimetry, decomposition voltage or decomposition potential, over voltage and their importance, instrumentation, electrolysis at constant current, determination of <math>\text{Cu}^{2+}</math> by constant current electrolysis, electrolysis at controlled potentials, determination of Cu, Pb, Sn in brass and bronze by controlled potential electrolysis.</p> <p><b>Coulometric analysis:</b> Principles of coulometric analysis with constant current and controlled potential, coulometric analysis with controlled potential, applications of coulometric methods for the analysis of cations- As(III), Fe(II) and <math>\text{I}^-</math> and <math>\text{S}^{2-}</math> by using <math>\text{I}_2</math> liberations and <math>\text{Ce}^{4+}</math> liberation in solutions.</p>	12
V	<p><b>Electro analytical methods -3 Amperometry:</b> Introduction, principle, conditions for performing amperometric titrations, advantages, titrations with rotating platinum electrode, applications.</p> <p><b>Biamperometry:</b> Principle, biamperometric titrations and its curves, applications.</p> <p><b>Cyclic voltametry:</b> Basic principles, applications.</p>	12

**Reference books:**

1. Instrumental methods of analysis - H.H Willard, Meritt Jr. and J.ADean.
2. Principles of instrumental analysis - Skoog and West.
3. Vogel's Textbook of Quantitative Inorganic analysis - J. Basset, R.C. Denney, G.H. Jefferey and J.Madhan.
4. Instrumental methods of analysis - B.K Sarma, Goel Publishing House, Meerut.
5. Instrumental methods of Analysis - Chatwal and Anand.
6. Instrumental methods of Analysis - Ewing W. Wendtland.
7. Thermal Analysis, John Wiley Sons, New York.

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**II SEMESTER  
W.E.F 2022-23 (R22 Regulations)**

**Title of the Paper: ANALYSIS OF DRUGS, FOODS, DAIRY PRODUCTS & BIOCHEMICAL  
ANALYSIS**

Course Code	<b>22CH2E3</b>	Course Delivery Method	Class Room / Blended Mode - Both
Credits	<b>4</b>	CIA Marks	30
No. of Lecture Hours / Week	<b>4</b>	Semester End Exam Marks	70
Total Number of Lecture Hours	<b>60</b>	Total Marks	100
Year of Introduction:2017-2018	Year of Offering:	Year of Revision:----	Percentage of Revision: ---

S.No	COURSE OUTCOMES	PO'S
	After the completion of the course, Students will be able to	
1	Memorize the basic principles of analysis drugs. Food, dairy products and biological analysis.	2,7
2	Understand the basic and advanced concepts of drugs. Food, dairy products and biological analysis.	1,4,7
3	Apply the analysis of drugs, foods, dairy products and biological analysis in any chosen job role.	1,4,6
4	Interpret the role of the analysis of drugs, foods and biological analysis, quantitatively.	1,3,5

### Syllabus

Unit	Learning Units	Lecture Hours
I	<b>Analysis of the following drugs and pharmaceuticals preparations:</b> (Knowledge of molecular formula, structure and analysis) Analysis of analgesics and antipyretics like aspirin and paracetamol Analysis of antimalerials like chloroquine. Analysis of drugs in the treatment of infections and infestations: Amoxycillin, chloramphenicol, metronidazole, penicillin, tetracycline. Anti tuberculous drug- isoniazid.	12
II	<b>Analysis of the following drugs and pharmaceuticals preparations:</b> (Knowledge of molecular formula, structure and analysis) Analysis of antihistamine drugs and sedatives like: allegra, zyrtec(citirizine), alprazolam, trazodone, lorazepam.	12
III	Analysis of anti epileptic and anti convulsant drugs like phenobarbital and phenacemide. Analysis of drugs used in case of cardiovascular drugs:atenolol, norvasc (amlodipine), Analysis of Lipitor (atorvastatin) a drug for the preventin of productin of cholesterol. Analysis of diuretics like: furosemide (Lasix), triamterene	12

	Analysis of prevacid (lansoprazole) a drug used for the prevention of production of acids in stomach.	
IV	<b>Analysis of Milk and Milk Products:</b> Acidity, total solids, fat, total nitrogen, protein, lactose, phosphate activity, casein, chloride Analysis of food materials. <b>Preservatives:</b> Sodium carbonate, sodium benzoate sorbic acid Flavoring agents - Vanilla, diacetyl, isoamyl acetate, limonene, ethylpropionate, allyl hexanoate and Adulterants in rice and wheat, wheat flour, sago, coconut oil, coffee powder, tea powder, milk.	12
V	<b>Clinical Analysis of Blood:</b> Composition of blood, clinical analysis, trace elements in the body. Estimation of blood cholesterol, glucose, enzymes, RBC & WBC, Blood gas analyser.	12

*Reference Books:*

- 1) F.J.Welcher-Standard methods of analysis,
- 2) A.I.Vogel-A text book of quantitative Inorganic analysis-ELBS,
- 3) F.D.Snell & F.M.Biffen-Commercial methods of analysis-D.B.Taraporavala & sons,
- 4) J.J.Elving and I.M.Kolthoff- Chemical analysis - A series of monographs on
- 5) Analytical chemistry and its applications -- Inter Science- Vol I to VII.,
- 6) Analytical Agricultural Chemistry by S.L.Chopra & J.S.Kanwar - Kalyani Publishers
- 7) Quantitative analysis of drugs in pharmaceutical formulations by P.D.Sethi, CBS Publishers and Distributors, New Delhi.
- 8) G.Ingram- Methods of organic elemental micro analysis- Chapman and Hall.
- 9) H.Wincciam and Bobbles (Henry J)- Instrumental methods of analysis of food additives.,
- 10) H.Edward-The Chemical analysis of foods; Practical treatise on the examination of food stuffs and the detection of adulterants,
- 11) The quantitative analysis of drugs- D.C.Garratt-Chapman & Hall,
- 12) A text book of pharmaceutical analysis by K.A.Connors-Wiley- International,
- 12) Comprehensive medicinal chemistry-Ed Corwin Hansch Vol 5, Pergamon Press.

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**II SEMESTER**  
**W.E.F 2022-23 (R22 Regulations)**

**Title of the Paper: Practical – I – Organic Chemistry (22CH2L1)**

S.No	COURSE OUTCOMES	PO'S
	After completion of the course, the student will be able to :	
1	To understand the importance of organic compound synthesis and identify various functional groups in the given organic compound by using systematic procedures.	1,5,7
2	To get familiarized with the procedures of different steps involved in the compound synthesis and solubility nature of organic substances of different functional groups.	1,4,6
3	To understand mechanism for synthesis and formation of derivatives of functional groups.	1,3,6
4	To apply the procedure of recrystallisation of organic compounds and preparation of functional group derivatives as and when required.	1,6,3

**List of experiments:**

1. Preparation of organic compounds: Single stage preparations by reactions involving nitration, halogenation, oxidation, reduction, alkylation, acylation, condensation and rearrangement. (A student is expected to prepare at least 5 different organic compounds by making use of the reactions given above).
2. Preparation of organic compounds: Two stage preparations by reactions involving nitration, halogenation, oxidation, reduction, alkylation, acylation, condensation and rearrangement. (A student is expected to prepare at least 5 different organic compounds by making use of the reactions given above).
3. Systematic qualitative analysis of organic compounds with different functional groups (5 different compounds)

**Course Learning Outcome(S):** After studying this paper, students will acquire the knowledge of Organic chemistry practical.

**Text books/ Reference books:**

1. A.I.Vogel, "A Text Book of Practical Organic Chemistry", Longman
2. A.I.Vogel, "Elementary Practical Organic Chemistry", Longman
3. Practical Organic Chemistry, F.G.Mann and B.C.Saunders, Longman.
4. Reaction and Synthesis in Organic Laboratory, B.S.Furniss, A.J.Hannaford, Tatchell, University Science Books Mills valley.
5. Purification of Laboratory chemicals, manual, W.L.F. Armarego EDD Perrin.
6. Reaction and Synthesis in Organic Chemistry Laboratory, Lutz-Friedjan-Tietze, Theophil Eicher, University Science Book.



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**II SEMESTER**  
**W.E.F 2022-23 (R22 Regulations)**

**Title of the Paper: Practical – II - Physical Chemistry (22CH2L2)**

S.No	COURSE OUTCOMES	PO'S
	After completion of the course, the student will be able to :	
1	Develop skills in problem solving, critical thinking and analytical reasoning in finding the CST of phenol water system and partition coefficient of benzoic acid between benzene and water, potentiometric titrations of Fe(II) with $K_2Cr_2O_7$ .	1,2,5
2	Determine the rate constants of first and second order reactions, $P^H$ and conductance of strong & weak acids and bases.	1,2,5
3	Understand the practical knowledge on Beer's law	3,5
4	Communicate the results of analysis with ethics and responsibility	1,2,4

**List of experiments:**

- Separation of Binary mixtures of Carboxylic acid + Neutral organic compounds (Solvent extraction method). (CO – 3, L - 3)
- Separation of Binary mixtures of Basic nature + Neutral organic compounds (Solvent Extraction method). (CO – 3, L - 3)
- Separation of Binary mixtures of Phenolic compounds + Neutral organic compounds (Solvent extraction method). (CO – 3, L - 3)
- Preparation of Phthalimide from Phthalic anhydride – High Temperature. (CO – 3, L - 3)
- Preparation of p-nitro acetanilide – Low temperature. (CO – 3, L - 3)
- Preparation of Iodoform – Room temperature. (CO – 3, L - 3)
- Paper chromatography - separate the given mixture of sugars. (CO – 4, L - 4)
- Paper chromatography - separate the given mixture of amino acids. (CO – 4, L - 4)
- Thin layer chromatography - separate the given mixture of phenols (CO – 4, L - 4)
- Thin layer chromatography - separate the given mixture of 2,4-DNP derivatives of carbonyls compounds. (CO – 4, L - 4)

**Text books/ Reference books:**

- A.I. Vogel, "A Text Book of Practical Organic Chemistry", Longman
- A.I. Vogel, "Elementary Practical Organic Chemistry", Longman
- F.G. Mann and B.C. Saunders, "Practical Organic Chemistry", Longman
- Reaction and Synthesis in Organic Laboratory, B.S. Furniss, A.J. Hannaford, Tatchell, University Science Books mills valley.
- Purification of Laboratory chemicals, manual, W.L.F. Armarego EDD Perrin
- Reaction and Synthesis in Organic Chemistry Laboratory, Lutz-Friedjan- Tietze, Theophil Eicher, University Science Book.

**M.Sc. DEGREE EXAMINATION  
SECOND SEMESTER  
Course Code : 22CH2T1**

Paper-I :: Advanced Inorganic Chemistry

**Time: 3 hours**

**Maximum Marks: 70**

SECTION – A	(5x4M=20M)
1 (a). Write a short note on Phosphorous-Sulphur cages.	(CO-2, L-2)
<b>(Or)</b>	
(b). Explain the bonding aspects of $[\text{Nb}_6\text{Cl}_{12}]^{2+}$ .	(CO-2, L-2)
2 (a). Define hapticity.	(CO-1, L-1)
<b>(Or)</b>	
(b). Elaborate the classification of organometallic compounds.	(CO-1, L-1)
3(a). Derive rate law of Anation reaction.	(CO-2, L-2)
<b>(Or)</b>	
(b). Write note on complementary and non-complementary reactions.	(CO-2, L-2)
4(a). Discuss how Hund's rules can be used to predict ground terms.	(CO-2, L-2)
<b>(Or)</b>	
(b). Derive the ground term of $d^3$ and $d^9$ metal ions.	(CO-3, L-3)
5(a). Give a short account on Faraday Effect.	(CO-2, L-2)
<b>(Or)</b>	
(b). Deliberate the effect of spin orbital coupling on magnetic moments.	(CO-3, L-3)
<b>SECTION – B</b>	<b>(5x10M=50M)</b>
UNIT - I	
6.(a) Describe the bonding and structure in higher boranes and Metalloboranes.	(CO-2, L-2)
<b>(Or)</b>	
(b) Discuss the structure and bonding in $[\text{Re}_2\text{Cl}_8]^{2-}$ ion.	(CO-2, L-2)
UNIT – II	
7.(a) Elucidate the applications of organometallic compounds in catalytic hydrogenation and hydroformylation.	(CO-3, L-3)
<b>(Or)</b>	
(b) Explain oxidative addition, reductive elimination reactions of organometallic compounds.	(CO-2, L-2)
UNIT – III	
8.(a) Explain the outer sphere mechanism of redox reactions.	(CO-2, L-2)
<b>(Or)</b>	
(b) Discuss the direct and indirect evidences in favour of conjugate base mechanism.	(CO-3, L-3)
UNIT - IV	
9.(a) Discuss the calculation of $D_q$ and $\beta$ parameters.	(CO-3, L-3)
<b>(Or)</b>	
b) Draw the Orgel diagram and Tanabe Sugano diagram for $d^2$ and $d^9$ configuration and explain.	(CO-2, L-2)
UNIT - V	
10.(a) Discuss the storage of dioxygen by myoglobin and write its importance.	(CO-2, L-2)
<b>(Or)</b>	
(b) Describe the factors affecting paramagnetism.	(CO-2, L-2)

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**M.Sc. DEGREE EXAMINATION  
SECOND SEMESTER**

**Course Code : 22CH2T2**

Paper-II :: Advanced Organic Chemistry

**Time: 3 hours**

**Maximum Marks: 70**

<b>SECTION – A</b>		<b>(5x4M=20M)</b>
1 (a). Explain Shapiro reaction.		(CO-2, L-2)
	<b>(Or)</b>	
(b). Explain Stobbe condensation.		(CO-2, L-2)
2 (a). Write notes on configuration and conformation.		(CO-1, L-1)
	<b>(Or)</b>	
(b). Explain enantiomers with suitable examples.		(CO-1, L-1)
3(a). Draw the structures of the cyclohexane boat and twist boat structures.		(CO-1, L-1)
	<b>(Or)</b>	
(b). Discuss conformation and intramolecular hydrogen bonding.		(CO-2, L-2)
4(a). Discuss Clean Fischer Indole synthesis.		(CO-3, L-3)
	<b>(Or)</b>	
(b). Write notes on Biocatalysis.		(CO-1, L-1)
5(a). Define nano explain.		(CO-1, L-1)
	<b>(Or)</b>	
(b). Write general properties of carbon nano tubes.		(CO-1, L-1)
<b>SECTION – B</b>		<b>(5x10M=50M)</b>
<b>UNIT - I</b>		
6.(a) Discuss the mechanism of the following (i) Benzoin condensation. (ii) Reformatsky reaction.		(CO-2, L-2)
	<b>(Or)</b>	
(b) Discuss the definition and mechanism of (i) Wittig reaction (ii) Acyloin condensation.		(CO-2, L-2)
<b>UNIT – II</b>		
7.(a) Explain the various elements of symmetry with suitable examples.		(CO-1,L-1)
	<b>(Or)</b>	
(b) Discuss the various methods for determination of configuration of geometrical isomers with suitable examples.		(CO-1,L-1)
<b>UNIT – III</b>		
8.(a) Discuss the conformational analysis of cyclohexane and explain the stabilities.(CO-1, L-1)		
	<b>(Or)</b>	
(b) Write an account of conformation around C – N and C – O hetero atom bonds.(CO-1, L-1)		
<b>UNIT - IV</b>		
9.(a) Discuss the principles of green chemistry.		(CO-2,L-2)
	<b>(Or)</b>	
(b) Explain the theory, principle and advantages of MicroWave (MW) organic synthesis.		(CO-2,L-2)
<b>UNIT - V</b>		
10.(a) Explain growth mechanism of carbon nanotubes.		(CO-2, L-2)
	<b>(Or)</b>	
(b) Give an applications of carbon nanotubes.		(CO-2,L-2)

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**M.Sc. DEGREE EXAMINATION**  
**SECOND SEMESTER**  
**Course Code : 22CH2T3**  
Paper-IV :: Advanced Physical Chemistry

**Time: 3 hours**

**Maximum Marks: 70**

**SECTION – A**

**(5x4M=20M)**

- 1 (a). Explain briefly Nernst Heat theorem. (CO-2, L-2)  
(Or)  
(b). Discuss Third law of thermodynamics in short. (CO-2, L-2)
- 2 (a). Demonstrate Classification of polymers. (CO-3, L-3)  
(Or)  
(b). Describe the Free radical polymerization with appropriate mechanism. (CO-2, L-2)
- 3(a). Explain Branching Chain Reactions in short. (CO-2, L-2)  
(Or)  
(b). Discuss briefly Hydrogen oxygen reaction with appropriate mechanism. (CO-2, L-2)
- 4(a). Discuss briefly Double layer at the interface. (CO-2, L-2)  
(Or)  
(b). Explain over potential in short. (CO-2, L-2)
- 5(a). What is radioactivity? Describe the properties of alpha rays. (CO-2, L-2)  
(Or)  
(b). Discuss briefly the theory of radioactive disintegration. (CO-2, L-2)

**SECTION – B**

**(5x10M=50M)**

UNIT - I

- 6.(a) Derive Fermi-Dirac statistics. (CO-3, L-3)  
(b) Derive Bose Einstein statistics. (CO-3, L-3)  
(Or)  
(c) Derive Chemical equilibrium in terms of partition function. (CO-3, L-3)  
(d) Derive Entropy of Monoatomic gases (Sackur-Tetrode equation). (CO-3, L-3)

UNIT – II

- 7.(a) Illustrate Zeigler -Natta Polymerization with suitable example. (CO-3, L-3)  
(Or)  
(b) Differentiate between Number average and Weight average weight of a polymer in detail. (CO-3, L-3)

UNIT – III

- 8.(a) Discuss with a neat labelled diagram Standard hydrogen electrode and Calomel electrode in detail. (CO-2, L-2)  
(Or)  
(b) Demonstrate the conductometric titrations in detail with a neat labelled graphs. (CO-3, L-3)

UNIT - IV

- 9.(a) What are Fast reactions ? Discuss the Study of kinetics by flow methods and Relaxation methods With a neat labeled diagram. (CO-3, L-3)  
(Or)  
(b) Differentiate between protolytic and prototropic mechanisms of Acid Base catalysis. (CO-3, L-3)

UNIT - V

- 10.(a) Explain the rate of disintegration in detail. (CO-2, L-2)  
(b) Discuss the Geiger – Nuttal rule. (CO-2, L-2)  
(Or)  
(c) Discuss the radioactive equilibrium. (CO-2, L-2)  
(d) What are isotopes? Illustrate radioactive and non-radioactive isotopes in detail. (CO-3, L-3)

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**M.Sc. DEGREE EXAMINATION  
SECOND SEMESTER  
Course Code : 22CH2 E1**

Elective Paper- :: Molecular Spectroscopy

**Time: 3 hours**

**Maximum Marks: 70**

<b>SECTION – A</b>		<b>(5x4M=20M)</b>
1 (a). Write a short note on Degrees of Freedom of a rigid body <b>(Or)</b>		(CO-2, L-2)
(b). Explain the effect of Isotopic substitution on the transition frequencies.		(CO-2, L-2)
2 (a). Define Zero point Energy and force constant. <b>(Or)</b>		(CO-1, L-1)
(b). Elaborate the importance of Morse Potential in vibration spectroscopy.		(CO-1, L-1)
3 (a). State the Mutual Exclusion Principle <b>(Or)</b>		(CO-2, L-2)
(b). Write note on Classical theory of Raman effect.		(CO-2, L-2)
4(a). Discuss electronic Spectra of Diatomic molecules. <b>(Or)</b>		(CO-2, L-2)
(b). Explain the classification of bands in Electronic spectroscopy.		(CO-2, L-2)
5(a). Give a short account of Krammers degeneracy. <b>(Or)</b>		(CO-2, L-2)
(b). Deliberate the spin Hamiltonian in ESR spectroscopy.		(CO-2, L-2)
<b>SECTION – B</b>		<b>(5x10M=50M)</b>
<b>UNIT - I</b>		
6.(a) Describe the Non-rigid rotator of rotational spectrum. <b>(Or)</b>		(CO-2, L-2)
(b) Discuss the Microwave spectra of polyatomic molecules .		(CO-2, L-2)
<b>UNIT – II</b>		
7.(a) Elucidate the importance of Born-oppenheimer approximation in vibrational spectroscopy. <b>(Or)</b>		(CO-2, L-2)
(b) Explain PQR Branches, Overtones and Hot bands in IR spectroscopy.		(CO-2, L-2)
<b>UNIT – III</b>		
8.(a) Explain the CARS. <b>(Or)</b>		(CO-2, L-2)
(b) Write about Resonance Raman spectroscopy.		(CO-3, L-3)
<b>UNIT - IV</b>		
9.(a) Discuss in detail Electronic spectra of ployatomic molecules. <b>(Or)</b>		(CO-3, L-3)
(b) Write a note on electronic transtitions and electronic spectra of diatomic molecules.(CO-2, L-2)		
<b>UNIT - V</b>		
10.(a) Discuss in detail hyper fine splitting in methyl and ethyl radicals . <b>(Or)</b>		(CO-2, L-2)
(b) Describe the factors affecting the 'g' value in ESR spectroscopy.		(CO-2, L-2)

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**M.Sc. DEGREE EXAMINATION  
SECOND SEMESTER  
Course Code : 22CH2E2**

Elective Paper:: Instrumental Methods of Analysis

**Time: 3 hours**

**Maximum Marks: 70**

**SECTION – A**

**(5x4M=20M)**

- 1 (a). Explain briefly the analysis of Na, K, Ca, Mg by using Flame photometry. (CO-2, L-2)  
(Or)  
(b). Discuss the theory involved in AAS. (CO-2, L-2)
- 2 (a). Elaborate the theory in TG. (CO-2, L-2)  
(Or)  
(b). Describe the principle involved in Differential Scanning Calorimetry . (CO-2, L-2)
- 3(a). Explain instrumentation of dropping mercury electrode. (CO-2, L-2)  
(Or)  
(b). Write about Cathode Stripping Voltametry. (CO-2, L-2)
- 4(a). Discuss briefly the important terms in electro gravimetry. (CO-2, L-2)  
(Or)  
(b). Explain determination of Cu, Pb by controlled potential electrolysis. (CO-2, L-2)
- 5 (a). What are amperometric titrations? Describe the advantages of amperometric titrations. (CO-2, L-2)  
(Or)  
(b). Discuss briefly the theory of Cyclic Voltametry. (CO-2, L-2)

**SECTION – B**

**(5x10M=50M)**

UNIT - I

- 6.(a) Elucidate the instrumentation & Principle of AAS in detail. (CO-2, L-2)  
(Or)  
(b) Discuss the instrumentation of ICP-AES, ICP-MS in detail. (CO-2, L-2)

UNIT – II

- 7.(a) Illustrate Thermo gravimetry applications of  $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ ,  $\text{CaC}_2\text{O}_4 \cdot 2\text{H}_2\text{O}$ ,  $\text{CaCO}_3$ . (CO-3, L-3)  
(Or)  
(b) Write a note on applications of DSC to inorganic materials. (CO-3, L-3)

UNIT – III

- 8.(a) Discuss the principle and instrumentation of Anode stripping voltametry (CO-2, L-2)  
(Or)  
(b) Explain the advantages and disadvantages of DME. (CO-2, L-2)

UNIT - IV

- 9.(a) What is the importance of decomposition potential, over voltage. (CO-2, L-2)  
(b) Explain the instrumentation of Electro gravimetry. (CO-2, L-2)  
(Or)  
(c) Write a note on coulometric analysis of cations-As(III), Fe(II), I<sup>-</sup> and S<sup>2-</sup> by using I<sub>2</sub> liberation and Ce<sup>4+</sup> liberation in solutions. (CO-2, L-2)

UNIT - V

- 10.(a) What are the conditions for performing amperometric titrations, biamperometric titrations. (CO-2, L-2)  
(Or)

- (b) Discuss the advantages and applications of amperometric titrations (CO-2, L -2)

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**M.Sc. DEGREE EXAMINATION  
SECOND SEMESTER**

Elective Paper:: **Analysis of Drugs, Foods, Dairy Products & Biochemical Analysis**  
Course Code : 22CH2E3

**Time: 3 hours**

**Maximum Marks: 70**

**SECTION – A**

**(5x4M=20M)**

- 1 (a). Discuss the analysis of Aspirin. (CO-2, L-2)  
(Or)  
(b). Explain the analysis of Paracetamol. (CO-2, L-2)
- 2 (a). Discuss the analysis of Allegra. (CO-2, L-2)  
(Or)  
(b). Explain the analysis of Citrizine. (CO-2, L-2)
- 3(a). Discuss the analysis of Phenobarbital. (CO-2, L-2)  
(Or)  
(b). Explain the phenacemide. (CO-2, L-2)
- 4(a). Discuss the acidity of milk shortly. (CO-2, L-2)  
(Or)  
(b). Explain the total solid fat of milk. (CO-2, L-2)
- 5 (a). Discuss the composition of blood. (CO-2, L-2)  
(Or)  
(b). Explain the chemical analysis of blood. (CO-2, L-2)

**SECTION – B**

**(5x10M=50M)**

**UNIT - I**

- 6.(a) Discuss the analysis of (i) chloroquine and (ii) Amoxycillin (CO-2, L-2)  
(Or)  
(b) Explain the analysis of chloramphenicol and metronidazole. (CO-2, L-2)

**UNIT – II**

- 7.(a) Discuss the analysis of alprazolam and trazodone. (CO-3, L-3)  
(Or)  
(b) Explain the analysis of lorazepam. (CO-3, L-3)

**UNIT - III**

- 8.(a) Discuss the analysis of atenolol and norvasc. (CO-2, L-2)  
(Or)  
(b) Explain the analysis of Lipitor and Furosemide in detail. (CO-2, L -2)

**UNIT – IV**

- 9.(a) Discuss the analysis of protenines and lactose. (CO-2, L-2)  
(Or)  
(b) Explain the analysis of phosphate activity and chloride analysis of food materials. (CO-2, L-2)

**UNIT - V**

- 10.(a) Give an account of chemical estimation of blood glucose. (CO-2, L-2)  
(Or)  
(b) Discuss in detail estimation of blood cholesterol in detail. (CO-2, L-2)

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P.B.Siddhartha College of Arts & Science : : Vijayawada – 520 010

Department of Chemistry

CIA Practicals

**Total Marks – 30 M**

We are assessing 10 marks for each practical. The scheme is as follows

Experiment – 6M

Observation– 2M

Result - 2M

We have no practical internal examination at the end of the each semester. However we consider 10 marks for each practical of total 10 practicals i.e (10 x 10M = 100M), then we reduce to 30M as internal practical marks.

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### **M.Sc. DEGREE EXAMINATION**

External Practical Model Paper

**Time: 6 hours**

**Maximum Marks: 70**

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- |    |   |        |
|----|---|--------|
| 1. | To write the principle and procedure / mechanism related to practical as listed in the practical syllabus | – 5 M  |
| 2. | Record  | – 10 M |
| 3. | Experiment (Procedure / Tabulation / calculation etc.,)   | – 50 M |
| 4. | Result / Graphs / Yield / Report  | – 5 M  |

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**P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE**  
**DEPARTMENT OF CHEMISTRY**  
**M.Sc – CHEMISTRY (ORGANIC CHEMISTRY)**  
**IV SEMESTER**  
**W.E.F 2022-23 (R22 Regulations)**

**Title of the Paper: MOOCS – ANALYTICAL CHEMISTRY**

Course Code	<b>20CH4M2</b>	Course Delivery Method	Class Room / Blended Mode - Both
Credits	<b>4</b>	CIA Marks	30
No. of Lecture Hours / Week	<b>4</b>	Semester End Exam Marks	70
Total Number of Lecture Hours	<b>60</b>	Total Marks	100
Year of Introduction:2022-2023	Year of Offering:	Year of Revision:----	Percentage of Revision: New

S.No	COURSE OUTCOMES	PO'S
	After the completion of the course, Students will be able to	
1	Memorize basic concepts of analytical chemistry, chemical equilibrium, absorption spectrometry, thermal methods of analysis and potentiometry.	2,7
2	Understand the principle, theory and advanced aspects of analytical chemistry, chemical equilibrium, absorption spectrometry, thermal methods of analysis and potentiometry.	1,3,7
3	Display the knowledge gained in the areas of analytical chemistry, chemical equilibrium, absorption spectrometry, thermal methods of analysis and potentiometry in chosen job role.	1,6,4
4	Analyse the role of analytical chemistry, chemical equilibrium, absorption spectrometry, thermal methods of analysis and potentiometry as and when required.	1,5,7

### Syllabus

Unit	Learning Units	Lecture Hours
I	<b>Basic introduction to nature of analytical chemistry</b> Quantitative methods Qualitative methods , Flow diagrams ,Chemistry in toxicology ,Examples for quantitative and qualitative methods, real life examples ROLE : sample preparation basic techniques for analysis physical separation , separation in liquids ,micro analytical balance ,filtration techniques ,wet washing ,dry Ashing , crucibles, filter paper uses of crucibles and filter papers stereo chemical modes are applied [supra +supra] : supra-anta Antra, supra Antra- anta.	12
II	<b>Chemical equilibria,</b> Chemical equilibria in nature chemical equilibria in analytical chemistry, equilibria between strong and weak acids , equilibrium state, different acids, types of equilibria as basis of chemical analysis, equilibria and equilibria constants , importance in analytical chemistry, salt hydrolysis, titration curves , common ion effect , formation constant for complex ions, Introduction from different titrimetric methods, henderson hesselbalch equation, spectro chemical methods , acid base titrations, acid base titration indicators.	12

III	<b>Absorption Spectrometry</b> , instruments , beers law, different transitions , chromophores , d-d , f-f, C-T transitions and applications, chromophoric reagents , analysis of mixture , applying beers law to mixtures , applications – photometric titrations, spectro photometric titrations, A) complexing agent B) complex ion in solution , infrared absorption spectroscopy A)theory B) principle C) instrumentation for IR, FTIR techniques A) theory B) principle, instrumentation of FTIR , uses and interterometer.	12
IV	<b>Thermal method of analysis</b> , Introduction ,dynamic measurement, thermo gravimetric analysis, differential thermal analysis , differential scanning calorimerty, thermo balance, thermal techniques and uses , thermal analysis – solids , Standardisation, geometric estimation, water content, TG-plot , thermo gravimetry – example, mixture of solids in TG, introduction of DTG, samples , furnaces and crucibles, DT, uses of DTG data, food analysis, introduction to DTG, DTA , instruments, uses and applications, DSC, instruments uses and applications, Introduction, electron transfer reactions, electrodes, electrode potential, standard electrode potential, nernest equation, applications of nernest equation, precipitaion /complex ions in nernest equation, electro chemical method of analysis, potentiometry, reference electrode.	12
V	<b>Potentiometers</b> , cells, potentiometric titrations, Use of oxidising and reducing agents , redox potential, potentiometric titrations, uses of oxidising and reducing agents, electrode potentials, IR drop In electrochemical cells, ohmic potential electro gravimetric method , controlled potential coulometry, Its uses in synthesis , colorimetric titrations Applications, electrochemical methods, volumetric methods, analytical method , voltametry, cyclic voltametry – waveforms , CV plot, CV and its application to identity, potential pulses, Differential pulses.	12

#### Reference Books:

1. Physical chemistry, G.K. Vemulapalli (Prentice Hall of India).
2. Physical chemistry, P.W. Atkins. ELBS.
3. Text book of Physical Chemistry, Samuel Glasstone, Macmillan pub.
4. Quantitative Analysis, A.I.Vogel, Addison Wesley Longmann Inc.
5. Fundamentals of Analytical Chemistry, Skoog & West
6. Quantitative Analysis, Day & Underwood.
7. Instrumental Methods of Analysis, H.H.WAILLARD, Merritt.Jr and J.A.D.Can
8. Instrumental Methods of Analysis, Ewing W.Wend & Pand
9. Instrumental Methods of Analysis, B.K.Sharma
10. Instrumental Methods of Analysis, Chatwel & Anand.
11. Analytical Chemistry, An introduction, D.A.Skoog, D.M.West & F.J.Holler, Sanders college Publishing, Newyork.

**M.Sc. DEGREE EXAMINATION  
FOURTH SEMESTER**

**Paper-I :: MOOCS**

**Time: 3 hours**

**Maximum Marks: 70**

**SECTION – A**

Answer all the questions. Each question carries 2 marks. (10x2=20M)

1. What is toxicology and explain with a suitable example. (L-2)
2. Discuss any one method of quantitative analysis. (L-1)
3. Explain equilibria between strong and weak acids. (L-2)
4. Discuss salt hydrolysis in detail. (L-2)
5. Explain Beers law in detail. (L-2)
6. Discuss chromophores in detail. (L-2)
7. Explain uses of oxidizing and reducing agents. (L-1)
8. Discuss IR drop in electrochemical cells. (L-2)
9. Explain thermo gravimetric analysis. (L-3)
10. Discuss differential thermal analysis. (L-2)

**SECTION – B**

**(10x5=50M)**

UNIT – I

11. a) Explain flow diagrams in detail. (L-2)  
**(Or)**  
b) Explain (i) Micro analytical balance (ii) Filtration techniques. (L-2)

UNIT – II

12. a) Explain the types of equilibria on basis of chemical analysis. (L-2)  
**(Or)**  
b) Discuss in detail (i) Titration curves (ii) Common ion effect. (L-2)

UNIT – III

13. a). Explain d – d, f – f transitions and its applications in detail. (L-2)  
**(Or)**  
b) Discuss chromophoric reagents and applying Beers law to mixtures. (L-2)

UNIT – IV

14. a) Discuss the (i) differential scanning calorimetry (ii) TG – plot. (L-3)  
**(Or)**  
b) Discuss (i) Geometric estimation (ii) Furnaces and crucibles (L-2)

UNIT - V

15. a) Discuss in detail potentiometric titrations with a neat labeled diagram. (L-2)  
**(Or)**  
b) Explain controlled potential coulometry with a neat labeled diagram. (L-3)

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## DEPARTMENT OF COMPUTER SCIENCE

Minutes of the meeting of Board of Studies in Computer Science for PG Programs held on 18<sup>th</sup> March 2023 (Saturday) at 11 A.M. in the Department of Computer Science.

Name of the Member	Role
Dr.T.S.Ravi Kiran, HOD, Dept of CS, P.B. Siddhartha College of Arts & Science. Mobile: 9441176980, Email: tsravikiran@pbsiddhartha.ac.in, kirantsr1@gmail.com	Chairman
Dr.R. Vijaya Kumari, Krishna University, Machilipatnam. Email: vijayakumari28@gmail.com, Mobile : 9948593964	University Nominee (Appeared through Online )
Dr.M. Babu Reddy, Principal, Krishna University College of Engineering and Technology, Krishna University, Machilipatnam. Mobile: 9963436460, Email: m_babureddy@yahoo.com	Subject Expert (Appeared through Online )
Dr.P.Deepalakshmi, ME, Ph.D. Professor and Dean, School of Computing Kalasalingam Academy of Research and Education Krishnankoil - 626126. Viridhunagar (Dist), Tamil Nadu, India. Email: deepa.kumar@klu.ac.in, deansoc@klu.ac.in Mobile: 9865061291, 8838010443.	Subject Expert
Bharat Kumar Reddy Gujavarti (M.C.A, PGDHRM), Hyderabad Founder & CEO, Pragmatiq Systems Inc Director, Sunblue Technologies; Co-founder, Edify Email: bharat@pragmatiq.in, Mobile: 8978191977	Industrialist
Shankar Lakkaraju, M.C.A: 1999-2002 Product Director, Blue Yonder India Email: shankar.lakkaraju@gmail.com Mobile: 98851 65651	Alumnus (Appeared through Online )
Ms.K.Priya, Asst Prof, P.B.Siddhartha College of Arts & Science. Mobile:7989782245	Member
Mrs. A.Kavitha, Asst Prof, P.B.Siddhartha College of Arts & Science. Mobile: 9493486272	Member
Mr. G.Samrat Krishna, Asst Prof, P.B.Siddhartha College of Arts & Science. Mobile: 9177937461	Member
Ms.R.Jayamma, Asst Prof, P.B.Siddhartha College of Arts & Science. Mobile: 9989895732	Member
Mrs. K.Sirisha, Asst Prof, P.P.B.Siddhartha College of Arts & Science. Mobile: 7032617871	Member
Mrs.K.Raja Sree, Asst Prof, P.P.B.Siddhartha College of Arts & Science. Mobile: 9492712745	Member
Mr.S.Tulasi Prasad, Asst Prof, P.P.B.Siddhartha College of Arts & Science. Mobile: 9985762476	Member
Mr.V.V.Ramana, Systems Analyst, P.B.Siddhartha College of Arts & Science. Mobile: 7989415546	Member

## AGENDA

1. To discuss and approve the *Programme Structure and Syllabi of Second Semester of M.Sc.(Computer Science), M.C.A and M.Sc.(Computational Data Science) Programmes* for the batch of students admitted from the Academic Year 2022-2023(R22) and onwards.
2. To recommend the policy to complete *MOOCS Certification*.
3. To discuss the Structure, Syllabi and Model Question Papers of *Fourth Semester of M.Sc.(Computer Science), M.C.A and M.Sc.(Computational Data Science) Programmes* for the batch of students admitted from the academic year 2021-2022(R20) and onwards.
4. To discuss about Rubrics for Allocating Marks for Project Work.

## RECOMMENDATIONS FOR M.Sc.(COMPUTR SCIENCE) PROGRAMME

- As per the new regulations recommended by the Krishna University with effect from 2022-2023(R22), new structure is formulated for *M.Sc.(Computer Science) Programme*. The *Program Structure and Syllabi of Second Semester* may be approved for the batch of students admitted in the academic year 2022-2023.

Percentage of change of syllabus between the Regulation 2021-2022 (R20) & 2022-2023 (R22) for Second Semester of M.Sc.(Computer Science) Programme								
SEMESTER II								
Academic Year: 2021-2022 (Second Semester)				Academic Year: 2022-2023 (Second Semester)				
S.No	Course Code	Title of Course	Credits	S.No	Course Code	Title of Course	Credits	Percentage of Change
1	20CS2T1	Computer Networks	4	1	22CS2T1	Computer Networks	4	Nil
2	20CS2T2	Data Structures	4	2	22CS2T2	Data Structures	4	Nil
3	20CS2T3	Web Technologies	4	3	22CS2T3	Web Technologies	4	10%
4	20CS2T4	Operating Systems	4	4	22CS2E1	Software Engineering	4	100%
5	21OE2	Mobile Application Development	4	5	22PG201	Research Methodology & IPR	3	100%
6	20CS2L1	Computer Networks & Operating Systems Lab	4	6	22CS2L2	Web Technologies Lab	3	Nil
7	20CS2L2	Data Structures Lab	4	7	22CS2L1	Data Structures Lab	3	Nil
8	20CS2TRW	Technical Report Writing	1	8	Nil	Nil	Nil	Nil
Total			29				25	
Percentage of change in Second Semester: 30%								

1. It is resolved and recommended to adopt the syllabus & model question paper of the course “Computer Networks” with course code “20CS2T1” as “Computer Networks” with course code “22CS2T1” in II semester of M.Sc.(Computer Science) programme from the batch of students admitted in 2022-23 and onwards. For the syllabus and model question paper vide page number from 9 to 11.
2. It is resolved and recommended to adopt the syllabus & model question paper of the course “Data Structures” with course code “20CS2T2” as “Data Structures” with course code “22CS2T2” in II semester of M.Sc.(Computer Science) programme from the batch of students admitted in 2022-23 and onwards. For the syllabus and model question paper vide page number from 12 to 14.
3. It is resolved and recommended to revise the syllabus & model question paper of the course “Web Technologies” with course code “20CS2T3” as “Web Technologies” with course code “22CS2T3” in II semester of M.Sc.(Computer Science) programme from the batch of students admitted in 2022-23 and onwards. For the syllabus and model question paper vide page number from 15 to 17.

4. It is resolved and recommended to introduce the syllabus & model question paper of the course “Software Engineering” with course code “22CS2E1” in place of “Operating Systems” with course code “20CS2T4” in II semester of M.Sc.(Computer Science) programme from the batch of students admitted in 2022-23 and onwards. For the syllabus and model question paper vide page number from 18 to 22.
5. It is resolved and recommended to introduce the syllabus & model question paper of the course “Research Methodology& IPR” with course code “22PG201” in place of “Mobile Application Development” with course code “21OE2” in II semester of M.Sc.(Computer Science) programme from the batch of students admitted in 2022-23 and onwards. For the syllabus and model question paper vide page numbers 75 to 77.
6. It is resolved and recommended to adopt the syllabus & model question paper of the course “Data Structures Lab” with course code “20CS2L2” as “Data Structures Lab” with course code “22CS2L1” in II semester of M.Sc.(Computer Science) programme from the batch of students admitted in 2022-23 and onwards. For the syllabus and model question paper vide page number from 23 to 24.
7. It is resolved and recommended to introduce the syllabus & model question paper of the course “Web Technologies Lab” with course code “22CS2L2” in place of “Computer Networks & Operating Systems Lab” with course code “20CS2L1” in II semester of M.Sc.(Computer Science) programme from the batch of students admitted in 2022-23 and onwards. For the syllabus and model question paper vide page number from 25 to 26.
8. Resolved and recommended to adopt the *Program Structure, Syllabi and Model Question Papers* of M.Sc.(Computer Science) in line with the guidelines of OBE following the Bloom’s Taxonomy for the batch of students admitted from the academic year 2021-2022(R20) and onwards.

### RECOMMENDATIONS FOR M.C.A PROGRAMME

- As per the new regulations recommended by the Krishna University with effect from 2022-2023(R22), new structure is formulated for M.C.A Programme. The *Program Structure and Syllabi of Second Semester* may be approved for the batch of students admitted in the academic year 2022-2023.

Percentage of change of syllabus between the Regulation 2021-2022 (R20) & 2022-2023 (R22) for Second Semester of M.C.A Programme								
SEMESTER II								
Academic Year: 2021-2022 (Second Semester)				Academic Year: 2022-2023 (Second Semester)				
S.No	CourseCode	Title of Course	Credits	S.No	Course Code	Title of Course	Credits	Percentage of Change
1	20CA2T1	Data Mining Techniques	4	1	22PG201	Research Methodology& IPR	4	100%
2	20CA2T2	Operating Systems	4	2	22CA2E1	Software Engineering	4	100%
3	20CA2T3	Data Structures	4	3	22CA2T2	Data Structures	4	Nil
4	20CA2T4	Computer Networks	4	4	22CA2T1	Computer Networks	4	Nil
5	20CA2T5	Web Technologies	4	5	22CA2T3	Web Technologies	3	10%
6	21OE2	Mobile Application Development	4	6	Nil	Nil	Nil	Nil
7	20CA2L1	Web Technologies Lab	4	7	22CA2L2	Web Technologies Lab	3	Nil
8	20CA2L2	Data Structures Lab	4	8	22CSAL1	Data Structures Lab	3	Nil
9	20CA2TRW	Technical Report Writing	1	9	Nil	Nil	Nil	Nil
Total			33				25	
Percentage of change in Second Semester: 30%								

1. It is resolved and recommended to adopt the syllabus & model question paper of the course “Computer Networks” with course code “20CA2T4” as “Computer Networks” with course code “22CA2T1” in II semester of M.C.A. programme from the batch of students admitted in 2022-23 and onwards. For the syllabus and model question paper vide page number from 30 to 32.

2. It is resolved and recommended to adopt the syllabus & model question paper of the course “Data Structures” with course code “20CA2T3” as “Data Structures” with course code “22CA2T2” in II semester of M.C.A. programme from the batch of students admitted in 2022-23 and onwards. For the syllabus and model question paper vide page number from 33 to 35.
3. It is resolved and recommended to revise the syllabus & model question paper of the course “Web Technologies” with course code “20CS2T5” as “Web Technologies” with course code “22CS2T3” in II semester of M.C.A. programme from the batch of students admitted in 2022-23 and onwards. For the syllabus and model question paper vide page number from 36 to 38.
4. It is resolved and recommended to introduce the syllabus & model question paper of the course “Software Engineering” with course code “22CA2E1” in place of “Operating Systems” with course code “20CA2T2” in II semester of M.C.A. programme from the batch of students admitted in 2022-23 and onwards. For the syllabus and model question paper vide page number from 39 to 43.
5. It is resolved and recommended to introduce the syllabus & model question paper of the course “Research Methodology& IPR” with course code “22PG201” in place of “Data Mining Techniques” with course code “20CA2T1” in II semester of M.C.A. programme from the batch of students admitted in 2022-23 and onwards. For the syllabus and model question paper vide page numbers 75 to 77.
6. It is resolved and recommended to adopt the syllabus & model question paper of the course “Data Structures Lab” with course code “20CA2L2” as “Data Structures Lab” with course code “22CA2L1” in II semester of M.C.A. programme from the batch of students admitted in 2022-23 and onwards. For the syllabus and model question paper vide page number from 44 to 45.
7. It is resolved and recommended to adopt the syllabus & model question paper of the course “Web Technologies Lab” with course code “20CA2L1” as “Web Technologies Lab” with course code “22CA2L2” in II semester of M.C.A. programme from the batch of students admitted in 2022-23 and onwards. For the syllabus and model question paper vide page number from 46 to 47.
8. Resolved and recommended to adopt the Program Structure, Syllabi and Model Question Papers of M.C.A in line with the guidelines of OBE following the Bloom’s Taxonomy for the batch of students admitted from the academic year 2021-2022(R20) and onwards.

### **RECOMMENDATIONS FOR M.Sc.(Computational Data Science) PROGRAMME**

- As per the new regulations recommended by the Krishna University with effect from 2022-2023(R22), new structure is formulated for M.Sc.(Computational Data Science) Programme. The *Program Structure* and *Syllabi of Second Semester* may be approved for the batch of students admitted in the academic year 2022-2023.

Percentage of change of syllabus between the Regulation 2021-2022 (R20) & 2022-2023 (R22) for Second Semester of M.Sc.(Computational Data Science) Programme								
<b>SEMESTER II</b>								
Academic Year: 2021-2022 (Second Semester)				Academic Year: 2022-2023 (Second Semester)				
S.No	CourseCode	Title of Course	Credits	S.No	Course Code	Title of Course	Credits	Percentage of Change
1	21DS2T1	Essentials of Statistics for Data Science using R	4	1	22DS2T1	Essentials of Statistics for Data Science using R	4	10%
2	21DS2T2	Machine Learning	4	2	22DS2T2	Machine Learning	4	Nil
3	21DS2T3	Internet of Things	4	3	22PG201	Research Methodology& IPR	3	100%
4	21DS2T4	Design & Analysis of Algorithms	4	4	22DS2E2	Design & Analysis of Algorithms	4	Nil
5	21OE03	Web Technologies	4	5	22DS2T3	Web Technologies	4	Nil
6	21DS2L1	Machine Learning Lab	3	6	22DS2L1	Machine Learning Lab	3	Nil
7	21DS2L2	Web Technologies Lab	3	7	22DS2L2	Web Technologies Lab	3	Nil
8	21DS2TRW	Technical Report Writing	1	8	Nil	Nil	Nil	Nil
Total			27				25	
Percentage of change in Second Semester: 15.71%								

1. It is resolved and recommended to revise the syllabus & model question paper of the course “Essentials of Statistics for Data Science using R” with course code “21DS2T1” as “Essentials of Statistics for Data Science using R” with course code “22DS2T1” in II semester of M.Sc.(Computational Data Science) programme from the batch of students admitted in 2022-23 and onwards. For the syllabus and model question paper vide page number from 51 to 53.
2. It is resolved and recommended to adopt the syllabus & model question paper of the course “Machine Learning” with course code “21DS2T2” as “Machine Learning” with course code “22DS2T2” in II semester of M.Sc.(Computational Data Science) programme from the batch of students admitted in 2022-23 and onwards. For the syllabus and model question paper vide page number from 54 to 56.
3. It is resolved and recommended to adopt the syllabus & model question paper of the course “Web Technologies” with course code “21OE04” as “Web Technologies” with course code “22DS2T3” in II semester of M.Sc.(Computational Data Science) programme from the batch of students admitted in 2022-23 and onwards. For the syllabus and model question paper vide page number from 57 to 59.
4. It is resolved and recommended to adopt the syllabus & model question paper of the course “Design & Analysis of Algorithms” with course code “21DS2T4” as “Design & Analysis of Algorithms” with course code “22DS2E2” in II semester of M.Sc.(Computational Data Science) programme from the batch of students admitted in 2022-23 and onwards. For the syllabus and model question paper vide page number from 60 to 62.
5. It is resolved and recommended to introduce the syllabus & model question paper of the course “Research Methodology& IPR” with course code “22PG201” in place of “Internet of Things” with course code “21DS2T3” in II semester of M.Sc.( Computational Data Science) programme from the batch of students admitted in 2022-23 and onwards. For the syllabus and model question paper vide page number from 75 to 77.
6. It is resolved and recommended to adopt the syllabus & model question paper of the course “Machine Learning Lab” with course code “21DS2L1” as “Machine Learning Lab” with course code “22DS2L1” in II semester of M.Sc.( Computational Data Science) programme from the batch of students admitted in 2022-23 and onwards. For the syllabus and model question paper vide page number from 63 to 64.
7. It is resolved and recommended to adopt the syllabus & model question paper of the course “Web Technologies Lab” with course code “21DS2L2” as “Web Technologies Lab” with course code “22DS2L2” in II semester of M.Sc.(Computational Data Science) programme from the batch of students admitted in 2022-23 and onwards. For the syllabus and model question paper vide page number from 65 to 66.
9. Resolved and recommended to adopt the Program Structure, Syllabi and Model Question Papers of M.Sc.(Computational Data Science) in line with the guidelines of OBE following the Bloom’s Taxonomy for the batch of students admitted from the academic year 2021-2022 and onwards. For the syllabus and model question paper vide page number from 67 to 74.

### **RECOMMENDATIONS FOR PROJECT WORK**

- Resolved and recommended to introduce the Rubrics for Allocating Marks for Project Work. Refer page number from 77 to 78.



**APPENDIX-I**  
**PROGRAM STRUCTURE & SECOND SEMESTER SYLLABI FOR M.Sc.(COMPUTER SCIENCE)**  
**PROGRAMME (R22)**



**P.B.Siddhartha College of Arts & Science, Vijayawada**  
**Programme Structure for M.Sc.(Computer Science)**  
**Under Choice Based Credit System (CBCS), W.E.F 2022-23 (R22 Regulations)**

I SEMESTER (For the batch of students admitted during 2022-2023)					M.Sc.(Computer Science)			
Course Code	Course Name	Teaching Hours / Week			CORE/IDC/DSE/SEC/OE C/MOOCs	CIA	SEE	No. of Credits
		Lecture	Practical	Tutorial				
22CS1T1	Programming and Problem Solving Using Python	4	0	0	Core	30	70	4
22CS1T2	Database Management Systems	4	0	0	Core	30	70	4
22CS1T3	Formal Languages and Automata Theory	4	0	0	Core	30	70	4
22CS1T4	Operating Systems	4	0	0	Core	30	70	4
22PG101	Personality Development through Life Enlightenment Skills	3	1	0	Core	30	70	3
22CS1L1	Programming and Problem solving using Python Lab	0	6	0	Core	30	70	3
22CS1L2	Database Management Systems Lab	0	6	0	Core	30	70	3
<b>TOTAL FOR FIRST SEMESTER</b>						<b>210</b>	<b>490</b>	<b>25</b>

II SEMESTER (For the batch of students admitted during 2022-2023)					M.Sc.(Computer Science)			
Course Code	Course Name	Teaching Hours/ Week			CORE/IDC/DSE/SEC/OEC/MOOCs	CIA	SEE	No. of Credits
		Lecture	Practical	Tutorial				
22CS2T1	Computer Networks	4	0	0	Core	30	70	4
22CS2T2	Data Structures	4	0	0	Core	30	70	4
22CS2T3	Web Technologies	4	0	0	Core	30	70	4
22PG201	Research Methodology& IPR	3	1	0	SEC	30	70	3

**DOMAIN SPECIFIC ELECTIVE COURSES (CHOOSE ANY ONE)**

22CS2E1	Software Engineering	4	0	0	DSE	30	70	4
22CS2E2	Mobile Applications	4	0	0	DSE	30	70	4
22CS2E3	Unix Programming	4	0	0	DSE	30	70	4

**LAB PRACTICALS**

22CS2L1	Data Structures Lab	0	6	0	Core	30	70	3
22CS2L2	Web Technologies Lab	0	6	0	Core	30	70	3

<b>TOTAL FOR SECOND SEMESTER</b>						<b>210</b>	<b>490</b>	<b>25</b>
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At the end of 2<sup>nd</sup> semester, every student must undergo *Summer Internship/Apprenticeship/Project Work/Industrial Training/Research based Project Work* for **Six Weeks** and must prepare a report concerned as per approved project guidelines, and submit the same to the University 14 days before the commencement of third semester end examinations.

**Note: Students may be allowed to register and appear for MOOCs from the third semester itself.**

However, students are to complete the MOOCs successfully and submit pass certificate of the same to the University through the Principal of the College concerned for approval and endorsement of the same on grade cards and PCs and ODs as per the regulations of the University.

III SEMESTER (For the batch of students admitted during 2022-2023)						M.Sc.(Computer Science)		
Course Code	Course Name	Teaching Hours/ Week			CORE/IDC/DSE/ SEC/OEC/MOOCs	CIA	SEE	No. of Credits
		Lecture	Practical	Tutorial				
22CS3T1	Data Science	4	0	0	Core	30	70	4
<b>DOMAIN SPECIFIC ELECTIVE COURSES (CHOOSE ANY THREE)</b>								
22CS3E1	Design & Analysis of Algorithms	4	0	0	DSE	30	70	4
22CS3E2	Data Mining Techniques	4	0	0	DSE	30	70	4
22CS3E3	Cryptography & Network Security	4	0	0	DSE	30	70	4
22CS3E4	Artificial Intelligence	4	0	0	DSE	30	70	4
22CS3E5	Internet of Things	4	0	0	DSE	30	70	4
22CS3E6	Block Chain Technologies	4	0	0	DSE	30	70	4
<b>LAB PRACTICALS</b>								
22CS3L1	Data Science Lab	0	6	0	Core	30	70	3
22CS3L2	Cryptography & Network Security Lab	0	6	0	Core	30	70	3
<b>OPEN ELECTIVE (INTERDISCIPLINARY/MULTIDISCIPLINARY) COURSES (CHOOSE ANY ONE)</b>								
22OE301	Python Programming	3	0	0	OEC	30	70	3
22OE302	Office Tools	3	0	0	OEC	30	70	3
22OE303	Mobile Computing	3	0	0	OEC	30	70	3
22OE304	R Programming	3	0	0	OEC	30	70	3
22OE305	Web Development	3	0	0	OEC	30	70	3
						<b>210</b>	<b>490</b>	<b>25</b>

IV SEMESTER (For the batch of students admitted during 2022-2023)						M.Sc.(Computer Science)		
Course Code	Course Name	Teaching Hours/ Week			CORE/IDC/DSE/ SEC/OEC/MOOCs	CIA	SEE	No. of Credits
		Lecture	Practical	Tutorial				
22CS4T1	Machine Learning	4	0	0	Core	30	70	4
<b>DOMAIN SPECIFIC ELECTIVE COURSES (CHOOSE ANY THREE)</b>								
22CS4E1	Cloud Computing	4	0	0	DSE	30	70	4
22CS4E2	Cyber Security	4	0	0	DSE	30	70	4
22CS4E3	Big Data Analytics	4	0	0	DSE	30	70	4
22CS4E4	Applied Data Analysis	4	0	0	DSE	30	70	4
22CS4E5	Deep Learning	4	0	0	DSE	30	70	4
22CS4E6	Information Security	4	0	0	DSE	30	70	4
<b>LAB PRACTICALS</b>								
22CS4L1	Machine Learning Lab	0	6	0	Core	30	70	3
<b>ENTREPRENEURIAL &amp; INNOVATION/IT SKILL RELATED TO DOMAIN SPECIFIC ELECTIVE COURSES (CHOOSE ANY ONE)</b>								
22CS4E7	Social Media Analytics	3	0	0	SEC	30	70	3
22CS4E8	Dynamic Web Programming using Python	3	0	0	SEC	30	70	3
22CS4E9	Software Testing and Project Management	3	0	0	SEC	30	70	3
<b>* CHOOSE MOOCs FROM SWAYAM/NPTEL SOURCES</b>								
<b>MOOCs</b>								4
<b>PROJECT WORK EVALUATION AND VIVA-VOCE</b>						Nil	100	4

**M.Sc.(Computer Science)****SEMESTER IV (For the batch of students admitted during 2021-2022)**

S.No.	Course Code	Title of the Course	Instruction Hours per Week			Credits	Evaluation			Total Marks
			L	T	P		CIA Marks	SEE		
								Marks	Duration	
1	20CS4M1	Certification Course offered by MOOCS providers such as NPTEL/Swayam/Edx/Coursera/Udacity/Udemy/Cisco/Guvi etc.	4			4	30	70	Time Taken by Examiner for conducting Viva-Vocce on	100
2	20CS4T1	Big Data and Analytics	4			4	30	70	3 Hours	100
3	Core Elective-I		4			4	30	70	3 Hours	100
	20CS4T3	Artificial Intelligence & Machine Learning								
	20CS4T3i	Block Chain Technology								
4	Core Elective-II		4			4	30	70	3 Hours	100
	20CS4T4	Cloud Computing								
	20CS4T4i	Cyber Security								
5	20CS4L1	Big Data and Analytics Lab			8	4	30	70	3 Hours	100
6	20CS4P1	Project Work			16	8	100	100	Time Taken by Examiner for conducting Project Work	200
Total			40			28	250	450		700
CIA=Continuous Internal Assessment						SEE=Semester End Examinations				

## 22CS2T1: COMPUTER NETWORKS

<b>Course Name</b>	Computer Networks	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>CIA</b>	<b>SEE</b>	<b>TM</b>
<b>Course Code</b>	22CS2T1	4	0	0	4	30	70	100
<b>Year of Introduction:</b> 1991	<b>Year of Offering:</b> 2022	<b>Year of Revision:</b> 2022		<b>Percentage of Revision:</b> 10				
<b>L-Lecture, T-Tutorial, P-Practical, C-Credits, CIA-Internal Marks, SEE-External Marks, TM-Total Marks</b>								

### Course Description and Purpose:

Computer Networks is a course that will exemplify basic concepts of *Computer Networks, Functionality of Layered Architecture, Error Correction and Detection Code and Various Protocols used in Layers and Protocols, Functionality of Medium Access Control Sub Layer, Various Routing Strategies used in inter networking using IP Addresses, Different Services and Protocols of Transport Layer and Various Application Layer Protocols* used over the internet.

### Course Objectives:

This course will help the students to understand and learn importance of *Protocols in a Network, The usage of the Protocols in Layered Architecture* and brief information of functionality of all the *Five Layers and their Protocols*.

### Specific objectives include:

- To understand functionality of *Layered Architecture*.
- To understand Ethernet, *Bluetooth and Data Link Layer Switching*.
- To learn Network Layer Design issues and Routing Algorithm used.
- To learn *Transport Services and TCP and UDP*.
- To understand the Protocols and services of *Applications Layer*.

### Course Learning Outcomes:

Upon successful completion of the course, the student will be able to:

**CO1:** Understand *Functionality of Layered Architecture, Error Correction and Detection Codes and Various Protocols used in Layers*.

**CO2:** Understand functionality of *Medium Access Control Sub Layer*.

**CO3:** Understand the various *Routing Strategies* used in internet working using *IP Addresses*.

**CO4:** Understand different Services and Protocols of *Transport Layer*.

**CO5:** Understand the various *Application Layer Protocols* used over internet.

### UNIT I (12 Hours)

**Introduction:** Uses of Computer Networks: Business Application, Home Applications, Mobile Users, Social Issues, Connection Oriented and Connectionless Services, Service Primitives, The relationship of Services to Protocols, **Reference Models:** The OSI Reference Model, The TCP/IP Reference Model, A Comparison of OSI and TCP/IP Reference Model.

**Physical Layer:** ALOHA, CSMA, CSMA/CA

**Data Link Layer: Data Link Layer Design Issues:** Services Provided to the Network Layer, Framing, Error Control, Flow Control, **Error Correcting Codes, Error Detecting Codes, Elementary Data Link Protocols:** An Utopian Simplex Protocol, A Simplex Stop and Wait Protocol, A Simplex Protocol for a Noisy Channel, **Sliding Window Protocols:** A One Bit Sliding Window Protocol, A Protocol Using Go Back N, A Protocol using Selective Repeat

### UNIT II (12 Hours)

**The Medium Access Control Sub Layer: Ethernet:** Ethernet Cabling, Manchester Encoding, The Ethernet MAC sub layer Protocol, The Binary Exponential Backoff Algorithm, **Bluetooth:** Bluetooth Architecture, Bluetooth Applications, The Bluetooth Protocol Stack, The Bluetooth Radio Layer, The Bluetooth Link Layers, The Bluetooth Frame Structure, **Data Link Layer Switching:** Uses of Bridges, Learning Bridges, Spanning Tree Bridges, Remote Bridges, Repeaters, Hubs, Bridges, Switches, Routers and Gateways, Virtual LANs.

### UNIT III (12 Hours)

**The Network Layer: *Network Layer Design Issues*:** Store and Forward Packet Switching, Services provided to the Transport Layer, Implementation of Connectionless Services, Implementation of Connection Oriented Services, Comparison of Virtual Circuit and Datagram subnets. ***Routing Algorithms*** : The Optimality Principle, Shortest Path Routing, Flooding , Distance Vector Routing, LinkState Routing, Hierarchical Routing, Broadcast Routing, Multicast Routing, Routing for Mobile Hosts ***The Network Layer in the Internet*:** The IP Version 4 Protocol, IP Address, IPV6 Features and Advantages.

### UNIT IV(12 Hours)

**The Transport Layer: *The Transport Service*:** Services provided to the Upper Layers, Transport Services Primitives, Berkeley Sockets. ***Elements of Transport Protocols*:** Addressing, Connection Establishment, Connection Release, Flow Control and Buffering, Multiplexing, Crash Recovery.

**The Internet Transport Protocols:** Introduction to TCP, The TCP Service Model, The TCP Protocol, The TCP Segment Header, TCP Connection Establishment, TCP Connection Release, Modeling TCP Connection Management, TCP Sliding Window, TCP Congestion Control, Comparison of TCP and UDP.

### UNIT V (12 Hours)

**Wireless TCP:** Classical improvement in WTCP.

**The Application Layer: *DNS*:** The Domain Name System: The DNS Name Space, Resource Records, Name Servers.

***Electronic Mail*:** Architecture and Services, The User Agent, Message Formats, Message Transfer, Final Delivery.

***The World Wide Web*:** Architecture Overview, Static Web Pages, Dynamic Web Pages. ***Streaming Audio and Video*:** Digital Audio, Digital Video, Streaming Stored Media, Streaming Live Media, Real Time Conferencing.

#### Reference Text books:

1. Andrew S. Tanenbaum, Computer Networks, Sixth Edition, Pearson, 2021
2. Andrew S. Tanenbaum, Computer Networks, Fifth Edition, Pearson, 2011
3. James F. Kurose, Keith W. Ross, Computer Networking, 3<sup>rd</sup> Edition, Pearson Edition
4. Michael A. Gallo, William M. Hancock, Data Communications and Networking, 4<sup>th</sup> Edition, TMH

**PARVATHANENI BRAHMAYYA SIDDHARTHA COLLEGE OF ARTS & SCIENCE**

(An Autonomous College in the jurisdiction of Krishna University)

M.Sc.(Computer Science), Second Semester

**Course Name:** Computer Networks

**Course Code:** 22CS2T1

(w.e.f admittedbatch2022-23)

**Time: 3 Hours**

**Max Marks: 70**

**SECTION-A**

**Answer ALL Questions. All Questions Carry Equal Marks. (5×4=20Marks)**

- 1.(a) What are the Uses of Computer Networks. (CO1,L1)  
(or)  
(b) Write about ALOHA (CO1,L1)
2. (a) Explain about The Binary Exponential Backoff Algorithm. (CO3,L2)  
(or)  
(b) Explain about Virtual LANs. (CO3,L2)
3. (a) What is Store and Forward Packet Switching. (CO2,L1)  
(or)  
(b) What are the Features of IPV6. (CO2,L1)
4. (a) Explain about Berkeley Sockets. (CO3,L2)  
(or)  
(b) Explain TCP Congestion Control. (CO3,L2)
5. (a) Explain about WTCP. (CO5,L5)  
(or)  
(b) Explain about URLs. (CO5,L5)

**SECTION-B**

**Answer ALL questions. All Questions Carry Equal Marks. (5×10=50Marks)**

6. (a) Explain the OSI Reference Model with a neat diagram. (CO1,L2)  
(or)  
(b) Explain Sliding Window Protocols. (CO1,L2)
7. (a) List the operations of Ethernet.(CO2,L4)  
(or)  
(b) Analyze Bluetooth Architecture with Bluetooth Application. (CO2,L4)
8. (a) Model Shortest Path Routing Algorithm.(CO2,L3)  
(or)  
(b) Select IP Addressing Techniques. (CO2,L3)
9. (a) Explain about Connection Establishment and Connection Release. (CO3,L5)  
(or)  
(b) Explain about TCP. (CO3,L5)
- 10.(a) Discuss Domain Name System. (CO3,L6)  
(or)  
(b) Discuss Electronic Mail System. (CO3,L6)

## 22CS2T2: DATA STRUCTURES

<b>Course Name</b>	<b>Data Structures</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>CIA</b>	<b>SEE</b>	<b>TM</b>
<b>Course Code</b>	22CS2T2	4	0	0	4	30	70	100
<b>Year of Introduction:</b> 1991	<b>Year of Offering:</b> 2023	<b>Year of Revision:</b> 2023		<b>Percentage of Revision:</b> 10				
L-Lecture, T-Tutorial, P-Practical, C-Credits, CIA-Internal Marks, SEE-External Marks, TM-Total Marks								

### Course Description and Purpose:

Data Structures is a course that illustrates *Elementary Data Organization, Data Structure Operations, and Algorithms, Arrays, Matrices, String Processing, Stack, Queues, Linked List, Trees, Heap Sort, Multi-way Search Trees, B-Tree, B+-Trees, Graphs Algorithms, Elementary Graph Algorithms, Sorting and Searching Techniques.*

### Course Objectives:

This course will help enable the students to understand, learn and develop *Data Structure Operations and Algorithms, Arrays, Matrices, String Processing, Stack, Queues, Linked List, Trees, Heap Sort, Multi-way Search Trees, B-Tree, B+-Trees, Graphs Algorithms, Elementary Graph Algorithms, Sorting and Searching Techniques.*

### Specific Objectives include:

- To understand *Data Structures, Data Structure Operations and Algorithms, Arrays.*
- To understand *String Processing, Stack, Queues and Linked List.*
- To learn the *Binary Tree, Binary Search Trees, AVL Trees, Heap.*
- To learn the *Multi-way Search Trees, B-Trees, B+-Trees.*
- To understand the *Graph Algorithms, different Sorting and Searching Techniques.*

### Course Learning Outcomes:

At the end of this course the students should be able to:

**CO1:** Understand *Data Structures, Data Structure Operations and Algorithms, Arrays.*

**CO2:** Understand *String Processing, Stack, Queues and Linked List.*

**CO3:** Learn the *Binary Tree, Binary Search Trees, AVL Trees, Heap.*

**CO4:** Learn the *Multi-way Search Trees, B-Trees, B+-Trees.*

**CO5:** Understand the *Graph Algorithms, different Sorting and Searching Techniques.*

### Course Content:

#### UNIT I (12 Hours)

**Introduction and Overview:** Elementary Data Organization, Data Structures, Data Structure Operations, and Algorithms: Complexity, Time and Space Tradeoff Asymptotic Notations. Linear Arrays, Representation and Traversing Linear Arrays, Inserting and Deleting, Linear Search, Binary Search, Multidimensional Arrays, Pointer Arrays, Record Structures, Representation of records in memory, Parallel Arrays, Matrices, Sparse Matrices.

#### UNIT II (12 Hours)

**String Processing:** Pattern Matching Algorithms.

**Stacks:** Stacks, Array representation, Linked List representation, Evaluation of Arithmetic Expressions, Quick Sort, Recursion, Towers of Hanoi.

**Queues:** Linked representation of Queues, Deques, Priority Queues.

**Linked Lists:** Representation, Traversing, Searching, Memory Allocation: Garbage Collection, Insertion, Deletion, Header Linked Lists, Two Way Lists.

#### UNIT III (12 Hours)

**Trees:** Binary Trees, Representing and Traversing Binary Trees, Traversal Algorithms using Stacks, Binary Search Trees, Searching, Insertion and Deletion in Binary Search Trees, AVL Search Trees, Insertion and Deletion in AVL Trees.

**Heap:** Heap Sort, Huffman's Algorithms, General Trees

#### UNIT IV (12 Hours)

**Multi-way Search Trees:** M-Way Search Trees, Definition and Properties, Searching an M-Way Search Tree, B-Trees, Definition and Properties, Number of Elements in a B-Tree, Insertion into B-Tree, Deletion from a B-Tree, B+-Tree Definition, Searching a B+-Tree, Insertion into B+-Tree, Deletion from a B+-Tree.

#### UNIT V(12 Hours)

**Graphs:** Graphs Algorithms, Elementary Graph Algorithms: Topological Sort, Single Source Shortest Path Algorithms:Dijkstra's, Bellman-Ford, All Pairs Shortest Paths : Floyd Warshall's Algorithm.

**Sorting and Searching:** Insertion Sort, Selection Sort, Merging, Merge Sort, Radix Sort, Searching and Data Modification, Hashing.

#### Reference Textbooks:

1. Seymour Lipschutz, Data Structures, Mc Graw Hill (Schaums Outlines), Revised First Edition, 2014.
2. Seymour Lipschutz, Theory and Problems of Data Structures, Mc Graw Hill (Schaums Outlines), Paperback, 2017.
3. John R Hubbard, Second Edition, Data Structures with Java, Mc Graw Hill (Schaums Outlines), 2009.
4. Robert Lafore, Data Structures & Algorithms in Java, Second Edition, Pearson Education, 2017.
5. Fundamentals of Data Structures in C, Second Edition, Horowitz, Sahani, Anderson-freed, Universities Press, 1993.
6. Data Structures: A Pseudocode Approach, Richard F Gilberg, Behrouz A Forouzan, Cengage, 2004



**PARVATHANENI BRAHMAYYA SIDDHARTHA COLLEGE OF ARTS & SCIENCE**

(An Autonomous College in the jurisdiction of Krishna University)

M.Sc.(Computer Science), Second Semester

**Course Name:** Data Structures

**Course Code:** 22CS2T2

**(w.e.f admitted batch 2022-23)**

**Time: 3 Hours**

**Max Marks: 70 Marks**

**SECTION-A**

**Answer ALL questions. All Questions Carry Equal Marks. (5×4 = 20 Marks)**

1.(a) Explain different *Data Structure Operations*. (CO1, L2)  
(or)

(b) Explain *Linear Array*.(CO1, L2)

2. (a) What is *Stack*? Explain its Operations. (CO2, L1)

(or)

(b) Define *Linked List* and its operations. (CO2, L1)

3. (a) Explain *Binary Search Trees*. (CO3, L2)

(or)

(b) Explain *General Trees*. (CO3, L2)

4. (a) Explain *M-Way Search Tree*. (CO4, L2)

(or)

(b) Explain *searching an element* from *B+-Tree*. (CO4, L2)

5. (a) Explain *Topological Sort Algorithm*. (CO5, L2)

(or)

(b) Explain *Bellman-Ford Algorithm*. (CO5, L2)

**SECTION-B**

**Answer ALL questions. All Questions Carry Equal Marks. (5×10 = 50 Marks)**

6. (a) Explain Binary Search and Linear Search Algorithms with example. (CO1, L2)  
(or)

(b) Explain *Multidimensional Arrays in Java* with example. (CO1, L2)

7. (a) Explain *Towers of Hanoi Problem* implementation with example. (CO2, L5)

(or)

(b) Explain Operations of *Queue* using *Linked List* with example. (CO2, L5)

8. (a) Discuss *AVL Search Trees operations* in detail. (CO3, L6)

(or)

(b) Discuss about the insertion and deletion operations of Binary Search Trees with example. (CO3,L6)

9. (a) List *B-Tree operations* with examples. (CO4, L4)

(or)

(b) List insertion and deletion operations of B+-Tree with examples. (CO4, L4)

10. (a) Utilize Merge Sort Algorithm to sort the elements 10, 45, 15, 56, 48, 23, 8, 17. Explain step by step procedure. (CO5, L3)

(or)

(b) Make use of elements 23, 34, 12, 45, 14, 73, 21, 7 perform sort using Radix Sort. (CO5, L3)

## 22CS2T3: WEB TECHNOLOGIES

<b>Course Name</b>	Web Technologies	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>CIA</b>	<b>SEE</b>	<b>TM</b>
<b>Course Code</b>	22CS2T3	4	0	0	4	30	70	100
<b>Year of Introduction:</b> 1991	<b>Year of Offering:</b> 2022	<b>Year of Revision:</b> No revision			<b>Percentage of Revision:</b> Nil			
L-Lecture, T-Tutorial, P-Practical, C-Credits, CIA-Internal Marks, SEE-External Marks, TM-Total Marks								

### Course Description and Purpose:

Web Technologies (22CA2T3) is a course that illustrates about *WWW, HTML, Write code in JavaScript & DHTML, Designing of XML Files, Install and use Servlets and PHP, Programming in JSP, Establish Database Connectivity & Form Validations using C#, Basic knowledge of Node JS, Express & Spring Boot, Creating AJAX form validations.*

**Course Objectives:** The course will help the students to understand, learn and build *WWW, HTML, Write code in JavaScript & DHTML, Designing of XML Files, Install and use Servlets and PHP, Programming in JSP, Establish Database Connectivity & Form Validations using C#, Basic knowledge of Node JS, Express & Spring Boot, Creating AJAX form validations.*

### Course Objectives:

- To understand the concepts of *WWW* including *Browser and HTTP Protocol* and various *HTML Tags* and use them to develop the user friendly web pages.
- To use the *JavaScript* and define the *CSS* with its types to develop the *Dynamic Web Pages*.
- Students will be able to and develop the *Modern Web Pages* using the *XML Elements* and *Servlets* with different layouts as per need of applications.
- Able to develop *Server Side Scripting* with *PHP* and *JSP* to generate the *Web Pages* dynamically using the *Database Connectivity & C# Database Connectivity with Form Validations*.
- Able to develop *Interactive Forms* for *Web Applications* using *Node JS, Express, Spring Boot & AJAX*.

### Course Outcomes:

On successful completion of this course, the students:

CO1: Able to understand the concepts of *WWW* including *Browser and HTTP Protocol* and various *HTML Tags* and use them to develop the user friendly web pages.

CO2: Able to use the *JavaScript* and define the *CSS* with its types to develop the *Dynamic Web Pages*.

CO3: Students will be able to develop the *Modern Web Pages* using the *XML Elements* and *Servlets* with different layouts as per need of applications.

CO4: Able to develop *Server Side Scripting* with *PHP* and *JSP* to generate the *Web Pages* dynamically using the *Database Connectivity C# Database Connectivity with Form Validations*.

CO5: Able to develop *Interactive Forms* for *Web Applications* using *Node JS, Express, Spring Boot & AJAX*.

### UNIT I (12 Hours)

**Introduction:** What is Internet, History of Internet, Internet Services and Accessibility, Uses of the Internet, Protocols, **Web Concepts:** The Client/Server Model, Retrieving Data from the Web, How the Web Works?, Web Browsers, Searching information on the Web, Internet Standards.

**HTML:** Outline of an HTML Document, **Head Section Body Section:** Headers, Paragraphs, Text Formatting, Linking, Internal Linking, Embedded Images, Lists, Tables, Frames, Other Special Tags and Characters, HTML Forms.

### UNIT II (12 Hours)

**Java Script:** Introduction to Scripting, Control Statements I, Control Statements II, Functions, Arrays, Objects, Document Object Model, Events.

**Dynamic HTML (DHTML):** Introduction, Cascading Style Sheets (CSS), Coding CSS, Properties of Tags, Property Values, Other Style Properties, In Line Style Sheets, Embedded Style Sheets, External Style Sheets, Grouping - Inheritance, Class as Selector, ID as Selector, Contextual Selector, Pseudo Classes and Pseudo Elements, Positioning - Backgrounds, Element Dimensions, DHTML Document Object Model and Collections, Using the Collections All, Moving Object around the Document, Event Handling, Assigning Event Handlers, Event Bubbling, Filters and Transition Filters, Transitions, Data Binding, Using Tabular Data Control, Sorting Data, Dynamic Sorting, Filtering.

### UNIT III (12 Hours)

**XML:** Introduction, HTML vs. XML, Syntax of XML Document, XML Attributes, Use of elements vs. Use of Attributes, XML Validation, Well Formed XML Documents, Valid XML Documents, XML DTD: Internal DTD, External DTD, The Buildings blocks of XML Documents, **DTD Elements** : Declaring an Element, Empty Elements, Elements with Data, Elements with Children, Wrapping, Declaring only one Occurrence of the Same Elements, Declaring Minimum one Occurrence of the Same Element, Defining Zero or One Occurrence of the Same Element, Declaring Mixed Content, **DTD Attributes:** Declaring Attributes, Default Attribute Value, Implied attribute, required attribute, fixed attribute value, enumerated attribute values, DTD Entries, DTD Validation, XSL, XSL Transformation, XML NameSpaces, XML Schema.

**Servlets:** Introduction, Advantages of Servlets over CGI, Installing Servlets, The Servlet Life Cycle, Servlets API, A Simple Servlet, Handling HTTP Get Requests, Handling HTTP Post Requests, Cookies, Session Tracking, Multi Tier Applications using Database Connectivity, Servlets Chaining.

### UNIT IV (12 Hours)

**PHP:** Introduction, PHP Basics, String Processing and Regular Expressions, Form Processing and Business Logic, Connecting to a Database, Using Cookies, Dynamic Content, Operator Precedence Chart.

**Java Server Pages (JSP):** Introduction, Advantages of JSP, Developing first JSP, Components of JSP, Reading Request Information, Retrieving the Data Posted from a HTML File to a JSP File, JSP Sessions, Cookies, Disabling Sessions.

**Database Connectivity & Form Validations using C#:** Database Connectivity using C#.Net, Form Validations (Name Validation, Integer Validation, Floating Point Validation, Email Validation, Combo Box Validation).

**Spring Boot:** Introduction to Spring Boot, Spring Initializer, Maven, Gradel, Class Path Dependencies Creating Executable Jar File.

### UNIT V (12 Hours)

**Getting Started with Node:** Getting Node, Using the Terminal, Editors, npm, A Simple Webserver with Node (Hello World, Event Driven Programming, Routing, Serving Static Resource).

**Saving Time with Express:** Scaffolding, Initial Steps (Views and Layouts, Static Files and Views, Dynamic Content in Views).

**Form Handling:** Sending Client Data to Server, HTML Forms. Encoding, Approaches in Form Handling, Form Handling with Express, Handling AJAX Forms-File Uploads, jQuery File Upload.

#### Reference Books:

1. N.P.Gopalan, J.Akilandeswari, Web Technologies - A Developer's Perspective, PHI(2008)
2. Harvey M.Deitel and Paul L. Deitel, Internet and World Wide WebHow To Program, Prentice Hall, 5<sup>th</sup> Edition.
3. Ethan Brown, Web Development with Node & Express, O'Reilly, First Edition, 2014.

**PARVATHANENI BRAHMAYYA SIDDHARTHA COLLEGE OF ARTS & SCIENCE**

(An Autonomous College in the jurisdiction of Krishna University)

**M.Sc.(Computer Science) Second Semester**

**Course Name:** Web Technologies

**Course Code:** 22CA2T3

**(w.e.f admitted batch 2022-23)**

**Time: 3 Hours**

**Max Marks: 70**

**SECTION-A**

**Answer ALL questions. All Questions Carry Equal Marks. (5×4 = 20 Marks)**

1. (a) What are *protocols* used in accessing the internet? (CO1, L1)  
(or)  
(b) What are the differences between *Inline & Block Elements*? (CO2, L1)
2. (a) What is *DOM*? Explain it. (CO2, L1)  
(or)  
(b) What is advantage of using *External Style Sheets*? (CO2,L1)
3. (a) What is *XML Document Validation*? Explain in detail. (CO3,L1)  
(or)  
(b) What is *Servlet*? Explain in detail. (CO3,L1)
4. (a) List C# function to validate *Name of the User*. (CO4,L1)  
(or)  
(b) List the components of *JSP*. (CO4,L2)
5. (a) State various *services of Web Browser*. (CO5,L5)  
(or)  
(b) What are the features of *JQuery*? Explain it (CO5,L5)

**SECTION-B**

**Answer ALL questions. All Questions Carry Equal Marks. (5×10 = 50 Marks)**

6. (a) Explain services of *Internet* and *Web Browser*. (CO1, L2)  
(or)  
(b) Explain *Client-Server Architecture and Frame and its attributes with example program*. (CO1,L2)
7. (a) List *JavaScript variables and characteristics of Array objects*. (CO2, L4)  
(or)  
(b) Examine building an *External Style Sheet*. Explain advantages and disadvantages of *External Style Sheets* with an example. (CO2, L4)
8. (a) Develop *TDC, DTD* with building blocks of *DTD*. (CO3,L3)  
(or)  
(b) Develop *Life Cycle of Servlets*. Write the session tracker that tracks the number of access and last access of data of a particular web page. (CO3,L3)
9. (a) Discuss (i) *String Processing* (ii) *Regular Expressions* (iii) *Cookies*. (CO4, L6)  
(or)  
(b) Discuss *Components of JSP* and write a *JSP Program to accept username and password from a user and validate them*. (CO4, L6)
10. (a) Explain *Class Path Dependencies*. (CO5,L5)  
(or)  
(b) Explain how to upload Files using *jQuery* with example program. (CO5, L5)

## 22CS2E1: SOFTWARE ENGINEERING

<b>Course Name</b>	Software Engineering	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>CIA</b>	<b>SEE</b>	<b>TM</b>
<b>Course Code</b>	22CS2E1	4	0	0	4	30	70	100
<b>Year of Introduction:</b> 1991	<b>Year of Offering:</b> 2022	<b>Year of Revision:</b> No Revision		<b>Percentage of Revision:</b> Nil				
<b>L-Lecture, T-Tutorial, P-Practical, C-Credits, CIA-Internal Marks, SEE-External Marks, TM-Total Marks</b>								

### **Course Description and Purpose:**

*Software Engineering (22CS2E1) is a course that illustrates Process Models, Agile Development, Core Principles, Requirements Modeling, Data Modeling, Software Quality Assurance, Software Testing Strategies, Testing Conventional Applications, Project Management Concepts, Process and Project Metrics, Formal Modeling and Verification and Estimation for Software Project.*

**Course Objectives:** *The course will help the students to understand, learn and build Process Models, Agile Models, Core Principles, Requirement Models, Data Models, Software Quality Assurance Procedures, Software Testing Strategies, Strategies to Test Conventional Applications, Project Management Concepts, Process and Project Metrics, Formal Modeling and Verification and Models to estimate Software Projects.*

### **Specific objectives include:**

- *To understand various Software Engineering Methods, Practices, Process Models and Agile Development Strategies.*
- *To understand and apply Core Principles, Requirements & Modeling Concepts.*
- *To understand and apply different Software Testing Approaches and various aspects of Software Quality Assurance.*
- *To understand and apply Process & Project Management Concepts.*
- *To understand and apply Software Estimates for Projects & apply Formal Methods Modeling.*

### **Course Learning Outcomes:**

Upon successful completion of the course, the student will be able to:

**CO1:** Understand various *Software Engineering Methods, Practices, Process Models and Agile Development Strategies.*

**CO2:** Understand and apply *Core Principles, Requirements & Modeling Concepts.*

**CO3:** Understand and apply different *Software Testing Approaches* and various aspects of *Software Quality Assurance.*

**CO4:** Understand and apply *Process & Project Management Concepts.*

**CO5:** Understand and apply *Software Estimates for Projects & apply Formal Methods Modeling.*

## **UNIT I ( 12 Hours)**

**Software and Software Engineering:** The Nature of Software: Defining Software, Software Application Domains, Legacy Software, The Unique Nature of Web Apps, Software Engineering, The Software Process, Software Engineering Practices: The Essence of Practice, General Principles, Software Myths.

**Process Models:** A Generic Process Model: Defining a Framework Activity, Identifying a Task Set, Process Patterns, Process Assessment and Improvement, Prescriptive Process Models: The Waterfall Model, Incremental Process Models, Evolutionary Process Models, Concurrent Models, A Final Word on Evolutionary Processes, Specialized Process Models: Component-Based Development, The Formal Methods Model, Aspect-Oriented Software Development, The Unified Process: A Brief History, Phases of the Unified Process, Personal and Team Process Models: Personal Software Process (PSP), Team Software Process (TSP).

**Agile Development:** What Is Agility, Agility and the Cost of Change, What Is an Agile Process: Agility Principles, The Politics of Agile Development, Human Factors, Extreme Programming (XP): XP Values, The XP Process, Industrial XP, The XP Debate, Other Agile Process Models: Adaptive Software Development (ASD), Scrum, Dynamic Systems Development Method (DSDM), Crystal, Feature Driven Development (FDD), Lean Software Development (LSD), Agile Modeling (AM), Agile Unified Process (AUP).

## UNIT II (12 Hours)

**Principles that Guide Practice: Core Principles:** Principles That Guide Process, Principles That Guide Practice, Principles That Guide Each Framework Activity: Communication Principles, Planning Principles, Modeling Principles, Construction Principles, Deployment Principles.

**Requirements Modeling: Scenarios, Information, and Analysis Classes:** Requirements Analysis: Overall Objectives and Philosophy, Analysis Rules of Thumb, Domain Analysis, Requirements Modeling Approaches, Scenario-Based Modeling: Creating a Preliminary Use Case, Refining a Preliminary Use Case, Writing a Formal Use Case, UML Models That Supplement the Use Case: Developing an Activity Diagram, Swim lane Diagrams.

**Data Modeling Concepts:** Data Objects, Data Attributes, Relationships, Class-Based Modeling: Identifying Analysis Classes, Specifying Attributes, Defining Operations, Class-Responsibility- Collaborator (CRC) Modeling, Associations and Dependencies, Analysis Packages.

## UNIT III (12 Hours)

**Software Quality Assurance:** Background Issues, Elements of Software Quality Assurance, SQA Tasks, Goals, and Metrics: SQA Tasks, Goals, Attributes, and Metrics, Formal Approaches to SQA, Statistical Software Quality Assurance: A Generic Example, Six Sigma for Software Engineering, Software Reliability : Measures of Reliability and Availability, Software Safety, The ISO 9000 Quality Standards, The SQA Plan.

**Software Testing Strategies:** A Strategic Approach to Software Testing : Verification and Validation, Organizing for Software Testing, Software Testing Strategy-The Big Picture, Criteria for Completion of Testing, Strategic Issues, Test Strategies for Conventional Software: Unit Testing, Integration Testing, Test Strategies for Object-Oriented Software: Unit Testing in the OO Context, Integration Testing in the OO Context, Test Strategies for Web Apps, Validation Testing: Validation-Test Criteria, Configuration Review, Alpha and Beta Testing, System Testing: Recovery Testing, Security Testing, Stress Testing, Performance Testing, Deployment Testing, The Art of Debugging: The Debugging Process, Psychological Considerations, Debugging Strategies, Correcting the Error

**Testing Conventional Applications:** Software Testing Fundamentals, Internal and External Views of Testing, White-Box Testing, Basis Path Testing: Flow Graph Notation, Independent Program Paths, Deriving Test Cases, Graph Matrices, Control Structure Testing: Condition Testing, Data Flow Testing, Loop Testing, Black-Box Testing: Graph-Based Testing Methods, Equivalence Partitioning, Boundary Value Analysis, Orthogonal Array Testing.

## UNIT IV (12 Hours)

**Project Management Concepts:** The Management Spectrum: The People, The Product, The Process, The Project, People: The Stakeholders, Team Leaders, The Software Team, Agile Teams, Coordination and Communication Issues, The Product: Software Scope, Problem Decomposition, The Process: Melding the Product and the Process, Process Decomposition, The Project, The W5HH Principles.

**Process and Project Metrics:** Metrics in the Process and Project Domains: Process Metrics and Software Process Improvement, Project Metrics, Software Measurement: Size-Oriented Metrics, Function-Oriented Metrics, Reconciling LOC and FP Metrics, Object-Oriented Metrics, Use-Case- Oriented Metrics, Web App Project Metrics, Metrics for Software Quality: Measuring Quality, Defect Removal Efficiency.

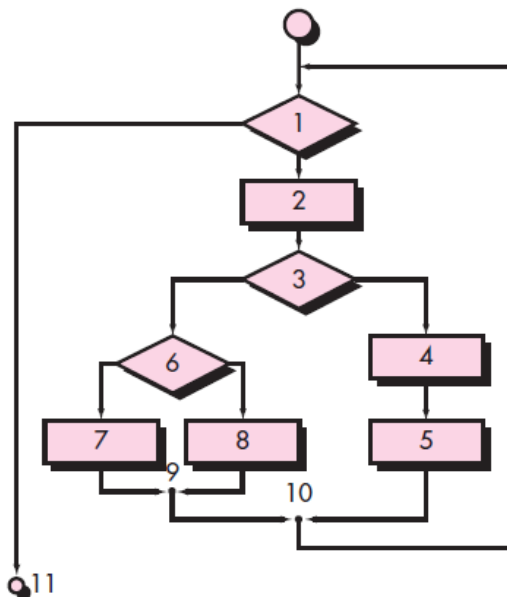
## UNIT V (12 Hours)

**Formal Modeling And Verification:** The Cleanroom Strategy, Functional Specification: Black-Box Specification, State-Box Specification, Clear-Box Specification, Cleanroom Design: Design Refinement, Design Verification, Cleanroom Testing: Statistical Use Testing, Certification, Formal Methods Concepts, Applying Mathematical Notation for Formal Specification, Formal Specification Languages: Object Constraint Language (OCL), The Z Specification Language.

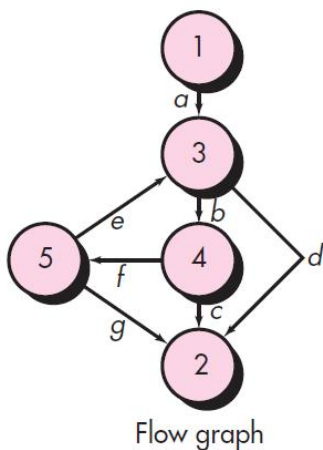
**Estimation for Software Projects:** Resources: Human Resources, Reusable Software Resources, Environmental Resources, Software Project Estimation, Decomposition Techniques: Software Sizing, Problem-Based Estimation, An Example of LOC-Based Estimation, An Example of FP-Based Estimation, Empirical Estimation Models: The Structure of Estimation Models, The COCOMO II Model, The Software Equation, Estimation for Object-Oriented Projects.

**Case Studies:**

- Draw example for Process Pattern when requirements are uncertain.
- Draw UML use case diagram for Safehome Security Function.
- Draw UML Activity Diagram for Access camera surveillance via the Internet - display camera views function.
- Draw UML Swimlane Diagram for Access camera surveillance via the Internet - display camera views function.
- Draw UML Class Diagram for Floor Plan.
- Draw UML Package for specifying Environment, Characters of the Game and Rules of the Game.
- Draw Level 1 DFD for Safehome Security Function
- Draw State diagram for Safehome Security Function
- Draw Sequence Diagram (partial) for the Safehome Security Function
- A UML Deployment Diagram for Safehome Security Function.
- Draw Flow Graph for Flow Chart and find the Cyclomatic Complexity.



- Draw the Graph Matrix for the Flow Graph



- Draw Generalization diagram by specifying Structural Constraint.
  - Specify sample (a) Project Metrics (b) Product Metrics
  - Specify (i) Decision Table (ii) Decision Tree in Block Box Testing
  - Draw the Block Diagram for Block Handler and also specify the logic using Object Constraint Language (OCL)
1. No block will be marked as both unused and used.
  2. All the sets of blocks held in the queue will be subsets of the collection of currently used blocks
  3. No elements of the queue will contain the same block numbers.
  4. The collection of used blocks and blocks that are unused will be the total collection of blocks that make up files.
  5. The collection of unused blocks will have no duplicate block numbers.

6. The collection of used blocks will have no duplicate block numbers.
7. Using Z Specification Language describes the state of the block handler and the data invariant:

**Reference Text Books:**

1. Roger S Pressman, Software Engineering - A Practitioner's Approach, Ninth Edition, McGraw - Hill, A Business Unit of The McGraw-Hill Companies, Inc., 2020.
2. Roger S Pressman, Software Engineering - A Practitioner's Approach, Seventh Edition, McGraw - Hill, A Business Unit of The McGraw-Hill Companies, Inc., 2010.
3. Sommerville, Software Engineering, 7<sup>th</sup> Edition, Pearson Education, 2004.
4. S.A.Kelkar, Software Engineering - A Concise Study, PHI, January 2007.
5. Waman, Software Engineering, TMH, June 2004.
6. AH Behforooz and Frederick J.Hudson, Software Engineering Fundamentals, Oxford, 2008.



**PARVATHANENI BRAHMAYYA SIDDHARTHA COLLEGE OF ARTS & SCIENCE**

(An Autonomous College in the jurisdiction of Krishna University)

**M.Sc.(Computer Science), Second Semester**

**Course Name:** Software Engineering

**Course Code:** 22CS2E1

**(w.e.f admitted batch 2022-23)**

**Time: 3 Hours**

**Max Marks: 70**

**SECTION-A**

**Answer ALL questions. All Questions Carry Equal Marks. (5×4 = 20 Marks)**

1. (a) What are various aspects of *PSP* and *TSP*? (CO1, L1)  
(or)  
(b) What is *SCRUM*? Explain it in detail. (CO2, L1)
2. (a) What are the phases of *Extreme Programming (XP)*? (CO2, L1)  
(or)  
(b) What is *Class-Based Modeling*? Explain it by writing Class Diagram (CO2,L1)
3. (a) What is *Software Reliability*? Explain in detail. (CO3,L1)  
(or)  
(b) What is *Alpha* and *Beta* Testing? Explain in detail. (CO3,L1)
4. (a) List W5HH Principles. (CO4,L1)  
(or)  
(b) What is *Use Case Diagram*? Demonstrate with example. (CO4,L2)
5. (a) State various *resources* of Information System. (CO5,L5)  
(or)  
(b) What is *Software Sizing*? Explain it (CO5,L5)

**SECTION-B**

**Answer ALL questions. All Questions Carry Equal Marks. (5×10 = 50 Marks)**

6. (a) Explain various types of *Software Myths*. (CO1, L2)  
(or)  
(b) Explain *Incremental Process Models*. (CO1,L2)
7. (a) List (i) *Planning Principles* (ii) *Modeling Principles*. (CO2, L4)  
(or)  
(b) Examine various aspects of *Scenario-Based Modeling*. (CO2, L4)
8. (a) Develop various test strategies to test *Conventional Software*. (CO3,L3)  
(or)  
(b) Develop various strategies for *White Box Testing*. (CO3,L3)
9. (a) Discuss the *Management Spectrum* in detail. (CO4, L6)  
(or)  
(b) Discuss (i) *Size-Oriented Metrics* (ii) *Function-Oriented Metrics* in detail. (CO4, L6)
10. (a) Explain *Functional Specification* of *Cleanroom Strategy*. (CO5,L5)  
(or)  
(b) Explain (i) *The COCOMO II Model* (ii) *The Software Equation* of Empirical Estimation Models.  
(CO5, L5)

## 22CS2L1: DATA STRUCTURES LAB

<b>Course Name</b>	Data Structures Lab	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>CIA</b>	<b>SEE</b>	<b>TM</b>
<b>Course Code</b>	22CS2L1	0	0	6	3	30	70	100
<b>Year of Introduction:</b> 2020	<b>Year of Offering:</b> 2022	<b>Year of Revision:</b> No Revision			<b>Percentage of Revision:</b> Nil			
L-Lecture, T-Tutorial, P-Practical, C-Credits, CIA-Internal Marks, SEE-External Marks, TM-Total Marks								

### Course Description and Purpose:

Data Structures Lab (22CS2L1) is a course that illustrates concepts of *Stacks*, *Queues*, and *Tree Traversals*, *Singly Linked Lists*, *Doubly Linked Lists*, *Circular Linked Lists*, *Binary Search Tree*, *Binary Search Tree Traversals*, *Sparse Matrix and DFS & BFS Algorithm*, *Searching & Sorting Algorithms*, *AVL-Trees and B-Trees* and its operations and implementations.

### Course Objectives:

This course will help enable the students to understand learn, apply/ implement the concepts of *Stacks*, *Queues*, and *Tree Traversals*, *Singly Linked Lists*, *Doubly Linked Lists*, *Circular Linked Lists*, *Binary Search Tree*, *Binary Search Tree Traversals*, *Sparse Matrix and DFS & BFS Algorithm*, *Searching & Sorting Algorithms*, *AVL-Trees and B-Trees*.

### Specific Objectives include:

- To understand the concepts of Stacks, Queues, and Tree Traversals.
- To apply the operations of Singly Linked Lists, Doubly Linked Lists, Circular Linked Lists and Operations on Stacks and Queues.
- To apply operations on Binary Search Tree, Binary Search Tree Traversals, Sparse Matrix and DFS & BFS Algorithm.
- To implement Searching & Sorting Algorithms.
- To implement AVL-Trees and B-Trees.

### Course Learning Outcomes:

Upon successful completion of the course, the student will be able to:

**CO1:** Understand the concepts of *Stacks*, *Queues*, and *Tree Traversals*.

**CO2:** Apply the operations of *Singly Linked Lists*, *Doubly Linked Lists*, *Circular Linked Lists* and *Operations on Stacks and Queues*.

**CO3:** Apply operations on *Binary Search Tree*, *Binary Search Tree Traversals*, *Sparse Matrix and DFS & BFS Algorithm*.

**CO4:** Implement *Searching & Sorting Algorithms*.

**CO5:** Implement *AVL-Trees and B-Trees*.

### CYCLE 1

1. Write a Java Program to create a class called Stack and implement Stack Operations. (CO1,L1)
2. Write a Java Program to create a class called Queue and implement Stack Operations. (CO1,L1)
3. Write a Java Program to convert the Infix to Postfix Expression. (CO1,L1)
4. Write a Java Program to evaluate Postfix Expression. (CO1,L1)
5. Write a Java Program to obtain the Binary Number for a given Decimal Number. (CO1,L1)

### CYCLE 2

1. Write a Java Class to implement the operations of a Singly Linked List. (CO2,L1)
2. Write a Java Class to implement the operations of a Doubly Linked List. (CO2,L1)
3. Write a Java Class to implement the operations of a Circular Linked List. (CO2,L1)
4. Write a java program for the following a) Reverse a Linked List b) Sort the data in a Linked List c) Remove Duplicates d) Merge Two Linked Lists (CO2,L1)
5. Write a java program for performing various operations on Stack using Linked List. (CO2,L1)
6. Write a java program for performing various operations on Queue using Linked List. (CO2,L1)

### **CYCLE 3**

1. Write a Java Program to implement operations on Binary Trees Using Recursive and Non- Recursive Methods. (CO3,L1)
2. Write a Java Program to perform Binary Search Tree Traversal. (CO3,L1)
3. Write a Java Program to implement Sparse Matrix. (CO3,L1)
4. Write a Java Program to implement DFS Algorithm. (CO3,L1)
5. Write a Java Program to implement BFS Algorithm. (CO3,L1)

### **CYCLE 4**

1. Write a Java Program to implement the following sorting techniques:
  - a. Bubble Sort
  - b. Merge Sort.
  - c. Quick Sort.
  - d. Heap Sort. (CO4,L1)
2. Write a Java Program to implement Quick Sort of given elements. (CO4,L1)
3. Write a Java Program to implement the Following search techniques:
  - a. Linear Search
  - b. Binary Search (CO4,L1)

### **CYCLE 5**

1. Write a Java Program to implement various operations on AVL Trees. (CO5,L1)
2. Write a Java Program to perform the following operations: a) Insertion into a B-Tree b) Searching in a B-Tree (CO5,L1)
3. Write a Java Program to implementation of recursive and non-recursive functions to Binary Tree Traversals (CO5,L1)
4. Write a Java Program to implement all the functions of Dictionary (ADT) using Hashing. (CO5,L1)

**Note: The list of experiments is not limited to the above list. If the existing laboratory experiments completed in advance, the additional laboratory programs can added , and to be executed in the laboratory.**

## 22CS2L2: WEB TECHNOLOGIES LAB

<b>Course Name</b>	Web Technologies Lab	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>CIA</b>	<b>SEE</b>	<b>TM</b>
<b>Course Code</b>	22CS2L2	0	0	6	3	30	70	100
<b>Year of Introduction:</b> 2020	<b>Year of Offering:</b> 2022	<b>Year of Revision:</b> No Revision			<b>Percentage of Revision:</b> Nil			
L-Lecture, T-Tutorial, P-Practical, C-Credits, CIA-Internal Marks, SEE-External Marks, TM-Total Marks								

### Course Description and Purpose:

Web Technologies Lab (22CS2L2) is a course that illustrates concepts of *HTML, Java Script, DHTML, XML, PHP, JSP, Angular JS, Svelte and Git*.

### Course Objectives:

This course will help enable the students to understand, learn, design *Static and Dynamic WebPages, Create XML Style Sheets, write PHP programs for data retrieval, write JSP Applications for Client-Server Communication, can create Directives, Events, Data Binding and Database Connectivity using Angular JS and Bindings & Events using Svelte and Version Controlling using Git*.

### Specific Objectives include:

- To build functional web applications using *HTML*.
- To create *Dynamic Web Pages* using *Java Script* and *DHTML*.
- To create *Style Sheets with XML* and write *PHP Programs for Data Retrieval*.
- To create *JSP Applications* for *Client-Server Communication*.
- To create *Directives, Events, Data Binding and Database Connectivity* using *Angular JS* and *Bindings & Events using Svelte and Version Controlling using Git*.

### Course Outcomes:

Upon successful completion of the course, the student will be able to:

CO1: Build functional web applications using *HTML*.

CO2: Create *Dynamic Web Pages* using *Java Script* and *DHTML*.

CO3: Create *Style Sheets with XML* and write *PHP Programs for Data Retrieval*.

CO4: Create *JSP Applications* for *Client-Server Communication*.

CO5: Create *Directives, Events, Data Binding and Database Connectivity* using *Angular JS* and *Bindings & Events using Svelte and Version Controlling using Git*.

### HTML:

1. Write HTML code to provide intra document linking. (CO1, L1)
2. Write HTML code to provide inter document linking. (CO1, L2)
3. Write a program to implement the three types of lists. (CO1, L1)
4. Create a HTML page using frames. (CO1, L6)
5. Write a program to embed college picture into your web page and write a short note on your college using paragraph tag. (CO1, L1)
6. With a suitable example, depict how we can align text using a table tag as follows. (CO1, L3)
7. Write a program to create the time table as follows: (CO1, L1)
8. Create a Registration form that interacts with the user. Collect *Login Name, Password, Date of Birth, Sex, Address, Qualification* and display a "Thanks for Registering" message when the user submits the form. (CO1, L6)

### JAVA SCRIPT:

9. Write a script to compare two strings using String object. (CO2, L1)
10. Write a script to generate random numbers within 1 to 10 and display the numbers in a table. (CO2, L1)
11. Write a Java Script to update the information into the array, in the "onClick" event of the button "Update". (CO2, L1)

12. Create a web page for a shopping mall that allows the user to tick off his purchases and obtain the bill with the total being added up simultaneously. (CO2, L3)
13. Write a script to find the duplicate elements of an array. (CO2, L1)
14. Write a script which generates a different greeting each time the script is executed. (CO2, L1)
15. Write a javascript to check the number is Armstrong number or not by getting the number from textbox and the result is displayed in a alert dialog box. (CO2, L1)
16. Using functions write a java script code that accepts user name and password from user, Check their correctness and display appropriate alert messages. (CO2, L1)

**DHTML:**

17. Create an inline style sheet. Illustrate the use of an embedded style sheet. (CO2, L6)
18. Create an external style sheet to illustrate the "Font" elements. (CO2, L6)
19. Write a program to switch on and off light using onClick event. (CO2, L1)
20. Illustrate different types of filters (atleast six) on a sample text. (CO2, L2)
21. Write a program to illustrate tabular data control for data binding. (CO2, L1)

**XML:**

22. Create a small XML file designed to contain information about student performance on a module. Each student has a name, a roll number, a subject mark and an exam mark. (CO3, L6)
23. Create an internal DTD file. (CO3, L6)
24. Create an external DTD file. (CO3, L6)
25. Create an XSLT stylesheet to display the student data as an HTML table. (CO3, L6)

**PHP:**

26. Calculate the factorial of a given number using PHP declarations and expressions. (CO3, L1)
27. Write a PHP program that interacts with the user. Collect first name lastname and date of birth and displays that information back to the user. (CO3, L1)

**JSP:**

28. Write a program to implement JSP directives. (CO4, L1)
29. Write a JSP program for session tracking. (CO4, L1)

**ANGULAR JS:**

30. Create Registration and Login Forms with Validations using JQuery. (CO5, L6)
31. Implement the following in Angular JS (CO5, L5)
  - (a) Angular JS Data Binding
  - (b) Angular JS Directives and Events
  - (c) Using Angular JS to fetch Data from MySql

**SVELTE:** Illustrate the following (CO5, L2)

32. Reactivity using SVELTE.
33. Bindings using SVELTE.
34. Transitions using SVELTE.

**Git:** Illustrate the following (CO5, L2)

Version Control Using Git.

**Note: The list of experiments is not limited to the above list. If the existing laboratory experiments completed in advance, the additional laboratory programs can be added, and to be executed in the laboratory.**

**APPENDIX-II**  
**PROGRAM STRUCTURE & SECOND SEMESTER SYLLABI FOR M.C.A PROGRAMME (R22)**



**P.B.Siddhartha College of Arts & Science, Vijayawada**  
**Programme Structure for M.C.A**  
**Under Choice Based Credit System (CBCS)**  
**W.E.F 2022-23 (R22 Regulations)**

<b>I SEMESTER (For the batch of students admitted during 2022-2023)</b>					<b>M.C.A</b>			
<b>Course Code</b>	<b>Course Name</b>	<b>Teaching Hours/Week</b>			<b>CORE/IDC/DSE/SEC/OE C/ MOOCS</b>	<b>CIA</b>	<b>SEE</b>	<b>No. of Credits</b>
		<b>Lecture</b>	<b>Practical</b>	<b>Tutorial</b>				
22CA1T1	Programming and Problem Solving Using Python	4	0	0	Core	30	70	4
22CA1T2	Database Management Systems	4	0	0	Core	30	70	4
22CA1T3	Mathematical and Statistical Foundations	4	0	0	Core	30	70	4
22CA1T4	Operating Systems	4	0	0	Core	30	70	4
22CA1T5	Personality Development through Life Enlightenment Skills	3	1	0	Core	30	70	3
22CA1L1	Programming and Problem solving using Python Lab	0	6	0	Core	30	70	3
22CA1L2	Database Management Systems Lab	0	6	0	Core	30	70	3
<b>TOTAL FOR FIRST SEMESTER</b>						<b>210</b>	<b>490</b>	<b>25</b>

<b>II SEMESTER (For the batch of students admitted during 2022-2023)</b>					<b>M.C.A</b>			
<b>Course Code</b>	<b>Course Name</b>	<b>Teaching Hours/ Week</b>			<b>CORE/IDC/DSE/SEC/OEC/M OOCS</b>	<b>CIA</b>	<b>SEE</b>	<b>No. of Credits</b>
		<b>Lecture</b>	<b>Practical</b>	<b>Tutorial</b>				
22CA2T1	Computer Networks	4	0	0	Core	30	70	4
22CA2T2	Data Structures	4	0	0	Core	30	70	4
22CA2T3	Web Technologies	4	0	0	Core	30	70	4
22PG201	Research Methodology & IPR	3	1	0	SEC	30	70	3
<b>DOMAIN SPECIFIC ELECTIVE COURSES (CHOOSE ANY ONE)</b>								
22CA2E1	Software Engineering	4	0	0	DSE	30	70	4
22CA2E2	Mobile Applications	4	0	0	DSE	30	70	4
22CA2E3	Unix Programming	4	0	0	DSE	30	70	4
<b>LAB PRACTICALS</b>								
22CA2L1	Data Structures Lab	0	6	0	Core	30	70	3
22CA2L2	Web Technologies Lab	0	6	0	Core	30	70	3
<b>TOTAL FOR SECOND SEMESTER</b>						<b>210</b>	<b>490</b>	<b>25</b>

At the end of 2<sup>nd</sup> semester, every student must undergo *Summer Internship/Apprenticeship/Project Work/Industrial Training/Research based Project Work* for **Six Weeks** and must prepare a report concerned as per approved project guidelines, and submit the same to the University 14 days before the commencement of third semester end examinations.

**Note:** Students may be allowed to register and appear for MOOCS from the third semester itself. However, students are to complete the MOOCS successfully and submit pass certificate of the same to the University through the Principal of the College concerned for approval and endorsement of the same on grade cards and PCA and ODs as per the regulations of the University.

III SEMESTER (For the batch of students admitted during 2022-2023)					M.C.A			
Course Code	Course Name	Teaching Hours/ week			CORE/IDC/DSE/ SEC/OEC/MOOCs	CIA	SEE	No. of Credits
		Lecture	Practical	Tutorial				
22CA3T1	Data Science	4	0	0	Core	30	70	4
<b>DOMAIN SPECIFIC ELECTIVE COURSES (CHOOSE ANY THREE)</b>								
22CA3E1	Design & Analysis of Algorithms	4	0	0	DSE	30	70	4
22CA3E2	Data Mining Techniques	4	0	0	DSE	30	70	4
22CA3E3	Cryptography & Network Security	4	0	0	DSE	30	70	4
22CA3E4	Artificial Intelligence	4	0	0	DSE	30	70	4
22CA3E5	Internet of Things	4	0	0	DSE	30	70	4
22CA3E6	Block Chain Technologies	4	0	0	DSE	30	70	4
<b>LAB PRACTICALS</b>								
22CA3L1	Data Science Lab	0	6	0	Core	30	70	3
22CA3L2	Cryptography & Network Security Lab	0	6	0	Core	30	70	3
<b>OPEN ELECTIVE (INTERDISCIPLINARY/MULTIDISCIPLINARY) COURSES (CHOOSE ANY ONE)</b>								
22OE301	Python Programming	3	0	0	OEC	30	70	3
22OE302	Office Tools	3	0	0	OEC	30	70	3
22OE303	Mobile Computing	3	0	0	OEC	30	70	3
22OE304	R Programming	3	0	0	OEC	30	70	3
22OE305	Web Development	3	0	0	OEC	30	70	3
<b>TOTAL FOR THIRD SEMESTER</b>						<b>210</b>	<b>490</b>	<b>25</b>

M.C.A (R20)									
IV SEMESTER (For the batch of students admitted during 2021-2022)									
S.No.	Course Code	Title of the Course	Instruction Hours per Week			Credits	Evaluation		Total Marks
			L	T	P		CIA	SEE	
1	20CA4M1	Certification Course offered by MOOCS providers such as NPTEL/Swayam/Edx/Coursera/Udacity/Udemy/Cisco/Guvi etc.		4		4	30	70	100
2	20CA4T1	Data Wrangling and Data Visualization	2		4	4	30	70	100
3	20CA4T2	Applied Data Analysis	4			4	30	70	100
4	20CA4T3	Deep Learning	4			4	30	70	100
5	20CA4P1	Project Work			12	6	100	100	200
Total			30			22	220	380	600

IV SEMESTER (For the batch of students admitted during 2022-2023)					M.C.A			
Course Code	Course Name	Teaching Hours/ week			CORE / IDC/DSE/ SEC/OEC/ MOOCS	CIA	SEE	No. of Credits
		Lecture	Practical	Tutorial				
22CA4T1	Machine Learning	4	0	0	Core	30	70	4
<b>DOMAIN SPECIFIC ELECTIVE COURSES (CHOOSE ANY ONE)</b>								
22CA4E1	Cloud Computing	4	0	0	DSE	30	70	4
22CA4E2	Social Media Analytics	4	0	0	DSE	30	70	4
22CA4E3	Deep Learning	4	0	0	DSE	30	70	4
22CA4E4	Technical Report Writing	4	0	0	DSE	30	70	4
<b>LAB PRACTICALS</b>								
22CA4L1	Machine Learning Lab	0	6	0	Core	30	70	3
<b>ENTREPRENEURIAL &amp; INNOVATION/IT SKILL RELATED TO DOMAIN SPECIFIC ELECTIVE COURSES (CHOOSE ANY ONE)</b>								
22CA4E5	Big Data Analytics	3	0	0	SEC	30	70	3
22CA4E6	Dynamic Web Programming using Python	3	0	0	SEC	30	70	3
22CA4E7	Software Testing and Project Management	3	0	0	SEC	30	70	3
<b>* CHOOSE MOOCs FROM SWAYAM/NPTEL SOURCES</b>								
MOOCS								4
<b>PROJECT WORK EVALUATION AND VIVA-VOCE</b>						Nil	200	12
<b>TOTAL FOR IV SEMESTER</b>						<b>120</b>	<b>480</b>	<b>30</b>



## 22CA2T1: COMPUTER NETWORKS

<b>Course Name</b>	Computer Networks	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>CIA</b>	<b>SEE</b>	<b>TM</b>
<b>Course Code</b>	22CA2T1	4	0	0	4	30	70	100
<b>Year of Introduction:</b> 1991	<b>Year of Offering:</b> 2022	<b>Year of Revision:</b> 2022		<b>Percentage of Revision:</b> 10				
<b>L-Lecture, T-Tutorial, P-Practical, C-Credits, CIA-Internal Marks, SEE-External Marks, TM-Total Marks</b>								

### Course Description and Purpose:

Computer Networks (22CA2T1) is a course that will exemplify basic concepts of *Computer Networks, Functionality of Layered Architecture, Error Correction and Detection Code and Various Protocols used in Layers and Protocols, Functionality of Medium Access Control Sub Layer, Various Routing Strategies used in inter networking using IPAddresses, Different Services and Protocols of Transport Layer and Various Application Layer Protocols* used over the internet.

### Course Objectives:

This course will help the students to understand and learn importance of *Protocols in a Network, The usage of the Protocols in Layered Architecture* and brief information of functionality of all the *Five Layers and their Protocols*.

### Specific objectives include:

- To understand functionality of *Layered Architecture*.
- To understand Ethernet, *Bluetooth and Data Link Layer Switching*.
- To learn Network Layer Design issues and Routing Algorithm used.
- To learn *Transport Services and TCP and UDP*.
- To understand the Protocols and services of *Applications Layer*.

### Course Learning Outcomes:

Upon successful completion of the course, the student will be able to:

**CO1:** Understand *Functionality of Layered Architecture, Error Correction and Detection Codes and Various Protocols used in Layers.*

**CO2:** Understand functionality of *Medium Access Control Sub Layer.*

**CO3:** Understand the various *Routing Strategies* used in internet working using *IP Addresses.*

**CO4:** Understand different Services and Protocols of *Transport Layer.*

**CO5:** Understand the various *Application Layer Protocols* used over internet.

### UNIT I (12 Hours)

**Introduction:** Uses of Computer Networks: Business Application, Home Applications, Mobile Users, Social Issues, Connection Oriented and Connectionless Services, Service Primitives, The relationship of Services to Protocols, **Reference Models:** The OSI Reference Model, The TCP/IP Reference Model, A Comparison of OSI and TCP/IP Reference Model.

**Physical Layer:** ALOHA, CSMA, CSMA/CA

**Data Link Layer: Data Link Layer Design Issues:** Services Provided to the Network Layer, Framing, Error Control, Flow Control, **Error Correcting Codes, Error Detecting Codes, Elementary Data Link Protocols:** An Utopian Simplex Protocol, A Simplex Stop and Wait Protocol, A Simplex Protocol for a Noisy Channel, **Sliding Window Protocols:** A One Bit Sliding Window Protocol, A Protocol Using Go Back N, A Protocol using Selective Repeat

### UNIT II (12 Hours)

**The Medium Access Control Sub Layer: Ethernet:** Ethernet Cabling, Manchester Encoding, The Ethernet MAC sub layer Protocol, The Binary Exponential Backoff Algorithm, **Bluetooth:** Bluetooth Architecture, Bluetooth Applications, The Bluetooth Protocol Stack, The Bluetooth Radio Layer, The Bluetooth Link Layers, The Bluetooth Frame Structure, **Data Link Layer Switching:** Uses of Bridges, Learning Bridges, Spanning Tree Bridges, Remote Bridges, Repeaters, Hubs, Bridges, Switches, Routers and Gateways, Virtual LANs.

### UNIT III (12 Hours)

**The Network Layer: Network Layer Design Issues:** Store and Forward Packet Switching, Services provided to the Transport Layer, Implementation of Connectionless Services, Implementation of Connection Oriented Services, Comparison of Virtual Circuit and Datagram subnets. **Routing Algorithms :** The Optimality Principle, Shortest Path Routing, Flooding, Distance Vector Routing, LinkState Routing, Hierarchical Routing, Broadcast Routing, Multicast Routing, Routing for Mobile Hosts **The Network Layer in the Internet:** The IP Version 4 Protocol, IP Address, IPV6 Features and Advantages.

### UNIT IV (12 Hours)

**The Transport Layer: The Transport Service:** Services provided to the Upper Layers, Transport Services Primitives, Berkeley Sockets. **Elements of Transport Protocols:** Addressing, Connection Establishment, Connection Release, Flow Control and Buffering, Multiplexing, Crash Recovery.

**The Internet Transport Protocols:** Introduction to TCP, The TCP Service Model, The TCP Protocol, The TCP Segment Header, TCP Connection Establishment, TCP Connection Release, Modeling TCP Connection Management, TCP Sliding Window, TCP Congestion Control, Comparison of TCP and UDP.

### UNIT V (12 Hours)

**Wireless TCP:** Classical improvement in WTCP.

**The Application Layer: DNS:** The Domain Name System: The DNS Name Space, Resource Records, Name Servers. **Electronic Mail:** Architecture and Services, The User Agent, Message Formats, Message Transfer, Final Delivery. **The World Wide Web:** Architecture Overview, Static Web Pages, Dynamic Web Pages. **Streaming Audio and Video:** Digital Audio, Digital Video, Streaming Stored Media, Streaming Live Media, Real Time Conferencing.

**Reference Text books:**

5. Andrew S. Tanenbaum, Computer Networks, Sixth Edition, Pearson, 2021
6. Andrew S. Tanenbaum, Computer Networks, Fifth Edition, Pearson, 2011
7. James F. Kurose, Keith W. Ross, Computer Networking, 3<sup>rd</sup> Edition, Pearson Edition
8. Michael A. Gallo, William M. Hancock, Data Communications and Networking, 4<sup>th</sup> Edition, TMH

**PARVATHANENI BRAHMAYYA SIDDHARTHA COLLEGE OF ARTS & SCIENCE**

(An Autonomous College in the jurisdiction of Krishna University)

M.C.A, Second Semester

**Course Name:** Computer Networks

**Course Code:** 22CA2T1

**(w.e.f admitted batch 2022-23)**

**Time: 3 Hours**

**Max Marks: 70**

**SECTION-A**

**Answer ALL Questions. All Questions Carry Equal Marks. (5×4=20Marks)**

- 1.(a) What are the Uses of Computer Networks. (CO1,L1)  
(or)  
(b) Write about ALOHA (CO1,L1)
2. (a) Explain about The Binary Exponential Backoff Algorithm. (CO3,L2)  
(or)  
(b) Explain about Virtual LANs. (CO3,L2)
3. (a) What is Store and Forward Packet Switching. (CO2,L1)  
(or)  
(b) What are the Features of IPV6. (CO2,L1)
4. (a) Explain about Berkeley Sockets. (CO3,L2)  
(or)  
(b) Explain TCP Congestion Control. (CO3,L2)
5. (a) Explain about WTCP. (CO5,L5)  
(or)

(b) Explain about URLs. (CO5,L5)

### SECTION-B

Answer ALL questions. All Questions Carry Equal Marks. (5×10=50 Marks)

6. (a) Explain the OSI Reference Model with a neat diagram. (CO1,L2)

(or)

(b) Explain Sliding Window Protocols. (CO1,L2)

7. (a) List the operations of Ethernet. (CO2,L4)

(or)

(b) Analyze Bluetooth Architecture with Bluetooth Application. (CO2,L4)

8. (a) Model Shortest Path Routing Algorithm. (CO2,L3)

(or)

(b) Select IP Addressing Techniques. (CO2,L3)

9. (a) Explain about Connection Establishment and Connection Release. (CO3,L5)

(or)

(b) Explain about TCP. (CO3,L5)

10. (a) Discuss Domain Name System. (CO3,L6)

(or)

(b) Discuss Electronic Mail System. (CO3,L6)

### 22CA2T2: DATA STRUCTURES

<b>Course Name</b>	<b>Data Structures</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>CIA</b>	<b>SEE</b>	<b>TM</b>
<b>Course Code</b>	22CA2T2	4	0	0	4	30	70	100
<b>Year of Introduction:</b> 1991	<b>Year of Offering:</b> 2023	<b>Year of Revision:</b> 2023		<b>Percentage of Revision:</b> 10				
<b>L-Lecture, T-Tutorial, P-Practical, C-Credits, CIA-Internal Marks, SEE-External Marks, TM-Total Marks</b>								

#### Course Description and Purpose:

Data Structures is a course that illustrates *Elementary Data Organization, Data Structure Operations, and Algorithms, Arrays, Matrices, String Processing, Stack, Queues, Linked List, Trees, Heap Sort, Multi-way Search Trees, B-Tree, B+-Trees, Graphs Algorithms, Elementary Graph Algorithms, Sorting and Searching Techniques.*

#### Course Objectives:

This course will help enable the students to understand, learn and develop *Data Structure Operations and Algorithms, Arrays, Matrices, String Processing, Stack, Queues, Linked List, Trees, Heap Sort, Multi-way Search Trees, B-Tree, B+-Trees, Graphs Algorithms, Elementary Graph Algorithms, Sorting and Searching Techniques.*

#### Specific Objectives include:

- To understand *Data Structures, Data Structure Operations and Algorithms, Arrays.*
- To understand *String Processing, Stack, Queues and Linked List.*
- To learn the *Binary Tree, Binary Search Trees, AVL Trees, Heap.*

- To learn the *Multi-way Search Trees, B-Trees, B+-Trees*.
- To understand the *Graph Algorithms, different Sorting and Searching Techniques*.

### Course Learning Outcomes:

At the end of this course the students should be able to:

**CO1:** Understand *Data Structures, Data Structure Operations and Algorithms, Arrays*.

**CO2:** Understand *String Processing, Stack, Queues and Linked List*.

**CO3:** Learn the Binary Tree, Binary Search Trees, AVL Trees, Heap.

**CO4:** Learn the *Multi-way Search Trees, B-Trees, B+-Trees*.

**CO5:** Understand the *Graph Algorithms, different Sorting and Searching Techniques*.

### Course Content:

#### UNIT I (12 Hours)

**Introduction and Overview:** Elementary Data Organization, Data Structures, Data Structure Operations, and Algorithms: Complexity, Time and Space Tradeoff Asymptotic Notations. Linear Arrays, Representation and Traversing Linear Arrays, Inserting and Deleting, Linear Search, Binary Search, Multidimensional Arrays, Pointer Arrays, Record Structures, Representation of records in memory, Parallel Arrays, Matrices, Sparse Matrices.

#### UNIT II (12 Hours)

**String Processing:** Pattern Matching Algorithms.

**Stacks:** Stacks, Array representation, Linked List representation, Evaluation of Arithmetic Expressions, Quick Sort, Recursion, Towers of Hanoi.

**Queues:** Linked representation of Queues, Deques, Priority Queues.

**Linked Lists:** Representation, Traversing, Searching, Memory Allocation: Garbage Collection, Insertion, Deletion, Header Linked Lists, Two Way Lists.

#### UNIT III (12 Hours)

**Trees:** Binary Trees, Representing and Traversing Binary Trees, Traversal Algorithms using Stacks, Binary Search Trees, Searching, Insertion and Deletion in Binary Search Trees, AVL Search Trees, Insertion and Deletion in AVL Trees.

**Heap:** Heap Sort, Huffman's Algorithms, General Trees

#### UNIT IV (12 Hours)

**Multi-way Search Trees:** M-Way Search Trees, Definition and Properties, Searching an M-Way Search Tree, B-Trees, Definition and Properties, Number of Elements in a B-Tree, Insertion into B-Tree, Deletion from a B-Tree, B+-Tree Definition, Searching a B+-Tree, Insertion into B+-Tree, Deletion from a B+-Tree.

#### UNIT V (12 Hours)

**Graphs:** Graphs Algorithms, Elementary Graph Algorithms: Topological Sort, Single Source Shortest Path Algorithms: Dijkstra's, Bellman-Ford, All Pairs Shortest Paths : Floyd Warshall's Algorithm.

**Sorting and Searching:** Insertion Sort, Selection Sort, Merging, Merge Sort, Radix Sort, Searching and Data Modification, Hashing.

### Reference Textbooks:

1. Seymour Lipschutz, Data Structures, Mc Graw Hill (Schaums Outlines), Revised First Edition, 2014.
2. Seymour Lipschutz, Theory and Problems of Data Structures, Mc Graw Hill (Schaums Outlines), Paperback, 2017.
3. John R Hubbard, Second Edition, Data Structures with Java, Mc Graw Hill (Schaums Outlines), 2009.
4. Robert Lafore, Data Structures & Algorithms in Java, Second Edition, Pearson Education, 2017.
5. Fundamentals of Data Structures in C, Second Edition, Horowitz, Sahani, Anderson-freed, Universities Press, 1993.
6. Data Structures: A Pseudocode Approach, Richard F Gilberg, Behrouz A Forouzan, Cengage, 2004

**PARVATHANENI BRAHMAYYA SIDDHARTHA COLLEGE OF ARTS & SCIENCE**

(An Autonomous College in the jurisdiction of Krishna University)

M.C.A., Second Semester

**Course Name:** Data Structures

**Course Code:** 22CA2T2

**(w.e.f admitted batch 2022-23)**

**Time: 3 Hours**

**Max Marks: 70 Marks**

**SECTION-A**

**Answer ALL questions. All Questions Carry Equal Marks. (5×4 = 20 Marks)**

1.(a) Explain different *Data Structure Operations*. (CO1, L2)

(or)

(b) Explain *Linear Array*.(CO1, L2)

2. (a) What is *Stack*? Explain its Operations. (CO2, L1)

(or)

(b) Define *Linked List* and its operations. (CO2, L1)

3. (a) Explain *Binary Search Trees*. (CO3, L2)

(or)

(b) Explain *General Trees*. (CO3, L2)

4. (a) Explain *M-Way Search Tree*. (CO4, L2)

(or)

(b) Explain *searching an element from B+-Tree*. (CO4, L2)

5. (a) Explain *Topological Sort Algorithm*. (CO5, L2)

(or)

(b) Explain *Bellman-Ford Algorithm*. (CO5, L2)

**SECTION-B**

**Answer ALL questions. All Questions Carry Equal Marks. (5×10 = 50 Marks)**

6. (a) Explain Binary Search and Linear Search Algorithms with example. (CO1, L2)

(or)

(b) Explain *Multidimensional Arrays in Java with example*. (CO1, L2)

7. (a) Explain *Towers of Hanoi Problem* implementation with example. (CO2, L5)

(or)

(b) Explain Operations of *Queue* using *Linked List with example*. (CO2, L5)

8. (a) Discuss *AVL Search Trees operations* in detail. (CO3, L6)

(or)

(b) Discuss about the insertion and deletion operations of Binary Search Trees with example. (CO3,L6)

9. (a) List *B-Tree operations* with examples. (CO4, L4)

(or)

(b) List insertion and deletion operations of B+-Tree with examples. (CO4, L4)

10. (a) Utilize Merge Sort Algorithm to sort the elements 10, 45, 15, 56, 48, 23, 8, 17. Explain step by step procedure. (CO5, L3)

(or)

(b) Make use of elements 23, 34, 12, 45, 14, 73, 21, 7 perform sort using Radix Sort. (CO5, L3)

## 22CA2T3: WEB TECHNOLOGIES

<b>Course Name</b>	Software Engineering	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>CIA</b>	<b>SEE</b>	<b>TM</b>
<b>Course Code</b>	22CA2T3	4	0	0	4	30	70	100
<b>Year of Introduction:</b> 1991	<b>Year of Offering:</b> 2022	<b>Year of Revision:</b> 2022			<b>Percentage of Revision:</b> 10			
L-Lecture, T-Tutorial, P-Practical, C-Credits, CIA-Internal Marks, SEE-External Marks, TM-Total Marks								

### Course Description and Purpose:

Web Technologies (22CA2T3) is a course that illustrates about *WWW, HTML, Write code in JavaScript & DHTML, Designing of XML Files, Install and use Servlets and PHP, Programming in JSP, Establish Database Connectivity & Form Validations using C#, Basic knowledge of Node JS, Express & Spring Boot, Creating AJAX form validations.*

**Course Objectives:** The course will help the students to understand, learn and build *WWW, HTML, Write code in JavaScript & DHTML, Designing of XML Files, Install and use Servlets and PhP, Programming in JSP, Establish Database Connectivity & Form Validations using C#, Basic knowledge of Node JS, Express & Spring Boot, Creating AJAX form validations.*

### Course Objectives:

- To understand the concepts of *WWW* including *Browser and HTTP Protocol* and various *HTML Tags* and use them to develop the user friendly web pages.
- To use the *JavaScript* and define the *CSS* with its types to develop the *Dynamic Web Pages*.
- Students will be able to and develop the *Modern Web Pages* using the *XML Elements* and *Servlets* with different layouts as per need of applications.
- Able to develop *Server Side Scripting* with *PHP* and *JSP* to generate the *Web Pages* dynamically using the *Database Connectivity & C# Database Connectivity with Form Validations*.
- Able to develop *Interactive Forms* for *Web Applications* using *Node JS, Express, Spring Boot & AJAX*.

### Course Outcomes:

On successful completion of this course, the students:

CO1: Able to understand the concepts of *WWW* including *Browser* and *HTTP Protocol* and various *HTML Tags* and use them to develop the user friendly web pages.

CO2: Able to use the *JavaScript* and define the *CSS* with its types to develop the *Dynamic Web Pages*.

CO3: Students will be able to develop the *Modern Web Pages* using the *XML Elements* and *Servlets* with different layouts as per need of applications.

CO4: Able to develop *Server Side Scripting* with *PHP* and *JSP* to generate the *Web Pages* dynamically using the *Database Connectivity C# Database Connectivity with Form Validations*.

CO5: Able to develop *Interactive Forms* for *Web Applications* using *Node JS, Express, Spring Boot & AJAX*.

### UNIT I (12 Hours)

**Introduction:** What is Internet, History of Internet, Internet Services and Accessibility, Uses of the Internet, Protocols, **Web Concepts:** The Client/Server Model, Retrieving Data from the Web, How the Web Works?, Web Browsers, Searching information on the Web, Internet Standards.

**HTML:** Outline of an HTML Document, **Head Section Body Section:** Headers, Paragraphs, Text Formatting, Linking, Internal Linking, Embedded Images, Lists, Tables, Frames, Other Special Tags and Characters, HTML Forms.

### UNIT II (12 Hours)

**Java Script:** Introduction to Scripting, Control Statements I, Control Statements II, Functions, Arrays, Objects, Document Object Model, Events.

**Dynamic HTML (DHTML):** Introduction, Cascading Style Sheets (CSS), Coding CSS, Properties of Tags, Property Values, Other Style Properties, In Line Style Sheets, Embedded Style Sheets, External Style Sheets, Grouping - Inheritance, Class as Selector, ID as Selector, Contextual Selector, Pseudo Classes and Pseudo Elements, Positioning - Backgrounds, Element Dimensions, DHTML Document Object Model and Collections, Using the Collections All, Moving Object around the Document, Event Handling, Assigning Event Handlers, Event Bubbling, Filters and Transition Filters, Transitions, Data Binding, Using Tabular Data Control, Sorting Data, Dynamic Sorting, Filtering.

### UNIT III (12 Hours)

**XML:** Introduction, HTML vs. XML, Syntax of XML Document, XML Attributes, Use of elements vs. Use of Attributes, XML Validation, Well Formed XML Documents, Valid XML Documents, XML DTD: Internal DTD, External DTD, The Buildings blocks of XML Documents, **DTD Elements** : Declaring an Element, Empty Elements, Elements with Data, Elements with Children, Wrapping, Declaring only one Occurrence of the Same Elements, Declaring Minimum one Occurrence of the Same Element, Defining Zero or One Occurrence of the Same Element, Declaring Mixed Content, **DTD Attributes:** Declaring Attributes, Default Attribute Value, Implied attribute, required attribute, fixed attribute value, enumerated attribute values, DTD Entries, DTD Validation, XSL, XSL Transformation, XML NameSpaces, XML Schema.

**Servlets:** Introduction, Advantages of Servlets over CGI, Installing Servlets, The Servlet Life Cycle, Servlets API, A Simple Servlet, Handling HTTP Get Requests, Handling HTTP Post Requests, Cookies, Session Tracking, Multi Tier Applications using Database Connectivity, Servlets Chaining.

### UNIT IV (12 Hours)

**PHP:** Introduction, PHP Basics, String Processing and Regular Expressions, Form Processing and Business Logic, Connecting to a Database, Using Cookies, Dynamic Content, Operator Precedence Chart.

**Java Server Pages (JSP):** Introduction, Advantages of JSP, Developing first JSP, Components of JSP, Reading Request Information, Retrieving the Data Posted from a HTML File to a JSP File, JSP Sessions, Cookies, Disabling Sessions.

**Database Connectivity & Form Validations using C#:** Database Connectivity using C#.Net, Form Validations (Name Validation, Integer Validation, Floating Point Validation, Email Validation, Combo Box Validation).

**Spring Boot:** Introduction to Spring Boot, Spring Initializer, Maven, Gradle, Class Path Dependencies Creating Executable Jar File.

### UNIT V (12 Hours)

**Getting Started with Node:** Getting Node, Using the Terminal, Editors, npm, A Simple Webserver with Node (Hello World, Event Driven Programming, Routing, Serving Static Resource).

**Saving Time with Express:** Scaffolding, Initial Steps (Views and Layouts, Static Files and Views, Dynamic Content in Views).

**Form Handling:** Sending Client Data to Server, HTML Forms. Encoding, Approaches in Form Handling, Form Handling with Express, Handling AJAX Forms-File Uploads, jQuery File Upload.

### Reference Books:

1. N.P.Gopalan, J.Akilandeswari, Web Technologies - A Developer's Perspective, PHI(2008)
2. Harvey M.Deitel and Paul L. Deitel, Internet and World Wide WebHow To Program, Prentice Hall, 5th Edition.
3. Ethan Brown, Web Development with Node & Express, O'Reilly, First Edition, 2014



**PARVATHANENI BRAHMAYYA SIDDHARTHA COLLEGE OF ARTS & SCIENCE**

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**M.C.A. Second Semester**

**Course Name:** Web Technologies

**Course Code:** 22CA2T3

**(w.e.f admitted batch 2022-23)**

**Time: 3 Hours**

**Max Marks: 70**

**SECTION-A**

**Answer ALL questions. All Questions Carry Equal Marks. (5×4 = 20 Marks)**

1. (a) What are *protocols* used in accessing the internet? (CO1, L1)  
(or)  
(b) What are the differences between *Inline & Block Elements*? (CO2, L1)
2. (a) What is *DOM*? Explain it. (CO2, L1)  
(or)  
(b) What is advantage of using *External Style Sheets*? (CO2,L1)
3. (a) What is *XML Document Validation*? Explain in detail. (CO3,L1)  
(or)  
(b) What is *Servlet*? Explain in detail. (CO3,L1)
4. (a) List C# function to validate *Name of the User*. (CO4,L1)  
(or)  
(b) List the components of *JSP*. (CO4,L2)
5. (a) State various *services of Web Browser*. (CO5,L5)  
(or)  
(b) What are the features of *JQuery*? Explain it (CO5,L5)

**SECTION-B**

**Answer ALL questions. All Questions Carry Equal Marks. (5×10 = 50 Marks)**

6. (a) Explain services of *Internet* and *Web Browser*. (CO1, L2)  
(or)  
(b) Explain *Client-Server Architecture and Frame and its attributes with example program*. (CO1,L2)
7. (a) List *JavaScript variables and characteristics of Array objects*. (CO2, L4)  
(or)  
(b) Examine building an *External Style Sheet*. Explain advantages and disadvantages of *External Style Sheets* with an example. (CO2, L4)
8. (a) Develop *TDC, DTD* with building blocks of *DTD*. (CO3,L3)  
(or)  
(b) Develop *Life Cycle of Servlets*. Write the session tracker that tracks the number of access and last access of data of a particular web page. (CO3,L3)
9. (a) Discuss (i) *String Processing* (ii) *Regular Expressions* (iii) *Cookies*. (CO4, L6)  
(or)  
(b) Discuss *Components of JSP* and write a *JSP Program to accept username and password from a user and validate them*. (CO4, L6)
10. (a) Explain *Class Path Dependencies*. (CO5,L5)  
(or)  
(b) Explain how to upload Files using *jQuery* with example program. (CO5, L5)

## 22CA2E1: SOFTWARE ENGINEERING

<b>Course Name</b>	Software Engineering	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>CIA</b>	<b>SEE</b>	<b>TM</b>
<b>Course Code</b>	22CA2E1	4	0	0	4	30	70	100
<b>Year of Introduction:</b> 1991	<b>Year of Offering:</b> 2022	<b>Year of Revision:</b> 2022		<b>Percentage of Revision:</b> 10				
L-Lecture, T-Tutorial, P-Practical, C-Credits, CIA-Internal Marks, SEE-External Marks, TM-Total Marks								

### Course Description and Purpose:

Software Engineering (22CA2E1) is a course that illustrates *Process Models, Agile Development, Core Principles, Requirements Modeling, Data Modeling, Software Quality Assurance, Software Testing Strategies, Testing Conventional Applications, Project Management Concepts, Process and Project Metrics, Formal Modeling and Verification and Estimation for Software Project.*

**Course Objectives:** The course will help the students to understand, learn and build *Process Models, Agile Models, Core Principles, Requirement Models, Data Models, Software Quality Assurance Procedures, Software Testing Strategies, Strategies to Test Conventional Applications, Project Management Concepts, Process and Project Metrics, Formal Modeling and Verification and Models to estimate Software Projects.*

### Specific objectives include:

- To understand various *Software Engineering Methods, Practices, Process Models and Agile Development Strategies.*
- To understand and apply *Core Principles, Requirements & Modeling Concepts.*
- To understand and apply different *Software Testing Approaches* and various aspects of *Software Quality Assurance.*
- To understand and apply *Process & Project Management Concepts.*
- To understand and apply *Software Estimates for Projects & apply Formal Methods Modeling.*

### Course Learning Outcomes:

Upon successful completion of the course, the student will be able to:

**CO1:** Understand various *Software Engineering Methods, Practices, Process Models and Agile Development Strategies.*

**CO2:** Understand and apply *Core Principles, Requirements & Modeling Concepts.*

**CO3:** Understand and apply different *Software Testing Approaches* and various aspects of *Software Quality Assurance.*

**CO4:** Understand and apply *Process & Project Management Concepts.*

**CO5:** Understand and apply *Software Estimates for Projects & apply Formal Methods Modeling.*

### UNIT I (12 Hours)

**Software and Software Engineering:** The Nature of Software: Defining Software, Software Application Domains, Legacy Software, The Unique Nature of Web Apps, Software Engineering, The Software Process, Software Engineering Practices: The Essence of Practice, General Principles, Software Myths.

**Process Models:** A Generic Process Model: Defining a Framework Activity, Identifying a Task Set, Process Patterns, Process Assessment and Improvement, Prescriptive Process Models: The Waterfall Model, Incremental Process Models, Evolutionary Process Models, Concurrent Models, A Final Word on Evolutionary Processes, Specialized Process Models: Component-Based Development, The Formal Methods Model, Aspect-Oriented Software Development, The Unified Process: A Brief History, Phases of the Unified Process, Personal and Team Process Models: Personal Software Process (PSP), Team Software Process (TSP).

**Agile Development:** What Is Agility, Agility and the Cost of Change, What Is an Agile Process: Agility Principles, The Politics of Agile Development, Human Factors, Extreme Programming (XP): XP Values, The XP Process, Industrial XP, The XP Debate, Other Agile Process Models: Adaptive Software Development (ASD), Scrum, Dynamic Systems Development Method (DSDM), Crystal, Feature Driven Development (FDD), Lean Software Development (LSD), Agile Modeling (AM), Agile Unified Process (AUP).

## UNIT II (12 Hours)

**Principles that Guide Practice: Core Principles:** Principles That Guide Process, Principles That Guide Practice, Principles That Guide Each Framework Activity: Communication Principles, Planning Principles, Modeling Principles, Construction Principles, Deployment Principles.

**Requirements Modeling: Scenarios, Information, and Analysis Classes:** Requirements Analysis: Overall Objectives and Philosophy, Analysis Rules of Thumb, Domain Analysis, Requirements Modeling Approaches, Scenario-Based Modeling: Creating a Preliminary Use Case, Refining a Preliminary Use Case, Writing a Formal Use Case, UML Models That Supplement the Use Case: Developing an Activity Diagram, Swim lane Diagrams.

**Data Modeling Concepts:** Data Objects, Data Attributes, Relationships, Class-Based Modeling: Identifying Analysis Classes, Specifying Attributes, Defining Operations, Class-Responsibility- Collaborator (CRC) Modeling, Associations and Dependencies, Analysis Packages.

## UNIT III (12 Hours)

**Software Quality Assurance:** Background Issues, Elements of Software Quality Assurance, SQA Tasks, Goals, and Metrics: SQA Tasks, Goals, Attributes, and Metrics, Formal Approaches to SQA, Statistical Software Quality Assurance: A Generic Example, Six Sigma for Software Engineering, Software Reliability : Measures of Reliability and Availability, Software Safety, The ISO 9000 Quality Standards, The SQA Plan.

**Software Testing Strategies:** A Strategic Approach to Software Testing : Verification and Validation, Organizing for Software Testing, Software Testing Strategy-The Big Picture, Criteria for Completion of Testing, Strategic Issues, Test Strategies for Conventional Software: Unit Testing, Integration Testing, Test Strategies for Object-Oriented Software: Unit Testing in the OO Context, Integration Testing in the OO Context, Test Strategies for Web Apps, Validation Testing: Validation-Test Criteria, Configuration Review, Alpha and Beta Testing, System Testing: Recovery Testing, Security Testing, Stress Testing, Performance Testing, Deployment Testing, The Art of Debugging: The Debugging Process, Psychological Considerations, Debugging Strategies, Correcting the Error

**Testing Conventional Applications:** Software Testing Fundamentals, Internal and External Views of Testing, White-Box Testing, Basis Path Testing: Flow Graph Notation, Independent Program Paths, Deriving Test Cases, Graph Matrices, Control Structure Testing: Condition Testing, Data Flow Testing, Loop Testing, Black-Box Testing: Graph-Based Testing Methods, Equivalence Partitioning, Boundary Value Analysis, Orthogonal Array Testing.

## UNIT IV (12 Hours)

**Project Management Concepts:** The Management Spectrum: The People, The Product, The Process, The Project, People: The Stakeholders, Team Leaders, The Software Team, Agile Teams, Coordination and Communication Issues, The Product: Software Scope, Problem Decomposition, The Process: Melding the Product and the Process, Process Decomposition, The Project, The W5HH Principles.

**Process and Project Metrics:** Metrics in the Process and Project Domains: Process Metrics and Software Process Improvement, Project Metrics, Software Measurement: Size-Oriented Metrics, Function-Oriented Metrics, Reconciling LOC and FP Metrics, Object-Oriented Metrics, Use-Case– Oriented Metrics, Web App Project Metrics, Metrics for Software Quality: Measuring Quality, Defect Removal Efficiency.

## UNIT V (12 Hours)

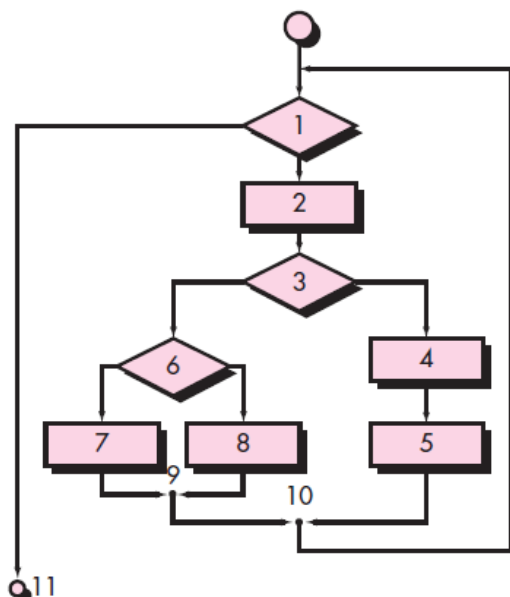
**Formal Modeling And Verification:** The Cleanroom Strategy, Functional Specification: Black-Box Specification, State-Box Specification, Clear-Box Specification, Cleanroom Design: Design Refinement, Design Verification, Cleanroom Testing: Statistical Use Testing, Certification, Formal Methods Concepts, Applying Mathematical Notation for Formal Specification, Formal Specification Languages: Object Constraint Language (OCL), The Z Specification Language.

**Estimation for Software Projects:** Resources: Human Resources, Reusable Software Resources, Environmental Resources, Software Project Estimation, Decomposition Techniques: Software Sizing,

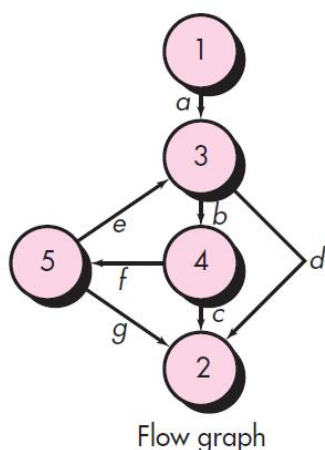
Problem-Based Estimation, An Example of LOC-Based Estimation, An Example of FP-Based Estimation, Empirical Estimation Models: The Structure of Estimation Models, The COCOMO II Model, The Software Equation, Estimation for Object-Oriented Projects.

**Case Studies:**

- Draw example for Process Pattern when requirements are uncertain.
- Draw UML use case diagram for Safehome Security Function.
- Draw UML Activity Diagram for Access camera surveillance via the Internet - display camera views function.
- Draw UML Swimlane Diagram for Access camera surveillance via the Internet - display camera views function.
- Draw UML Class Diagram for Floor Plan.
- Draw UML Package for specifying Environment, Characters of the Game and Rules of the Game.
- Draw Level 1 DFD for Safehome Security Function
- Draw State diagram for Safehome Security Function
- Draw Sequence Diagram (partial) for the Safehome Security Function
- A UML Deployment Diagram for Safehome Security Function.
- Draw Flow Graph for Flow Chart and find the Cyclomatic Complexity.



- Draw the Graph Matrix for the Flow Graph



- Draw Generalization diagram by specifying Structural Constraint.
  - Specify sample (a) Project Metrics (b) Product Metrics
  - Specify (i) Decision Table (ii) Decision Tree in Block Box Testing
  - Draw the Block Diagram for Block Handler and also specify the logic using Object Constraint Language (OCL)
8. No block will be marked as both unused and used.

9. All the sets of blocks held in the queue will be subsets of the collection of currently used blocks
10. No elements of the queue will contain the same block numbers.
11. The collection of used blocks and blocks that are unused will be the total collection of blocks that make up files.
12. The collection of unused blocks will have no duplicate block numbers.
13. The collection of used blocks will have no duplicate block numbers.
14. Using Z Specification Language describes the state of the block handler and the data invariant:

**Reference Text Books:**

1. Roger S Pressman, Software Engineering - A Practitioner's Approach, Ninth Edition, McGraw - Hill, A Business Unit of The McGraw-Hill Companies, Inc., 2020.
2. Roger S Pressman, Software Engineering - A Practitioner's Approach, Seventh Edition, McGraw - Hill, A Business Unit of The McGraw-Hill Companies, Inc., 2010.
3. Sommerville, Software Engineering, 7<sup>th</sup> Edition, Pearson Education, 2004.
4. S.A.Kelkar, Software Engineering - A Concise Study, PHI, January 2007.
5. Waman, Software Engineering, TMH, June 2004.
6. AH Behforooz and Frederick J.Hudson, Software Engineering Fundamentals, Oxford, 2008.

**PARVATHANENI BRAHMAYYA SIDDHARTHA COLLEGE OF ARTS & SCIENCE**

(An Autonomous College in the jurisdiction of Krishna University)

**M.C.A Second Semester**

**Course Name:** Software Engineering

**Course Code:** 22CA2E1

**(w.e.f admitted batch 2022-23)**

**Time: 3 Hours**

**Max Marks: 70**

**SECTION-A**

**Answer ALL questions. All Questions Carry Equal Marks. (5×4 = 20 Marks)**

1. (a) What are various aspects of *PSP* and *TSP*? (CO1, L1)  
(or)  
(b) What is *SCRUM*? Explain it in detail. (CO2, L1)
2. (a) What are the phases of *Extreme Programming (XP)*? (CO2, L1)  
(or)  
(b) What is *Class-Based Modeling*? Explain it by writing Class Diagram (CO2,L1)
3. (a) What is *Software Reliability*? Explain in detail. (CO3,L1)  
(or)  
(b) What is *Alpha* and *Beta* Testing? Explain in detail. (CO3,L1)
4. (a) List *W5HH* Principles. (CO4,L1)  
(or)  
(b) What is *Use Case Diagram*? Demonstrate with example. (CO4,L2)
5. (a) State various *resources* of Information System. (CO5,L5)  
(or)  
(b) What is *Software Sizing*? Explain it (CO5,L5)

**SECTION-B**

**Answer ALL questions. All Questions Carry Equal Marks. (5×10 = 50 Marks)**

6. (a) Explain various types of *Software Myths*. (CO1, L2)  
(or)  
(b) Explain *Incremental Process Models*. (CO1,L2)
7. (a) List (i) *Planning Principles* (ii) *Modeling Principles*. (CO2, L4)  
(or)  
(b) Examine various aspects of *Scenario-Based Modeling*. (CO2, L4)
8. (a) Develop various test strategies to test *Conventional Software*. (CO3,L3)  
(or)  
(b) Develop various strategies for *White Box Testing*. (CO3,L3)
9. (a) Discuss the *Management Spectrum* in detail. (CO4, L6)  
(or)  
(b) Discuss (i) *Size-Oriented Metrics* (ii) *Function-Oriented Metrics* in detail. (CO4, L6)
10. (a) Explain *Functional Specification* of *Cleanroom Strategy*. (CO5,L5)  
(or)  
(b) Explain (i) *The COCOMO II Model* (ii) *The Software Equation* of Empirical Estimation Models.  
(CO5, L5)

## 22CA2L1: DATA STRUCTURES LAB

<b>Course Name</b>	Data Structures Lab	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>CIA</b>	<b>SEE</b>	<b>TM</b>
<b>Course Code</b>	22CA2L1	0	0	6	3	30	70	100
<b>Year of Introduction:</b> 2020	<b>Year of Offering:</b> 2022	<b>Year of Revision:</b> No Revision			<b>Percentage of Revision:</b> Nil			
<b>L-Lecture, T-Tutorial, P-Practical, C-Credits, CIA-Internal Marks, SEE-External Marks, TM-Total Marks</b>								

### Course Description and Purpose:

Data Structures Lab (22CA2L1) is a course that illustrates concepts of *Stacks*, *Queues*, and *Tree Traversals*, *Singly Linked Lists*, *Doubly Linked Lists*, *Circular Linked Lists*, *Binary Search Tree*, *Binary Search Tree Traversals*, *Sparse Matrix and DFS & BFS Algorithm*, *Searching & Sorting Algorithms*, *AVL-Trees and B-Trees* and its operations and implementations.

### Course Objectives:

This course will help enable the students to understand learn, apply/ implement the concepts of *Stacks*, *Queues*, and *Tree Traversals*, *Singly Linked Lists*, *Doubly Linked Lists*, *Circular Linked Lists*, *Binary Search Tree*, *Binary Search Tree Traversals*, *Sparse Matrix and DFS & BFS Algorithm*, *Searching & Sorting Algorithms*, *AVL-Trees and B-Trees*.

### Specific Objectives include:

- To understand the concepts of *Stacks*, *Queues*, and *Tree Traversals*.
- To apply the operations of *Singly Linked Lists*, *Doubly Linked Lists*, *Circular Linked Lists* and *Operations on Stacks and Queues*.
- To apply operations on *Binary Search Tree*, *Binary Search Tree Traversals*, *Sparse Matrix and DFS & BFS Algorithm*.
- To implement *Searching & Sorting Algorithms*.
- To implement *AVL-Trees and B-Trees*.

### Course Learning Outcomes:

Upon successful completion of the course, the student will be able to:

**CO1:** Understand the concepts of *Stacks*, *Queues*, and *Tree Traversals*.

**CO2:** Apply the operations of *Singly Linked Lists*, *Doubly Linked Lists*, *Circular Linked Lists* and *Operations on Stacks and Queues*.

**CO3:** Apply operations on *Binary Search Tree*, *Binary Search Tree Traversals*, *Sparse Matrix and DFS & BFS Algorithm*.

**CO4:** Implement *Searching & Sorting Algorithms*.

**CO5:** Implement *AVL-Trees and B-Trees*.

### CYCLE 1

1. Write a Java Program to create a class called Stack and implement Stack Operations. (CO1,L1)
2. Write a Java Program to create a class called Queue and implement Stack Operations. (CO1,L1)
3. Write a Java Program to convert the Infix to Postfix Expression. (CO1,L1)
4. Write a Java Program to evaluate Postfix Expression. (CO1,L1)
5. Write a Java Program to obtain the Binary Number for a given Decimal Number. (CO1,L1)

### CYCLE 2

1. Write a Java Class to implement the operations of a *Singly Linked List*. (CO2,L1)
2. Write a Java Class to implement the operations of a *Doubly Linked List*. (CO2,L1)
3. Write a Java Class to implement the operations of a *Circular Linked List*. (CO2,L1)
4. Write a java program for the following a) Reverse a *Linked List* b) Sort the data in a *Linked List* c) Remove Duplicates d) Merge Two *Linked Lists* (CO2,L1)
5. Write a java program for performing various operations on *Stack* using *Linked List*. (CO2,L1)
6. Write a java program for performing various operations on *Queue* using *Linked List*. (CO2,L1)

### CYCLE 3

1. Write a Java Program to implement operations on Binary Trees Using Recursive and Non- Recursive Methods. (CO3,L1)
2. Write a Java Program to perform Binary Search Tree Traversal. (CO3,L1)
3. Write a Java Program to implement Sparse Matrix. (CO3,L1)
4. Write a Java Program to implement DFS Algorithm. (CO3,L1)
5. Write a Java Program to implement BFS Algorithm. (CO3,L1)

### CYCLE 4

1. Write a Java Program to implement the following sorting techniques:
  - a. Bubble Sort
  - b. Merge Sort.
  - c. Quick Sort.
  - d. Heap Sort. (CO4,L1)
2. Write a Java Program to implement Quick Sort of given elements. (CO4,L1)
3. Write a Java Program to implement the Following search techniques:
  - a. Linear Search
  - b. Binary Search (CO4,L1)

### CYCLE 5

5. Write a Java Program to implement various operations on AVL Trees. (CO5,L1)
6. Write a Java Program to perform the following operations: a) Insertion into a B-Tree b) Searching in a B-Tree (CO5,L1)
7. Write a Java Program to implementation of recursive and non-recursive functions to Binary Tree Traversals (CO5,L1)
8. Write a Java Program to implement all the functions of Dictionary (ADT) using Hashing. (CO5,L1)

**Note: The list of experiments is not limited to the above list. If the existing laboratory experiments completed in advance, the additional laboratory programs can added , and to be executed in the laboratory.**



## 22CA2L2: WEB TECHNOLOGIES LAB

<b>Course Name</b>	Web Technologies Lab	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>CIA</b>	<b>SEE</b>	<b>TM</b>
<b>Course Code</b>	22CA2L2	0	0	6	3	30	70	100
<b>Year of Introduction:</b> 2020	<b>Year of Offering:</b> 2022	<b>Year of Revision:</b> No Revision		<b>Percentage of Revision:</b> Nil				
<b>L-Lecture, T-Tutorial, P-Practical, C-Credits, CIA-Internal Marks, SEE-External Marks, TM-Total Marks</b>								

### Course Description and Purpose:

Web Technologies Lab (22CS2L2) is a course that illustrates concepts of *HTML, Java Script, DHTML, XML, PHP, JSP, Angular JS, Svelte and Git*.

### Course Objectives:

This course will help enable the students to understand, learn, design *Static and Dynamic WebPages, Create XML Style Sheets, write PHP programs for data retrieval, write JSP Applications for Client-Server Communication, can create Directives, Events, Data Binding and Database Connectivity using Angular JS and Bindings & Events using Svelte and Version Controlling using Git*.

### Specific Objectives include:

- To build functional web applications using *HTML*.
- To create *Dynamic Web Pages* using *Java Script* and *DHTML*.
- To create *Style Sheets with XML* and write *PHP Programs for Data Retrieval*.
- To create *JSP Applications for Client-Server Communication*.
- To create *Directives, Events, Data Binding and Database Connectivity* using *Angular JS* and *Bindings & Events using Svelte and Version Controlling using Git*.

### Course Outcomes:

Upon successful completion of the course, the student will be able to:

CO1: Build functional web applications using *HTML*.

CO2: Create *Dynamic Web Pages* using *Java Script* and *DHTML*.

CO3: Create *Style Sheets with XML* and write *PHP Programs for Data Retrieval*.

CO4: Create *JSP Applications for Client-Server Communication*.

CO5: Create *Directives, Events, Data Binding and Database Connectivity* using *Angular JS* and *Bindings & Events using Svelte and Version Controlling using Git*.

### HTML:

1. Write HTML code to provide intra document linking. (CO1, L1)
2. Write HTML code to provide inter document linking. (CO1, L2)
3. Write a program to implement the three types of lists. (CO1, L1)
4. Create a HTML page using frames. (CO1, L6)
5. Write a program to embed college picture into your web page and write a short note on your college using paragraph tag. (CO1, L1)
6. With a suitable example, depict how we can align text using a table tag as follows. (CO1, L3)
7. Write a program to create the time table as follows: (CO1, L1)
8. Create a Registration form that interacts with the user. Collect *Login Name, Password, Date of Birth, Sex, Address, Qualification* and display a "Thanks for Registering" message when the user submits the form. (CO1, L6)

### JAVA SCRIPT:

9. Write a script to compare two strings using String object. (CO2, L1)
10. Write a script to generate random numbers within 1 to 10 and display the numbers in a table. (CO2, L1)
11. Write a Java Script to update the information into the array, in the "onClick" event of the button "Update". (CO2, L1)
12. Create a web page for a shopping mall that allows the user to tick off his purchases and obtain the bill with the total being added up simultaneously. (CO2, L3)

13. Write a script to find the duplicate elements of an array. (CO2, L1)
14. Write a script which generates a different greeting each time the script is executed. (CO2, L1)
15. Write a javascript to check the number is Armstrong number or not by getting the number from textbox and the result is displayed in a alert dialog box. (CO2, L1)
16. Using functions write a java script code that accepts user name and password from user, Check their correctness and display appropriate alert messages. (CO2, L1)

**DHTML:**

17. Create an inline style sheet. Illustrate the use of an embedded style sheet. (CO2, L6)
18. Create an external style sheet to illustrate the "Font" elements. (CO2, L6)
19. Write a program to switch on and off light using onClick event. (CO2, L1)
20. Illustrate different types of filters (atleast six) on a sample text. (CO2, L2)
21. Write a program to illustrate tabular data control for data binding. (CO2, L1)

**XML:**

22. Create a small XML file designed to contain information about student performance on a module. Each student has a name, a roll number, a subject mark and an exam mark. (CO3, L6)
23. Create an internal DTD file. (CO3, L6)
24. Create an external DTD file. (CO3, L6)
25. Create an XSLT stylesheet to display the student data as an HTML table. (CO3, L6)

**PHP:**

26. Calculate the factorial of a given number using PHP declarations and expressions. (CO3, L1)
27. Write a PHP program that interacts with the user. Collect first name lastname and date of birth and displays that information back to the user. (CO3, L1)

**JSP:**

28. Write a program to implement JSP directives. (CO4, L1)
29. Write a JSP program for session tracking. (CO4, L1)

**ANGULAR JS:**

30. Create Registration and Login Forms with Validations using JQuery. (CO5, L6)
31. Implement the following in Angular JS (CO5, L5)
  - (a) Angular JS Data Binding
  - (b) Angular JS Directives and Events
  - (c) Using Angular JS to fetch Data from MySql

**SVELTE:** Illustrate the following (CO5, L2)

32. Reactivity using SVELTE.
33. Bindings using SVELTE.
34. Transitions using SVELTE.

**Git:** Illustrate the following (CO5, L2)

Version Control Using Git.

**Note: The list of experiments is not limited to the above list. If the existing laboratory experiments completed in advance, the additional laboratory programs can be added, and to be executed in the laboratory.**

**APPENDIX-III**  
**PROGRAM STRUCTURE & SECOND SEMESTER SYLLABI FOR M.Sc.(Computational Data Science) PROGRAMME (R22)**



**P.B.Siddhartha College of Arts & Science, Vijayawada**  
**Programme Structure for M.Sc.(Computational Data Science)**  
**Under Choice Based Credit System (CBCS)**  
**W.E.F 2022-23 (R22 Regulations)**

I SEMESTER (For the batch of students admitted during 2022-2023)					M.Sc.(Computational Data Science)			
Course Code	Course Name	Teaching Hours / Week			CORE/IDC /DSE/SEC/ OEC/MOOCs	CIA	SEE	No. of Credits
		Lecture	Practical	Tutorial				
22DS1T1	Data Structures	4	0	0	Core	30	70	4
22DS1T2	Object Oriented Programming	4	0	0	Core	30	70	4
22DS1T3	Advanced Database Management Systems	4	0	0	Core	30	70	4
22DS1T4	Data Mining Techniques	4	0	0	Core	30	70	4
22DS1T5	Personality Development through Life Enlightenment Skills	3	1	0	Core	30	70	3
22DS1L1	Data Structures Lab	0	6	0	Core	30	70	3
22DS1L2	Object Oriented Programming Lab	0	6	0	Core	30	70	3
<b>TOTAL FOR FIRST SEMESTER</b>						<b>210</b>	<b>490</b>	<b>25</b>

II SEMESTER (For the batch of students admitted during 2022-2023)					M.Sc.(Computational Data Science)			
Course Code	Course Name	Teaching Hours / Week			CORE/IDC /DSE/SEC/ OEC/MOOCs	CIA	SEE	No. of Credits
		Lecture	Practical	Tutorial				
22DS2T1	Essentials of Statistics for Data Science using R	4	0	0	Core	30	70	4
22DS2T2	Machine Learning	4	0	0	Core	30	70	4
22DS2T3	Web Technologies	4	0	0	Core	30	70	4
22PG201	Research Methodology & IPR	3	1	0	SEC	30	70	3
<b>DOMAIN SPECIFIC ELECTIVE COURSES (CHOOSE ANY ONE)</b>								
22DS2E1	Mobile Computing	4	0	0	DSE	30	70	4
22DS2E2	Design & Analysis of Algorithms	4	0	0	DSE	30	70	4
22DS2E3	Cyber Security	4	0	0	DSE	30	70	4
<b>LAB PRACTICALS</b>								
22DS2L1	Machine Learning Lab	0	6	0	Core	30	70	3
22DS2L2	Web Technologies Lab	0	6	0	Core	30	70	3
<b>TOTAL FOR SECOND SEMESTER</b>						<b>210</b>	<b>490</b>	<b>25</b>

At the end of 2<sup>nd</sup> semester, every student must undergo *Summer Internship/Apprenticeship/Project Work/Industrial Training/Research based Project Work* for **Six Weeks** and must prepare a report concerned as per approved project guidelines, and submit the same to the University 14 days before the commencement of third semester end examinations.

**Note:** Students may be allowed to register and appear for MOOCs from the third semester itself. However, students are to complete the MOOCs successfully and submit pass certificate of the same to the University through the Principal of the College concerned for approval and endorsement of the same on grade cards and PCs and ODs as per the regulations of the University.

III SEMESTER (For the batch of students admitted during 2022-2023)								
Course Code	Course Name	Teaching Hours/Week			CORE / IDC/DSE/ SEC/OEC/MOOC S	CIA	SEE	No. of Credits
		Lecture	Practical	Tutorial				
22DS3T1	Data Science	4	0	0	Core	30	70	4
<b>DOMAIN SPECIFIC ELECTIVE COURSES (CHOOSE ANY THREE)</b>								
22DS3E1	Cloud Computing	4	0	0	DSE	30	70	4
22DS3E2	Internet of Things	4	0	0	DSE	30	70	4
22DS3E3	Big Data and Analytics	4	0	0	DSE	30	70	4
22DS3E4	Deep Learning	4	0	0	DSE	30	70	4
22DS3E5	Software Engineering	4	0	0	DSE	30	70	4
22DS3E6	Block Chain Technology	4	0	0	DSE	30	70	4
<b>LAB PRACTICALS</b>								
22DS3L1	Deep Learning Lab	0	6	0	Core	30	70	3
22DS3L2	Big Data and Analytics Lab	0	6	0	Core	30	70	3
<b>OPEN ELECTIVE (INTERDISCIPLINARY/MULTIDISCIPLINARY) COURSES (CHOOSE ANY ONE)</b>								
22OE301	Python Programming	3	0	0	OEC	30	70	3
22OE302	Office Tools	3	0	0	OEC	30	70	3
22OE303	Mobile Computing	3	0	0	OEC	30	70	3
22OE304	R Programming	3	0	0	OEC	30	70	3
22OE305	Web Development	3	0	0	OEC	30	70	3
						<b>210</b>	<b>490</b>	<b>25</b>

IV SEMESTER (For the batch of students admitted during 2022-2023)								
Course Code	Course Name	Teaching Hours/ Week			CORE / IDC/DSE/ SEC/OEC/MOOC S	CIA	SEE	No. of Credits
		Lecture	Practical	Tutorial				

22DS4T1	Data Visualization	4	0	0	Core	30	70	4
<b>DOMAIN SPECIFIC ELECTIVE COURSES (CHOOSE ANY THREE)</b>								
22DS4E1	Natural Language Processing	4	0	0	DSE	30	70	4
22DS4E2	Business Analytics	4	0	0	DSE	30	70	4
22DS4E3	Software Testing and Project Management	4	0	0	DSE	30	70	4
22DS4E4	Applied Data Analysis	4	0	0	DSE	30	70	4
22DS4E5	Artificial Intelligence	4	0	0	DSE	30	70	4
22DS4E6	Cryptography & Network Security	4	0	0	DSE	30	70	4
<b>LAB PRACTICALS</b>								
22DS4L1	Data Visualization Lab	0	6	0	Core	30	70	3
<b>ENTREPRENEURIAL &amp; INNOVATION/IT SKILL RELATED TO DOMAIN SPECIFIC ELECTIVE COURSES (CHOOSE ANY ONE)</b>								
22DS4E7	Social Media Analytics	3	0	0	SEC	30	70	3
22DS4E8	Dynamic Web Programming using Python	3	0	0	SEC	30	70	3
22DS4E9	Mobile Application Development	3	0	0	SEC	30	70	3
<b>* CHOOSE MOOCs FROM SWAYAM/NPTEL SOURCES</b>								
MOOCs								4
<b>PROJECT WORK EVALUATION AND VIVA-VOCE</b>						100		4
<b>TOTAL FOR IV SEMESTER</b>						<b>180</b>	<b>520</b>	<b>30</b>

<b>M.Sc. (Computational Data Science)</b>						
<b>SEMESTER IV (For the batch of students admitted during 2021-2022)</b>						
S.No.	Course Code	Title of the Course	Credits	Evaluation		Total Marks
				IA Marks	SEE Marks	
1	21DS4M1	Certification Course offered by MOOCs providers such as NPTEL/Swayam/edX/Coursera/Udacity/Udemy/Cisco/Guvi etc. - 8 Weeks	4	30	70	100
2	21DS4T1	Data Visualization	4	30	70	100
3	Core Elective-II		4	30	70	100
	21DS4T2	Natural Language Processing				
	21DS4T2i	Business Analytics				
4	21DS4L1	Data Visualization Lab	3	30	70	100
5	21DS4P1	Major Project / Internship	8	100	100	200
Total			23	220	380	600

## 22DS2T1: ESSENTIALS OF STATISTICS FOR DATA SCIENCE USING R

<b>Course Name</b>	Essentials of Statistics for Data Science Using R	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>CIA</b>	<b>SEE</b>	<b>TM</b>
<b>Course Code</b>	22DS2T1	4	0	0	4	30	70	100
<b>Year of Introduction:</b> 2021	<b>Year of Offering:</b> 2021	<b>Year of Revision:</b> 2022			<b>Percentage of Revision:</b> 10			
L-Lecture, T-Tutorial, P-Practical, C-Credits, CIA-Internal Marks, SEE-External Marks, TM-Total Marks								

### Course Description and Purpose:

Essentials of Statistics for Data Science using R (22DS2T1) is a course that illustrates basic concepts of *R Programming, Bi-variate Analysis, Probability, Regressions, Time Series Analysis, Hypothesis Testing, Analysis of ANOVA, Connecting to R External Interfaces.*

### Course Objectives:

This course will help enable the students to understand, learn and implement concepts of Statistics using R programming like *Bi-variate Analysis, Probability, Regressions, Time Series Analysis, Hypothesis Testing, Analysis of ANOVA, Connecting to R External Interfaces.*

### Course Objectives:

The learning objectives include:

- To understand basic concepts of *Statistics, R Programming and Bi-Variate Analysis.*
- To understand the concepts of *Probability, Random Variables and Probability Distribution and its Applications.*
- To understand and gain knowledge on *Regressions, Time Series of Analysis*
- To understand the concepts of *Hypothesis Testing and Analysis of ANOVA.*
- To understand how to import *Different Files and Connecting Databases to R.*

### Course Outcomes:

After completing this course, the students should have developed a clear understanding of

**CO1:** Understand basic concepts of *Statistics, R Programming and Bi-Variate Analysis*.

**CO2:** Understand the concepts of *Probability, Random Variables and Probability Distribution and its Applications*.

**CO3:** Understand and gain knowledge on *Regressions, Time Series of Analysis*.

**CO4:** Understand the concepts of *Hypothesis Testing and Analysis of ANOVA*.

**CO5:** Understand how to *import Different Files and Connecting Databases to R*.

#### **UNIT I (12 Hours)**

**Introduction to Statistics:** Statistics Definition - Types of Statistical Methods - Data Collection (Definition , Sources of Data Collection, Methods of Data Collection) - Classification- Basic of Classification Types - Tabulation of Data (Meaning and Definition, Objectives, Types of Tables) - Exploratory Data Analysis (Types of Data Visualization).

**Introduction to R Programming:** Basic Data Types - Operations on Data Structures - Descriptive Statistics with R-Measures(Central Tendency and Measures of Dispersion of Variability).

**Bi-variate Analysis using R:** Correlation Meaning - Types of Correlation (Measures or Methods of Correlation, Scatter Diagram, Karl Pearson's Coefficient of Correlation, Spearman's Rank Correlation Coefficient) - Bivariate Analysis of Categorical Variables and numerical variables.

#### **UNIT II (12 Hours)**

**Probability Using R:** Various Definitions - Addition Theorem - Conditional Probability - Multiplication Theorem - Bayes' Theorem and its Applications - Random Variables: Definition, Discrete and Continuous Random Variables - Distribution Function and its Properties - Discrete Probability Distributions: Binomial, Poisson and Geometric - Continuous Probability Distributions - Uniform, Normal and Exponential Distributions - Properties and Applications. Applications of Probability using R.

#### **UNIT III (12 Hours)**

**Regression:** Introduction - Estimation the Method of Least Square - Regression Coefficients(Properties of Regression Coefficients, Coefficient of Simple Linear Determination) - Types of Regression Models (Simple Linear Regression , Multiple Linear Regression, Logistic Regression) - Assumptions of Regression Models, Applications and its implementation using R Programming

**Time Series Analysis using R:** Meaning of Time Series - Components Of Time Series - Time Series Decomposition Models (Multiplicative Model and Additive Model) - Forecasting Methods (Simple Moving Averages and Weighted Moving Averages).

**Note: Proofs and derivations of statements are excluded.**

#### **UNIT IV (12 Hours)**

**Testing of Hypothesis Using R:** Definition of Hypothesis - Steps in Testing of Hypothesis - Types of Hypothesis Testing - Hypothesis Testing of Means and Proportions - Testing for Differences between Means and Proportions.

**Non Parametric Tests:** The MannWhitney U Test - Kruskal Wallis Test - Wilcoxon Signed Rank Test and Chi Square Test.

**Analysis of Variance Using R:** One way ANOVA - Two way ANOVA - Multivariate Analysis of Variance (MANOVA).

#### **UNIT V (12 Hours)**

**Connecting R to External Interfaces:** CSV Files (Reading From a CSV File, Writing to a CSV File) - Microsoft Excel (Reading from XLSX File, Writing to XLSX File) - Databases (Connecting R to MYSQL (Creating Tables, Inserting Rows, Updating Rows, Deleting Rows, Querying Rows, Querying Tables, Dropping Tables)) - XML Files (Reading From XML Files, JSON Files, Reading From JSON Files), Binary Files (Writing to Binary Files, Reading From Binary Files).

**Reference Text Books:**

1. Sharma, J. K., Business Statistics (UNIT-I,UNIT-III), New Delhi: Pearson Education, 2013
2. Anderson,D.,Sweeney,D.,Williams,T., Camm, J., & Cochran, J., Statistics for Business and Economics, Cengage Learning, 2013, New Delhi
3. Dr. Rob Kabacoff, R in Action: Data Analysis and Graphics with R (UNIT-IV), Manning Publications CO, Edition 2011.
4. Dr.Jeeva Jose, A Beginners Guide for Data Analysis Using R Programming. (UNIT-II, UNIT-V, UNIT-III), Khanna Book Publishing Co.(P) Ltd, Edition 2019.
5. Michael J. Crawley, John Wiley & Sons, Statistics: An Introduction using R, Weily, 2015.
6. Aczel,A.D.& Sounderbandian, J, Complete Business Statistics, Tata McGraw Hill, 2011, New Delhi.
7. Davis, G., & Pecar, B., Business Statistics using Excel, New Delhi: Oxford University Press, 2014.

**22DS2T1****P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE (AUTONOMOUS),  
VIJAYAWADA-520010**

(An Autonomous College in the Jurisdiction of Krishna University, A.P., India.)

**M.Sc.,(Computational Data Science) DEGREE EXAMINATIONS****SECOND SEMESTER****ESSENTIALS OF STATISTICS FOR DATA SCIENCE USING R****SYLLABUS W.E.F 2022-2023****Time 3 Hours****Answer all questions. All question carry equal marks.****Max.Marks: 70****5 × 4 Marks =20 Marks**1.(a) Explain types of *Statistical Methods*.(CO1,L2)

(OR)

(b) Explain *Types of Correlation* with examples. (CO1,L2)2.(a) Explain *Distribution Function* and its Properties. (CO2,L2)

(OR)

(b) Explain *Applications of Probability* using R. (CO2,L2)3. (a) How we can determine the Coefficients of *Simple Linear Regression*? (CO3,L1)

(OR)

(b) What are the components of *Time Series*. (CO3,L1)4. (a) What are the steps involved in *Hypothesis Testing*. (CO4,L1)

(OR)

(b) What is meant by *Two Way ANOVA*? Give one example using R .(CO4,L1)

5. (a) How can you create table and insert rows in table with the help of MYSQL using R. (CO5,L1)

(OR)

(b) How do you import *XML Files* using R with example? (CO5,L1)**Answer the following****5 × 10M = 50Marks**



- 1.(a) What is *Descriptive Statistic*? Explain about *Measures of Central Tendency* and *Dispersion of Variability* using R. (CO1,L1) 10 Marks  
(or)  
(b) What is *Correlation*? Explain *Karl Pearson's Coefficient* and *Spearman's Rank Correlation Coefficient* using R. (CO1,L1) 5 Marks  
(c) What is *Bi-variate Analysis*? How we can implement using categorical and numerical data using R? (CO1,L1) 5 Marks
2. (a) Explain *Addition Theorem of Probability* using an example. (CO2,L2) 5 Marks  
(b) Illustrate *Conditional Probability*? Explain *Baye's Theorem* without Proof. (CO2,L2) 5Marks  
(or)  
(c) Explain the assumption of *Poisson Distribution* and give its *Probability Distribution Function* using R with example (CO2,L5) 5 Marks  
(b) Explain the properties of *Normal Distribution* and give its *Probability Distribution Function* using R. (CO2,L5) 5Marks
- 3.(a) Construct different *Regression Models* using R. (CO3,L3) 10 Marks  
(or)  
(c) Apply *Simple Moving Averages* and *Weighted Moving Averages* using R. (CO3,L3) 10 Marks
4. (a) List any two approaches used in *Non Parametric Testing*. (CO4,L4) 10 Marks  
(or)  
(b) Analyze *Hypothesis Testing of Means and Proportions* and its differences with examples using R. (CO4,L4) 10 Marks
- 5.(a) Develop database connection in R using MySQL commands? Give one example. (CO5,L6) 10 Marks  
(or)  
(b) Discuss about JSON files and binary files in R with examples? (CO5,L6) 10 Marks

## 22DS2T2: MACHINE LEARNING

<b>Course Name</b>	Machine Learning				<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>CIA</b>	<b>SEE</b>	<b>TM</b>
<b>Course Code</b>	22DS2T2				4	0	0	4	30	70	100
<b>Year of Introduction:</b> 2021	<b>Year of Offering:</b> 2021	<b>Year of Revision:</b> 2022		<b>Percentage of Revision:</b> NIL							
L-Lecture, T-Tutorial, P-Practical, C-Credits, CIA-Internal Marks, SEE-External Marks, TM-Total Marks											

**Course Description and Purpose:** Machine Learning is a course that illustrates *Concepts of Machine Learning, Basics of Data Preprocessing and Feature Engineering, Supervised Learning Algorithms, Regression Algorithms, Unsupervised Learning Algorithms, concepts of Neural Networks.*

### Course Objectives:

This course will help enable the students to understand and learn various *Concepts of Machine Learning, Basics of Data Preprocessing and Feature Engineering, Supervised Learning Algorithms, Regression Algorithms, Unsupervised Learning Algorithms, Concepts of Neural Networks.*

### Course Objectives:

The learning objectives include:

- To know the concepts of *Machine Learning*.
- To understand basics of *Data Pre-processing and Feature Selection*.
- To learn *Supervised Learning and Regression Algorithms*.
- To learn the concepts of *Unsupervised Learning*.
- To understand the concepts of *Neural Networks*.

### Course Outcomes:

Upon successful completion of the course, the student will be able to:

CO1: Know the concepts of *Machine Learning*.

CO2: Understand basics of *Data Pre-processing* and *Feature Selection*.

CO3: Learn *Supervised Learning* and *Regression Algorithms*.

CO4: Learn the concepts of *Unsupervised Learning*.

CO5: Understand the concepts of *Neural Networks*.

#### UNIT I (12 Hours)

**Introduction to Machine Learning:** Human Learning and Machine Learning - Types of Machine Learning - Languages and Tools in Machine Learning - Framework for Developing Machine Learning Models - Preparing to Model - Modeling and Evaluation Metrics.

#### UNIT II (12 Hours)

**Basics of Data Preprocessing and Feature Engineering:** Feature Transformation - Feature Scaling- Feature Construction and Feature Subset Selection - Dimensionality Reduction - Explorative Data Analysis - Hyper Parameter Tuning - Introduction to SK Learn Package.

#### UNIT III (12 Hours)

**Supervised Learning:** Introduction - Classification (Common Classification Algorithms):Naïve Bayes,KNN, Decision Trees, Random Forest, Support Vector Machines, XGBoost.

**Regression(Common Regression Algorithms):** Simple Linear Regression and Multiple Linear Regression - Polynomial Regression - Logistic Regression-Regularisation:Lasso and Ridge.

#### UNIT IV (12 Hours)

**Unsupervised Learning:** Introduction - Unsupervised Vs Supervised Learning - Unsupervised Learning Models - Dimensionality Reduction - Clustering : Association Rule Mining - Applications of Unsupervised Learning.

#### UNIT V (12 Hours)

**Introduction to Neural Networks:** Artificial Neural Networks - Hand Digit Classification - Convolution Neural Networks - Image Classification - Hyper Parameter Tuning - Recurrent Neural Networks - Building Recurrent NN - Long Short Term Memory.

#### Reference Text Books:

1. Hastie, T., R. Tibshirani, and J. H. Friedman. , *The Elements of Statistical Learning: Data Mining, Inference and Prediction*, New York, NY: Springer, 2011, ISBN: 97803879
2. EthemAlphaydin, An introduction to Machine Learning, PHI Learning Private Limited, 2020
3. AurelienGeron, Hands-On Machine Learning with Scikit Learn, Keras and Tensor Flow, O'REILLY -2019
4. Tom Mitchell, Machine Learning, Tata McGraw Hill, 2013
5. Francois Chollet, Deep Learning with Python, Manning , 2019

**PARVATHANENI BRAHMAYYA SIDDHARTHA COLLEGE OF ARTS & SCIENCE**

(An Autonomous College in the jurisdiction of Krishna University)

M.Sc(Computational Data Science)., Second Semester

**Course Name:** Machine Learning

**Course Code:** 22DS2T2

**(w.e.f admitted batch 2022-23)**

**Time: 3 Hours**

**Max Marks: 70 Marks**

**SECTION-A**

**Answer ALL questions. All Questions Carry Equal Marks. (5×4 = 20 Marks)**

1. (a) Define *Machine Learning* and list different *Machine Learning Techniques*. (CO1, L1)  
(or)  
(b) What are the *different tools* used in Machine Learning? (CO1, L1)
2. (a) What are the techniques of *Feature Scaling*? (CO2, L1)  
(or)  
(b) Define *Dimensionality Reduction* and explain its Techniques. (CO2, L1)
3. (a) What are the various algorithms used for *Classification*? (CO3, L1)  
(or)  
(b) Define *Logistic Regression*. (CO3, L1)
4. (a) Explain *Clustering* and list out different *Clustering Algorithms*? (CO4, L2)  
(or)  
(b) Explain the Applications of *Unsupervised Learning*? (CO4, L2)
5. (a) List some commercial practical applications of *Artificial Neural Networks*. (CO5, L1)  
(or)  
(b) Define *Hyper Parameter Tuning* with example. (CO5, L1)

**SECTION-B**

**Answer ALL questions. All Questions Carry Equal Marks. (5×10 = 50 Marks)**

6. (a) Explain the *work flow* in Machine Learning Problem Solving. (CO1, L2) 10 Marks  
(or)  
(b) Explain *Supervised* and *Unsupervised Learning* with Examples. (CO1, L2) 10 Marks
7. (a) Discuss *Feature Transmission* in detail. (CO2, L6) 10 Marks  
(or)  
(b) Discuss *Feature Subset Selection* and its Application. (CO2, L6) 10 Marks
8. (a) Explain *Classification Problem* in Supervised Learning and Explain *Decision Tree Algorithm* for Classification. (CO3, L5) 10 Marks  
(or)  
(b) Explain *Linear and Multiple Linear Regression* in Python Library Stats Models. (CO3, L5) 10 Marks
9. (a) Apply *K-Means Clustering Algorithm* on following X and Y values (10,34), (45,55), (23,55), (14,66), (56,25), (12,16), (14,25). (CO4, L3) 10 Marks  
(or)  
(b) Choose suitable Algorithm in SK-Learn Package to perform *Hierarchical Clustering*. (CO4, L3) 10 Marks
10. (a) List basic features in Neuron and different types of *Activation Functions*. (CO5, L4) 10 Marks  
(or)  
(b) List various parameters of *Convolution Neural Networks*. (CO5, L4) 10 Marks

## 22DS2T3: WEB TECHNOLOGIES

<b>Course Name</b>	Web Technologies	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>CIA</b>	<b>SEE</b>	<b>TM</b>
<b>Course Code</b>	22DS2T3	4	0	0	4	30	70	100
<b>Year of Introduction:</b> 2021	<b>Year of Offering:</b> 2021	<b>Year of Revision:</b> 2022			<b>Percentage of Revision:</b> NIL			
L-Lecture, T-Tutorial, P-Practical, C-Credits, CIA-Internal Marks, SEE-External Marks, TM-Total Marks								

**Course Description and Purpose:** Web Technologies (22DS2T3) is a course that illustrates WWW including *Browser* and *HTTP Protocol* and various *HTML Tags* and use them to develop the user friendly web pages, *JavaScript* and define the CSS with its types to develop the *Dynamic Web Pages*, develop the *Modern Web Pages* using the *XML Elements* and Servlets with different layouts as per need of applications, *Interactive Forms* for Web Applications using *Node* and *Express*.

### Course Objectives:

This course will help enable the students to understand and learn various WWW including *Browser* and *HTTP Protocol* and various *HTML Tags* and use them to develop the user friendly web pages, *JavaScript* and define the CSS with its types to develop the *Dynamic Web Pages*, develop the *Modern Web Pages* using the *XML Elements* and Servlets with different layouts as per need of applications, *Interactive Forms* for Web Applications using *Node* and *Express*.

### Course Objectives:

- To understand the concepts of WWW including *Browser* and *HTTP Protocol* and various *HTML Tags* and use them to develop the user friendly web pages.
- To use the *JavaScript* and define the CSS with its types to develop the *Dynamic Web Pages*.
- Students will be able to and develop the *Modern Web Pages* using the *XML Elements* and Servlets with different layouts as per need of applications.
- Able to develop *Server Side Scripting* with PHP and JSP to generate the Web Pages dynamically using the Database Connectivity & C# Database Connectivity with Form Validations.
- Able to develop *Interactive Forms* for Web Applications using *Node* and *Express*.

### Course Outcomes:

On successful completion of this course, the students:

CO1: Able to understand the concepts of WWW including *Browser* and *HTTP Protocol* and various *HTML Tags* and use them to develop the user friendly web pages.

CO2: Able to use the *JavaScript* and define the CSS with its types to develop the *Dynamic Web Pages*.

CO3: Students will be able to develop the *Modern Web Pages* using the *XML Elements* and Servlets with different layouts as per need of applications.

CO4: Able to develop *Server Side Scripting* with PHP and JSP to generate the Web Pages dynamically using the Database Connectivity C# Database Connectivity with Form Validations.

CO5: Able to develop *Interactive Forms* for Web Applications using *Node* and *Express*.

### UNIT I (12 Hours)

**Introduction:** What is Internet - History of Internet - Internet Services and Accessibility - Uses of the Internet - Protocols - Web Concepts: The Client/Server Model, Retrieving Data from the Web, How the Web Works? - Web Browsers - Searching information on the Web - Internet Standards.

**HTML:** Outline of an HTML Document - Head Section Body Section: Headers, Paragraphs, Text Formatting, Linking, Internal Linking, Embedded Images, Lists, Tables, Frames, Other Special Tags and Characters, HTML Forms.

### UNIT II (12 Hours)

**Java Script:** Introduction to Scripting - Control Statements I - Control Statements II - Functions - Arrays, Objects - Document Object Model - Events.

**Dynamic HTML (DHTML):** Introduction - Cascading Style Sheets (CSS) - Coding CSS - Properties of Tags - Property Values - Other Style Properties - In Line Style Sheets - Embedded Style Sheets - External Style Sheets - Grouping - Inheritance - Class as Selector - ID as Selector - Contextual Selector - Pseudo Classes and Pseudo Elements - Positioning - Backgrounds - Element Dimensions - DHTML Document Object Model and Collections - Using the Collections All - Moving Object around the Document - Event Handling - Assigning Event Handlers -

Event Bubbling - Filters and Transition Filters - Transitions - Data Binding - Using Tabular Data Control - Sorting Data - Dynamic Sorting - Filtering.

### UNIT III (12 Hours)

**XML:** Introduction, HTML vs. XML - Syntax of XML Document - XML Attributes - Use of elements vs. Use of Attributes - XML Validation - Well Formed XML Documents - Valid XML Documents - XML DTD: Internal DTD, External DTD - The Building blocks of XML Documents, DTD Elements : Declaring an Element, Empty Elements, Elements with Data, Elements with Children - Wrapping - Declaring only one Occurrence of the Same Elements - Declaring Minimum one Occurrence of the Same Element - Defining Zero or One Occurrence of the Same Element - Declaring Mixed Content - DTD Attributes: Declaring Attributes, Default Attribute Value, Implied attribute, required attribute, fixed attribute value, enumerated attribute values, DTD Entries, DTD Validation, XSL, XSL Transformation, XML NameSpaces, XML Schema.

**Servlets:** Introduction - Advantages of Servlets over CGI - Installing Servlets - The Servlet Life Cycle - Servlets API - A Simple Servlet - Handling HTTP Get Requests - Handling HTTP Post Requests - Cookies - Session Tracking - Multi Tier Applications using Database Connectivity - Servlets Chaining.

### UNIT IV (12 Hours)

**PHP:** Introduction - PHP Basics - String Processing and Regular Expressions - Form Processing and Business Logic - Connecting to a Database - Using Cookies - Dynamic Content - Operator Precedence Chart.

**Java Server Pages (JSP):** Introduction - Advantages of JSP - Developing first JSP - Components of JSP - Reading Request Information - Retrieving the Data Posted from a HTML File to a JSP File - JSP Sessions - Cookies - Disabling Sessions.

**Database Connectivity & Form Validations using C#:** Database Connectivity using C#.Net-Form Validations (Name Validation, Integer Validation, Floating Point Validation, Email Validation, Combo Box Validation).

### UNIT V (12 Hours)

**Getting Started with Node:** Getting Node - Using the Terminal - Editors - npm - A Simple Webserver with Node (Hello World, Event Driven Programming, Routing, Serving Static Resource).

**Saving Time with Express:** Scaffolding - Initial Steps (Views and Layouts, Static Files and Views, Dynamic Content in Views).

**Form Handling:** Sending Client Data to Server - HTML Forms - Encoding - Approaches in Form Handling - Form Handling with Express - Handling AJAX Forms – File Uploads- jQuery File Upload.

### Reference Text Books:

1. N.P.Gopalan, J.Akilandeswari, Web Technologies - A Developer's Perspective, PHI(2008).
2. Harvey M.Deitel and Paul L.Deitel, Internet and World Wide Web How To Program, Prentice Hall, 5<sup>th</sup> Edition
3. Ethan Brown, Web Development with Node & Express, O'Reilly, First Edition, 2014
4. Vikas Gupta, Comdex .Net 4.5 Programming Course Kit, Dreamtech Press, 2014
5. Robert W. Sebesta, Programming the World Wide Web, Third Edition, Pearson Education, 2007
6. Anders Moller and Michaelschwarzbach, An Introduction to XML and Web Technologies, Addison Wesley, 2006
7. Chris Battes, Web programming-Building Internet Application, Second Edition, Wiley, 2007.
8. Jeffrey C. fackson, Web Technologies- Computer Science Perspective, Pearson Education, 2008.

**PARVATHANENI BRAHMAYYA SIDDHARTHA COLLEGE OF ARTS & SCIENCE**

(An Autonomous College in the jurisdiction of Krishna University)

**M.Sc.(Computational Data Science). Second Semester**

**Course Name: Web Technologies**

**Course Code: 22DS2T3**

**(w.e.f admitted batch 2022-23)**

**Time: 3 Hours**

**Max Marks: 70**

**SECTION-A**

**Answer ALL questions. All Questions Carry Equal Marks. (5×4 = 20 Marks)**

- 1.(a) What are protocols used in accessing the internet? (CO1, L1)  
(or)  
(b) What are the differences between *Inline* & *Block* Elements? (CO2, L1)
2. (a) What is *DOM*? (CO2, L1)  
(or)  
(b) What is advantage of using *External Style Sheets*? (CO2,L1)
3. (a) What is *XML Validation*? (CO3,L1)  
(or)  
(b) What is *Servlet*? Explain in detail. (CO3,L1)
4. (a) List C# functions to validate Name of the user. (CO4,L1)  
(or)  
(b) List the components of JSP. (CO4,L2)
5. (a) State various *services of Web Browser*. (CO5,L5)  
(or)  
(b) What are the features of *JQuery*? Explain it (CO5,L5)

**SECTION-B**

**Answer ALL questions. All Questions Carry Equal Marks. (5×10 = 50 Marks)**

6. (a) Explain services of *Internet* and *Web Browser*. (CO1, L2)  
(or)  
(b) Explain *Client-Server Architecture*; write its *attributes* with *example program*. (CO1,L2)
7. (a) List (i) *JavaScript Variables* and (ii) *Characteristics of Array Objects*. (CO2, L4)  
(or)  
(b) Examine building an *External Style Sheet*. Explain advantages and disadvantages of *External Style Sheets* with an example. (CO2, L4)
8. (a) Develop *TDC, DTD* with *building blocks of DTD* . (CO3,L3)  
(or)  
(b) Develop *Life Cycle of Servlets*. Write the session tracker that tracks the number of access and last access of data of a particular web page. (CO3,L3)
9. (a) Discuss (i) *String Processing* (ii) *Regular Expressions* (iii) *Cookies*. (CO4, L6)  
(or)  
(b) Discuss *Components of JSP* and write a JSP Program to accept *username* and *password* from a *user* and *validate them*. (CO4, L6)
10. (a) Explain *Views* and *Layouts* with example program. (CO5,L5)  
(or)  
(b) Explain how to upload Files using *jQuery* with example program. (CO5, L5)



## 22DS2E2: DESIGN & ANALYSIS OF ALGORITHMS

<b>Course Name</b>	Design & Analysis of Algorithms	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>CIA</b>	<b>SEE</b>	<b>TM</b>
<b>Course Code</b>	22DS2E2	4	0	0	4	30	70	100
<b>Year of Introduction:</b> 2005	<b>Year of Offering:</b> 2021	<b>Year of Revision:</b> 2022			<b>Percentage of Revision:</b> NIL			
L-Lecture, T-Tutorial, P-Practical, C-Credits, CIA-Internal Marks, SEE-External Marks, TM-Total Marks								

**Course Description and Purpose:** Design & Analysis of Algorithms (22DS2E2) is a course that illustrates *Algorithms, Analysis, Elementary Data Structures, Divide - and -Conquer Technique* and *The Greedy Method, Dynamic Programming* and *Basic Traversal and Search Techniques, Backtracking* and *Branch and Bound Techniques, NP Hard* and *NP Complete Problem*.

### Course Objectives:

This course will help enable the students to understand and learn various *Algorithms, Analysis, Elementary Data Structures, Divide -and -Conquer Technique* and *The Greedy Method, Dynamic Programming* and *Basic Traversal and Search Techniques, Backtracking* and *Branch and Bound Techniques, NP Hard* and *NP Complete Problem*.

### Course Objectives:

- To understand *Algorithms, Analysis, Elementary Data Structures*.
- To gain familiarity in *Divide -and -Conquer Technique* and *The Greedy Method*.
- To apply the concepts of *Dynamic Programming* and *Basic Traversal and Search Techniques*.
- To understand the concepts of *Backtracking* and *Branch and Bound Techniques*.
- To acquire knowledge in *NP Hard* and *NP Complete Problem*.

### Course Outcomes:

Upon successful completion of the course, the student will be able to:

CO1: Understand *Algorithms, Analysis, Elementary Data Structures*.

CO2: Gains familiarity in *Divide-and-Conquer Technique* and *The Greedy Method*.

CO3: Apply the concepts of *Dynamic Programming* and *Basic Traversal and Search Techniques*.

CO4: Understand the concepts of *Backtracking* and *Branch and Bound techniques*.

CO5: Acquire knowledge in *NP Hard* and *NP Complete Problem*.

### UNIT I (12 Hours)

**Introduction:** What IS Algorithm - Algorithm Specification - Pseudocode Conventions - Recursive Algorithms - Performance Analysis: Space Complexity Time Complexity - Asymptotic Notation - Performance Measurement - Randomized Algorithms (Basics of Probability Theory, Randomized Algorithms Identifying the Repeated Element, Primality Testing: Advantages and Disadvantages).

**Elementary Data Structures:** Binary Trees - Dictionaries (Binary Search Trees, Priority Queues, Heaps, Heap sort) - Sets and Disjoint Set Union (Introduction, Union and Find Operations).

### UNIT II (12 Hours)

**Divide - and - Conquer:** General Method - Defective Chess Board - Binary Search - Finding Maximum and Minimum - Merge Sort - Quick Sort - Selection Problem - Strassen's Matrix Multiplication - Convex Hull: (Some Geometric Primitives, The Quick Hull Algorithm, Graham's Scan ,An  $O(n \log n)$  Divide and Conquer Algorithm).

**The Greedy Method:** The General Method - Container Loading - Knapsack Problem - Tree Vertex Splitting - Job Sequencing with Deadlines - Minimum Cost Spanning Trees: Prim's Algorithm - Kruskal's Algorithm - Optimal Storage on Tapes - Optimal Merge Patterns - Single Source Shortest Paths.

### UNIT III (12 Hours)

**Dynamic Programming:** The General Method - Multi Stage Graphs - All Pairs Shortest Paths - Single Source Shortest Paths - Optimal Binary Search Trees - String Editing 0/1 Knapsack - Reliability Design - The Traveling Sales Person Problem - Flow Shop Scheduling.



**Basic Traversal and Search Techniques:** Techniques for Binary Trees - Techniques for Graphs: Breadth First Search and Traversal Depth First Search - Connected Components and Spanning Trees -Bi Connected Components and DFS.

#### UNIT IV (12 Hours)

**Backtracking:** The General Method - The 8 Queens Problem - Sum of Subsets - Graph Coloring - Hamiltonian Cycles - Knapsack Problem.

**Branch and Bound:** The Method: (Least Cost Search, The 15 Puzzle Control Abstractions for LC Search, Bounding, FIFO Branch and Bound - LC Branch and Bound ) - 0/1 Knapsack Problem (LC Branch and Bound Solution - FIFO Branch and Bound Solution) - Traveling Sales Person.

#### UNIT V (12 Hours)

**NP Hard and NP Complete Problems:** Basic Concepts: Non Deterministic Algorithms - The Classes NP Hard and NP Complex - Cook's Theorem - NP Hard Graph Problems (Clique Decision Problem, Node Cover Decision Problem, Chromatic Number Decision Problem, Directed Hamiltonian Cycle, Traveling Sales Person Decision Problem, AND/OR Graph Decision Problem) - NP Hard Scheduling Problems ( Scheduling Identical Processors, Flow Shop Scheduling, Job Scheduling) - NP Hard Code Generation Problems (Code Generation With Common Sub Expressions, Implementing Parallel Assignment Instructions) - Some Simplified NP-Hard Problems.

#### Reference Text Books:

1. Sartaj Sahni and Sanguthevar Rajasekaran Ellis Horowitz, Fundamentals of Computer Algorithms, Fourth Edition, Universities Press, 2018
2. Sartaj Sahni, Fundamentals of Computer Algorithms, Second Edition, Universities Press, 2008
3. Cormen TH Leiserson CE, Rivest R L and Stein, Clifford, Introduction to Algorithms, PHI , Third Edition, 2010, 35<sup>th</sup> Chapter
4. Anany Levitin, Introduction to the Design & Analysis of Algorithms, Second Edition, Pearson Education (2007)
5. I.Chandra Mohan, Design and Analysis of Algorithms, PHI
6. Prabhakar Gupta, Vineet Agrawal, Design and Analysis of Algorithms, PHI
7. Parag Himanshu, Dave, Design and Analysis of Algorithms, Pearson Education (2008)

**P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE (AUTONOMOUS), VIJAYAWADA-520010**  
 (An Autonomous College in the Jurisdiction of Krishna University, A.P., India.)  
**M.Sc.(COMPUTATIONAL DATA SCIENCE) DEGREE EXAMINATIONS**  
**SECOND SEMESTER**  
**DESIGN & ANALYSIS OF ALGORITHMS**  
**SYLLABUS W.E.F 2022-2023**

Time 3 Hours

Max.Marks: 70

**SECTION-A**

Answer ALL questions

(5×4 = 20 Marks)

1. (a) Define *Algorithm*. Explain the algorithm specification briefly.(CO1, L1)  
(or)  
(b) What are the operations in a *priority queue*? (CO1, L1)
2. (a) Explain the Divide and Conquer Algorithms to solve *Convex Hull Problem*. (CO2, L1)  
(or)  
(b) What is *tree vertex splitting*? (CO2, L1)
3. (a) What is *String Editing* ? (CO3, L1)  
(or)  
(b) Differentiate *DFS and BFS*. (CO3, L1)
4. (a) What is *Graph colouring*? (CO4, L1)  
(or)  
(b) What is *Branch and Bound* technique?(CO4, L1)
5. (a) Compare *NP hard and NP complete classes*. (CO5, L1)  
(or)  
(b) Explain *flow shop scheduling* in *NP Hard Scheduling problems*. (CO5, L1)

**SECTION - B**

Answer all questions. All question carry equal marks.

5 × 10 = 50 Marks

6. (a) Define Algorithm. Discuss *Performance Analysis of Algorithms* briefly. ( CO1, L2) 10 Marks  
(or)  
(b) Explain Disjoint Sets, Disjoint Set Union & Find Operations with Algorithms. (CO1, L2)  
10 Marks
7. (a) Discuss the method for *Divide and Conquer* approach and write algorithm for Quick Sort with an example. (CO2, L6) 10 Marks  
(or)  
(b) Discuss the general method for *Greedy Method*. Apply it on *Single Source Shortest Path* by writing an algorithm with suitable example. (CO2,L6) 10 Marks
8. (a) Examine algorithm and procedure of finding *Optimal Binary Search Tree* using Dynamic Programming with example. (CO3,L4) 10 Marks  
(or)  
(b) Examine *Traversal Techniques for Graphs* with an example. (CO3,L4) 10 Marks
9. (a) Explain *Control Abstraction for LC Search*. Solve *0/1-Knapsack Problem* using *Branch and Bound Technique*. (CO4,L5) 10 Marks  
(or)  
(b) Explain the *Sum of Subsets Problem* using *Back Tracking Technique*. (CO4,L5) 10 Marks
- 10.(a) Make use of different formulae prove *COOKs Theorem*.. (CO5,L3) 10 Marks  
(or)  
(b) Choose *NP-Hard Graph problems* and explain. (CO5,L3) 10 Marks

## 22DS2L1: MACHINE LEARNING LAB

<b>Course Name</b>	Machine Learning Lab	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>CIA</b>	<b>SEE</b>	<b>TM</b>
<b>Course Code</b>	22DS2L1	4	0	0	4	30	70	100
<b>Year of Introduction:</b> 2021	<b>Year of Offering:</b> 2021	<b>Year of Revision:</b> 2022		<b>Percentage of Revision:</b> NIL				
L-Lecture, T-Tutorial, P-Practical, C-Credits, CIA-Internal Marks, SEE-External Marks, TM-Total Marks								

### Course Description and Purpose:

Machine Learning Lab is a course that illustrates concepts of *Load Data Sets from Different Sources*, *Basics of Data Pre-processing* and *Feature Selection*, *Supervised Learning and Regression Algorithms*, *Supervised Learning and Classification Algorithms*, *Concepts of Clustering Algorithms*.

### Course Objectives:

This course will help enable the students to understand learn, apply / implement the *Load Data Sets from Different Sources*, *Basics of Data Pre-processing* and *Feature Selection*, *Supervised Learning and Regression Algorithms*, *Supervised Learning and Classification Algorithms*, *Concepts of Clustering Algorithms*.

The learning objectives include:

- To know the concepts of *Load Data Sets* from different Sources.
- To understand basics of *Data Pre-processing* and *Feature Selection*.
- To learn *Supervised Learning* and *Regression Algorithms*.
- To learn *Supervised Learning* and *Classification Algorithms*.
- To understand the concepts of *Clustering Algorithms*.

### Course Outcomes:

Upon successful completion of the course, the student will be able to:

- CO1: Know the concepts of *Load Data Sets* from Different Sources.  
CO2: Understand basics of *Data Pre-processing* and *Feature Selection*.  
CO3: Learn *Supervised Learning* and *Regression Algorithms*.  
CO4: Learn *Supervised Learning* and *Classification Algorithms*.  
CO5: Understand the concepts of *Clustering Algorithms*.

1. Write a program to open Data Sets in Python. (CO1,L1)
2. Explain various *Plotting Techniques* of Python. (CO2, L2)

### REGRESSION ALGORITHMS

3. Demonstrate *Simple Linear Regression* in Python with Sample Data Sets. (CO3,L2)
4. Demonstrate *Multiple Linear Regression* in Python with Sample Data Sets. (CO3,L2)
5. Demonstrate *Decision Tree Regression* in Python with Sample Data Sets. (CO3,L2)
6. Demonstrate *Support Vector Regression* in Python with Sample Data Sets. (CO3,L2)
7. Demonstrate *Random Forest Regression* in Python with Sample Data Sets. (CO3,L2)

### CLASSIFICATION ALGORITHMS

8. Demonstrate *Logistic Regression in Python* with Sample Data Sets. (CO4,L2)
9. Demonstrate *Support Vector Classification* in Python with Sample Data Sets. (CO4,L2)
10. Demonstrate *Random Forest Classification* in Python with Sample Data Sets. (CO4,L2)

### CLUSTERING ALGORITHMS

11. Demonstrate *K-Means Clustering* with Sample Data Sets. (CO5,L2)
12. Demonstrate *Hierarchical Clustering* with Sample Data Sets. (CO5,L2)

**Note: The list of experiments is not limited to the above list. If the existing laboratory experiments completed in advance, the additional laboratory programs can added , and to be executed in the laboratory.**

## 22DS2L2: WEB TECHNOLOGIES LAB

<b>Course Name</b>	Web Technologies Lab	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>CIA</b>	<b>SEE</b>	<b>TM</b>
<b>Course Code</b>	22DS2L2	0	0	6	3	30	70	100
<b>Year of Introduction:</b> 2020	<b>Year of Offering:</b> 2022	<b>Year of Revision:</b> No Revision			<b>Percentage of Revision:</b> Nil			
L-Lecture, T-Tutorial, P-Practical, C-Credits, CIA-Internal Marks, SEE-External Marks, TM-Total Marks								

### Course Description and Purpose:

Web Technologies Lab (22CA2L2) is a course that illustrates concepts of *HTML*, *Java Script*, *DHTML*, *XML*, *PHP*, *JSP*, *Angular JS*, *Svelte* and *Git*.

### Course Objectives:

This course will help enable the students to understand, learn, design *Static and Dynamic WebPages*, *Create XML Style Sheets*, *write PHP programs for data retrieval*, *write JSP Applications for Client-Server Communication*, *can create Directives, Events, Data Binding and Database Connectivity using Angular JS and Bindings & Events using Svelte and Version Controlling using Git*.

### Specific Objectives include:

- To build functional web applications using *HTML*.
- To create *Dynamic Web Pages* using *Java Script* and *DHTML*.
- To create *Style Sheets with XML* and write *PHP Programs for Data Retrieval*.
- To create *JSP Applications for Client-Server Communication*.
- To create *Directives, Events, Data Binding and Database Connectivity using Angular JS and Bindings & Events using Svelte and Version Controlling using Git*.

### Course Outcomes:

Upon successful completion of the course, the student will be able to:

CO1: Build functional web applications using *HTML*.

CO2: Create *Dynamic Web Pages* using *Java Script* and *DHTML*.

CO3: Create *Style Sheets with XML* and write *PHP Programs for Data Retrieval*.

CO4: Create *JSP Applications for Client-Server Communication*.

CO5: Create *Directives, Events, Data Binding and Database Connectivity using Angular JS and Bindings & Events using Svelte and Version Controlling using Git*.

### HTML:

1. Write HTML code to provide intra document linking. (CO1, L1)
2. Write HTML code to provide inter document linking. (CO1, L2)
3. Write a program to implement the three types of lists. (CO1, L1)
4. Create a HTML page using frames. (CO1, L6)
5. Write a program to embed college picture into your web page and write a short note on your college using paragraph tag. (CO1, L1)
6. With a suitable example, depict how we can align text using a table tag as follows. (CO1, L3)
7. Write a program to create the time table as follows: (CO1, L1)
8. Create a Registration form that interacts with the user. Collect *Login Name, Password, Date of Birth, Sex, Address, Qualification* and display a "Thanks for Registering" message when the user submits the form. (CO1, L6)

### JAVA SCRIPT:

9. Write a script to compare two strings using String object. (CO2, L1)
10. Write a script to generate random numbers within 1 to 10 and display the numbers in a table. (CO2, L1)
11. Write a Java Script to update the information into the array, in the "onClick" event of the button "Update". (CO2, L1)
12. Create a web page for a shopping mall that allows the user to tick off his purchases and obtain the bill with the total being added up simultaneously. (CO2, L3)
13. Write a script to find the duplicate elements of an array. (CO2, L1)

14. Write a script which generates a different greeting each time the script is executed. (CO2, L1)
15. Write a javascript to check the number is Armstrong number or not by getting the number from textbox and the result is displayed in a alert dialog box. (CO2, L1)
16. Using functions write a java script code that accepts user name and password from user, Check their correctness and display appropriate alert messages. (CO2, L1)

**DHTML:**

17. Create an inline style sheet. Illustrate the use of an embedded style sheet. (CO2, L6)
18. Create an external style sheet to illustrate the “Font” elements. (CO2, L6)
19. Write a program to switch on and off light using onClick event. (CO2, L1)
20. Illustrate different types of filters (atleast six) on a sample text. (CO2, L2)
21. Write a program to illustrate tabular data control for data binding. (CO2, L1)

**XML:**

22. Create a small XML file designed to contain information about student performance on a module. Each student has a name, a roll number, a subject mark and an exam mark. (CO3, L6)
23. Create an internal DTD file. (CO3, L6)
24. Create an external DTD file. (CO3, L6)
25. Create an XSLT stylesheet to display the student data as an HTML table. (CO3, L6)

**PHP:**

26. Calculate the factorial of a given number using PHP declarations and expressions. (CO3, L1)
27. Write a PHP program that interacts with the user. Collect first name lastname and date of birth and displays that information back to the user. (CO3, L1)

**JSP:**

28. Write a program to implement JSP directives. (CO4, L1)
29. Write a JSP program for session tracking. (CO4, L1)

**ANGULAR JS:**

30. Create Registration and Login Forms with Validations using JQuery. (CO5, L6)
31. Implement the following in Angular JS (CO5, L5)
  - (a) Angular JS Data Binding
  - (b) Angular JS Directives and Events
  - (c) Using Angular JS to fetch Data from MySql

**SVELTE:** Illustrate the following (CO5, L2)

32. Reactivity using SVELTE.
33. Bindings using SVELTE.
34. Transitions using SVELTE.

**Git:**

35. Illustrate the following (CO5, L2)  
Version Control Using Git.

**Note: The list of experiments is not limited to the above list. If the existing laboratory experiments completed in advance, the additional laboratory programs can added, and to be executed in the laboratory.**

**M.Sc.(Computational Data Science) Syllabi & Model Question Papers  
(For the batch of students admitted during academic year 2021-2022)**

**21DS4T1**

**P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE (AUTONOMOUS), VIJAYAWADA-520010**

(An Autonomous College in the Jurisdiction of Krishna University, A.P., India.)

**DATA VISUALIZATION**

**SYLLABUS W.E.F 2021-2022**

**Course Category:** Programme Core    **Course Type:** Theory    **Credits:** 4    **Semester:** IV

**Prerequisites:** Python Programming    **Lecture-Tutorial-Practice:** 4-0-0

**Continuous Evaluation:** 30    **Semester end Evaluation:** 70    **Total Marks:** 100

**Course Objectives:**

1. To understand *Basics of Tableau, Visual Design and Connecting various Data Sources.*
2. To know *Uni-variate Charts, Bi-variate Charts, Multi-variate Charts, Interacting with the Viewer.*
3. To create *Tableau Maps and Creating Dashboards and Stories.*
4. To implement *Data Operations of Power BI.*
5. To implement *Power Pivot Model and Power BI Environment.*

**Course Outcomes:**

On successful completion of this course, the students able to:

CO1: Understand *Basics of Tableau, Visual Design and Connecting various Data Sources.*

CO2: Know *Uni-variate Charts, Bi-variate Charts, Multi-variate Charts, Interacting with the Viewer.*

CO3: Create *Tableau Maps and Creating Dashboards and Stories.*

CO4: To implement *Data Operations of Power BI.*

CO5: To implement *Power Pivot Model and Power BI Environment.*

**UNIT I (12 Hours)**

**Introduction to Tableau:** What is Tableau? - Opening Existing Workbooks - Creating New Workbooks.

**Basic Visualization Design:** Using Show Me - Choosing Mark Types - Color - Size - Shape and Label Options - Choosing Color Options - Setting Mark Size - Choosing Shapes - Text Tables and Mark Labels - Formatting Options - Evaluating Multiple Measures - Shared Axis Charts - Measure Names and Measure Values - Dual Axis Charts.

**Connecting to Data:** Connecting to Various Data Sources - The Data Source Page - Customizing Your View of the Data: Changing Data Type - Modifying Dimension / Measure Assignment - Hiding -Renaming and Combining Fields - Splitting Fields - Changing the Default Field Appearance - Organizing Dimensions in Hierarchies Using Table or Folder View - Saving and Sharing Metadata Extracting Data -Data Blending - Moving from Test to Production Database.

**UNIT II (12 Hours)**

**Top 10 Chart Types (Uni-variate/Bi-Variate & Multi-variate Charts):** Bar Chart - Line/Area Chart - Pie Chart - Text Table / Crosstab - Scatter Plot - Bubble Chart - Bullet Graph - Box Plot - Tree Map - Word Cloud.

**Interacting with the Viewer:** Filtering Data - Include or Exclude from the Worksheet - Basic Filtering -Quick Filters - Parameters - Creating a Parameter - Displaying a Parameter - Using a Parameter in a Worksheet - Worksheet Actions - Filter Actions - Highlight Actions - URL Actions.

**UNIT III(12 Hours)**

**Tableau Maps:** Geocoded Fields - Geographic Hierarchies and Ambiguity - Custom Geocoding - Background Maps and Layers - Navigating Maps and Selecting Marks - Map Options - Web Map Services - Mapping and Mark Types - Custom Background Images - Generating Your Own Coordinate System - Adding a Custom Background Image.

**Creating Dashboards and Stories:** Creating a Simple Dashboard - Setting Dashboard - Size - Adding Sheets - Associated Worksheet Elements - Supplementary Dashboard Features - Layout Container - Blank Text - Image - Webpage - Setting Dashboard and Element - Sizes - Dashboard Actions - Highlight Action - Filter Action - URL Action.

#### UNIT IV (12 Hours)

##### **Introduction Power Pivot:**

Introduction of Pivot: Use Power Pivot - xVelocity in Memory Analytics Engine - Exploring the Data Model Management Interface - Analyzing Data Using a Pivot Table.

##### **Data Operations:**

**Working with Data:** Import Data from Relational Databases - Import Data from Text Files - Import Data from a Data Feed - Import data from an OLAP cube.

**Power BI Data Munging (Query):** Discover and import data from various Sources - Getting, Cleaning and Shaping Data - Creating Table Relationships, Data, Merge, Shape, and Filter Data - Group and Aggregate Data - Insert Calculated Columns.

#### UNIT V(12 Hours)

**Power Pivot Model:** Creating Data Model - Explain what a Data Model is, Create Relationships between Tables in the Model, Create and use a Star Schema - Understand when and how to de-normalize the Data, Create and use Linked Tables.

##### **Power BI:**

**Power BI Environment:** Adding Calculations and Measures - Importing Graphs - User Graphs, Dash boards- Incorporating Time Based Analysis.

Prescribed Text Books			
	Author	Title	Publisher
1	George Peck	Tableau 9 - The Official Guide	McGraw Hill, 2016
2	Dan Clark	Beginning Power BI: A Practical Guide to Self Service Data Analytics with Excel 2016 and Power BI Desktop	O'Reilley, Second Edition

Reference Text Books			
	Author	Title	Publisher
1	Ashutosh Nandeshwar	Tableau Data Visualization Cookbook	Packt Publishing Ltd, 2013
2	Rob Collie & Avi Singh	Power Pivot and Power BI: The Excel User's Guide to DAX Power Query, Power BI & Power Pivot in Excel 2010-2016	Holy Macro! Books,2016
3	Daniel G. Murray	Tableau Your Data! Fast and Easy Visual Analysis with Tableau Software Second Edition	John Wiley & Sons



Time: 3 Hours

Max. Marks: 70

Answer ALL questions

(10×2 = 20 Marks)

1. a) What is *Tableau*? (CO1,L1)
- b) How do you change *Data Type* in *Tableau*. (CO1,L1)
- c) What is *Tree Map*? (CO2,L1)
- d) What is *Quick Filter*? (CO2,L1)
- e) Name any two *Web Map Services*. (CO3,L1)
- f) Name any two features of *Supplementary Dashboard*. (CO3,L1)
- g) What is *Pivot Table*? (CO4,L1)
- h) What is *Data Munging*? (CO4,L1)
- i) What is *Star Schema*? (CO5,L1)
- j) What are the advantages of *Time Based Analysis*? (CO5,L1)

Answer Five Questions Choosing One Question from Each Unit.

All Questions Carry Equal Marks.

(5×10 = 50 Marks)

## UNIT I

- 2 a. Explain *Shape and Label Options* and *Formatting Options* in *Tableau*. (CO1,L2) 10 Marks  
(or)
- b. Illustrate how data sources connected to *Tableau*. (CO1,L2) 10 Marks

## UNIT II

- 3 a. Build Uni-variate charts. (CO2,L3) 10 Marks  
(or)
- c. Experiment with *Basic Filters* and *Quick Filters*. (CO2,L3) 10 Marks

## UNIT III

- 4 a. Compare any two types of *Tableau Maps*. (CO3,L4) 10 Marks  
(or)
- b. Examine the procedure to create Simple Dashboard. (CO3,L4) 10 Marks

## UNIT IV

- 5 a. Explain how to Analyze Data using a Pivot Table. (CO4,L5) 10 Marks  
(or)
- c. Explain how to import data from various sources. (CO4,L5) 10 Marks

## UNIT V

- 6 a. Create Relationships between Tables in the Model (CO5, L6) 10 Marks  
(or)
- b. Discuss how to import Graphs in Power BI. (CO5, L6) 10 Marks

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**BUSINESS ANALYTICS**  
**SYLLABUS W.E.F 2021-2022**

**Course Category:** Programme Core **Course Type:** Theory **Credits:** 4 **Semester:** IV

**Prerequisites:** Statistical Techniques **Lecture-Tutorial-Practice:** 4-0-0

**Continuous Evaluation:** 30 **Semester end Evaluation:** 70 **Total Marks:** 100

**Year of Introduction:** 2021 **Percentage of Change:** Nil

**Course Objectives:**

1. To learn overview of *Big Data Analytics*.
2. To understand and implement *MongoDB* and *MapReduce*.
3. To understand analyze *Descriptive* and *Predictive Analysis*.
4. To understand *Prescriptive Analytics*.
5. To understand and implement *Emerging Trends* and *Future Impacts*.

**Course Outcomes:**

Upon successful completion of the course, the student will be able to:

CO1: Learn overview of *Big Data Analytics*.

CO2: Understand and implement *MongoDB* and *MapReduce*.

CO3: Understand analyze *Descriptive* and *Predictive Analysis*.

CO4: Understand *Prescriptive Analytics*.

CO5: Understand and implement *Emerging Trends* and *Future Impacts*.

**UNIT I (12 Hours)**

**Big Data Analytics:**

Types of Digital Data (Structured, Unstructured and Semi-structured Data) - Big data from Business Perspective (Introduction of Big data, Characteristics of Big data, Data in the Warehouse, Importance of Big data) - Big data Use Cases (Patterns for Big Data Deployment, Big data Market Survey).

**UNIT II (12 Hours)**

**Introduction to MongoDB and MapReduce Programming**

**MongoDB:** Why MongoDB - Terms used in RDBMS and MongoDB - Data Types - MongoDB Query Language

**MapReduce:** Mapper - Reducer - Combiner - Partitioner - Searching - Sorting - Compression.

**UNIT III (12 Hours)**

**Business Analytics- Descriptive and Predictive Analytics**

**Introduction Business Analytics:** What and Why Business Analytics - Business Analytics Importance. **Descriptive Analytics:** Data Warehousing - Business Reporting - Visual Analytics - Business Performance Management.

**Predictive Analytics:** Techniques for Predictive Modeling - Web Analytics - Web Mining - Social Analytics - Case Study.

**UNIT IV (12 Hours)**

**Business Analytics- Prescriptive Analytics**

**Prescriptive Analytics:** Case Study – Model Based Decision Making (Optimization and Multi-Criteria Systems).

**Modeling and Analysis:** Heuristic Search Methods and Simulation - Case Study.

**UNIT V (12 Hours)**

**Business Analytics: Emerging Trends and Future Impacts**

Opening Vignette - Location Based Analytics for Organizations - Analytics Applications for Consumers - Web 2.0 - Online Social Networking - Cloud Computing and BI - Impacts of Analytics in Organizations - Analytics Ecosystem.

Prescribed Text Book			
S.No.	Author	Title	Publisher
1	MarcJ.Schniederjans,DaraG.Schniederjans,ChristopherM.Starkey	Business Analytics Principles, Concepts, and Applications	Pearson.2014.
2	R.Sharada,D Delen	Business Intelligence and Analytics	E. Turbon- Tenth Edition.
3	R.N.Prasad & Seema Acharya	Fundamentals of Business Analytics	Wiley Publications, 2nd Edition, 2016

Reference Text Book			
S.No.	Author	Title	Publisher
1	Frank J Ohlhorst	Big Data Analytics: Turning Big Data into Big Money	WileyandSASBusinessSeries,2012

**P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE (AUTONOMOUS), VIJAYAWADA-520010**

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**M.Sc.,(DATA SCIENCE) DEGREE EXAMINATIONS****FORTH SEMESTER****BUSINESS ANALYTICS****SYLLABUS W.E.F 2021-2022****Time: 3 Hours****Max. Marks: 70****Answer ALL questions****(10×2 = 20 Marks)**

- 1.a) What is *Structured Data*? (CO1,L1)
- b) Write about Warehouse. (CO1,L1)
- c) What is the Purpose of *RDBMS*? (CO2,L1)
- d) What is *Data Type*? (CO2,L1)
- e) What is *Business Analytics*? (CO3,L1)
- f) What is a *Visualization*? (CO3,L1)
- g) What is a *Model*? (CO4,L1)
- h) State *Perspective Analysis*. (CO4,L1)
- i) What is *Web 2.0*? (CO5,L1)
- j) State the impact of *ADS system*. (CO5,L1)

**Answer Five Questions Choosing One Question from Each Unit.****All Questions Carry Equal Marks.****(5×10 = 50 Marks)****UNIT- I**

2. a) Explain the characteristics of Big Data and Why Big Data is important ? (CO1,L2) 10 Marks  
(or)
- b) Explain *the Classification of Analytics*. (CO1,L2) 10 Marks

**UNIT- II**

3. a) List *various methods in MongoDB*. (CO2,L4) 10 Marks  
(or)
- b) Analyze *Parallel Breadth-First Search*. (CO2,L4) 10 Marks

**UNIT-III**

4. a) Apply *Business reporting and Visual Analytics for any organization*.(CO3,L3) 10 Marks  
(or)
- b) Identify and explain difference between *Web and Social Analytics*.(CO3,L3) 10 Marks

**UNIT-IV**

5. a) Illustrate *Structure Of Mathematical Models For Decision Support*. (CO4,L5) 10 Marks  
(or)
- b). Explain *Genetic Algorithm*. (CO4,L5) 10 Marks

**UNIT-V**

6. a) Discuss *Cloud Computing and BI* (CO5,L6) 10 Marks  
(or)
- b) Discuss *Analytics Ecosystem*. (CO5,L6) 10 Marks

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**DATA VISUALIZATION LAB****SYLLABUS W.E.F 2021-2022****Course Category:** Programme Core **Course Type:** Practical **Credits:** 3 **Semester:** IV**Prerequisites:** Excel, Tableau **Lecture-Tutorial-Practice:** 0-0-6**Continuous Evaluation:** 30 **Semester end Evaluation:** 70 **Total Marks:** 100**Course Objectives:**

1. To implement *Tableau Installation, Introduction, Exploring*.
2. To implement *Data Blending*.
3. To implement *Uni-variate Charts, Bi-variate Charts, Multi-variate Charts*.
4. To implement *Trend Line, Word cloud, Bubble Chart*.
5. To implement creating a Simple Dash Board, Creating Maps, Creating a Dash Board, Creating a Story and Data Munging, Importing Graphs, Group and Aggregate Data, Create a Dash Board in Power BI.

**Course Outcomes:**

Upon successful completion of the course, the student will be able to:

CO1: Implement tableau *Installation, Introduction, Exploring*.CO2: Implement *Data Blending*.CO3: Implement *Uni-variate Charts, Bi-variate Charts, Multi-variate Charts*.CO4: Implement *Trend Line, Word Cloud, Bubble Chart*.CO5: To implement creating a *Simple Dash Board, Creating Maps, Creating a Dash Board, Creating a Story and Data Munging, Importing Graphs, Group and Aggregate Data, Create a Dash Board in Power BI*.

1. Tableau installation. (CO1,L1)
2. Tableau Introduction / Exploring Tableau. (CO1,L1)
3. Data Blending. (CO2,L3)
4. Creating Univariate charts
  - a. Bar Chart. (CO3,L3)
  - b. Pie Chart. (CO3,L3)
  - c. Line Charts
  - d. Box plots
5. Dual Axis Chart. (CO3,L3)
6. Shared Axis. (CO3,L3)
7. Creating Bivariate Charts
  - a. Cross Tab. (CO3,L3)
  - b. Scatter Plot. (CO3,L3)
  - c. Trend Line. (CO3,L3)
8. Creating Multi-variate Charts
  - a. Dual Axis Chart. (CO3,L3)
  - b. Area charts(CO3,L3)
9. Word Cloud. (CO4,L3)
10. Bubble Chart. (CO4,L3)

11. Creating a Simple Dash Board. (CO5,L3)

12. Creating Maps. (CO5, L3)

13. Creating a Dash Board. (CO5, L3)

14. Creating a Story. (CO5, L3)

**Power BI:**

15. Data Munging in Power BI. (CO5, L3)

16. Importing Graphs in to power BI. (CO5, L3)

17. Group and Aggregate Data in Power BI. (CO5, L3)

18. Create a *Dash Board* in *Power BI*. (CO5, L3)

**Note: The list of experiments is not limited to the above list. If the existing laboratory experiments completed in advance, the additional laboratory programs can added , and to be executed in the laboratory.**

**APPENDIX-III**  
**Syllabus of Research Methodology & Intellectual Property Rights (IPR)**

**22MCA204: Research Methodology & Intellectual Property Rights (IPR)**

<b>Course Name</b>	Design & Analysis of Algorithms	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>CIA</b>	<b>SEE</b>	<b>TM</b>
<b>Course Code</b>	22PG201	4	0	0	4	30	70	100
<b>Year of Introduction:</b> 2023	<b>Year of Offering:</b> 2023	<b>Year of Revision:</b> Nil		<b>Percentage of Revision:</b> NIL				
<b>L-Lecture, T-Tutorial, P-Practical, C-Credits, CIA-Internal Marks, SEE-External Marks, TM-Total Marks</b>								

**Course Description and Purpose:**

The aim of this course is to develop research bent of mind (spirit of inquiry) and impart research skills to the all Post graduate students. It also encompasses the series of research methodology contents: from problem formulation, to design, to data collection, analysis, reporting and dissemination. This course also covers intellectual property rights (IPR), and intended to equip students with conceptual understandings of current scenario of IPR, and the practical issues encountered in filing patents, trademarks and copyrights.

**Course Objectives:**

- To understand some basic concepts of research and its methodologies
- To develop an understanding of the basic framework of research process.
- To develop an understanding of various research designs and techniques.
- To identify various sources of information for literature review and data collection.
- Ability to write a research Proposal, report and thesis
- To demonstrate knowledge and understanding of IPR Filing and Rights

**Course Learning Outcomes:**

At the end of this course the students should be able to:

- ✓ Understand some basic concepts of research and its methodologies
- ✓ Identify appropriate research topics
- ✓ Select and define appropriate research problem and parameters
- ✓ Demonstrate the ability to choose methods appropriate to research aims and objectives
- ✓ Have adequate knowledge on measurement & scaling techniques
- ✓ Have basic awareness of data analysis-and hypothesis testing procedures
- ✓ Prepare a project proposal (to undertake a project)
- ✓ Write a research report and thesis
- ✓ File Patents, Trademarks and Copy Rights

**Course Content:**

**UNIT I**

Foundations of Research:

Meaning of Research – Definitions of Research – Motivation in Research – General Characteristics of Research – Criteria of Good Research – Types of Research – Research Process – Research Methods vs. Methodology – Defining and Formulating the Research Problem – Review of Literature – Approaches to Critical Literature Review – Importance of Literature Review in Identifying Research Gaps and Defining a Problem – Development of Working Hypothesis.

## UNIT II

Research Design, Sampling Concepts, and Data Collection Methods

Meaning, Significance and Characteristics of Good Research Design – Types of Research Design: Exploratory, Conclusive Research and Experimental – Sampling Theory: Types of Sampling and Errors in Sampling – Data Collection: Types of Data – Data Collection Methods and Techniques for Primary and Secondary Data.

## UNIT III

Measurement & Scaling Techniques, Hypothesis Formulation and Testing, Overview of Data Analysis and Report Writing

Basic measurement scales – Reliability & Validity – Definition and Types of Hypothesis – Hypothesis Formulation and Testing Procedure – Overview of Data Analysis: Methods, Process and Types – Report Writing: Significance of Report Writing, Different Steps in Writing Report, Layout of the Research Report, Types of Reports, Oral Presentation, Mechanics of Writing a Research Report, Precautions for Writing Research Reports – How to Write a Research Proposal, Research Ethics, Conflict of Interest and Plagiarism.

## UNIT IV

Intellectual Property Rights (IPR)

Definition and Nature and Features of Intellectual Property Rights (IPR) – Types of Intellectual Property Rights – Procedure for Grants of Patents – Rights of a Patent – Scope of a Patent Rights – Licensing and Transfer of Technology – Why protection of intellectual property is important? – Enforcement of IPR – Infringement of IPR.

## UNIT V

Indian and International Scenario and New Developments in IPR

IPR Developments in India for the past Five Years – Development of IPR Laws in India – International Cooperation on IPR – New Developments in IPR – Administration of Patent System – International Patent protection – Case Studies in Indian and Global Contexts.

### PRACTICAL COMPONENTS:

- ✓ Students should identify different research problems with examples and describe the characteristics of researchable problems in their academic area/society/community/organization concerned.
- ✓ Students are to form in groups (a group consists of 4-6 students) and conduct critical literature survey with regard to the identified research problems and prepare a brief literature review coupled with research gaps and working hypothesis.
- ✓ Students are required to identify and develop good research design to address the defined research problems.
- ✓ Students are expected to write the research design on Exploratory and Descriptive Research.
- ✓ Students are required to develop practical experience in writing a research proposal by conducting a thorough critical review of any three research proposals (examples).
- ✓ Students are expected to develop templates for technical report writing.
- ✓ Students should conduct a team based mini research project, which is a unified and practical case on a topic of their choice, with approximately 4-6 students per group.
- ✓ Students are expected to identify types of plagiarism in academic research, and how to avoid plagiarism in research.
- ✓ Students are asked to identify and submit a brief report on Indian patents of International repute.
- ✓ Students are asked to write on Patent registration procedure, and visit Official website of Intellectual Property India <https://ipindia.gov.in> to know how to get IPR in India.
- ✓ Students are asked to identify and summarise remedies available against the infringement of intellectual property rights in Indian and global contexts.
- ✓ Students are asked to submit any five examples of ethical issues in copyright and patents.

### Reference Text Books:

1. Garg, B.L., Karadia, R., Agarwal, F. and Agarwal, U.K., 2002, An introduction to Research Methodology, RBSA Publishers.
2. Cohen, L. Lawrence, M., & Morrison, K. (2005), Research Methods in Education (5th edition). Oxford: Oxford University Press.
3. Kothari, C.R., 1990, Research Methodology: Methods and Techniques, New Age International.
4. Dornyei, Z. (2007). Research Methods in Applied Linguistics. Oxford: Oxford University Press.
5. Anthony, M., Graziano, A.M. and Raulin, M.L., 2009, Research Methods: A Process of Inquiry, Allyn



and Bacon.

6. Fink, A., 2009, Conducting Research Literature Reviews: From the Internet to Paper. Sage Publications.
7. Day, R.A., 1992, How to Write and Publish a Scientific Paper, Cambridge University Press.
8. Wadehra, B.L. 2000, Law relating to patents, trade marks, copyright designs and geographical indications. Universal Law Publishing.
9. Coley, S.M. and Scheinberg, C. A., 1990, Proposal Writing, Sage Publications.
10. Carlos, C.M., 2000. Intellectual property rights, the WTO and developing countries: the TRIPS agreement and policy options, Zed Books, New York.
11. Leedy, P.D. and Ormrod, J.E., 2004, Practical Research: Planning and Design, Prentice Hall.
12. Satarkar, S.V., 2000. Intellectual property rights and Copy right. Ess Publications.
13. Important Websites:
  - [www.ipindia.nic.in](http://www.ipindia.nic.in) - Intellectual Property Office, India
  - [www.patentoffice.nic.in](http://www.patentoffice.nic.in) – Patent office, India
  - <http://copyright.gov.in/> - Copyright Office, India
  - [ipr.icegate.gov.in](http://ipr.icegate.gov.in) – Automated Recordation & Targeting for IPR Protection
  - <http://www.icegate.gov.in>- E- Commerce portal of Central Board of Excise and Customs
  - [www.ipab.tn.nic.in](http://www.ipab.tn.nic.in) - Intellectual Property Appellate Board, India
  - [www.mit.gov.in](http://www.mit.gov.in) – Department of Information Technology, India
  - <http://www.mit.gov.in/content/office-semiconductorintegrated-circuits-layout-designregistry>
  - Semiconductor Integrated Circuits Layout-Design Registry (SICLDR)

**APPENDIX - IV**  
**RUBRICS FOR ALLOCATING MARKS FOR PROJECT WORK**

- At the end of 2nd semester, every student must undergo *Summer Internship/Apprenticeship/Project Work/Industrial Training/Research based Project Work* for Six Weeks and must prepare a report concerned as per approved project guidelines, and submit the same to the University 14 days before the commencement of third semester end examinations.
- Evaluation procedure of *Summer Internship/Apprenticeship/Project Work/Industrial Training/Research based Project Work* for Six Weeks. Head of Department (HoD) has the authority to set review dates for project evaluations.

Evaluation Schema for Continuous Internal Assessment of Project Work	
Review-I	Submission of Abstract
Review-II	Submission of Data Dictionary & UML/ER Diagrams
Review-III	Project Execution
	Record Submission

- Rubrics for *Summer Internship/Apprenticeship/Project Work/Industrial Training/Research based Project Work* for Six Weeks at the end of Second Semester.

Rubrics for <i>Summer Internship/Apprenticeship/Project Work/Industrial Training/Research based Project Work</i> for Six Weeks at the end of Second Semester (Maximum Marks: 50)				
Abstract	Data Analysis (Data Dictionary & UML/ER Diagrams)	Project Execution	Project Report	Viva-voce
5 Marks	10 Marks	15 Marks	10 Marks	10 Marks

- External of Project reviews will be done by the concerned Project Internal Guide and HOD. Head of Department (HoD) has the authority to set review dates for project evaluations.

External Projects Reviews	
Review-I	Submission of Abstract
Review-II	Submission of Data Dictionary & UML/ER Diagrams
Review-III	Project Execution
Record Submission	

- Rubrics for External Project

Rubrics for External Project. (Maximum Marks: 100)				
Abstract	Data Analysis (Data Dictionary & UML/ER Diagrams)	Project Execution	Project Report	Viva-voce
10 Marks	20 Marks	30 Marks	20 Marks	20 Marks



**PARVATHANENI BRAHMAYYA  
SIDDHARTHA COLLEGE OF ARTS & SCIENCE: : VIJAYAWADA – 10**

**DEPARTMENT OF MATHEMATICS**

Minutes of the **online meeting** of the members of Board of Studies in Mathematics held on 10<sup>th</sup> March 2023 through Zoom App at 03.00p.m.

**Members Present**

- |  |                             |
|--|-----------------------------|
| 1. Prof. V. Lakshmi Prasannam<br>Professor & Head                        | Chairman                    |
| 2. Prof. K. Jaya Lakshmi<br>Department of Mathematics<br>JNTU Ananthapur | University Nominee          |
| 3. Prof. K.K.M. Sarma<br>Department of Mathematics<br>Andhra University  | Subject Expert              |
| 4. Prof. Y.N.Reddy<br>Department of Mathematics<br>NIT, Warangal.        | Subject Expert              |
| 5. Dr. V. Amarendra Babu<br>Department of Mathematics, ANU               | Subject Expert<br>(Alumnus) |
| 6. Sri. I.V.Venkateswara Rao,<br>Sr. Asst. Professor & Incharge UG       | Member                      |
| 7. Smt. T. Anuradha, Asst. Professor                                     | Member                      |
| 8. Smt. M Venkata Ramana, Asst. Professor                                | Member                      |
| 9. Sri. Venkatesh Akurathi, Asst. Professor                              | Member                      |
| 10. Smt. K. Anupama, Asst. Professor                                     | Member                      |
| 11. Smt. S. N. S. Naga Lakshmi, Asst. Professor                          | Member                      |
| 12. Sri. Y Sai Subrahmanyam, Asst. Professor                             | Member                      |
| 13. Sri. ASV Varaprasad, Asst. Professor                                 | Member                      |
| 14. Dr M. Sudha Rani, Asst. Professor                                    | Member                      |
| 15. Sri. Y. Ravi Babu, Asst. Professor                                   | Member                      |
| 16. Kum Ch.Sreedevi, Asst. Professor                                     | Member                      |
| 17. Smt. J. Nirmala, Asst. Professor                                     | Member                      |

**DEPARTMENT OF MATHEMATICS**

**LIST OF THE COURSES REVISED/ INTRODUCED - II SEMESTER 2022-23**

<b>S.N O</b>	<b>TITLE OF THE COURSE</b>	<b>Course Code</b>	<b>Off ere d in SE M</b>	<b>Type of the Paper</b>	<b>Year of Introducti on</b>	<b>Year of Revision</b>	<b>P ag e N u m b e r s</b>	<b>OBE with BTL</b>	<b>Offered to (Name of the Programme)</b>
1	Complex Analysis	22MA2T1	II	CORE	2020-2021	2022-2023		YES	M.Sc. Mathematics
2	Numerical Methods	22MA2T2	II	CORE	2020-2021	2022-2023		YES	M.Sc. Mathematics
3	Partial Differential Equations	22MA2T3	II	CORE	2020-2021	2022-2023		YES	M.Sc. Mathematics
4	Lattice Theory	22MA2T4	II	CORE	2020-2021	2022-2023		YES	M.Sc. Mathematics
5	Research Methodology and IPR	22PG201	II	SEC	2022-2023	INTROD UCE		YES	M.Sc. Mathematics
6	Algebraic Coding Theory	22MA2D1	II	DSE	2022-2023	INTROD UCE		YES	M.Sc. Mathematics
	Graph Theory	22MA2D2	II	DSE	2022-2023	INTROD UCE		YES	M.Sc. Mathematics
	Discrete Mathematical Structures	22MA2D3	II	DSE	2022-23	INTROD UCE		YES	M.Sc. Mathematics
7	Numerical Methods Lab	22MA2L1	II	CORE	2020-2021	2022-2023		YES	M.Sc. Mathematics
<b>LIST OF THE COURSES INTRODUCED - IV SEMESTER 2022-23</b>									
1	Advanced Linear Algebra	21MA4M1	IV	MOOC S	2022-23	INTROD UCE		YES	M.Sc. Mathematics

## RESOLUTIONS (PG):

1. It is resolved to recommend the revised Syllabus & Model question paper of **COMPLEX ANALYSIS with course code 22MA2T1** in II semester of M.Sc. Mathematics for the batch of students admitted in 2022 – 23 and onwards, in place of COMPLEX ANALYSIS with course code 20MA2T1.
2. It is resolved to recommend the revised Syllabus & Model question paper of **NUMERICAL METHODS with course code 22MA2T2** in II semester of M.Sc. Mathematics for the batch of students admitted in 2022 – 23 and onwards, in place of NUMERICAL METHODS with course code 20MA2T2.
3. It is resolved to recommend the revised Syllabus & Model question paper of **PARTIAL DIFFERENTIAL EQUATIONS with course code 22MA2T3** in II semester of M.Sc. Mathematics for the batch of students admitted in 2022 – 23 and onwards, in place of PARTIAL DIFFERENTIAL EQUATIONS with course code 20MA2T3.
4. It is resolved to recommend the revised Syllabus & Model question paper of **LATTICE THEORY with course code 22MA2T4** in II semester of M.Sc. Mathematics for the batch of students admitted in 2022 – 23 and onwards, in place of LATTICE THEORY with course code 20MA2T4. .
5. It is resolved to recommend to introduce **RESEARCH METHODOLOGY WITH IPR with course code 22PG201** in II semester of M.Sc. Mathematics in line with the guidelines of OBE following the Bloom's Taxonomy for the batch students admitted in the academic year 2022 – 23 and onwards.
6. It is resolved to recommend introduce the Syllabus & Model question paper of Domain Specific Elective course **ALGEBRAIC CODING THEORY with course code 22MA2D1** in II semester of M.Sc. Mathematics in line with the guidelines of OBE following the Bloom's Taxonomy for the batch of students admitted in 2022 – 23 and onwards.
7. It is resolved to recommend introduce the Syllabus & Model question paper of Domain Specific Elective course **GRAPH THEORY with course code 22MA2D2** in II semester of M.Sc. Mathematics in line with the guidelines of OBE following the Bloom's Taxonomy for the batch of students admitted in 2022 – 23 and onwards.

8. It is resolved to recommend to introduce the Syllabus & Model question paper of Domain Specific Elective course **DISCRETE MATHEMATICAL STRUCTURES with course code 22MA2D3** in II semester of M.Sc. Mathematics in line with the guidelines of OBE following the Bloom's Taxonomy for the batch of students admitted in 2022 – 23 and onwards.
9. It is resolved to recommend the revised Syllabus & Model question paper of **NUMERICAL METHODS LAB with course code 22MA2L1** in II semester of M.Sc. Mathematics for the batch of students admitted in 2022 – 23 and onwards, in place of NUMERICAL METHODS LAB with course code 20MA2L1.
10. The Syllabus and Model question papers for IV semester M.Sc. Mathematics students admitted in the academic year 2021-22 are same as that of 2020-21 admitted batch as per the modified programme structure approved in October 2021 except the MOOCS course.
11. It is resolved to recommend to introduce the Syllabus & Model question paper of MOOCS '**ADVANCED LINEAR ALGEBRA**' with course code **21MA4M1** in IV semester of M.Sc. Mathematics for the batch of students admitted in 2021– 22 and onwards.

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## P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

Siddhartha Nagar, Vijayawada – 520 010

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**Title of the Course: COMPLEX ANALYSIS**

**Semester : II**

Course Code	22MA2T1	Course Delivery Method	Blended Mode
Credits	4	CIA Marks	30
No. of Lecture Hours / Week	4	Semester End Exam Marks	70
Total Number of Lecture Hours	60	Total Marks	100
Year of Introduction : 2020-21	Year of offering : 2022-23	Year of Revision: 2022-23	Percentage of Revision : 5%

### Course Objectives:

The main objective of the course is to learn the basic properties of complex numbers, analytical functions, differentiation and integration of complex valued functions.

COURSE OUTCOME	Upon successful completion of this course, students will be able to:
CO1	understand the concept of continuity for complex valued functions and use the Cauchy-Riemann equations to find the derivative of a complex valued function
CO2	apply Cauchy integral formula to evaluate complex contour integrals.
CO3	find power series representations of analytic functions.
CO4	classify singularities and evaluate complex integrals using the residue theorem.
CO5	understand Rouché's theorem and Linear Transformations.

### Mapping of Course Outcomes:

	PO1	PO2	PO3	PO4	PO5
CO1	L3				
CO2				L4	
CO3				L5	
CO4					L5
CO5	L3				

### **UNIT-I**

Analytic Functions: Continuity- Derivatives- Differentiation Formulas-Cauchy-Riemann Equations-Sufficient conditions for Differentiability-Polar Coordinates- Analytic Functions- Harmonic Functions. [Sec 18 to 26 of Chapter 2 of the Prescribed Text Book [1]]

### **UNIT-II**

Integrals: Derivatives of functions  $w(t)$ -Definite integrals of functions  $w(t)$ - Contours- Contour Integrals- Cauchy-Goursat theorem- Proof of the theorem- Simply Connected Domains- Multiply Connected Domains- Cauchy Integral Formula- An extension of Integral Formula- Some Consequences of the extension- Liouville's Theorem and the Fundamental Theorem of Algebra.

[Sec 37 to Sec 41 and Sec 46 to Sec 53 of chapter 4 of the Prescribed Text Book [1]]

### **UNIT-III**

Series: Convergence of Sequences- Convergence of Series-Taylor's series – Proof of Taylor's theorem- Examples- Laurent's series – Proof of Laurent's Series- Examples.

[Sec 55 to 62 of Chapter-5 of the Prescribed Text Book [1]]

### **UNIT-IV**

Residues and Poles: Isolated singular points- Residues – Cauchy's residue theorem- Residue at Infinity- the three types of isolated singular points - Residues at poles, Zero's of analytic function- Zeros and Poles- Evaluation of improper integrals.

[Sec 68 to 76 of chapter 6 and sec 78, 79 of chapter 7 of the Prescribed Text Book [1]]

### **UNIT-V**

Argument principle- Rouche's theorem- Linear Transformations: The transformation  $w=1/z$  - Mappings by  $1/z$  - Linear fractional transformations - The transformation  $w=\sin z$ .

[Sec 86 &87 of chapter7, sec 90 to 93, 96 of chapter 8 of the Prescribed Text Book [1]]

### **Prescribed Text Book:**

1. "Complex Variables and Applications", James Ward Brown, Ruel V. Churchill, McGraw-Hill International Editions, Eighth Edition.

### **Reference Books:**

1. "Complex analysis for Mathematics and Engineering", John H. Mathews and Russel W, Howell, Narosa Publishing house.
2. "Complex Variables", H. S. Kasana, Prentice Hall of India.

**Course has Focus on :Foundation**

**Websites of Interest:** 1. [www.nptel.ac.in](http://www.nptel.ac.in)  
2. [www.epgp.inflibnet.ac.in](http://www.epgp.inflibnet.ac.in)  
3. [www.ocw.mit.edu](http://www.ocw.mit.edu)



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(An autonomous college in the jurisdiction of Krishna University)  
**M. Sc. Mathematics**  
**Second Semester**

**COMPLEX ANALYSIS– 22MA2T1**

**Time: 3 hours**

**Max. Marks: 70**

**SECTION-A**

**Answer all questions. All questions carry equal marks.**

**(5x4=20)**

1 a) Check the differentiability of  $f(z) = \bar{z}$  (CO1, L2)

(OR)

b) Show that the function  $f(z) = z^2$  is an entire function. (CO1, L2)

2 a) Evaluate  $\int_c f(z)$ , where  $f(z) = 2e^{i\theta}$  and  $0 \leq \theta \leq 2\pi$ . (CO2, L2)

(OR)

b) Define simply connected domain and multiply connected domain.

Give an example for each. (CO2, L2)

3 a) Find the Taylor's series expansion of the function  $f(z) = 1/(1+z)$  at the point 0. (CO3, L3)

(OR)

b) Find the Laurent series expansion of the function  $f(z) = \frac{1}{z(1+z)}$  at the point 0 in the domain  $1 < |z| < \infty$  (CO3, L3)

4 a) Find the residue of the function  $f(z) = 2z/(z-1)^2$  at  $z = 1$ . (CO4, L2)

(OR)

b) Find the residue of the function  $f(z) = \frac{1}{z+z^2}$  at  $z = 0$  (CO4, L2)

5 a) Find the linear transformation that maps  $(2, i, -2)$  onto  $(1, i, -1)$  (CO5, L2)

(OR)

b) Find the fixed points of  $f(z) = \frac{z-1}{z+1}$  (CO5, L2)

### SECTION – B

**Answer all questions. All questions carry equal marks. (5X10=50)**

6 a) Suppose that the complex function  $f(z) = u + iv$  is differentiable at  $z_0 = x_0 + iy_0$ , then prove that the first order partial derivatives of 'u' and 'v' are exist and satisfies Cauchy Riemann equations  $u_x = v_y$  and  $u_y = -v_x$  at  $(x_0, y_0)$ . (CO1, L2)

(OR)

b) If a function  $f(z) = u + iv$  is analytic in a domain D, then show that u and v are harmonic in D. Also find a harmonic conjugate of  $u(x, y) = y^3 - 3x^2y$  (CO1, L2)

7 a) State and Prove Cauchy-Goursat Theorem. (CO2, L3)

(OR)

b) State and Prove Cauchy Integral formula. (CO2, L3)

8 a) State and prove Taylor's theorem. (CO3, L3)

(OR)

b) State and prove Laurent's theorem. (CO3, L3)

9 a) State and prove Cauchy's residues theorem. (CO4, L3)

(OR)

b) Using residue theorem, evaluate the improper integral  $\int_0^{\infty} \frac{x^2}{x^6 + 1} dx$  (CO4, L3)

10 a) State and prove Rouché's Theorem. (CO5, L3)

(OR)

b) Discuss the transformation  $w = 1/z$  (CO5, L3)

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**Title of the Course: NUMERICAL METHODS**

**Semester : II**

Course Code	22MA2T2	Course Delivery Method	Blended Mode
Credits	4	CIA Marks	30
No. of Lecture Hours / Week	4	Semester End Exam Marks	70
Total Number of Lecture Hours	60	Total Marks	100
Year of Introduction : 2020-21	Year of offering : 2022-23	Year of Revision: 2022-23	Percentage of Revision : 5%

### Course Objectives:

This Course introduces various Numerical methods for solving Mathematical problems that arise in Science and Engineering and helps to choose, develop and apply the appropriate Numerical techniques for the Mathematical problems.

COURSE OUTCOME	Upon successful completion of this course, students will be able to:
CO1	solve first and second order Transcendental and Polynomial Equations using different iteration methods.
CO2	solve System of Linear Algebraic Equations and Eigen Value Problems.
CO3	compare the viability of different approaches to the numerical solution of problems arising in interpolation and approximation.
CO4	evaluate a derivative at a value using an appropriate numerical method and calculate the value of a definite integral.
CO5	derive and apply numerical methods like single step methods, multistep methods to solve the linear system of equations.

### Mapping of Course Outcomes:

	PO1	PO2	PO3	PO4	PO5
CO1		L2			
CO2					L3
CO3				L4	
CO4					L3
CO5					L4

#### UNIT-I:

Transcendental and Polynomial Equations: Introduction - Bisection method - Iteration methods based on first degree equation - Secant method –Regula-Falsi method - Newton Raphson method - Iteration method based on second degree equation – Muller method, Chebyshev method- Rate of convergence of Secant method - Newton Raphson method.

[Above topics from Chapter-2 of the Prescribed Book [1]]

#### UNIT-II:

System of Linear Algebraic Equation and Eigen Value Problems: Introduction - Direct methods - Gauss Elimination Method- Gauss – Jordan Elimination Method - Triangularisation method - Iteration Methods- Jacobi iteration Method - Gauss-Seidel Iteration Method - Eigen values and Eigen vectors. [Above topics from Chapter-3 of the Prescribed Book [1]]

#### UNIT-III:

Interpolation and Approximation: Introduction - Lagrange Interpolation – Newton’s Divided Difference Interpolation - Finite Difference Operators - Interpolating Polynomials using finite differences- Gregory- Newton forward difference interpolation- Gregory- Newton Backward difference interpolation - Hermite interpolation - Approximation:Least Square approximation.

[Above topics from Chapter-4 of the Prescribed Book [1]]

#### UNIT-IV:

Numerical Differentiation and Integration: Introduction – Numerical differentiation: Methods based on Interpolation- Methods based on finite differences.

Numerical Integration:Trapezoidal rule – Simpson’s rule -Composite integration methods.

[Above topics from Chapter-5 of the Prescribed Book [1]]

**UNIT-V:**

Numerical solutions to Ordinary Differential Equations – Euler Method–Backward Euler Method – Midpoint Method-Runge-Kutta methods: Euler - Cauchy Method- Modified Euler-Cauchy Method- Runge-Kutta second order method-Runge-Kutta fourth order method.  
[Above topics from Chapter- 6 of the Prescribed Book [1]]

**PRESCRIBED BOOK :**

1. “Numerical Methods for Scientific and Engineering Computation”, M. K. Jain, S. R. K. Iyengar, R. K. Jain, New Age International, 6<sup>th</sup> Edition.

**REFERENCE BOOK:**

“An Introduction to Numerical Analysis” Kendall E. Atkinson.

**Course has Focus on :**Foundation

**Websites of Interest:** 1. [www.nptel.ac.in](http://www.nptel.ac.in)  
2. [www.epgp.inflibnet.ac.in](http://www.epgp.inflibnet.ac.in)  
3. [www.ocw.mit.edu](http://www.ocw.mit.edu)

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**M. Sc. Mathematics**  
**Second Semester**  
**NUMERICAL METHODS-22MA2T2**

**Time: 3 Hours**

**Max. Marks : 70**

**SECTION-A**

**Answer all questions.**

**(5x4=20)**

1 a) Explain bisection method.

(CO1, L1)

(OR)

b) Explain Regula-Falsi method.

(CO1, L1)

2 a) Explain Gauss Elimination Method .

(CO2, L2)

(OR)

b) Find the eigen values of the matrix  $A = \begin{pmatrix} 1 & 2 & 3 \\ 5 & 0 & 2 \\ 4 & 6 & 3 \end{pmatrix}$

(CO2, L2)

3 a) Prove that (i)  $\Delta = E - 1$  (ii)  $\nabla = 1 - E^{-1}$

(CO3, L1)

(OR)

b) Find the third difference with arguments 2,4,9,10 of the function  $f(x) = x^3 - 2x$

(CO3, L1)

4 a) Explain Newton's backward interpolation method.

(CO4, L2)

(OR)

b) Explain Simpson's 1/3<sup>rd</sup> rule.

(CO4, L2)

5 a) Solve the differential equation  $y' = t + y$  with  $y(1) = 0$ , by Taylor series method to obtain  $y(1.2)$  with  $h = 0.1$ .

(CO5, L3)

(OR)

b) Explain second order Runge-Kutta method.

(CO5, L3)

**SECTION- B**

**Answer all questions. All questions carry Equal Marks.**

**(5x10 = 50)**

6 a) Use Newton-Raphson method to obtain a root, correct to 3 decimal places of the equation  $x + \log x = 2$ .

(CO1, L3)

(OR)

b) Find a root of the equation  $f(x) = x^3 - 4x - 9 = 0$ , using the bisection method in four stages.

(CO1, L3)

7 a) Solve the equations  $10x+2y+z=9$ ,  $2x+3y-2z = -44$ ,  $2x+3y+10z=22$  by using Gauss –Seidal method. (CO2, L3)

(OR)

b) Solve the system of linear equations  $x_1+x_2+x_3=1$ ,  $4x_1+3x_2-x_3=6$ ,  $3x_1+5x_2+3x_3=14$ , by triangulation method. (CO2,L3)

8 a) The values of x and y are given as below:

x	5	6	9	11
f(x)	12	13	14	16

Find the value of y at x=10 by using Lagrange’s interpolation formula. (CO3, L4)

(OR)

b) Given the following values of  $f(x)$  and  $f'(x)$ .

x	f(x)	f'(x)
-1	1	-5
0	1	1
1	3	7

Estimate the values of  $f(-0.5)$  and  $f'(0.5)$  using Hermite interpolation. (CO3, L4)

9 a) The following data for  $f(x) = x^4$  is given (CO4, L3)

x	0.4	0.6	0.8
f(x)	0.0256	0.1296	0.4096

Find  $f'(0.8)$  and  $f''(0.8)$  using quadratic interpolation.

(OR)

b) (i) Evaluate  $\int_{-2}^2 \frac{x}{5+2x} dx$  by using Trapezoidal rule with 5 ordinates.

(ii) Evaluate  $\int_0^2 \frac{dx}{x^3+x+1}$  by using Simpson’s 1/3 rule with  $h=0.25$  (CO4, L3)

10 a) Solve the initial value problem  $y' = -y^2$ , with  $y(1)=1$  using Euler method and compute  $y(1.2)$  using  $h=0.1$ . (CO5, L4)

(OR)

b) Solve  $u' = -2u^2$  with  $u(0)=1$  and  $h=0.2$  on the interval  $[0, 0.4]$  using the fourth order classical Runge-Kutta method. (CO5, L4)

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**Title of the Course: PARTIAL DIFFERENTIAL EQUATIONS**

**Semester : II**

Course Code	22MA2T3	Course Delivery Method	Blended Mode
Credits	4	CIA Marks	30
No. of Lecture Hours / Week	4	Semester End Exam Marks	70
Total Number of Lecture Hours	60	Total Marks	100
Year of Introduction : 2020-21	Year of offering : 2022-23	Year of Revision: 2022-23	Percentage of Revision : 5%

**Course Objectives:** The objective of the course is to find the solutions of first and second order partial differential equations and to study some applications of partial differential equations.

COURSE OUTCOME	Upon successful completion of this course, students will be able to:
CO1	Formulate and classify first order and second order partial differential equations
CO2	Solve the first order linear and non linear equations using different methods
CO3	Solve the wave equation with different initial and boundary conditions and can apply these solutions to physical problems
CO4	Solve the Laplace equation with different initial and boundary conditions and can apply these solutions to physical problems
CO5	Find Riemann Volterra solution of one dimensional wave equation

**Mapping of Course Outcomes:**

	PO1	PO2	PO3	PO4	PO5
CO1			L4		
CO2					L4
CO3	L3				
CO4	L3				
CO5					L4



## UNIT-I

First Order PDE's - Introduction - Methods of solution of  $dx/P=dy/Q=dz/R$  - Orthogonal trajectories of a system of curves on a surface - Pfaffian Differential forms and equations - Solution of Pfaffian Differential Equations in three variables – Partial Differential equations- Origins of first order Partial Differential Equations- Cauchy's problem for first order equations.

[Sections 3 to 6 of Chapter 1, Sections 1 to 3 of Chapter 2 of the Prescribed Book [1]]

## UNIT-II

**Partial differential equations of the First order:** Linear Equations of the first order - Integral Surfaces passing through a given curve- Surfaces orthogonal to a given system of Surfaces - Non Linear PDE of the first order - Cauchy's method of characteristics - Compatible systems of first order equations - Charpit's Method- Special types of first order equations - Solutions satisfying given conditions- Jacobi's Method.

[Sections 4 to 13 of Chapter 2 of the Prescribed Book [1]]

## UNIT-III

**Partial differential equations of the second order:** The origin of second order equations - Linear partial differential equations with constant coefficients - Equations with variable coefficients - The solution of linear hyperbolic equations - Separation of variables - Monge's Method.[Sections 1, 4, 5, 8, 9, 11 of Chapter 3 of the Prescribed Book [1]]

## UNIT-IV

**Laplace's Equation:** Elementary solutions of Laplace's Equation - Families of equipotential surfaces - Boundary value problems - Separation of a variables - Problems with axial symmetry - Kelvin's Inversion theorem. [Sections 2 to 7 of Chapter 4 of the Prescribed Book[1]]

## UNIT-V

**The wave equation:** Elementary solutions of the one dimensional form - The Riemann Volterra solution of one dimensional wave equation.[Problematic approach is Preferred]

[Sections 1 to 3 of Chapter 5 of the Prescribed Book [1]]

## PRESCRIBED BOOK:

1. "Elements of partial differential equations", I. N. Sneddon, McGraw-Hill International Edition, Mathematics series.

## REFERENCE BOOK:

1. "An Elementary Course in Partial differential equations",T. Amaranath, Second Edition, Narosa Publishing House.

**Course has Focus on :Foundation**

**Websites of Interest:** 1. [www.nptel.ac.in](http://www.nptel.ac.in)  
2. [www.epgp.inflibnet.ac.in](http://www.epgp.inflibnet.ac.in)  
3. [www.ocw.mit.edu](http://www.ocw.mit.edu)

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**M. Sc. Mathematics**  
**Second Semester**

**PARTIAL DIFFERENTIAL EQUATIONS – 22MA2T3**

**Time: 3 hours**

**Max. Marks: 70**

**SECTION-A**

**Answer all questions.**

**(5x4=20)**

- 1 a) Explain the concept of orthogonal trajectories with an example. (CO1, L1)  
(OR)  
b) Define Pfaffian differential equation and state the necessary and sufficient condition for the integrability of Pfaffian differential equation. (CO1, L1)  
(OR)
- 2 a) Explain Charpit's method. (CO2, L2)  
b) Explain Jacobi's method. (CO2, L2)
- 3 a) Classify Second order PDE's and give an example. (CO3, L2)  
(OR)  
b) Define Greens function and Riemann's function. (CO3, L2)
- 4 a) State two types of boundary value problems for Laplace equations. (CO4, L2)  
(OR)  
b) Define family of equipotential surfaces and give an example. (CO4, L2)
- 5 a) Discuss the occurrence of wave equation in Physics with example. (CO5, L2)  
(OR)  
b) Write Riemann-Volterra solution for one dimensional wave equation. (CO5, L2)

**SECTION-B**

**Answer the following questions. All questions carry equal marks.**

**(5X10=50)**

6. a) If there exists a relation between two functions  $u(x, y)$  and  $v(x, y)$  not involving  $x$  or  $y$  explicitly, then show that  $\partial(u,v)/\partial(x,y) = 0$  (CO1, L3)  
(OR)  
b) Verify that the equation  $(z+y)+z(z+x)dy-2xy dz = 0$  is integrable and find its primitive. (CO1, L3)

- 7 a) Find a complete integral of the equation  $(p^2+q^2)y=qz$ . (CO2, L3)  
 (OR)  
 b) Find a complete integral of  $p^2x+q^2y=z$  using Jacobi's method. (CO2, L3)
- 8 a) Reduce the equation  $Z_{xx} = x^2Z_{yy}$  to canonical form. (CO3, L3)  
 (OR)  
 b) Solve the equation  $r+4s+t+rt-s^2=2$  using Monge's method. (CO3, L3)
- 9 a) A rigid sphere of radius  $a$  is placed in a stream of fluid whose velocity in the undisturbed state is  $V$ . Determine the velocity of the fluid at any point of the disturbed stream. (CO4,L3)  
 (OR)  
 b) State and Prove Kelvin's inversion theorem. (CO4, L3)
- 10 a) Derive D'Alembert's solution of the one-dimensional wave equation. (CO5, L3)  
 (OR)  
 b) If  $\psi$  is determined by the differential equation  $a^2(\partial^2\psi/\partial x^2)+b^2\psi=\partial^2\psi/\partial y^2$  where  $a$  and  $b$  are constants and satisfies the conditions  $y=0, \psi=f(x), \partial\psi/\partial y = g(x)$ , then find  $\psi$  using Riemann-Volterra Method. (CO5, L3)

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**Title of the Course: LATTICE THEORY**

**Semester : II**

Course Code	22MA2T4	Course Delivery Method	Blended Mode
Credits	4	CIA Marks	30
No. of Lecture Hours / Week	4	Semester End Exam Marks	70
Total Number of Lecture Hours	60	Total Marks	100
Year of Introduction : 2020-21	Year of offering : 2022-23	Year of Revision: 2022-23	Percentage of Revision : 5%

**Course Objectives :** The aim of this course is to understand the concepts of Partly Ordered Sets, Complete lattices, Distributive lattices, Boolean algebras and classical propositional logic.

COURSE OUTCOME	Upon successful completion of this course, students will be able to:
CO1	Understand partially ordered sets and Jordan Dedekind chain conditions
CO2	Analyze the relationship between posets and lattices, acquire knowledge of fundamental notions from lattice theory
CO3	Define and understand basic properties of complete lattices and conditionally complete lattices, closure operations and their applications.
CO4	Characterize modular and distributive lattices using the Birkhoff and Dedekind criterions
CO5	Understand Boolean algebras, Boolean rings and lattices of relations and propositions

**Mapping of Course Outcomes:**

	PO1	PO2	PO3	PO4	PO5
CO1	L3				
CO2			L4		
CO3	L3				
CO4				L3	
CO5			L4		

### UNIT –I

**Partly Ordered Sets:** Set Theoretical Notations, Relations, Partly Ordered Sets, Diagrams, Special Subsets of a Partly Ordered Set, Length, Lower and Upper Bounds, The Minimum

and Maximum Condition, The Jordan–Dedekind Chain Condition, Dimension Functions.

[ Sections 1 to 9 of chapter I of Prescribed Book [1]]

## UNIT – II

**Lattices in General:** Algebras, Lattices, The Lattice Theoretical Duality Principle, Semilattices, Lattices as Partly Ordered Sets, Diagrams of Lattices, Sublattices, Ideals, Bound Elements of a Lattice, Atoms and Dual Atoms, Complements, Relative Complements, Semicomplements, Irreducible and Prime Elements of a Lattice, The Homomorphism of a Lattice, Axiom Systems of Lattices. [Sections 10 to 21 of chapter II of Prescribed Book [1]]

## UNIT – III

**Complete Lattices:** Complete Lattices, Complete Sublattices of a Complete Lattice, Conditionally Complete Lattices,  $\sigma$ -Lattices, Compact Elements, Compactly Generated Lattices, Subalgebra Lattice of an Algebra, Closure Operations, Galois Connections, Dedekind Cuts, Partly Ordered Sets as Topological Spaces.

[ Sections 22 to 29 of chapter III of Prescribed Book [1]]

## UNIT – IV

**Distributive and Modular Lattices:** Distributive Lattices, Infinitely Distributive and Completely Distributive Lattices, Modular Lattices, Characterization of Modular and Distributive Lattices by their Sublattices, Distributive Sublattices of Modular Lattices, The Isomorphism Theorem of Modular Lattices, Covering Conditions, Meet Representations in Modular and Distributive Lattices. [Sections 30 to 36 of chapter IV of Prescribed Book [1]]

## UNIT-V

**Boolean Algebras:** Boolean Algebras, De Morgan Formulae, Complete Boolean Algebras, Boolean Algebras and Boolean Rings, The Algebra of Relations, The Lattice of Propositions, Valuations of Boolean Algebras. [Sections 42 to 47 of chapter VI of Prescribed Book [1]]

**PRESCRIBED BOOK:** Gabor Szasz, *Introduction to Lattice Theory*, Academic press, 1963.

**REFERENCE BOOK:** G. Birkhoff, *Lattice Theory*, Third Edition, Colloquium publications, Vol. 25, American Mathematical Society, 1995.

**Course has Focus on :** Foundation

**Websites of Interest:**

1. [www.nptel.ac.in](http://www.nptel.ac.in)
2. [www.epgp.inflibnet.ac.in](http://www.epgp.inflibnet.ac.in)
3. [www.ocw.mit.edu](http://www.ocw.mit.edu)

**P B SIDDHARTHA COLLEGE OF ARTS AND SCIENCE::VIJAYAWADA**

(An autonomous college in the jurisdiction of Krishna University)

**M. Sc. Mathematics**

**Second Semester**

**LATTICE THEORY-22MA2T4**

**Time: 3 hours**

**Max. Marks: 70**

**SECTION-A**

**Answer all questions.**

**(5x4=20)**

- 1 (a) Define a Partly ordered set. Prove that the set of all real numbers is a partly ordered set with respect to natural ordering. (CO1, L1)  
(OR)  
(b) Define JDCC and give an example of a partly ordered set satisfying JDCC. (CO1, L1)
- 2 (a) Define (i) Meet irreducible element (ii) Join irreducible element and give examples of each. (CO2, L2)  
(OR)  
(b) Define a sublattice, ideal of a lattice. Prove that every sublattice is an ideal. (CO2, L2)
- 3 (a) Define closure operation. Prove that every maximal element is closed under a closure operation. (CO3, L2)  
(OR)  
(b) Define complete lattice. Prove that every complete lattice is bounded. (CO3, L2)
- 4 (a) Define a Distributive lattice and Modular lattice. Prove that every distributive lattice is modular. (CO4, L2)  
(OR)  
(b) Define transposed interval and covering conditions. Prove that every Modular Lattice satisfy covering conditions. (CO4, L2)
- 5 (a) Define a Boolean Ring. Prove that every Boolean ring is commutative. (CO5, L2)  
(OR)  
(b) State and prove De Morgan laws in a Boolean Algebra. (CO5, L2)

**SECTION-B**

**Answer all questions. All questions carry equal marks.**

**(5X10=50)**

- 6 (a) If every subchain of a non-empty partly ordered set  $P$  has an upper bound, then prove that  $P$  contains a maximal element. (CO1, L2)  
(OR)  
(b) Prove that a partly ordered set can satisfy both the maximum and minimum conditions if and only if every one of its subchain is finite. (CO1, L2)

7 (a) Show that two lattices are isomorphic if and only if they are also order isomorphic. (CO2, L2)

(OR)

(b) (i) Show that every weakly complemented lattice is semicomplemented.

(ii) Show that every section complemented lattice bounded below is weakly complemented. (CO2, L2)

8 (a) If a lattice satisfies both the maximum and minimum conditions then show that it is complete. (CO3, L3)

(OR)

(b) Show that every element of a compactly generated lattice can be represented as a meet of finite number of meet irreducible elements. (CO3, L3)

9 (a) State and Prove Dedekind's Modularity criterion. (CO4, L4)

(OR)

(b) Show that all irredundant irreducible meet - representations of any element of a modular lattice have the same number of components. (CO4, L4)

10(a) For a Complete Boolean algebra  $B$ , show that the following conditions are equivalent.

(i)  $B$  is Completely meet- distributive.

(ii)  $B$  is Atomic.

(iii)  $B$  is isomorphic with the subset lattice of a set. (CO5, L3)

(OR)

(b) Show that the algebra of relations  $R(M)$  of a set  $M$  forms a complete Boolean algebra. (CO5, L3)

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## P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

Siddhartha Nagar, Vijayawada – 520 010

Reaccredited at 'A+' level by NAAC

**Autonomous&ISO 9001:2015 Certified**

**Title of the Course: ALGEBRAIC CODING THEORY**

**Semester : II**

Course Code	22MA2D1	Course Delivery Method	Blended Mode
Credits	4	CIA Marks	30
No. of Lecture Hours / Week	4	Semester End Exam Marks	70
Total Number of Lecture Hours	60	Total Marks	100
Year of Introduction : 2022-23	Year of offering : 2022-23	Year of Revision:	Percentage of Revision :

**Course Objective :**To acquire knowledge on basic concepts of linear codes, parity-check matrices, Gilbert bound, Hamming bound, Singleton bound, Cyclic Linear Codes, Perfect Codes etc.

<b>COURSE OUTCOME</b>	<b>Upon successful completion of this course, students will be able to:</b>
CO1	Understand the basic knowledge of coding theory and demonstrate encoding and decoding using MLD
CO2	Demonstrate the concepts of error correction and detection, understand linear codes, calculate a basis for linear codes and its dual.
CO3	Calculate generator matrix, parity check matrix for linear codes and its dual using algorithms and decoding using CMLD and IMLD.
CO4	Understand perfect codes by illustrating with examples of Hamming codes and calculating Hamming bound, Gilbert Varshamov Bound, decoding with Reed-Muller codes.
CO5	Study cyclic linear codes and dual cyclic codes and construct cyclic linear codes of a given length.

**Mapping of Course Outcomes:**

	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>
<b>CO1</b>					<b>L2</b>
<b>CO2</b>	<b>L4</b>				
<b>CO3</b>			<b>L4</b>		
<b>CO4</b>		<b>L2</b>			
<b>CO5</b>	<b>L4</b>				



## UNIT – I

**Introduction to Coding Theory:** Introduction, Basic assumptions, Correcting and Detecting error patterns, Information Rate, The Effects of error Correction and Detection, Finding the most likely codeword transmitted, Some basic algebra, Weight and Distance, Maximum likelihood decoding, Reliability of MLD.

(Section 1.1 to 1.10 of chapter 1 of prescribed book [1])

## UNIT – II

**Introduction to Coding Theory :** Error- Detecting Codes, Error – Correcting Codes.

**Linear Codes :** Linear Codes, Two important subspaces , Independence, Basis, Dimension, Matrices, Bases for  $C = \langle S \rangle$  and  $C^\perp$ .

(Sections 1.11, 1.12 of chapter 1 & Section 2.1 to 2.5 of chapter 2 of prescribed book [1]).

## UNIT - III

**Linear Codes :** Generating Matrices and Encoding , Parity – Check Matrices, Equivalent Codes, Distance of a Linear Code, Cosets, MLD for Linear Codes, Reliability of IMLD for Linear Codes.(section 2.6 to 2.12 of chapter 2 of prescribed book [1])

## UNIT – IV

**Perfect and Related Codes:** Some bounds for Code, Perfect Codes, Hamming Codes , Extended Codes, The extended Golay Code, Decoding the extended Golay Code, The Golay code, Reed – Muller Codes, Fast decoding for RM (1,m).(Chapter 3 of prescribed book [1])

## UNIT – V

**Cyclic Linear Codes :** Polynomials and Words, Introduction to Cyclic codes, Polynomials encoding and decoding, Finding Cyclic Codes, Dual Cyclic Codes.

(Chapter 4 of prescribed book [1])

### PRESCRIBED BOOK:

1. Hoffman D.G, Lanonard D.A, Lindner C.C, Phelps K.T, Rodger C.A, Wall J.R, Coding Theory- The Essentials, Marcel Dekker (1991).

**REFERENCE BOOK:** Van Lint J.H., Introduction to coding Theory, SpringerVerlag (2013).

**Course has Focus on :** Foundation (Elective Paper)

**Websites of Interest :** 1. [www.nptel.ac.in](http://www.nptel.ac.in)

2. [www.epgp.inflibnet.ac.in](http://www.epgp.inflibnet.ac.in)

3. [www.ocw.mit.edu](http://www.ocw.mit.edu)

**P B SIDDHARTHA COLLEGE OF ARTS AND SCIENCE::VIJAYAWADA**  
(An autonomous college in the jurisdiction of Krishna University)  
**M. Sc. Mathematics**  
**Second Semester**

**ALGEBRAIC CODING THEORY– 22MA2D1**

**Time: 3 Hours**

**Max. Marks : 70**

**SECTION- A**

**Answer all questions. (5 X 4=20)**

- 1 (a) Define Binary code, length of a code, reliability of a channel, Information rate. (CO1, L1)  
(OR)  
(b) Show that (i)  $wt(v+w) \leq wt(v) + wt(w)$  and (ii)  $d(v, w) \leq d(v, u) + d(u, w)$  (CO1, L1)
- 2 (a) Define a linear code. Verify whether the code  $C = \{000, 100, 101, 001\}$  is linear. (CO2, L2)  
(OR)  
(b) Prove that the set  $\{1000, 0100, 0010, 0001\}$  is linearly independent. (CO2, L2)
- 3 (a) Define a generating matrix and a parity check matrix. Prove that  $G$  is a generating matrix for a linear code  $C$   $\square$  the rows of  $G$  are linearly independent. (CO3, L2)  
(OR)  
(b) Find the cosets for the code  $C = \{0000, 1010, 0101, 1111\}$  (CO3, L2)
- 4 (a) State and prove singleton bound theorem. (CO4, L2)  
(OR)  
(b) Define Reed-Muller code and a perfect code. (CO4, L2)
- 5 (a) Define a linear cyclic code. Verify whether the code  $C = \{000, 100, 110, 101\}$  is cyclic. (CO5, L3)  
(OR)  
(b) Define dual code of a cyclic code. Find a generator matrix and a basis for the code  $C = \{000, 101, 010, 111\}$  (CO5, L3)

**SECTION- B**

**Answer all questions. All questions carry equal marks. (5X10=50)**

6. (a) Define CMLD, IMLD. Construct IMLD table for the code  $C = \{0000, 1001, 0110, 1111\}$   
(b) Suppose  $p=0.90$ ,  $|M|=3$ ,  $n=4$ , and  $C = \{0000, 1010, 0111\}$ . For each  $v$  in  $C$ , calculate  $\theta_p(C, v)$ . (CO1, L2)

(OR)

(c) Suppose we have a BSC with  $\frac{1}{2} < p < 1$ . Let  $v_1$  and  $v_2$  be code words,  $w$  a word, each of length  $n$  and  $v_1, w$  disagree in  $d_1$  positions and  $v_2, w$  disagree in  $d_2$  positions. Then show that  $\phi_p(v_1, w) \leq \phi_p(v_2, w)$  if and only if  $d_1 \geq d_2$

(d) Find the error patterns that corrected by  $C = \{000, 111\}$  (CO1, L2)

7 (a) Show that a code  $C$  of distance  $d$  will at least detect all non zero error patterns of weight less than or equal to  $(d-1)$  and there is at least one error pattern of weight  $d$  which  $C$  will not detect.

(b) Find the largest linearly independent set from the following set  
 $S = \{1101, 0111, 1100, 0011\}$  (CO2, L3)

(OR)

(c) For each of the following sets  $S$ , find a basis  $B$  for the code  $C = \langle S \rangle$  and a basis for the dual code where  $S = \{111000, 000111, 101010, 010101\}$  (CO2, L3)

8 (a) Find a generator matrix and a parity check matrix for the code  
 $C = \{000000, 010101, 101010, 111111\}$  (CO3, L3)

(OR)

(b) If  $H$  is a parity-check matrix for a linear code  $C$  then show that  $C$  has distance  $d$  if and only if any set of  $(d-1)$  rows of  $H$  are linearly independent and at least one set of  $d$  rows of  $H$  is linearly dependent. (CO3, L3)

9. (a) Construct an SDA for a Hamming code of length 7 and use it to decode the word 1101011. (CO4, L4)

(OR)

(b) Using the IMLD for  $C_{24}$  decode the following word  
 $w = 001001001101, 101000101000$ . (CO4, L4)

10 (a) Show that  $g(x)$  is a generator polynomial for a linear cyclic code  $C$  of length  $n$  if and only if  $g(x)$  divides  $(1+x^n)$ . (CO5, L3)

(OR)

(b) Find the generator polynomial for all linear cyclic codes of length  $n=4$ . (CO5, L3)



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Siddhartha Nagar, Vijayawada – 520 010

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**Title of the Course: GRAPH THEORY**

**Semester : II**

Course Code	22MA2D2	Course Delivery Method	Blended Mode
Credits	4	CIA Marks	30
No. of Lecture Hours / Week	4	Semester End Exam Marks	70
Total Number of Lecture Hours	60	Total Marks	100
Year of Introduction : 2022-23	Year of offering : 2022-23	Year of Revision:	Percentage of Revision :

**Course Objectives:** The objective of this course is to understand some important classes of graph theoretic problems, properties of trees, matching, connectivity and learn some algorithms for graphs.

COURSE OUTCOME	Upon successful completion of this course, students will be able to:
CO1	understand the basic concepts in graphs and characterize Eulerian circuits and Hamiltonian cycles
CO2	find minimal spanning tree and shortest paths
CO3	learn matching in a graph and solve assignment problem
CO4	characterize 2-connected graphs and learn various algorithms
CO5	understand planar graphs and coloring of graphs.

**Mapping of Course Outcomes:**

	PO1	PO2	PO3	PO4	PO5
CO1	L3				
CO2				L3	
CO3					L4
CO4					L4
CO5				L4	

### UNIT-I

**Fundamental Concepts:** What is a Graph: The Definition- Graphs as Models- Matrices and Isomorphism- Decomposition and Special graphs; Paths, cycles and trails : connection in

graphs, bipartite graphs, Eulerian Circuits; Vertex degrees and counting: Directed Graphs; Hamiltonian Cycles - Necessary and Sufficient conditions.

[Sections 1.1, 1.2, 1.3, 1.4 of chapter 1 and Section 7.2 of chapter 7 of Prescribed Book [1]]

## **UNIT-II**

**Trees and distance** : Properties of Trees; Spanning trees in Graphs; Kruskal and Prim algorithms with proofs of correctness; Shortest paths - Dijkstra's algorithm, BFS and DFS algorithms, Application to Chinese postman problem; Trees in Computer science - rooted trees, binary trees, Huffman's Algorithm.

[Sections 2.1, 2.2, 2.3 of chapter 2 of Prescribed Book [1]]

## **UNIT-III**

**Matchings:** Maximum Matchings- Hall's matching condition- Maximum bipartite matching - Augmenting path algorithm; Weighted bipartite matching - Hungarian algorithm and solving the assignment problem; Tutte's theorem.

[Sections 3.1, 3.2, 3.3 of Chapter 3 of Prescribed Book [1]]

## **UNIT-IV**

**Connectivity and Paths:** Connectivity; 2-connected graphs; Menger's theorem; Network flow problems - Ford-Fulkerson labelling algorithm, Max-flow Min-cut Theorem.

[Sections 4.1, 4.2, 4.3 of chapter 4 of Prescribed Book [1]]

## **UNIT-V**

**Coloring of Graphs:** Definition and Examples; Upper Bounds- Greedy coloring algorithm- Brooks' theorem; Graphs with large chromatic number; Extremal problems and Turan's theorem.

**Planar Graphs:** Planar graphs; Dual graphs; Euler's formula; Preparation for Kuratowski's Theorem; Coloring of Planar Graphs-Five Color Theorem; Four Color Problem.

[Sections 5.1, 5.2 of Chapter 5 & Sections 6.1, 6.2, 6.3 of chapter 6 of Prescribed Book [1]]

**PRESCRIBED BOOK** : [1] "Introduction to Graph Theory", Douglas B. West, Second Edition, Prentice Hall, 2001.

### **REFERENCE BOOKS:**

1. "Graph Theory", R. Diestel, Second Edition, Springer, 2017.
2. "Graph Theory with Applications to Engineering and Computer Science", NarsinghDeo, Prentice-Hall, 2001.

**Course has Focus on** : Foundation (Elective paper)

**Websites of Interest:**

1. [www.nptel.ac.in](http://www.nptel.ac.in)
2. [www.epgp.inflibnet.ac.in](http://www.epgp.inflibnet.ac.in)
3. [www.ocw.mit.edu](http://www.ocw.mit.edu)

**P B SIDDHARTHA COLLEGE OF ARTS AND SCIENCE::VIJAYAWADA**

(An autonomous college in the jurisdiction of Krishna University)

**M. Sc. Mathematics**

**Second Semester**

**GRAPH THEORY – 22MA2D2**

**Time: 3 hours**

**Max. Marks: 70**

**SECTION-A**

**Answer all questions.**

**(5x4=20)**

- 1 a) Define (i) Adjacency matrix and (ii) incident matrix of a graph with examples.(CO1, L1)  
(OR)  
b) State and prove Hand shaking lemma. (CO1, L1)
- 2 a) Define (i) Spanning tree and (ii) Weighted graph with examples. (CO2, L2)  
(OR)  
b) Define (i) diameter and (ii) eccentricity of a graph with examples. (CO2, L2)
- 3 a) Define (i) Maximal Matching (ii) Augmenting path. Write Hall's matching condition. (CO3, L2)  
(OR)  
b) Define (i) Edge connectivity (ii) Vertex connectivity of a graph. Write Tutte's condition. (CO3, L2)
- 4 a) State and prove expansion lemma. (CO4, L2)  
(OR)  
b) Prove that two blocks in a graph share at most one vertex. (CO4, L2)
- 5 a) Define chromatic number. Find the chromatic number of  $C_5$ . (CO5, L1)  
(OR)  
b) Define a Planar graph. Prove that  $K_5$  and  $K_{3,3}$  are not planar. (CO5, L1)

**SECTION-B**

**Answer all questions. All questions carry equal marks.**

**(5X10=50)**

- 6 a) Show that a graph is Eulerian if and only if it has at most one non trivial component and its vertices all have even degree. (CO1, L2)  
(OR)  
b) Show that the minimum number of edges in a connected graph with n vertices is n-1. (CO1, L2)
- 7 a) For a n vertex graph G, show that the following are equivalent.  
(i) G is connected and has no cycles.  
(ii) G is connected and has n-1 edges.  
(iii) G has n-1 edges and no cycles.  
(iv) For  $u, v \in V(G)$ , G has exactly one u,v-path. (CO2, L2)  
(OR)  
b) Explain Kruskal's algorithm with an example. (CO2, L2)
- 8 a) State and prove Hall's theorem. (CO3, L3)

(OR)

b) Write Augmenting path algorithm and show that by applying augmenting path algorithm to a bipartite graph produces a matching and a vertex cover of equal size.

(CO3, L3)

9 a) Show that a graph  $G$  having atleast three vertices is 2-connected if and only if for each

pair  $u, v \in V(G)$ , there exists internally disjoint  $u, v$ -paths in  $G$ . (CO4, L3)

(OR)

b) If  $x, y$  are vertices of a graph  $G$  and  $x, y \notin E(G)$ , then prove that the minimum size of an  $x, y$ -cut equals the maximum number of pairwise internally disjoint  $x, y$ -paths.

(CO4, L3)

10 a) State and prove Brook's theorem.

(CO5, L3)

(OR)

b) If a connected plane graph  $G$  has exactly  $n$  vertices,  $e$  edges and  $f$  faces, then prove that  $n-e+f=2$ .

(CO5, L3)



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Siddhartha Nagar, Vijayawada – 520 010

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**Autonomous&ISO 9001:2015 Certified**

**Title of the Course: DISCRETE MATHEMATICAL STRUCTURES**

**Semester : II**

Course Code	22MA2D3	Course Delivery Method	Blended Mode
Credits	4	CIA Marks	30
No. of Lecture Hours / Week	4	Semester End Exam Marks	70
Total Number of Lecture Hours	60	Total Marks	100
Year of Introduction : 2022-23	Year of offering : 2022-23	Year of Revision: ----	Percentage of Revision :---

**Course Objective :** The main objective of the course to acquire knowledge on the basic concepts in Logic, Finite Machines, Lattices and their Applications.

COURSE OUTCOME	Upon successful completion of this course, students will be able to:
CO1	construct truth tables of statements and apply the rules of inference for conclusions.
CO2	understand the concept of finite machines.
CO3	understand the basic concepts of algebraic structures, including lattices and Boolean algebras with examples.
CO4	determine the minimal forms of Boolean polynomials.
CO5	construct switching circuits and study the applications of switching circuits and Boolean algebras.

**Mapping of Course Outcomes:**

	PO1	PO2	PO3	PO4	PO5
CO1			L4		
CO2	L2				
CO3	L2				
CO4				L4	
CO5	L4				



## UNIT –I

**Logic** :Logic, Tautology, Normal Forms, Logical Inferences, Predicate Logic, Universal Quantifiers, Rules of Inference, Recurrence Relations, Solution using generating functions (1.6 to 1.10 of Chapter 1 & 3.7,3.8 of chapter 3 of [3] )

## UNIT –II

**Finite Machines** :state machine, input-output machines, Introduction, state tables and state diagrams, simple properties , Dynamics, Behavior and Minimization. (Sections 5.1 to 5.5 of Chapter 5 of [1] )

## UNIT – III

**Lattices**: Properties and Examples of Lattices, Distributive Lattices, Boolean Algebras. (Sections 1 to 3 of Chapter 1 of [2] ).

## UNIT –IV

**Lattices continued**: Boolean polynomials, Ideals , filters and equations, Minimal forms of Boolean polynomials, ( Sections 4,5,6 of Chapter -1 of [2])

## UNIT –V

**Application of Lattices**: Switching circuits, Applications of switching circuits, More Applications of Boolean Algebras ( Sections 7, 8 and 9 of Chapter -2 of [2] ).

**PRESCRIBED BOOKS** [1] “Application oriented Algebra” JAMES L FISHER , IEP, Dun-Downplay pub.1977.

[2] “ Applied abstract algebra”, Second Edition, R.LIDL AND G. PILZ, Springer,1998.

[3] “ Discrete Mathematical Structures”, RM. SOMASUNDARAM, Prentice Hall of India,2003

**REFERENCE BOOK**: “Discrete Mathematical Structures with Applications to Computer Science”, J.P.TREMBLAY AND R.MANO HAR, Tata Mc. Graw Hill, 2002.

**Course has Focus on** :Foundation (Elective Paper)

**Websites of Interest** :1. [www.nptel.ac.in](http://www.nptel.ac.in)

2. [www.epgp.inflibnet.ac.in](http://www.epgp.inflibnet.ac.in)

3. [www.ocw.mit.edu](http://www.ocw.mit.edu)

**P B SIDDHARTHA COLLEGE OF ARTS AND SCIENCE::VIJAYAWADA**  
 (An autonomous college in the jurisdiction of Krishna University)  
**M. Sc. Mathematics**  
**Second Semester**  
**DISCRETE MATHEMATICAL STRUCTURES – 22MA2D3**

**Time: 3 hours**

**Max. Marks: 70**

**SECTION-A**

**Answer all questions.**

**(5x4=20)**

- 1 a) Prove that  $P \vee (Q \wedge R)$  and  $(P \vee Q) \wedge (P \vee R)$  are logically equivalent. (CO1, L1)  
 (OR)  
 b) Solve the recurrence relation  $a_n = 6a_{n-1} - 9a_{n-2}$ , with  $a_0 = 1$  and  $a_1 = 6$  (CO1, L1)
- 2 a) Prove that state machine congruence is an equivalence relation. (CO2, L2)  
 (OR)  
 b) Let  $M=(S, I, O, \delta, \theta)$  be an i/o machine, then show that there exists an out put machine  $M_1$  and a one to one function  $f :S \rightarrow S_1$  such that  $\beta_s = \beta_{f(s)}$ . (CO2, L2)
- 3 a) Define (i) distributive lattice (ii) Boolean algebra and give an example. (CO3, L1)  
 (OR)  
 b) State and prove De Morgan laws in a Boolean algebra. (CO3, L1)
- 4 a) Prove that an ideal  $M$  in a Boolean algebra  $B$  is maximal if and only if for any  $b \in B$  either  $b \in M$  or  $b' \in M$  but not both. (CO4, L2)  
 (OR)  
 b) Define a principle ideal. Show that a principle ideal  $(b) = \{a \in B/ a \leq b\}$ . (CO4, L2)
- 5 a) Show that the identity  $x(y+z) = xy+xz$  is valid. (CO5, L3)  
 (OR)  
 b) Construct circuits for (i)  $(x+y) \bar{x}$  and (ii)  $\bar{x}((y+z) \bar{y})$  (CO5, L3)

**SECTION – B**

**Answer all questions. All questions carry equal marks.**

**(5X10=50)**

- 6 a) Define a tautology. Show that the expression  $((P \wedge \sim Q) \rightarrow R) \rightarrow (P \rightarrow (Q \vee R))$  is a tautology.  
 b) Obtain DNF and CNF of the following formula  $(\sim P \vee \sim Q) \rightarrow (P \leftrightarrow \sim Q)$ . (CO1, L2)  
 (OR)  
 c) Solve  $a_r - 2a_{r-1} = (r+1)2^r$ . (CO1, L2)
- 7 a) Let  $f$  be a state homomorphism from the state machine  $M=(S,I, \delta)$  onto the state machine  $M_1=(S_1, I, \delta_1)$ . Then show that there exists a state machine congruence on  $M$  such that  $M$  is isomorphic to  $M_1$ . (CO2, L3)

(OR)

b) Minimize the states of the following machine and write reduced machine. (CO2, L3)

states	$\delta$		$\theta$	
	0	1	0	1
1	2	5	1	0
2	5	5	1	1
3	1	8	1	1
4	8	2	1	0
5	6	5	1	1
6	1	5	1	1
7	2	3	1	0
8	3	5	1	1

8 a) Define atom and join-irreducible element in a Lattice. Show that every atom is join-irreducible.

b) State and prove the distributive inequalities in Lattices. (CO3, L3)

(OR)

c) State and prove Representation theorem in a Boolean Algebra. (CO3, L3)

9 a) Find CNF and DNF of the polynomial  $x(y+z)' + (xy+z)'$ . (CO4, L3)

(OR)

b) Minimize the following Boolean polynomial using Quiene- Mc Clusky method

$$wx'y'z + w'xy'z + wx'y'z + w'xyz + w'x'yz + wxyz + wx'yz + w'xyz + w'x'yz.$$

(CO4, L3)

10 a) Draw the diagram for the following switching circuit

$$P = x_1(x_2(x_3+x_4)+x_3(x_5+x_6)).$$

b) Determine the symbolic representation of the circuit given by

$$P = (x_1+x_2+x_3)(x_1+x_2)(x_1x_2+x_1x_2)(x_2+x_3).$$

(CO5, L3)

(OR)

c) Explain the central lighting system in a room and draw its switching circuit. (CO5, L3)

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## P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

Siddhartha Nagar, Vijayawada – 520 010

Reaccredited at 'A+' level by NAAC

Autonomous&ISO 9001:2015 Certified

**Title of the Course: NUMERICAL METHODS LAB**

**Semester : II**

Course Code	22MA2L1	Course Delivery Method	Blended Mode
Credits	3	CIA Marks	30
No. of Lecture Hours / Week	6	Semester End Exam Marks	70
Total Number of Lecture Hours	90	Total Marks	100
Year of Introduction : 2020-21	Year of offering : 2022-23	Year of Revision: 2022-23	Percentage of Revision :5%

**Objectives:** The objective of this course is to develop the computational skills of the students to solve various mathematical problems by numerical techniques using C programming.

### LIST OF PROGRAMS:

1. Bisection method.
2. False position method(Regula-Falsi Method).
3. Newton -Raphson method.
4. Secant method.
5. Gauss elimination method.
6. Gauss-Jordan method.
7. Gauss-Seidal method.
8. Lagrange's method.
9. Difference table method.
10. Trapezoidal method.
11. Simpson's 1/3 rule.
12. Simpson's 3/8 rule.
13. Euler's method.
14. Taylor Series method.
15. Runge-Kutta method.
16. Modified Euler's method.



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**Title of the Course: ADVANCED LINEAR ALGEBRA (MOOCS)**

**Semester : IV**

Course Code	21MA4M1	Course Delivery Method	Blended Mode
Credits	5	CIA Marks	30
No. of Lecture Hours / Week	5	Semester End Exam Marks	70
Total Number of Lecture Hours	75	Total Marks	100
Year of Introduction : 2022-23	Year of offering : 2022-23	Year of Revision:	Percentage of Revision :

**Course Objectives :** The main objective of this course is to provide students with an understanding of Mathematical concept on Linear Algebra that includes basic as well as advanced level with computational perspective. Linear System of Equations, Vector Spaces, Linear Transformations, Canonical Forms and Jordan Forms, Inner Product Spaces, Bilinear forms and singular value decomposition are the major components.

<b>COURSE OUTCOME</b>	<b>Upon successful completion of this course, students will be able to:</b>
CO1	understand the basics of Linear algebra.
CO2	understand the concepts of Linear transformations
CO3	understand the concepts of canonical forms.
CO4	understand the concepts of Inner Product Spaces.
CO5	understand the basics of Singular Value decomposition.

### UNIT – I

**Linear Equations:** Systems of Linear Equations, Matrices and Elementary row operations, Row Reduced Echelon Matrices, Invertible Matrices.

**Vector Spaces:** Vector Spaces, Subspaces, Bases and Dimension, Coordinates, Computations Concerning Subspaces. (Sections 1.2 to 1.6 of chapter 1 and sections 2.1 to 2.6 of chapter 2 of prescribed book [1])

## UNIT –II

**Linear Transformations:** Linear Transformations, The algebra of Linear Transformations, Isomorphism, Representation of Transformations by Matrices, Linear Functionals, The Double Dual, The Transpose of a Linear Transformation.

(Sections 3.1 to 3.7 of chapter 3 of prescribed book [1])

## UNIT – III

**Elementary Canonical Forms:** Introduction, Characteristic Values, Annihilating Polynomials, Invariant Subspaces, Simultaneous Triangulation; Simultaneous Diagonalization, Direct –Sum Decompositions, Invariant Direct sums, The Primary Decomposition theorem, Cyclic Decompositions and rational Form, The Jordan Form.

(Sections 6.1 to 6.7 of chapter 6 and sections 7.2 and 7.3 of chapter 7 of prescribed book [1])

## UNIT – IV

**Inner Product Spaces:** Inner Products, Inner Product Spaces, Linear Functionals and Adjoints, Unitary Operators, Normal Operators and Spectral Theory.

(Sections 8.1 to 8.5 of chapter 8 and section 9.5 of chapter 9 of prescribed book [1])

## UNIT – V

Bilinear and Quadratic Forms, Orthogonal Projections, Spectral Theorem, g inverse of a matrix and Singular value decomposition.

### REFERENCE BOOKS:

- 1.Kenneth Hoffman and Ray Kunze, Linear Algebra, Second edition, PHI publications (1992).
- 2.Stevan Roman, Advanced Linear Algebra, Springer.
- 3.K. B. Datta, Matrix and Linear Algebra, PHI Publications.

**Course has Focus on :**Skill Development

**Websites of Interest:** 1. [https://onlinecourses.nptel.ac.in/noc23\\_ma17/preview](https://onlinecourses.nptel.ac.in/noc23_ma17/preview)

2. [www.epgp.inflibnet.ac.in](http://www.epgp.inflibnet.ac.in)

3. [www.ocw.mit.edu](http://www.ocw.mit.edu)

**P B SIDDHARTHA COLLEGE OF ARTS AND SCIENCE::VIJAYAWADA**  
(An Autonomous College in the Jurisdiction of Krishna University)  
**M.Sc. Mathematics**  
**Fourth Semester**  
**ADVANCED LINEAR ALGEBRA - 20MA4M1**

**Time:3 hours**

**Max. Marks: 70**

**SECTION A**

**Answer all questions. (10x2=20)**

- 1 a) Define row-reduced echelon matrix and elementary matrix. (CO1, L1)  
b) Define a vector space and give an example. (CO1, L1)  
c) Verify whether  $T: \mathbb{R}^2 \rightarrow \mathbb{R}^2$  defined by  $T(x_1, x_2) = (x_2, x_1)$  is a linear transformation. (CO2, L3)  
d) Define dual space and double dual space for a vector space  $V$ . (CO2, L2)  
e) Prove that similar matrices have same characteristic polynomial. (CO3, L2)  
f) Find the minimal polynomial of a linear operator represented by the matrix  
$$A = \begin{bmatrix} 0 & -1 \\ 1 & 0 \end{bmatrix}$$
 (CO3, L3)  
g) Define an inner product space and give an example. (CO4, L2)  
h) Define adjoint operator and self-adjoint operator of a linear operator. (CO4, L2)  
i) Define a bilinear form and give an example. (CO5, L2)  
j) State spectral theorem of linear operators. (CO5, L2)

**SECTION B**

**Answer the following questions. All questions carry equal marks. (5X10=50)**

- 2 a) Find the solutions of the system of equations

$$x_1 - x_2 + 2x_3 = 1,$$

$$2x_1 + 2x_3 = 1,$$

$$x_1 - 3x_2 + 4x_3 = 2 \text{ and describe explicitly all solutions. (CO1, L2)}$$

(OR)

- b) If  $W_1$  and  $W_2$  are finite dimensional subspaces of a vector space  $V$ , then prove that

$$\dim W_1 + \dim W_2 = \dim(W_1 \cap W_2) + \dim(W_1 + W_2) \quad (\text{CO1, L2})$$

- 3 a) Let  $V$  and  $W$  be finite dimensional vector spaces over a field  $F$  such that  $\dim V = \dim W$ . If  $T$  is a linear transformation from  $V$  into  $W$ , then prove that the following statements are equivalent.

- (i)  $T$  is invertible.  
(ii)  $T$  is non-singular.  
(iii)  $T$  is onto, that is, the range of  $T$  is  $W$ . (CO2, L3)

(OR)

b) Let  $V$  be a finite dimensional vectors space over a field  $F$  and let  $W$  be a subspace of

$V$ . Then prove that  $\dim W + \dim W^\perp = \dim V$ . (CO2, L3)

4 a) State and prove the Cayley-Hamilton theorem. (CO3, L3)

(OR)

b) Let  $V$  be a finite dimensional vector space over the field  $F$  and let  $T$  be a linear operator on  $V$ . Then prove that  $T$  is diagonalizable if and only if the minimal polynomial of  $T$  has the form  $p=(x-c_1)\dots(x-c_k)$ , where  $c_1, \dots, c_k$  are distinct elements of  $F$ . (CO3, L3)

5 a) If  $V$  is an inner product space, then prove that

(i)  $\|c\alpha\| = |c|\|\alpha\|$                       (ii)  $\|\alpha\| > 0$ , for  $\alpha \neq 0$

(iii)  $\|(\alpha | \beta)\| \leq \|\alpha\|\|\beta\|$     and (iv)  $\|\alpha + \beta\| \leq \|\alpha\| + \|\beta\|$  (CO4, L3)

(OR)

b) Let  $U$  be a linear operator on an inner product space  $V$ . Then prove that  $U$  is unitary if and only if the adjoint  $U^*$  of  $U$  exists and  $UU^*=U^*U=1$ . (CO4, L3)

6 a) Let  $V$  be a finite dimensional vector space over a field of characteristic 0 and let  $f$  be a symmetric bilinear form on  $V$ . Then prove that there is an ordered basis for  $V$  in which  $f$  is represented by a diagonal matrix.

(OR)

b) Find a Singular value decomposition of  $A = \begin{bmatrix} 1 & -1 \\ -2 & 2 \\ 2 & -2 \end{bmatrix}$

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**Agenda for Board of Studies meeting for the  
Master of Business Administration Programme (M.B.A) of  
Department of Commerce & Business Administration  
04-03-2023**

1. To evaluate and recommend the programme structure for Master of Business Administration Programme(M.B.A) under Choice Based Credit System with effect from academic year 2022-2023 under R 22 Regulations.
2. To introduce Research Methodology & IPR for the Second Semester of MBA Programme with effect from academic year 2022-2023 under R 22 Regulations.
3. To discuss about the operational issues relating to course MOOC's in the Fourth Semester.
4. To discuss about the modalities of summer internship project.
5. To assess the compatibility of practical courses with theory courses.
6. To approve the structure of Model Question Papers with COs and levels of Bloom's taxonomy for all courses of II semester of MBA Program.
7. To approve the list of examiners and paper setters of all the courses.
8. Any other matter with the permission of chair.

Minutes of the meeting of Board of Studies in Department of Business Administration for **MBA** held on 04/03/2023 at 11.30 AM (Online Mode) in the Department of Business Administration. The following members were present.

**Members Present**

<b>S.No</b>	<b>Name of the Member</b>	<b>Role</b>	<b>Signature</b>
1.	Prof.Rajesh.C.Jampala, HOD, Commerce & Business Administration and Dean (Academics & Administration)	Chairman	
2	Dr.D. Suryachandra Rao, Professor, Business Management, Krishna University, Machilipatnam Ph : 9440149149 Mobile: : + 91- 9542487999 profdsrao@gmail.com	University Nominee	
3	Dr. B K Surya Prakasha Rao Professor, Department of Accounting and Finance, College of Business and Economics, BuleHora University,	Subject Expert	

	BULE HORA, ETHIOPIA. Mail: bkspr.rvrjc@gmail.com Mobile: +251 94189 6964		
4	Dr. Murali Manohar, Professor - HAG VIT Business School (AACSB accredited Business School) Vellore Institute of Technology (Institution of Eminence as accorded by GoI) Vellore - 632014 (TN) India Email : bmm@vit.ac.in Mobile : 9791639977	Subject Expert	
5	Mr Ravi Teja Tallam General Manager, Trigyn Technologies Ltd., Vijayawada. M : 7680822227 Email: <a href="mailto:ravi.t@trigyn.com">ravi.t@trigyn.com</a> <a href="mailto:ravitejatallam@yahoo.com">ravitejatallam@yahoo.com</a>	Industrialist	
6	<b>Mohammed Asgar Hussain</b> Mobile No: 9248424246 E-Mail id: <a href="mailto:asgareee@gmail.com">asgareee@gmail.com</a> S/O MOHAMMED SABAR HUSSAIN DNO.42-56-7 TELGU BAPIST CHURCH ROAD AJITH SINGH NAGAR VIJAYAWADA - 520 010	Alumni	
7	Dr. B. Jaya Prakash	Member	
8	Dr. R. Srinivas Rao	Member	
9	Dr. S. B. Rajendra Prasad	Member	
10	Dr. J. Durga Prasad	Member	
11	Dr. Md. S. Rahaman	Member	
12	Mrs. A. Siva Naga Lakshmi	Member	

### Resolutions

- 1) It is resolved and recommended to introduce the **‘Operations Management’ (XXX)** instead of **‘Operations Research’ (22 BA 205)** with 4 credits in the II Semester as **Core Course** for the batch of students admitted in 2021-2022 and onwards. For the syllabi and model question paper refer **Annexure B**.
- 2) It is resolved and recommended to approve the syllabi for the **core courses** of the II Semester of Master of Business Administration programme titled **‘Marketing Management’ (22BA 201)**, **‘Human Resource Management’ (22BA 202)**, **‘Financial**

**Management'** (22BA 203) with 4 credits for the batch of students admitted in 2022-2023 and onwards. For the syllabi and model question paper refer **Annexure B**.

- 3) It is resolved and recommended to approve the syllabi for the **core courses** of the II Semester of Master of Business Administration programme titled '**Entrepreneurship & Small Business Management**' (22BA 204) and '**Research Methodology & IPR**' (22PG 201) with 3 credits for the batch of students admitted in 2022-2023 and onwards. For the syllabi and model question paper refer **Annexure B**.
- 4) It is resolved and recommended to approve the syllabi for the **Domain Specific Elective courses** of the II Semester of Master of Business Administration programme titled '**Leadership and Change Management**' (22BA206 (I)), '**Consumer Behaviour**' (22BA 206 (II)), '**Cost and Management Accounting**' (22BA 206(III)) with 4 credits for the batch of students admitted in 2022-2023 and onwards. For the syllabi and model question paper refer **Annexure B**.
- 5) It is resolved and recommended to approve the syllabi for the **Lab / Practical / Field Work** course of the II Semester of Master of Business Administration programme titled '**Selling & Negotiation Skills**' (22 BA 2L1) as a part of Lab/ Practical/Field work with 3 credits for the batch of students admitted in 2022-2023 and onwards. For the syllabi and model question paper refer **Annexure B**.

## 22BA201: MARKETING MANAGEMENT

Subject Code :	22 BA 201	I A Marks	30
No. of Lecture Hours / Week	05	End Exam Marks	70
Total Number of Lecture Hours	75	Total Marks	100
Practical Component	01 Hour/Week	Exam Hours	03

### CourseDescription:

Marketing Management is a course revolving around various concepts of marketing strategies, practices and new techniques which vary with the demands and needs of the consumers. The course examines the role and importance of marketing in the firm and other organizations. This course will cover topics such as marketing plans/strategies, marketing research, market segmentation, retailing, advertising, pricing, Internet marketing, etc.

### CourseObjectives:

This course will help the students to develop a better appreciation and understanding of the role of marketing in a business organization specifically, and in our society at large.

*Specific objectives include:*

- To enhance your knowledge about marketing theories, principles, strategies and concepts and how they are applied;
- To provide you with opportunities to analyze marketing activities within the firm;
- To allow you to apply marketing concepts and theories to realistic marketing situations

### CourseLearningOutcomes:

At the end of the course, the students will be able to:

Formulate a *marketing* plan that will meet the needs or goals of a business or organization.

Develop an integrated marketing communications plan for a *product*, concept, good and/or service based on an identified market need or target.

Formulate strategies for developing new and/or modified *products*, concepts, goods and services that respond to evolving market needs.

Develop strategies for the efficient and effective placement/distribution of *products*, concepts, goods, and services that respond to evolving markets.

Evaluate the impact of using different marketing strategies for a *product*, concept, good and/or service, on the finances, Return on Investment (ROI) and business goals of an organization.

Evaluate the viability of a concept, *product*, good and/or service in a local, national or international market.

Conduct *market research* to provide information needed to make *marketing* decisions.

## **UNIT-I(12Hours)**

**Introduction:** Core Marketing Concepts – Company Orientation towards the Marketplace – The Holistic Marketing Concept - Marketing Management Tasks; Marketing Environment: Macro and Micro Components and their Impact on Marketing Decisions – Marketing Research and Information;

## **UNIT-II(10Hours):**

**Strategic Marketing Planning:** Market Segmentation, Targeting, Positioning and Differentiation Strategies; Understanding Consumer Behaviour – Factors impacting consumer behavior; Marketing Tools – BGC Matrix, Ansoff Matrix, GE-McKinsey Matrix; Marketing and Building Customer Value, Satisfaction, and Loyalty – Value Chain – Customer Life Time Value;

## **UNIT – III (10 Hours):**

**Marketing Mix** – Product Decisions: Concept of a Product, and Classification of Products – Product Mix and Line Decisions – Product Life Cycle – Strategic Implications – New Product Development and Consumer Adoption Process; Pricing Strategies: Understanding Pricing – Steps in setting the Price - Objectives, Methods, Price Adapting Policies, and Initiating and Responding to Price Changes.

## **UNIT-IV(10Hours)**

**Marketing Communications and Marketing Channels:** Concept, Definition, and Importance of Marketing Communications; Marketing Communications Mix – Advertising, Sales Promotion, Personal Selling, Events and Experiences, Public Relations and Publicity, Online and Social Media Marketing, Mobile Marketing, Direct and Database Marketing; Importance of Integrated Marketing Communications - Recent trends in Marketing communications; **Marketing Channels:** Role of Marketing Channels, Channel Functions and Flows, Channel Design Decisions, Channel Management Decisions, Channel Integration and Systems; Channel Conflicts, Co-operation and Competition.

## **UNIT-V(10Hours)**

**Marketing Organization and Control:** Types of Marketing Organization Structures, and Factors effecting Marketing Organization; Control of Marketing Efforts: Annual Plan Control, Efficiency Control, Profitability Control and Strategic Control - Marketing Audit; **Adapting Marketing to New Liberalized Economy:** Changing Marketing Practices - Digital Marketing, e-marketing, Tele Marketing, Cause Marketing, Societal Marketing, Rural Marketing, Green Marketing, Emotional Marketing, Guerrilla Marketing, Consumerism – Consumer Rights and Marketers' Responsibilities.

### **Case Study (Not Exceeding 300 words) PRACTICAL COMPONENTS:**

- Analyze different needs and wants of consumers in your locality or region
  - Analyze the prevalent marketing environment in your locality or region.
  - Analyze Product Life Cycle of few Products like consumer durables (ex., Electronic goods, Computers, etc.).
  - Analyze Packaging strategies used by FMCG companies

- Analyze Marketing strategies/planning used by automobile, cosmetic and FMCG companies

**REFERENCETEXTBOOKS:**

- a. Philip Kotler, Kevin Lane Keller, Abraham Koshy & Mithileswar Jha, *Marketing Management - A South Asian Perspective*, Pearson Education.
  - b. Agarwal, P.K., *Marketing Management - An Indian Perspective*, Pragati Prakasham
  - c. Kazmi SHH, *Marketing Management Text and Cases*, Excel.
  - d. Philip Kotler and Armstrong, G., *MARKETING*, Prentice Hall of India, 12th Edition.
  - e. Ramaswamy V.S. & Nama Kumari, S., *Marketing Management - Planning and Control*, Macmillan.
2. Macmillan.
    - a. Jayachandran, S., *Marketing Management*, Excel Books.
    - b. Michale J. Etzel, Broce J. Walker, William J. Stanton, *Marketing*, Tata McGraw Hill.
    - c. William J Stanton, *Fundamentals of Marketing*, McGraw-Hill.
    - d. Palmer - *Introduction to Marketing*, Oxford University Press.
    - e. Zinkota & Kotabe, *Marketing Management*, Prentice Hall of India.

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## 22BA202:HUMAN RESOURCESMANAGEMENT

Subject Code :	22 BA 202	I A Marks	30
No. of Lecture Hours / Week	05	End Exam Marks	70
Total Number of Lecture Hours	75	Total Marks	100
Practical Component	01 Hour/Week	Exam Hours	03

### Course Learning Outcomes:

- CO-1 To develop a meaningful understanding of HRM theory, basic concepts, functions and practices of Human Resource management.
- CO-2 To apply HRM concepts and skills across various types of organizations and the development of human resource planning, implementation, and evaluation of employee recruitment, selection, and retention plans and processes
- CO-3 This course helps student to understand and develop, implement, and evaluate employee performance management program, training, and development programs
- CO-4 To develop the students' ability to learn concepts like compensation, employee welfare, and industrial relation issues
- CO-5 To equip the students to analyze and interpret the issues like HRIS, Employee Grievance and Quality of Work Life.

### UNIT I:

**Introduction:** Meaning, Definition, Nature, scope, and Importance of HRM - objectives and Functions of HRM- Organization of HRM - Role of HR manager - Models of HRM - HRM in a Changing Environment.

### UNIT II:

**Procurement:** HR Job Analysis - Human Resource Planning, Objectives, Importance, Factors Affecting HR Planning -Process of HR Planning - and Limitations of HRP - Recruitment: Definition, Objectives, Factors Affecting Recruitment - Recruitment Sources - Selection: Meaning, Definition, and Process of Selection – Placement and Induction.

### UNIT III:

**Development and Performance Management:** Objectives, Importance of Training, Training methods, Executive Development Programmes, Evaluation of Training and Development Programmes -Performance Appraisal: Meaning, Need, Purpose, Objectives, Different Methods of Appraisal, Uses of Performance Appraisal, Limitations, of Performance appraisal.

### UNIT IV:

**Promotion and Reward Management:** Promotion, Transfer, Demotion, and Career planning and Development - Compensation Management: Definition, Need for Sound salary Administration, Objectives, Factors Affecting Wages/ Salary administration, Job Evaluation - Employee Welfare Measures.

### UNIT V:

**Maintaining:** HRM Approach to Employee - Quality of Work Life (QWL): Meaning, definition, Specific Issues in QWL, Strategies for Improvement of QWL - HRIS, HRM Accounting, and HR Audit - International HRM: Perspectives and Challenges - Grievance and Disciplinary Procedure.

## Case Study (Not Exceeding 300 words)

### Practical Component:

- Give a case and ask the students to prepare the recruitment advertisement for a newspaper.
- Expose students to standard selection tests followed in various sectors.
- Exploring training and development practices.
- Exploring performance appraisal practices in various sectors.
- Exploring employee separation practices.
- Give a job analysis case and ask the students to prepare job description and job specification.
- Ask the students to prepare an appointment letter for the post of office manager of a company known to you.

### Reference Text books:

1. Aswathappa. K., Human Resource and Personnel Management, Tata McGraw Hill.
2. Dessler, Human Resource Management, Pearson Education.
3. Memoria C.B., Personnel Management, Himalaya Publishers
4. Singh. N. K., Human Resources Management, Excel Books.
5. Subba Rao, P., Human Resource Management and Industrial Relations, Himalaya Publishing House.
6. V.S.P.Rao, Human Resources Management, Excel Books.



## 22 BA 203: FINANCIAL MANAGEMENT

Subject Code :	22 BA 203	I A Marks	30
No. of Lecture Hours / Week	05	End Exam Marks	70
Total Number of Lecture Hours	75	Total Marks	100
Practical Component	01 Hour/Week	Exam Hours	03

**Course Outcomes:** by the end of the course, students will be able

- CO-1 To provide an understanding and perspective on financial management functions and time value of money in the organization.
- CO-2 To develop knowledge on financial management problems, and to increase the ability to handle the problems through reliable approach using leverages.
- CO-3 To develop knowledge on formation of capital structure and understand the impact of dividend decision on value of the firm.
- CO-4 To develop planning and monitoring skills in working capital management, so the students are able to apply the appropriate management strategy to face the company challenges.
- CO-5 To acquaint with the knowledge on the capital budgeting techniques and their application in business organizations.

### UNIT I

**Financial Management:** Conceptual Overview, Scope, Functions, Roles, Goals - Changing Role of Finance Managers -Time value for money -Present Value - Risk and Return – Profit maximization Vs. Wealth Maximization **(Theory only).**

### UNIT II

**Financial Leverages:** Types of Financial Leverages-EBIT and EPS analysis - Cost of Capital - Measurement of Specific Costs of Capital - Weighted Average Cost of Capital **(Theory and Problems).**

### UNIT III

**Capital Structure:** Determinants of Capital Structure, and Optimum Capital Structure - Capital Structure theories: Traditional, NI, NOI and MM Theories -**Management of Profits:**Dividend Policy and Dividend Theories. **(Theory and Problems)**

### UNIT IV

**Working Capital Management:** Meaning, Significance, Types of Working capital, Determinants of working capital, and Methods of Measuring working Capital Requirements - Operating cycle -Financing of Working Capital- Management of Cash, Receivables, and Inventory. **(Theory and Problems)**

### UNIT V

**Capital Budgeting:** Capital Budgeting Process, Nature, Scope, Significance, and Risks in Capital Budgeting-Techniques of Capital Budgeting: Traditional and DCF techniques– NPV vs. IRR. **(Theory and Problems)**

## Case Study (Problem)

### Practical Components:

- Students are expected to study any five companies' financial reports and submit a report on their financial planning and financial forecast.
- A group assignment on “capital structure of any three big domestic companies and any three MNCs with respect the models studied in unit-3.
- Case studies on dividend policies of various companies with respect to Indian context.

### References Text books:

1. James C. Van Horne, Financial Management and Policy, 6th Edition (2009) Prentice Hall of India.
2. Chandra Bose D., Fundamentals of Financial Management, 2<sup>nd</sup> Edition (2006) Prentice Hall of India.
3. Khan M Y and Jain P. K., Basic Financial Management: Text and Problems, 2nd Edition (2005) Tata McGraw Hill.
4. Pandey I M. Financial Management, 11<sup>th</sup> Edition (2015) Vikas Publishing House Pvt. Ltd.
5. Pandey&Bhat, Cases in Financial Management, 2<sup>nd</sup> Edition (2000) Tata McGraw Hill.
6. Prasanna Chandra, Financial Management - Theory and Practice, 10th Edition (2019) Tata McGraw Hill.

## 22BA204: ENTREPRENEURSHIP & SMALL BUSINESS MANAGEMENT

Subject Code :	<b>22 BA 204</b>	I A Marks	30
No. of Lecture Hours / Week	05	End Exam Marks	70
Total Number of Lecture Hours	75	Total Marks	100
Practical Component	01 Hour/Week	Exam Hours	03

### Course Learning Outcomes:

- CO-1 To understand the concept of entrepreneurship and the role of women and rural entrepreneurs.
- CO-2 To know the importance of Ideas in Entrepreneurship and the ability to assess the business potentiality of ideas.
- CO-3 To impart knowledge on preparation of project report and sources of finance
- CO-4 To acquaint students with the knowledge of writing a business plan, role of MSMEs in economic development.
- CO-5 To impart knowledge on institutional support to entrepreneurs in India.

### UNIT-I (12Hours)

Introduction to Entrepreneurship: Concept of Entrepreneur – Characteristics of an Entrepreneur–Distinction between an Entrepreneur and Intrapreneur and a Manager– Functions of an Entrepreneur–Common Myths–Types of Entrepreneurs,—Types of Start-up Firms–Importance of Entrepreneurship: Economic Impact–Impact on Society– Entrepreneurial Process. Growth of Entrepreneurship in India – Recent Trends in Women Entrepreneurship and Rural Entrepreneurship–Problems and Perspectives

### UNIT-II (10Hours)

Developing Successful Business Ideas: Recognizing Opportunities and Generating Ideas– Feasibility Analysis: Product/Service Feasibility–Industry/Market Feasibility–Financial Feasibility – Industry and Competitor Analysis: Industry Analysis – Competitive Analysis – Developing an effective Business Model: Business Models–Components of an effective Business Model – Building a new venture Team – Assessing a new venture’s financial strength and viability– Preparing the proper ethical and legal foundation– Writing a Business Plan.

### UNIT-III (10Hours)

Preparation of Project Report and Financing Ventures: Meaning of DPR - Importance of Project Report - Preparation of Project report — Content; Guidelines for Report preparation – Sources of Finance– Concept of working Capital and Estimation– Seed Capital–Venture Capital.

### UNIT-IV (10Hours)

Promotion of MSMEs: Definitions, Characteristics– Relationships of MSME – Relationship with large units – Export Oriented Units - Rationale – Objectives – Scope of Small Enterprises – Opportunities for an Entrepreneurial career–Role of Small Enterprises in Economic Development– Causes and Symptoms of Sickness–Cure for Sickness.

## UNIT-V (10Hours)

Institutional support to Entrepreneurs: Commercial Banks – Other major financial institutions– Central Level Institutions– NSIC: National Productivity Council (NPC); – State Level Institutions – DIC – SFC– state Small Industries Development Corporation (SSIDC) – Industry Associations– Confederation of Indian Industry (CII); Federation of Indian Chamber of Commerce Industry (FICCI); Associated Chambers of Commerce and Industry of India (ASSOCHAM).

### Case Study (Not Exceeding 300 words)

#### PRACTICAL COMPONENTS:

- ✓ Students must attend all the workshops
- ✓ Students will be expected to read widely on the academic literature of entrepreneurship and understand how the various themes in the theoretical literature
- ✓ Students will be expected to prepare, present in class and work on team assignments

#### REFERENCE TEXTBOOKS:

- Ram Chandran, ‘Entrepreneurial Development’, Tata McGraw Hill, New Delhi
- Vijay Sathe, ‘Corporate Entrepreneurship’ 1st edition, 2009, Cambridge
- Khanka, S.S., ‘Entrepreneurial Development’, S Chand & Company Ltd. New Delhi
- Badhai, B., ‘Entrepreneurship for Engineers’, Dhanpat Rai & Co. (P) Ltd.
- Vasanth Desai, ‘Dynamics of Entrepreneurial Development & Management’, 2007, HPH.
- Dr. Vasant Desai, ‘Small Scale Industries and Entrepreneurship’, 2006, HPH.
- P. Narayana Reddy, ‘Entrepreneurship – Text and Cases’, 2010, 1st Ed. Cengage Learning.
- David H. Hott, ‘Entrepreneurship New Venture Creation’, 2004, PHI.
- E-Book, MSME at a glance – English version, Ministry of MSME.
- Jaynal Ud– Din Ahmed and Abdul Rashid, MSME in India, New Century Publications.

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## 22BA XXX: OPERATIONS MANAGEMENT (4L + 1T + 1P)

Subject Code :	<b>22BA XXX</b>	I A Marks	30
No. of Lecture Hours / Week	05	End Exam Marks	70
Total Number of Lecture Hours	75	Total Marks	100
Practical Component	01 Hour/Week	Exam Hours	03

**Course Outcomes:** By the end of the course, students will be able

- CO-1 To understand the production systems, layouts, material handling systems etc
- CO-2 To apply suitable planning tools and techniques in the different production systems.
- CO-3 To identify maintenance strategies for managing assets.
- CO-4 To analyze inventory models for effective management (Purchase, Inventory, Storage) of materials
- CO-5 To deploy quality control systems for assuring quality of products.

### UNIT I:

**Operations Management:** overview, Concept, Objectives – Role and Responsibilities of Production Manager – Manufacturing Vs. Service Operation - **Strategic Decisions – Production Systems:** Intermittent and Continuous Production Systems, Job, Batch, Mass or Flow production systems **Facility Planning:** Importance, determinants of Facility Location Decisions - **Layout Planning – Principles of Layout Planning, Classification of Plant Layouts, Product layout, Process layout – Materials Handling:** Principles of Material Handling, and Material Handling Equipment's. **Capacity Planning -Productivity and Factors Affecting Productivity – World Class Manufacturing**

### UNIT II:

**Production Planning and Control:** Objectives, Functions, and Procedure of PPC – Production planning in Continuous, and Intermittent Production systems – Master Production Scheduling Aggregate Capacity Planning **Optimal Production Strategies:** Sequencing and Scheduling of Operations, Line balancing - **Project Management Techniques:** PERT and CPM (Theory only).– **Automation:** Definition, Concept, Tools of Automation.

### UNIT III:

**Work Study:**– **Method Study** Process, Recording Tools – **Work Measurement** Techniques: Time Study, work sampling - **Maintenance Management:** Need for Maintenance, Types, Functions, breakdown analysis – Equipment Life Cycle, Total Productive Maintenance (TPM)– Managing of Work Environment – Waste Management: Concept, and Methods of Waste Disposal

### UNIT IV:

**Materials Management:** Importance, and Functions – **Purchase Management:** Objectives, Purchasing Process, constraints – **Stores Management:** Functions, and Procedures of Store Management, – **Inventory Management:** Concepts, Types, Classification, Functions, and Costs of Inventory – Inventory Control Decisions –Inventory analysis models ABC, VED, FSN, HML techniques. - **Inventory Control Techniques** EOQ Model, MRP, JIT, Kanban, and Agile Supply Chain.

### UNIT V:

**Quality Management:** Concept, Significance of Quality and Costs of quality – Quality Assurance –Acceptance Sampling – Statistical Quality Control – Control Charts,  $\bar{x}$  and R, p-bar charts - **Quality Systems:** Need, Benefits, ISO 9001–2015, Quality Improvement Techniques: Quality Circles, Six Sigma, New QC Tools, PDCA Cycle, TQM, Kaizen – Lean Manufacturing.

**Case Study (Not Exceeding 300 words / Problem from 2, 4, 5 units only)**

**Reference Books:**

1. Chary, SN, 2013: Production and Operations Management, Tata McGraw Hill, New Delhi.
2. Elwood S. Buffa, Rakesh K. Sarin, 2013: Modern Production and Operations Management, John Wiley, New York.
3. Everett E. Adam, Jr., Ronald J. Ebert, 2000: Production and Operations Management, 5<sup>th</sup> edition, Prentice Hall of India, New Delhi.
4. Gopalakrishnan P. and Sundaresan. M., 2012: Materials Management An Integrated Approach, Prentice Hall of Indian, New Delhi.
5. Krajewski, L.J. and Ritzman, L.P., 2005: Operations Management: Strategy and Analysis, 7<sup>th</sup> edition, Addison Wesley Longman Pvt. Ltd. Delhi
6. Pannerselvam R. 1999, Production and Operations Management, Prentice Hall of India, New Delhi.
7. K.Aswathappa, K.ShridharaBhat 2017: Production and Operations Management 2<sup>nd</sup> edition, Himalaya Publishers.
8. Chunawala and Patel 2009: Production and Operations Management, 7<sup>th</sup> edition, Himalaya Publisher.
9. James P Evans and David 2007: Operations Management, Cengage, New Delhi.
10. Hamid Mori and Russel 1995: Production and Operations Management, Mcgraw-HillNewyork.
11. J.P. Saxena 2009: Production and Operations Management 2<sup>nd</sup> edition, TATA Mcgraw-Hill.
12. KanishkaBedi 2004: Production and Operations Management, Oxford university press NewDelhi.
13. UpendraKachan 2007: Production and Operations Management Text and Cases, 1<sup>st</sup> edition, EXCEL BOOKS.
14. B.Mahadevan 2010: Operations Management theory and practice, 2<sup>nd</sup> edition, Pearson.

## 22 PG201::RESEARCH METHODOLOGY & INTELLECTUAL PROPERTY RIGHTS (IPR)

Subject Code :	22 PG 201	I A Marks	30
No. of Lecture Hours / Week	05	End Exam Marks	70
Total Number of Lecture Hours	75	Total Marks	100
Practical Component	01 Hour/Week	Exam Hours	03

**Course Outcomes:** By the end of the course, students will be able:

- CO-1 To understand basic concepts of research and formulate research problems and process.
- CO-2 To understand research and sampling design.
- CO-3 To understand how to analyse and interpretation of the data.
- CO-4 To provide expert knowledge about to write a research report and thesis.
- CO-5 To demonstrate knowledge and understanding of IPR Filing and Rights

### Course Content

#### UNIT I

**Foundations of Research:** Meaning of Research – Definitions of Research – Motivation in Research – General Characteristics of Research – Criteria of Good Research – Types of Research – Research Process – Research Methods vs. Methodology – Defining and Formulating the Research Problem – Review of Literature – Importance of Literature Review in Identifying Research Gaps – Development of Working Hypothesis

#### UNIT II

**Research Design, Sampling Concepts, and Data Collection Methods:**

Meaning, Significance and Characteristics of Good Research Design – Types of Research Design:

Exploratory- Descriptive- Experimental – Sampling Theory: Types of Sampling and Errors in Sampling – Data Collection: Types of Data – Sources of Data- Methods of Data Collection.

#### UNIT III

**Measurement & Scaling Techniques, Hypothesis Formulation and Testing:** Basic measurement scales – Reliability & Validity – Definition and Types of Hypothesis – Hypothesis Formulation and Testing Procedure – Analysis of Variance (ANOVA) One way and two way classifications.

#### UNIT IV

**Research Report Writing and Presentation:** Report Writing: Significance of Report Writing, Different Steps in Writing Report, Layout of the Research Report, Types of Reports, Oral Presentation, Mechanics of Writing a Research Report, Precautions for Writing Research Reports – Research Ethics, Conflict of Interest and Plagiarism.

#### UNIT V

**Intellectual Property Rights (IPR):** Definition, Nature and Features of Intellectual Property Rights (IPR); Types of Intellectual Property Rights – Patents, Copy Rights, Trade Marks, Industrial Designs, Geographical Indications, Trade Secrets; Importance of Intellectual Assets – Challenges of securing Intellectual Assets, Procedure for Grant of Patents – Rights of a Patentee – Types of Infringement – Enforcement of IPR – Intellectual Property Laws in India – Role of World Intellectual Property Organization (WIPO).

**PRACTICAL COMPONENTS:**

Students should identify different research problems with examples and describe the characteristics of researchable problems in their academic area/society/community/organization concerned.

Students are to form in groups (a group consists of 4-6 students) and conduct critical literature survey with regard to the identified research problems and prepare a brief literature review coupled with research gaps and working hypothesis.

Students are required to identify and develop good research design to address the defined research problems.

Students are expected to write the research design on Exploratory and Descriptive Research.

Students are required to develop practical experience in writing a research proposal by conducting thorough critical review of any three research proposals (examples).

Students are expected to develop templates for technical report writing.

Students should conduct a team-based mini research project, which is a unified and practical case on a topic of their choice, with approximately 4-6 students per group.

Students are expected to identify types of plagiarism in academic research, and how to avoid plagiarism in research.

#### **REFERENCE BOOKS:**

1. Garg, B.L., Karadia, R., Agarwal, F. and Agarwal, U.K., 2002, An introduction to Research Methodology, RBSA Publishers.
2. Cohen, L. Lawrence, M., & Morrison, K. (2005), Research Methods in Education (5th edition). Oxford: Oxford University Press.
3. Kothari, C.R., 1990, Research Methodology: Methods and Techniques, New Age International.
4. Dornyei, Z. (2007). Research Methods in Applied Linguistics. Oxford: Oxford University Press.
5. Anthony, M., Graziano, A.M. and Raulin, M.L., 2009, Research Methods: A Process of Inquiry, Allyn and Bacon.
6. Fink, A., 2009, Conducting Research Literature Reviews: From the Internet to Paper. Sage Publications.

#### **Important Websites:**

- [www.ipindia.nic.in](http://www.ipindia.nic.in)-Intellectual Property Office, India
- [www.patentoffice.nic.in](http://www.patentoffice.nic.in)-Patent office, India
- <http://copyright.gov.in/>-Copyright Office, India
- [ipr.icegate.gov.in](http://ipr.icegate.gov.in)-Automated Recordation & Targeting for IPR Protection
- <http://www.icegate.gov.in>-E-Commerce portal of Central Board of Excise and Customs
- [www.ipab.tn.nic.in](http://www.ipab.tn.nic.in)- Intellectual Property Appellate Board, India



## 22BA2L1:SELLING &NEGOTIATIONSKILLS

Subject Code :	22 BA 2L1	I A Marks	50
No. of Lecture Hours / Week	05	End Exam Marks	50
Total Number of Lecture Hours	75	Total Marks	100
Practical Component	5 Hour/Week	Exam Hours	03

### CourseDescriptionandPurpose:

Sales and Negotiation Skills (SNS) Lab/Practical course teach management students how to sellstrategically—and successfully—to different clients and in different situations. By learning to facilitate productive meetings, handle objections, and manage negotiations effectively, they'll be able to close winning deals without breaching the institution's risk-return parameters. In thiscourse, participants study essential best practices and learn how to apply them as they completeinteractive exercises, observe video demonstrations, and familiarize themselves with helpful jobaids they can continue to use post-training.In addition, two one-day skills application labs,Client Meeting Skills and Negotiating with Clients, are available to reinforce the concepts taughtinthis course.

### CourseObjectives:

- Toimbibein thestudents, criticalsales competencies that drivebuying decisions;
- Togiveinsightsintohowtoboostindividualandorganizationalproductivityt hroughsaleslead management;
- Tointroducebasic theoreticalprinciplesandparticularstepsin thenegotiatingprocess.

### CourseLearningOutcomes:

AfterSuccessfulcompletion ofthiscourse, Studentsshouldbeableto

CO-1 Understandandappreciatetheskillsandcompetenciesrequiredtobeaneff ectivesalesperson

CO-2 Closesaleeffectivelyandmanagetheir respectiveterritories

CO-3 Understandandappreciatewhatittakestobeagoodnegotiator

CO-4 Manageconflictinthenegotiationprocess

CO-5 Understandtheadvantagesandlimitationsofvariousnegotiationstrategies

### CourseContent

#### UNIT-I:

Nature and Role of Selling: Importance of Selling – Role in the Context of Organization –survival and growth – Types of Selling: Differences in Selling Situations, New Business VersusService Selling – Newton's Classification of Sales Types – McMurry and Arnold's classificationof selling Types – Consumer Indirect Selling, industrial Selling, Missionary, Sales team/groupSellingMerchandising, Telesales, Franchise selling,International selling.

#### UNIT-II:

AttributesofaGoodSalesperson:PersonalityandPhysicalCharacteristics,Enthusia sm,Confidence, Intelligence, Self-Worth, Knowledge-product, Competition, Organization, Market,Customer,Territory:CommunicationSkills,PersuasiveSkills.(tobesupple

mented by live exercises on personal selling)

### **UNIT-III:**

Personal Selling Skills: The opening – Need and problem identification – the Presentation and Demonstration – Dealing with Objections – Negotiations – Closing the Sale – follow up (to be supplemented by live exercise on personal selling)

### **UNIT-IV:**

Negotiation Skills: Goal, Collaborative/Win-Win not Compromise – Pyramid of Success: Power, Time, and Information – Opponent: Visceral or Idea, (To be supplemented by live exercises on personal selling)

### **UNIT-V:**

Different Phases of Negotiation: Pre-Negotiation – Opening – Information Sharing – Problem Solving – Agreement – Breakdown in Negotiation – Barriers that Create Impasse – Overcoming Barriers – people Problem – Mediation – Arbitration – Ethics.

### **PRACTICAL COMPONENTS:**

- ✓ Dividing students into groups and give a scenario to negotiate and reach conclusion.
- ✓ Reading: 8 Habits of Highly Effective People; apply the concept to understand how people approach negotiation through different mind-sets.
- ✓ Conduct Role Plays for different scenarios.
- ✓ Solve various case studies dealing with conflict between teams and organizations.
- ✓ Ask students to identify three unconscious factors that may affect their negotiation effectiveness and ask them to explain why or how that phenomenon may occur. Management games like the two-dollar game, cross the line game can be played in the class to develop negotiation skills among the students.

### **REFERENCE TEXT BOOKS:**

- 1) Roy J. Lewicki, David M. Saunders, Bruce Barry, Negotiations, 5/e, McGraw Hill, 2005.
- 2) George Seidel, Negotiating for success: Essential strategies and skills, University of Michigan.
- 3) Patric Forsyth, Negotiation skills for rookies.
- 3) David Goldwich, Win-Win Negotiations, ST training solutions
- 4) Brian Tracy and Zig Ziglan, Persuasive selling and power negotiations.
- 5) The Essentials of Negotiation – Harvard Business School Press.
- 6) Negotiation Handbook by P. J. Cleary – Printice Hall of India.
- 7) ABC's of Selling Skills by Charles M. Futrell – McGraw Hill.

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**MODEL QUESTION PAPER**  
**M.B.A. (REGULAR) DEGREE EXAMINATION**  
**Second Semester**  
**22BA201: MARKETING MANAGEMENT**

(2022-2023 Regulation Onwards)

**Duration: 3 hours**

**Maximum Marks: 70**

**SECTION- A**

*Answer the of the Following Questions*

**5×4=20 Marks**

1a) Explain the concepts of Needs and Wants.

Or

1b) Outline the importance of Market Insights.

2a) Analyze the elements of GE-McKinsey Matrix.

Or

2b) Examine the various factors impacting consumer behavior

3a) What are the various stages of consumer adoption process?

Or

3b) Why consumer satisfaction is important?

4a) Explain the role of public relations.

Or

4b) Outline the importance of publicity.

5a) Explain the role of e-Marketing.

Or

5b) Outline the role of Tele Marketing.

**Section- B**

**Answer the of the Following**

**5X8=40 Marks**

6a) Appraise the role of Marketing Research in formulating marketing strategy.

Or

6b) Assess the elements of marketing environment in the present day business environment context.

7a) Discuss bases for segmenting the market.

Or

7b) Discuss the importance of building customer value, satisfaction and loyalty.

8a) Explain the steps in new product development with suitable examples.

Or

8b) Assess the importance of price adapting policies and initiating and responding to price changes.

9.a) Examine the importance of Integrated Marketing Communications.

Or

9. b) Analyze the reasons for channel conflicts and suggest measure to reduce them.

10.a) Evaluate the types of different Marketing Control methods.

Or

10.b) Analyze the impact of technology in marketing.

**SECTION C - (1 x 10=10 marks)**

**10Marks**

**Case study (Compulsory)**

**11.** Competition is a “necessary evil” of doing business, here How to make yours standout” Rebecca mink off launched her brand of ready-to-wear accessories handbags, and footwear in 2005.from the start, she it won’t Survive as a regular store. So, she set out to create the perfect shopper

Experience When shoppers enter flagship stores, they are greeted by a digital Touch screen wall that displays the latest runway selections, offers Style suggestions from Rebecca Mink off herself and can even take drink orders. Then, each item contains an RFID tag that detects when a shopper Enters a dressings room .when the tag is scanned, an image pops up on a mirror with suggestions for complementary accessories.

- A. Identify how Rebecca Mink off created a unique shopping experience did
- B. Discuss how information technology has changed Rebecca shopping experience to customers.
- C. Examine how to be innovative and come up with new ways to stand out from the competition.

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**MODEL QUESTION PAPER**  
**M.B.A. (REGULAR) DEGREE EXAMINATION**  
**Second Semester**  
**22BA202: HUMAN RESOURCES MANAGEMENT**  
**(2022-2023 Regulation Onwards)**

**Duration: 3 hours**

**Maximum Marks: 70**

**SECTION- A**

*Answer the Following Questions*

**5×4=20 Marks**

1. a) Role of HRM

**OR**

b) Model of HRM

2.a) Job Analysis

**OR**

b) Induction

3. a) 360 Degree performance appraisal

**OR**

b) Vestibule Training

4. a) Compensation

**OR**

b) Career Planning

5. a) HRIS

**OR**

b) Human Resource Audit

**SECTION – B**

*Answer All Questions*

**5×8=40Marks**

6. a) Define HRM. Explain the Nature and significance of HRM

**OR**

b) Explain the objectives and functions of Human Resource Management.

7. a) Outline the importance of Human Resource Planning. Illustrate the process of Human Resource Planning

**OR**

b) Demonstrate the steps in the process of selection of personnel

8. a) Identify and Apply the methods of performance appraisal.

**OR**

b) Summarize the importance of training and Distinguish between employee training and development

9. a) Analyse various employee welfare measures.

**OR**

b) Examine the methods of Job Evaluation.

**10. a)** What is meant by Quality of Work Life? Evaluate the issues and strategies to improve QWL

**OR**

**b)** Determine the International HRM perspectives and challenges.

**SECTION C - (1 x 10=10 marks)**

**Case study (Compulsory)**

**11. Read the following case and answer the questions given at the end.**

XYZ Public Ltd Company is well known for its welfare activities and employee oriented schemes in the manufacturing industry for more than ten decades. The company employs more than 800 workers and 150 administrative staff and 80 management-level employees. The Top-level management views all the employees at the same level. This can be clearly understood by seeing the uniform of the company which is the Same for all starting from MD to floor level workers. The company has 2 different cafeterias at different places one near the plant for workers and others near the Administration building. Though the place is different the amenities, infrastructure and the food provided are of the same quality. In short, the company stands by the rule of Employee Equality. The company has one registered trade union and the relationship between the union and the management is very cordial. The company has not lost a single man day due to strike. The company is not a paymaster in that industry. The compensation policy of that company, when compared to other similar companies, is very less still the employees don't have many grievances due to the other benefits provided by the company. But the company is facing a countable number of problems in supplying the materials in the recent past days. Problems like quality issues, mismatch in packing materials (placing material A in the box of material B) incorrect labelling of material, not dispatching the material on time, etc. The management views the case as there are loopholes in the system of various departments and hand over the responsibility to the HR department to solve the issue. When the HR manager goes through the issues he realized that the issues are not relating to the system but it relates to the employees. The company hired new employees for a higher-level post from external sources. The newly hired employees are placed with higher packages than that of existing employees in the same cadre.

**Questions**

1. Narrate the case summary and identify the problem of the case.
2. What are the roots causes of the problem?
3. How would you like to solve the problem of the case? Suggest the suitable measures to handle the situation amicably.

**MODEL QUESTION PAPER**  
**M.B.A. (REGULAR) DEGREE EXAMINATION**  
**SECOND SEMESTER**  
**22BA203: FINANCIAL MANAGEMENT**  
**(2022-2023 Regulation Onwards)**

**Duration: 3 hours**

**Maximum Marks: 70**

**SECTION- A**

**Answer the Following Questions**

**5×4=20 Marks**

1. (a) Define Present Value.

**(OR)**

(b) How Compound Interest will be calculated?

2. (a) What is combined leverage?

**(OR)**

(b) What are Earnings per Share?

3. (a) Define Optimum capital Structure.

**(OR)**

(b) What is meant by Stable dividend policy of a Firm?

4. (a) Explain the Operating Cycle of a manufacturing firm.

**(OR)**

(b) What is meant by temporary working capital?

5. (a) Explain the PI Method of Capital budgeting with formula.

**(OR)**

(b) Define Capital rationing.

**SECTION – B**

**Answer All Questions**

**5×8=40 Marks**

6. (a) Define financial management. Explain the scope and functions of Financial Management.

**(OR)**

(b) Why is the maximizing wealth a better goal than maximizing profit? Explain.

7. (a) What is financial leverage? Explain the impact of financial leverage on earning per share.

**(OR)**

(b) PF Ltd., has sales of Rs. 20,00,000, variable cost of Rs. 14,00,000, Fixed cost of Rs.

4,00,000 and debt of Rs. 10,00,000 at 12% rate of interest. Calculate operating, financial and combined leverages.

8. (a) What is meant by Capital Structure? Explain the importance of capital structure in organizational decision making.

(OR)

(b) Show the impact of dividend policy when DPR is 40% and 60% according to Gordon's Model from the following information.

Particulars	Growth Firm	Normal Firm	Declining Firm
R	15%	10%	8%

All the firms have  $k = 0.10$  and EPS Rs. 10.

9. (a) What is the concept of working Capital? Explain the factors that determine the needs of working capital?

(OR)

(b) Cost sheet of XYZ Company provides the following data:

Particulars	Cost per unit Rs
Raw Material	52
Direct labour	19.5
Overheads	39
<b>Total Costs</b>	<b>110.5</b>
Profit	19.5
<b>Selling Price</b>	<b>130</b>

The following is the additional information available:

- Average raw material in stock: one month;
- Average materials in process: half a month
- Credit allowed by suppliers: one month
- Credit allowed to debtors: two month;
- Time Lag in payment of wages: one and a half weeks.
- Overheads: one month.
- One fourth of sales are on cash basis.
- Cash balance is expected to be Rs. 1, 20,000. You are required to prepare a statement showing the working capital needed to finance a level of activity of 70,000 units of output.



Assume that production is carried on evenly throughout the year and wages and overheads accrue similarly.

10. (a) Define IRR. Distinguish between IRR and NPV.

(OR)

(b) The finance department of MN Ltd. has suggested 2 investment proposals. If the cost of capital is 12%, rank them on the basis of profitability index. The cash flows for each are tabulated below.

Year	Project A	Project B
0	Rs 36,000	Rs 60,000
1	Rs 13,000	Rs 12,000
2	Rs 13,000	Rs 20,000
3	Rs 13,000	Rs 24,000
4	Rs 13,000	Rs 32,000

### SECTION- C

#### CASE STUDY (Compulsory)

**1X10=10 Marks**

11. A company needs Rs. 5, 00,000 for construction of a new plant. It has EBIT of Rs.1, 00,000. The company has 2 alternatives (i) Raising the entire amount by equity with the issue of 25000 equity shares @ Rs. 10 each (ii) Issue of 10% debentures 2500 @ Rs.100 each. What will be the impact on EPS under those two alternatives?

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**MODEL QUESTION PAPER**  
**M.B.A. (REGULAR) DEGREE EXAMINATION**  
**Second Semester**  
**22BA204:ENTREPRENEURSHIP DEVELOPMENT AND BUSINESS MODELS**

(2022-2023 Regulation Onwards)

**Duration: 3 hours**

**Maximum Marks: 70**

**SECTION- A**

**Answer the of the Following Questions 5×4=20 Marks**

1a) Explain the factors influencing entrepreneurship.

**OR**

1b) Outline the problems of Rural entrepreneurs.

2a) Analyze the sources for Idea generation.

**OR**

2b) Examine the various methods to study the feasibility of business

3a) what are the various sources of financing?

**OR**

3b) Why working capital is important in success of business

4a) Explain the scope of small enterprises in present scenario

**OR**

4b) Outline the importance of export oriented units.

5a) Examine the role of State Finance Corporation in promoting small scale enterprises.

**OR**

5b) Analyze the role of ASSOCHAM in business development.

**Section- B**

**Answer the of the Following**

**5X8=40 Marks**

6a) Appraise the role of entrepreneurship in economic development of India

**OR**

6b) Assess the challenges faced by Indian women entrepreneurs in current era.

7a) What is a business model and explain the ways to generate new business model

**OR**

7b) why business plan is important in success of business

8a) Explain the importance of venture capital financing. Discuss the different venture capital financing schemes

**OR**

8b) Assess importance of project report and explain the contents of project report.

9a) Examine the role of small entrepreneurs in international business.

**OR**

9b) Analyze the reasons for sickness in small scale industries.

10a) Examine role of commercial banks and other financial institutions in developing small businesses.

Or

10 B) Analyze the impact of industry associations in success of micro, small and medium enterprises.

**SECTION -C**

**(1 x 10=10 marks)**

**Case study (Compulsory)**

**11.** Apollo Tyres was established in 1976 when the Indian tyre industry, was highly competitive with both the domestic and international players competing for the market share; and the license raj still prevalent. However, Apollo, a family-run business, transformed itself over generations under the changing leaderships and continuous innovations, emerging as the leading player in the industry. It further strengthened its position in the market with many innovative marketing techniques. In addition, to understand and cater to the customers' needs, the company focused on training its employees and imbued team spirit in them by inculcating the concept of 'WE' rather than 'I'. In 2005, after attaining the leading position in the Indian tyre industry, Apollo decided to go global. However, it remains to be seen whether Apollo retains its position in the Indian market while carving a niche on the global front.

**Answer the following questions**

1. Find the business dynamics and Critical Success Factors of the tyre industry
2. Analyze the factors for what it takes for a tyre manufacturing company to go global
3. Advise the Apollo tyres whether to go global or not if yes suggest global entry strategies

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**MODEL QUESTION PAPER**  
**M.B.A. (REGULAR) DEGREE EXAMINATION**  
**Second Semester**  
**22 G201::RESEARCHMETHODOLOGY&INTELLECTUALPROPERTYRIGHTS(IPR)**

(2022-2023 Regulation Onwards)

**Duration: 3 hours**

**Maximum Marks: 70**

**SECTION- A**

**Answer the Following Questions**

**(5X4 = 20 Marks)**

1. (a) Importance of Research  
**(OR)**  
(b) Criteria for Good Research
2. (a) Primary Vs Secondary data  
**(OR)**  
(b) Simple random Sampling
3. (a) Procedure for Testing of Hypothesis  
**(OR)**  
(b) Measurement of Scales
4. (a) Layout of Research report  
**(OR)**  
(b) Research Ethics
5. (a) Definition and Nature of IPR  
**(OR)**  
(b) Enforcement of IPR

**SECTION- B**

**Answer All Questions.**

**(5X10 = 50 Marks)**

6. (a) What is Research? Explain the research process in details.  
**(OR)**  
(b) Explain different types of research.
7. (a) What is Research Design? Distinguish between diagnostic and Exploratory Research designs.  
**(OR)**  
(b) Explain Principal steps in a Sample Survey?
8. (a) Explain the procedure for analysis of variance (ANOVA) two-way classification  
**(OR)**  
(b) Set up an analysis of variance table for the following per acre production data for three varieties of wheat, each grown on 4 plots and state if the variety differences are significant.

Plot of Land	Per acre production data		
	Variety of Wheat		
	A	B	C
1	6	5	5
2	7	5	4
3	3	3	3
4	8	7	4

9. (a) Explain the significance of research report and narrate the various steps involved in writing such a report.

**(OR)**

(b) Explain various types of research reports used in business research?

10. (a) Explain the importance of Intellectual Assets.

**(OR)**

(B) Explain the procedure for grants of Patents.

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**Agenda for Board of Studies meeting for the  
Master of Business Administration Programme (M.B.A Business Analytics) of  
Department of Commerce & Business Administration  
24-03-2023**

1. To evaluate and recommend the programme structure for newly proposed MBA( Business Analytics) under Choice Based Credit System with effect from academic year 2023-2024 under R 22 Regulations.
2. To discuss about the modalities of internships / projects.
3. To assess the compatibility of practical courses with theory courses.
4. To approve the list of examiners and paper setters of all the courses.
5. Any other matter with the permission of chair.

**RESOLUTIONS**

1. It is resolved and recommended to introduce the New Programme '**Master of Business Administration**' (**Business Analytics**) from the academic year 2023-2024 by taking the required permissions from Krishna University and AICTE.
2. It is resolved and recommended to introduce the '**Programme Structure**' for Master of Business Administration Programme( Business Analytics) under '**Choice Based Credit System**' (**CBCS**) for the batch of students admitted in 2023-2024 and onwards in line with '**KRU R-2022 Regulations**' For the syllabus and model question paper refer **Annexure A**.

**MBA Analytics  
Course Structure**

**SEMESTER – I**

Course Code	Title of the Course	Instruction Hours per week			Credits	CORE / IDC/DSE/ SEC/OEC/ MOOCS	Evaluation		
		L	T	P			CIA	SEE	
								MAR KS	MAR KS
<b>GENERIC CORE COURSES</b>									
23 BA101	Management Process & Organizational Behavior	4	1	1	4	Core	30	70	3 Hrs
23 BA102	Accounting for Managers	4	1	1	4	Core	30	70	3 Hrs
23 BA103	Marketing Management	4	1	1	4	Core	30	70	3 Hrs
23 BA104	Statistics for Business Analytics	4	1	1	4	Core	30	70	3 Hrs
23 BA105	Essentials of Business Analytics	4	1	1	4	Core	30	70	3 Hrs
23 BA106	Business Economics	4	1	1	4	Core	30	70	3 Hrs
22PG101	Personality Development Through Life Enlightenment Skills	3	1	0	3	Core	30	70	3 Hrs
<b>LAB/PRACTICAL/FIELD WORK</b>									
22BA 1L1	Spread Sheet & Accounting Packages	0	4	0	2	Core	30	70	--
<b>TOTAL FOR FIRST SEMESTER</b>		<b>29</b>							

**SEMESTER – II**

Course Code	Title of the Course	Instruction Hours per week			Credits	CORE / IDC/DSE/ SEC/OEC/ MOOCS	Evaluation		
		L	T	P			CIA MARKS	SEE	
								MARKS	DURATION
<b>GENERIC CORE COURSES</b>									
23 BA201	Econometrics and Business Forecasting	4	1	1	4	Core	30	70	3 Hrs
23 BA202	Financial Management	4	1	1	4	Core	30	70	3 Hrs
23 BA203	Data Base Management System	4	1	1	4	Core	30	70	3 Hrs
23 BA204	Operations Research	4	1	1	4	Core	30	70	3 Hrs
23 BA205	Advanced Production and Operations Management	4	1	1	4	Core	30	70	3 Hrs
22PG201	Research Methodology & IPR	3	1	0	3	Core	30	70	3 Hrs
<b>DOMAIN SPECIFIC ELECTIVE COURSES (CHOOSE ANY TWO)</b>									
23 BA 206(I)	Data Warehousing and OLAP	4	0	0	4	<b>DSE</b>	30	70	3Hrs
23 BA 206(II)	Design Thinking	4	0	0	4	<b>DSE</b>	30	70	3Hrs
23 BA 206(II)	Machine Learning and Data Mining	4	0	0	4	<b>DSE</b>	30	70	3Hrs
<b>LAB/PRACTICAL/FIELD WORK</b>									
22BA2L 1	Data Visualization	0	0	4	2	Core	30	70	--
<b>Total Credits</b>							<b>33</b>		
<p><b>At the end of 2<sup>nd</sup> semester, every student must undergo summer Internship/ Apprenticeship/Project work/Industrial Training/Research based Project work for Six weeks and must prepare a report concerned as per approved project guidelines and submit the same to the University 14 days before the commencement of third semester end examinations.</b></p>									



### SEMESTER III

Course Code	Title of the Course	Instruction Hours per week			Credits	Evaluation		
		L	T	P		CIA MARKS	SEE	
							MARKS	DURATION
<b>GENERIC CORE COURSES</b>								
23 BA301	Strategic Management	4	1	1	4	30	70	3 Hrs
23 BA302	Project Management	4	1	1	4	30	70	3 Hrs
23 BA303	Predictive Analytics	4	1	1	4	30	70	3 Hrs
23 BA304	Text, Social Media & Web Analytics	4	1	1	4	30	70	3 Hrs
23 BA305	Supply Chain Management Analytics	4	1	1	4	30	70	3 Hrs
<b>LAB/PRACTICAL/FIELD WORK</b>								
22BA3L1	Big Data Analytics	0	4	0	2	30	70	3 Hrs
<b>OPEN ELECTIVE (INTER DISCIPLINARY/MULTIDISCIPLINARY) COURSES (CHOOSE ANY TWO)</b>								
23 BA 306(I)	Marketing Analytics	3	1	1	4	30	70	3Hrs
23 BA306(II)	Financial Analytics	3	0	0	4	30	70	3 Hrs
23 BA306(III)	Human Resource Analytics	3	0	0	4	30	70	3 Hrs
<b>20GE10</b>	<b>MOOCS:</b> NPTEL/SWAYAM/edX/Coursera/ Stanford Online/Udacity/ OpenClassrooms/ Open2Study/ ALISON/ Khan Academy/ NSE- NCFM/IRDA/NISM/ Any course related to MBA from the authentic sources with prior permission.	1	1	1	2	50	-	
<b>Total Credits</b>					<b>32</b>			

**SEMESTER IV**

Course Code	Title of the Course	Instruction Hours per week			Credits	Evaluation		
		L	T	P		CIA MARKS	SEE	
							MAR KS	DURATIO N
<b>Generic Core Course</b>								
23 BA401	Project Work	4	1	1	16	30	70	3 Hrs
<b>20BA461</b>	<b>Comprehensive Viva-voce</b>	-	-	-	4	-	100	
	<b>OPEN ELECTIVE</b>	4	1	1	4	30	70	3 Hrs
<b>Total Credits</b>					<b>24</b>			


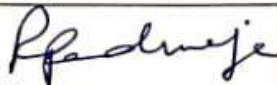



**Total Number of Credits: (29+33+32+24=118)**



**PARVATHANENI BRAHMAYYA**  
**SIDDHARTHA COLLEGE OF ARTS & SCIENCE: VIJAYAWADA-10**  
(An Autonomous college under the jurisdiction of Krishna University)  
Reaccredited at the level 'A+' by the NAAC

**DEPARTMENT OF BUSINESS ANALYTICS**

Minutes of the meeting of Board of Studies for M.B.A (Business Analytics) held on 24/03/2023 at 11.30 AM in the Department of Business Analytics. The following members were present.

Members Present		
Name of the Member	Role	Signature
Prof. Rajesh. C. Jampala, Dean, (Academics & Administration) PBSCAS	Chairman	
Dr.R. Padmaja, Krishna University, Machilipatnam Ph : 9440532444	University Nominee	
Dr B. Raja Sekhar, Professor, School of Management Studies University of Hyderabad, Hyderabad. Ph : 9866699983 <a href="mailto:brsms@uohyd.ernet.in">brsms@uohyd.ernet.in</a> ; <a href="mailto:b_rajasekhar@yahoo.com">b_rajasekhar@yahoo.com</a>	Subject Expert	
Dr. Pramod Kumar Mishra Assistant Professor, School of Management, University of Hyderabad, Gachibowli, Telangana- 500 046 Ph : 8142279454 Email: <a href="mailto:pramod.mishra@uohyd.ac.in">pramod.mishra@uohyd.ac.in</a>	Subject Expert	
Mr Ravi Teja Tallam Manager-HR (Data & Analytics), Trigyn Technologies Ltd., Vijayawada. M : 7680822227 Email: <a href="mailto:ravi.t@trigyn.com">ravi.t@trigyn.com</a> <a href="mailto:ravitejatallam@yahoo.com">ravitejatallam@yahoo.com</a>	Industrialist	
Mohammed Asgar Hussain Mobile No: 9248424246 S/O Mohammed Sabar Hussain DNO.42-56-7 Telguu Baptist Church Road Ajith Singh Nagar, Vijayawada - 520 010 E-Mail id: <a href="mailto:asgareee@gmail.com">asgareee@gmail.com</a>	Alumnus	

## 23 BA 101: MANAGEMENT PROCESS AND ORGANIZATIONAL BEHAVIOR

Course Code	<b>23 BA101</b>	Course Delivery Method	Class Room / Blended Mode
Credits	04	CIA Marks	30
No. of Lecture Hours / Week	05	Semester End Exam	70
Total Number of Lecture Hours	75	Total Marks	100

### Course Outcomes:

- CO-1 To explain the importance & role of management in the business organizations.
- CO-2 To analyze knowledge on the importance of planning and organizing.
- CO-3 To identify various leadership styles and their suitability to the situation.
- CO-4 To apply organizational behaviour theories and concepts to individual work experiences.
- CO-5 To know how to work more effectively in a team environment.

### Course Content

#### UNIT-I

**Introduction to Management:** Concept, Definition and Nature of Management – Evolution of Management thought – Purpose, Functions, Principles, and Levels of Management – Management and Environment–Social and Ethical Responsibilities of Managers – Recent Trends in Management Practices in the wake of Globalization.

**(15Hours)**

#### UNIT-II

**Planning:** Nature, Purpose, Process of Planning, and Types of Plans – Decision Making - Concept Process and Rationality in Decision – Management by Objectives - Organizing: Process –Formal and Informal Organizations – Departmentation – Span of Control – Delegation Vs Decentralization–Staffing.

**(15Hours)**

#### UNIT-III

Leading–concept, scope, significance – Motivation - Significance, Process-Theories of Maslow, Herzberg, Mc Clelland, Porter and Lawler - Leadership: Trait Approach, Leadership Styles,– Communication. Controlling: Basis-Control Process, Pre-Requisites, and Requirements of adequate Control - Techniques of control

**(15Hours)**

#### UNIT-IV

Organizational Behavior–Importance-Historical Background-Fundamental concepts of OB- Different models of OB – Understanding Individual Behavior – Perception- Concept– Process-Learning-Concept – Theories of learning - Personality –Concept-Personality traits.**(15 Hours)**

#### UNIT-V

Group dynamics – Concept, importance, types of groups, group formation, group development, group composition, group performance factors; Organizational conflict, Resolution of conflicts; Culture and determinants of Organizational Culture; Organizational Change, Concept, Need for change, resistance to change; Theories of planned change; Organizational Development-Concept

of OD.(15Hours)

### CaseStudy (NotExceeding 300words)

#### PRACTICALCOMPONENTS:

- ✓ Studyingorganizationalstructuresofanyfivecompaniesandclassifyingthemintodifferent types of organizations and justifying why such structures are chosen by thoseorganizations.
- ✓ Identifying any five organizations and group them into different types of organizationsbasedon Management atwork place.
- ✓ Studying organizational group dynamics of any three companies and identify the bestmethodofmanaginggroup dynamics.
- ✓ Studyanythreecompanies followingODinterventions andIdentifyeffectivetechnique.
- ✓ Note:Facultycaneitheridentifytheorganizations/leaders/jobsofstudentscanbeallowedto choosethe same.

#### REFERENCETEXTBOOKS:

1. Heinz Weihrich, Harold Kuntz,Management:AGlobalPerspective,10/e TMH
2. Stoner, Freeman and Gilbert.Jr. Management, Pearson Education, New Delhi.
3. Clegg,S.,Kornberger,M.,andPitsis,T.,Managingandorganizations:AnintroductiontoTheoryand practice, Sage, London, 2011.
4. RickyGriffin,GregoryMoorhead,OrganizationalBehavior:ManagingPeopleandOrganizations, CengageLearning, 2009.
5. GraemeMartin,ManagingPeopleandOrganizationsinChangingContexts,Rutledge,2006.
6. Knights,D.&Willmott,H.Introducingorganizationalbehaviorandmanagement,Thompson,London, 2006.
7. Luthans.F.Organizational Behaviour,TMH.
8. Robbins,Management,7/e,PearsonEducation.
9. John F.Wilson, The Makingof Modern Management, Oxford University Press.

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## 23 BA 102: ACCOUNTING FOR MANAGERS

Course Code	<b>23 BA102</b>	Course Delivery Method	Class Room / Blended Mode
Credits	04	CIA Marks	30
No. of Lecture Hours / Week	05	Semester End Exam Marks	70
Total Number of Lecture Hours	75	Total Marks	100

### Course Outcomes:

By the end of the course, students will be able:

- CO-1 To explain fundamental accounting concepts along with the elements of financial statements and basic accounting vocabulary.
- CO-2 To explain and use the accounting equation in basis financial analysis and explain how the equation is related to the financial statements.
- CO-3 To understand the meaning and various sources along with the applications of funds, cash flow statement analysis.
- CO-4 To calculate various ratios and inter-relationship of ratio.
- CO-5 To explain and use various cost management techniques

### Course Content

#### Unit-I

**Accounting:** Basics, Definition, Forms of Business Organizations, Advantages & Disadvantages. **(15Hours)**

#### Unit-II

**Accounting cycle:** Journalizing - Ledger posting – Subsidiary books – Trial Balance – Financial Accounts – Accounting Equation. Understanding Financial Statements – Income Statement – Balance Sheet – Funds Flow – Statement – Company Accounts – Special characteristics – Final Accounts **(15Hours)**

#### Unit-III

**Basic postulates of Accounting:** Concepts and Conventions. Analysis of financial statements – Ratio Analysis: Analysis of Financial Statements – Common size Analyze – Comparative statements – Trend Analysis – Inter –firm Comparison Industry Analysis. **(15Hours)**

#### Unit-IV

**Profit Planning:** Cost – Volume - Profit Analysis – Break-even point – Profit planning – Unit & Multiproduct Firm **(15Hours)**

## **Unit-V**

**Profit Planning:** Budgeting – Operational – Cash – Master Budgets – Fixed and Flexible Budgets. **(15Hours)**

### **Suggested Readings:**

1. Jain & Narang (1998) Advanced Accounts. New Delhi: Kalyani Publishers
2. Pandey I.M. (1995) Financial Management . New Delhi: Vikas Publishing House
3. Libby, Robert ( 1998) Financial Accounting. Boston : Mc Graw Hill
4. Tulsani, P.C. (1998) Financial Accounting. New Delhi: Mc Graw Hill
5. Needles, Belerd E (1997) Financial Accounting. Chennai: India Publishers.

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## 23 BA 103: MARKETING MANAGEMENT

Course Code	<b>23 BA103</b>	Course Delivery Method	Class Room / Blended Mode
Credits	04	CIA Marks	30
No. of Lecture Hours / Week	05	Semester End Exam Marks	70
Total Number of Lecture Hours	75	Total Marks	100

**Course Outcomes:** By the end of the course, students will be able

- CO-1 To understand the role of marketing in underpinning the success of business organizations and to know the changing context of marketing environment.
- CO-2 To understand the role of marketing mix elements in the successful implementation of marketing strategies to satisfy target customer.
- CO-3 To understand the product management and pricing methods.
- CO-4 To understand the challenges of channel management and to know the various forms of effective marketing communications.
- CO-5 To know the types of marketing organizations and to understand the set of criteria to control the marketing plan.

### UNIT I:

**Introduction:** Basic marketing concepts -Understanding Customers - Company Orientation towards Marketing - Transaction Vs Relationship Marketing - Analyzing Markets and Customers- Integrated Marketing Concept - Defining and Delivering Customer Value and Satisfaction-Value Chain - Marketing Environment: Macro and Micro Components and their Impact on Marketing Decisions - Marketing Research and Information - Adapting Marketing to New Liberalized Economy - Digitalization and Customization - Changing Marketing Practices: e-marketing, Tele Marketing, Societal Marketing, Rural Marketing, Green Marketing. **(15Hours)**

### UNIT II:

**Strategic Marketing Planning:** Buyer Behaviour - Consumer vs. Organizational Buyers - Market Segmentation and Targeting - Positioning and Differentiation Strategies - Marketing Mix -*Product Decisions:* Concept of a Product, and Classification of Products - Product Mix and Line Decisions - Product Life Cycle - Strategic Implications - New Product Development and Consumer Adoption Process. **(15Hours)**

### UNIT III:

**Price Setting:** Objectives, Factors and Methods, Price Adapting Policies, and Initiating and Responding to Price Changes. *Marketing Channel System:* Functions and Flows - Channel



Design - Channel Management -Selection, Training, Motivation, and Evaluation of Channel Members - *Channel dynamics*: VMS, HMS. (15Hours)

**UNIT IV:**

**Marketing Communication:** Concept, Definition, and Importance - Marketing Communication Mix - Promotion Decisions - Integrated Marketing Communication - IMC Planning Process -Integrated Communications Strategy - Recent trends in Marketing Communications (15Hours)

**UNIT V:**

**Marketing Organization and Control:** Types of Marketing Organization Structures, and Factors Affecting Marketing Organization - Control of Marketing Efforts: Annual Plan Control, Efficiency Control, Profitability Control and Strategic Control - Marketing Audit - *Consumerism* - Consumer Rights and Marketers' Responsibilities. (15Hours)

**Case Study (Not Exceeding 300 words)**

**Practical Components:**

- Analyze different needs and wants of consumers in your locality or region
- Analyze the prevalent marketing environment in your locality or region.
- Analyze Product Life Cycle of few Products like consumer durables (ex., Electronic goods, Computers, etc.).
- Analyze Packaging strategies used by FMCG companies
- Analyze Marketing strategies/planning used by automobile cosmetic and FMCG companies

**REFERENCE BOOKS:**

1. AparnaTembulkar, Marketing Management, 2nd Edition. (2014) NiraliPrakashan, Pune.
  2. Kazmi S H, marketing Management: Text and Cases, 1<sup>st</sup> Edition, (2007), Excel Books, New Delhi.
  3. Philip Kotler, Kevin Lane Keller, Marketing Management –Global Edition,15<sup>th</sup>Edition. (2016) Pearson India Education Services PvtLtd.
  4. RajanSuxsena, Marketing Management, 5th Edition.( 2017) McGraw Hill Education (India) Private Limited.
  5. Ramaswamy, Namakumari, Marketing Management: planning, Implementation & Control, 6<sup>th</sup> Edition, (2018), Sage Publisher, New Delhi.
  6. Sherlekar S.A, Marketing Management, 13<sup>th</sup> Edition, (2008), Himalaya Publishing House, Mumbai
- .....

## BA 104: STATISTICS FOR BUSINESS ANALYTICS

Course Code	23 BA104	Course Delivery Method	Class Room / Blended Mode
Credits	04	CIA Marks	30
No. of Lecture Hours / Week	05	Semester End Exam Marks	70
Total Number of Lecture Hours	75	Total Marks	100

**Course Outcomes:** By the end of the course, students will be able

CO-1 To define data, statistics, information and its applicability in business analytics.

CO-2 To explain data management issues in statistics and elucidate how quality improvement in data can take place through data management.

CO-3 To explain various statistical techniques like correlation, regressions, testing of hypotheses etc. in statistical models.

CO-4 To calculate and apply various statistics using empirical data and their applicability in statistical models.

CO-5 To compare and contrast statistical models using forward, backward regressions (in multivariate) statistical models.

### Course Content

1.	Introduction to the course
2.	Data collection, editing and classification
3.	Data processing and presentation
4.	Diagrammatic and graphical representation of data
5.	Measures of central tendency
6.	Measures of central tendency
7.	Measures of dispersion: mean and quartile deviation
8.	Measures of dispersion: standard deviation
9.	Measures of dispersion: moments
10.	Measures of dispersion: skewness

11.	Measures of dispersion: kurtosis
12.	Introduction to probability
13.	Rules of probability
14.	Bayes' theorem

**References:**

1. Albright, S. C., & Winston, W. L. (2015). *Business analytics: Data analysis and decision making*. New Delhi: Cengage Learning.
2. Levin, R. I., & Rubin, D. S. (2008). *Statistics for management*. New Delhi: Pearson Education.

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## 23BA105: ESSENTIALS OF BUSINESS ANALYTICS

Course Code	23 BA105	Course Delivery Method	Class Room / Blended Mode
Credits	04	CIA Marks	30
No. of Lecture Hours / Week	05	Semester End Exam Marks	70
Total Number of Lecture Hours	75	Total Marks	100

**Course Outcomes:** By the end of the course, students will be able

- CO-1 To equip with types business analytics, types of machine learning, various tools and techniques used in machine learning.
- CO-2 To understand various concepts in business analytics like data mining, business intelligence supervised and unsupervised machine learning, data visualization, big data etc.
- CO-3 To apply the business analytics process life cycle to real life scenarios. Apply the techniques of ML to various data sets.
- CO-4 To analyze the differences supervised and unsupervised machine learning procedures.
- CO-5 To evaluate and interpret the datasets and the related analytics solutions to the business problem at hand.

### Course Content

#### Unit- I

**Introduction to Business Analytics:** Types of data, Integrating Analytics with business, Business Analytics for Competitive Advantage, Descriptive, Predictive, and Prescriptive Analytics, Dashboards. **(15Hours)**

#### Unit -II

Business Analytics Process Cycle **(15Hours)**

#### Unit-III

**Machine Learning;** Supervised Learning and Unsupervised Learning, Regression, Clustering & Segmentation, Data Reduction, Visual Analytics and Data Visualization. **(15Hours)**

#### Unit -IV

Affinity/ Association Analysis, (Market basket Analysis) Text Analytics, Spreadsheet Modelling **(15Hours)**

#### Unit -V

**SUGGESTED READINGS:**

1. Analytics at Work by Thomas H. Davenport, Jeanne G.Harris and Robert Morison, Harvard Business Press, 2010.
2. Getting Started with Business Analytics: Insightful Decision – Making by David Hardoon, GalitShmueli, Chapman & Hall/CRC, 2013.
3. Essentials of Business Analytics by Jeffrey Ohlmann, James J. Cochran, Michael Fry, Jeffrey D. Camm, David Anderson, Thomas Arthur Williams, Dennis Sweeney, South Western 2015.
3. Business Intelligence: A Managerial Approach by Efraim Turban, Ramesh Sharda, DursunDelen and Daid King, Pearson Publication, 2012.
4. Business Intelligence Making Decision through Data Analytics, Jerzy Surma, Business Expert Press, 2011.
5. Successful Business Intelligence: Secrets to Making BI a Killer App by Cindi Howson, Tata McGraw Hill Edition 2012.
6. R for Everyone: Advanced Analytics and Graphics, Jared Lander, Addison Wesley.



## 23 BA 106: BUSINESS ECONOMICS

Course Code	23 BA106	Course Delivery Method	Class Room / Blended Mode
Credits	04	CIA Marks	30
No. of Lecture Hours / Week	05	Semester End Exam Marks	70
Total Number of Lecture Hours	75	Total Marks	100

**Course Outcomes:** By the end of the course, students will be able

- CO-1 To understand the economic concepts include economic principles, role of managerial economist that is useful in business decision making.
- CO-2 To Apply the various business situations with the help of theory of demand, production concepts and various economic concepts.
- CO-3 To analyze the application of modern principles and methods of microeconomics to real-world business problems in different contexts like production, cost analysis as well as theories of profit.
- CO-4 To analyze the pricing strategies that result from different market situations and understand how and why firms come to be price takers, price makers or price shapers in the business world.
- CO-5 To articulate the macroeconomic concepts, role and consequences of government policy in a market economy.

### Course Content

#### UNIT – I

**Introduction to Business Economics:** Economics and Business Decision Making – Scarcity and Choice – Normative and Positive Economics – Economic and Business Environment (15Hours)

#### UNIT – II

**The Market System- I:** Understanding demand – Price and Demand – Shifts in demand – Concept of Elasticity and its applications – Consumer Behaviour – Consumer surplus. (15Hours)

#### UNIT – III

**The Market System – II:** The supply curve – Shifts in supply – The short run and long run – Types of costs – Economies of scale – Revenue and profit – Producer surplus (15Hours)

## UNIT – IV

**The Market System – III:** Different types of markets – Equilibrium – Perfect competition – Monopoly – Price discrimination – Imperfect competition – Market failures (15Hours)

## UNIT- V

**Macroeconomic issues:** Introduction to Aggregate demand and aggregate supply – Unemployment – Inflation – Introduction to Monetary and Fiscal policy – Trade and Growth (15Hours)

### *References:*

1. Mankiw N. Gregory, Mark P. Taylor, Andrew Ashwin, *Business Economics*, 2<sup>nd</sup> Edition, 2016, Cengage
2. Gillespie Andrew, *Business Economics*, 2<sup>nd</sup> Edition, 2013, Oxford University Press
3. Hirschey Mark, *Managerial Economics*, 12<sup>th</sup> Edition, 2013, Cengage Learning

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**22PG101: PERSONALITY DEVELOPMENT THROUGH LIFE ENLIGHTENMENT  
SKILLS**

<b>Course Code</b>	<b>22PG101</b>	<b>Course Delivery Method</b>	Class Room / Blended Mode
<b>Credits</b>	04	<b>CIA Marks</b>	30
<b>No. of Lecture Hours / Week</b>	04	<b>Semester End Exam Marks</b>	70
<b>Total Number of Lecture Hours</b>	60	<b>Total Marks</b>	100

**Course Outcomes:** By the end of this course the students should be able to:

CO-1 : Understand their Personality and achieve their highest Goals of Life.

CO-2: Learn to build Positive Attitude, Self-Motivation, enhancing Self-Esteem and Emotional Intelligence.

CO-3: Analyze and Develop Time management, Team management, Work ethics, Good manners and personal and professional Etiquettes.

CO-4 :Lead the nation and mankind to peace , prosperity and practice emotional self-regulation

CO-5: Learn to develop coping mechanism to manage Stress through Yoga and meditation Techniques and develop a versatile personality.

**Course Content**

**UNIT-I**

**Introduction to Personality Development:** The concept of personality - Dimensions of Personality – Theories of Personality development(Freud & Erickson) – The concept of Success and Failure – Factors responsible for Success –Hurdles in achieving Success and Overcoming Hurdles — Causes of failure – Conducting SWOT(Strengths, Weaknesses, Opportunities and Threats)analysis. **(15 Hours)**

**UNIT - II**

**Attitude, Motivation and Self-esteem:** Conceptual overview of Attitude – Types of Attitudes – Attitude Formation – Advantages/Disadvantages of Positive/Negative Attitude -Ways to Develop Positive Attitude Concept of motivation: Definition and Nature of Motivation/Motive – Internal and external motives – Theories of Motivation – Importance of self- motivation- Factors leading to de- motivation. Self-esteem - Definition and Nature of self-esteem – Do's and Don'ts to develop positive self- esteem – Low self-esteem - Personality having low self-esteem - Positive and negative self-esteem.**(15 Hours)**



### UNIT -III

**Other Aspects of Personality Development:** Body language - Problem-solving - Conflict Management and Negotiation- Decision-making skills - Leadership and qualities of a successful leader – Character building -Team-work – Time management - Work ethics – Good manners and etiquette – Emotional Ability/Intelligence – Dimensions of Emotional Intelligence – Building Emotional Intelligence. **(15 Hours)**

### UNIT – IV

**Neetisatakam-Holistic Development of personality:** Verses- 19,20,21,22 (wisdom) – Verses- 29,31,32 (pride and heroism) – Verses- 26,28,63,65 (virtue)Personality of Role Model – Shrimad BhagwadgeetaChapter2-Verses 17 – Chapter 3-Verses 36,37,42 – Chapter 4-Verses 18, 38,39 – Chapter18 – Verses 37,38,63**(15 Hours)**

### UNIT –V

**Yoga & Stress Management:** Meaning and definition of Yoga - Historical Perspective of Yoga - Principles of Astanga Yoga by Patanjali – Meaning and Definition of Stress - Types of Stress - Eustress and Distress –Stress Management – Pranayama- Pranayama: Anulom and Vilom Pranayama - Nadishudhi Pranayama Kapalabhati-Pranayama - Bhramari Pranayama - Nadanusandhana Pranayama – Meditation techniques: Om Meditation - Cyclic meditation : Instant Relaxation technique (QRT), Quick Relaxation Technique (QRT), Deep Relaxation Technique (DRT) **(Theory & Practical),(15 Hours)**

#### REFERENCETEXTBOOKS:

- 1) Hurlock,E.B. Personality Development,28thReprint.NewDelhi:TataMcGrawHill,2006.
- 2) Gopinath,RashtriyaSanskritSansthanamP,Bhartrihari”sThreeSatakam,Niti-sringar-vairagya, New Delhi, 2010
- 3) SwamiSwarupananda,Srimad Bhagavad Gita, Advaita Ashram, Publication Department,Kolkata, 2016.
- 4) Lucas,Stephen. Art of PublicSpeaking.NewDelhi.Tata -Mc-GrawHill.2001
- 5) Mile,D.J Power of positive thinking.Delhi.RohanBookCompany, (2004).
- 6) Pravesh Kumar.AllaboutSelf-Motivation.NewDelhi.GoodwillPublishingHouse.2005.
- 7) Smith,B.BodyLanguage.Delhi:RohanBookCompany.2004
- 8) YogicAsanasforGroupTraining-Part-I:JanardhanSwamiYogabhyasiMandal,Nagpur.
- 9) Rajayoga or Conquering the Internal Nature by Swami Vivekananda, Advaita Ashrama(Publication Department), Kolkata.
- 10) Nagendra H.Rnad NagaratnaR, Yoga Perspective in Stress Management, Bangalore.

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## 22BA1L1: SPREAD SHEET & ACCOUNTING PACKAGES

<b>Course Code</b>	22BA1L1	<b>Course Delivery Method</b>	Class Room / Blended Mode
<b>Credits</b>	04	<b>CIA Marks</b>	30
<b>No. of Lecture Hours / Week</b>	04	<b>Semester End Exam Marks</b>	70
<b>Total Number of Lecture Hours</b>	60	<b>Total Marks</b>	100

**Course Outcomes:** By the end of this course the students should be able to:

- CO-1 To familiarize Students with basic to intermediate skills for using Excel in the classroom vis-à-vis Business Applications
- CO-2 To provide students hands-on experience on MS-Excel in different versions of Microsoft OS.
- CO-3 To gain proficiency in creating solutions for Data Management and Reporting.
- CO-4 To learn about Tally Software and gain proficiency in creating and exporting data and reports obtained in Tally Software.
- CO-5 To impart knowledge in Tally and to provide practical application for using tally in organization.

### Course Content

#### UNIT-I

**Introduction:** Understanding Excel's Files, Ribbon and Shortcut– Create a workbook– Enter data in a Worksheet – Format a Worksheet, Format Numbers in a Worksheet – Create an Excel Table–Filter Data by using an Auto Filter, Sort Data by using an Auto Filter–Essential Worksheet Operations using Help(F1), Key Board Shortcuts–Working with Cells and Ranges: Formatting Cells, Name Manager – Visualizing Data Using Conditional Formatting: Apply Conditional Formatting – Printing Your Work: Print a Worksheet , Using Print Preview &Other Utilities.  
**(12Hours)**

#### UNIT-II

**Lab based Evaluation-1:** Working with Dates and Times & Text: Working with Dates & Time, Creating Formulas that Manipulate Text – Upper, Proper, Lower, Concatenate, Text to Column–Creating Formulas  
**(12Hours)**

### UNIT-III

**Lab based Evaluation-2:** Creating Formulas for Financial Applications: Introduction to Formulas e.g. PV, PMT, NPER, RATE, Creating Balance Sheet, Investment Calculations, Depreciation Calculations – Creating Charts and Graphics: Chart Your Data, Creating Spark line Graphics, Using Insert Tab Utilities–using Custom Number Formats:RightClick, Format Cells Window– Using Data Tab and Data Validation: Getting external Data, Remove Duplicates, Apply Data Validation & using Utilities from Data Tab – Analyzing Data with the Analysis Tool Pak: Correlation, Covariance, Descriptive Statistics, Histogram, Rank and Percentile, Regression, t-Test, Z Test.  
(12Hours)

### UNIT-IV

**Computers and Accounting:** Fundamentals of Computerized Accounting–Computerized Accounting Vs Manual Accounting–Features of Tally–Procedure for Creating a New Company – Directory Name / Mailing Name / Address / Groups Creation – Editing and Deleting Groups – Display of Predefined Vouchers – Voucher Creations and Alteration of Vouchers while or after Entering Transaction – Types of Vouchers – Payment Voucher – Receipt Voucher –Sales Voucher–Purchase Vouchers. (12Hours)

### UNIT-V

**Accounting Tally:** Ledger – Groups in Tally – Primary Groups, Sub-groups, Creation of Ledger -process of Creation of Ledger – Balance Sheet at the Gateway of Tally – Method of Showing Trading, Profit and Loss account and Balance Sheet Creation of Inventory Reports – Creation of Stock Categories – Stock Items– Stock Groups (12Hours)

#### REFERENCETEXTBOOKS:

1. Tally– Accounting software S.Palanivel –Marghan Publications
2. Computer Applications in Business–Dr.Raj Kumar
3. Text Books Excel 2010 Bible [With CDROM]by John Walkenbach, John Wiley & Sons, 2010Edition
4. Reference Books Excel 2007 for Dummies by Greg Harvey New Perspectives on Microsoft OfficeExcel2007
5. Supplementary Reading  
Material[www.hrdiap.gov.in/Downloads/04.MS%20Excel.pdf](http://www.hrdiap.gov.in/Downloads/04.MS%20Excel.pdf)[www.stern.nyu.edu/~jsimonof/classes/1305/pdf/excelreg.pdf](http://www.stern.nyu.edu/~jsimonof/classes/1305/pdf/excelreg.pdf)[www.goodwin.edu/computer\\_resources/pdfs/excel\\_2010\\_tutorial.pdf](http://www.goodwin.edu/computer_resources/pdfs/excel_2010_tutorial.pdf)[www.microagecs.com/apps/training/courseware/excel.pdf](http://www.microagecs.com/apps/training/courseware/excel.pdf)

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**Board of Studies for the academic Year 2022-23 (II and IV Semester)**  
**Department of Physics (PG)**

Minutes of the meeting was held on 10<sup>th</sup> March 2023 for PG Physics program in the ONLINE MODE

1. **Agenda:** To discuss and approve II and IV SEM syllabus and model question papers in the Board of Studies meeting.

2. **List of Members in BOS**

1.	Dr. T. Srinivasa Reddy, HOD, Physics	Chairman
2.	Dr. P. B. Sandhya Sri	University Nominee
3.	Dr. R. P Vijaya Lakshmi	Subject Expert
4.	Dr. D. Haranath	Outside Subject Expert
5.	Sri N. Mallikarjuna	Industrialist
6.	Dr. T. Srikumar	Alumni
7.	Smt. M. Tasneem, Assistant Professor	Member
8.	Sri. S. Vijaya Krishna, Assistant Professor	Member

**List of courses to be introduced/revised in Semester –II (R 22 regulations)**

<b>DEPARTEMNT OF PHYSICS</b>									
<b>LIST OF THE COURSES REVISED /INTRODUCED IN II SEMESTER 2022-23</b>									
S. No	Course	COURSE CODE	Offered in SEM	Type of the paper	Year of introduction	Year of revision	Page no	OBE with BTL	Offered to
1.	Statistical Mechanics	22PH2T1	II	Core	2020	2022-23		YES	M.SC (PHYSICS)
2.	Quantum Mechanics –I	22PH2T2	II	Core	2020	2022-23		YES	M.SC (PHYSICS)
3.	Solid State Physics	22PH2T3	II	Core	2020	2022-23		YES	M.SC (PHYSICS)
4.	Research Methodology & IPR	22PH2T4	II	Core	2020	2022-23 (Introduced)		YES	M.SC (PHYSICS)
<b>DOMAIN SPECIFIC ELECTIVE COURSES (CHOOSE ANY ONE)</b>									
5.	Computational Methods and Programming	22PH2T5	II	DSE	2020	2022-23		YES	M.SC (PHYSICS)
6.	Applied Spectroscopy	22PH2T6	II	DSE	2020	2022-23		YES	M.SC (PHYSICS)
7.	Photonics	22PH2T7	II	DSE	2020	2022-23		YES	M.SC (PHYSICS)
8.	General Physics – II	22PH2L1	I	Core	2020	2022-23 (10%)		YES	M.SC (PHYSICS)
9.	C-programming and Microprocessor	22PH2L2	I	Core	2020	2022-23 (10%)		YES	M.SC (PHYSICS)

The following resolutions are made in board of studies meeting for PG Physics program of second and fourth semesters for the year 2022-23 to recommend to the Academic Council for its approval.

## **RESOLUTIONS\RECOMENDATIONS**

1. It is resolved and recommend revision of syllabus and model question paper of title “Statistical Mechanics” with revised course code 22PH2T1 in II semester of M.Sc. (Physics) from the batch of students admitted in 2022-23 and onwards. For the syllabus and model question paper vide page no. from 7 to 8
2. It is resolved and recommend revision of syllabus and model question paper of title “Quantum Mechanics –I” with revised course code 22PH2T2 in II semester of M.Sc. (Physics) from the batch of students admitted in 2022-23 and onwards. For the syllabus and model question paper vide page no. from 10 to 11
3. It is resolved and recommend revision of syllabus and model question paper of title “Solid State Physics” with revised course code 22PH2T3 in II semester of M.Sc. (Physics) from the batch of students admitted in 2022-23 and onwards. For the syllabus and model question paper vide page no. from 13 to 14
4. It is resolved and recommended to introduce “Research Methodology& IPR ” with course code 22PH2T4 for the II semester of M.Sc. (Physics). For the syllabus of the paper vide page no. from 16
5. It is resolved and recommend revision of syllabus and model question paper of title “Computational Methods and Programming” with revised course code 22PH2T5 in II semester of M.Sc. (Physics) from the batch of students admitted in 2022-23 and onwards. For the syllabus and model question paper vide page no. from 19 to 20
6. It is recommended to introduce MAT lab for computational methods instead of C- language.
7. It is resolved and recommend revision of syllabus and model question paper of title “Applied Spectroscopy” with revised course code 22PH2T6 in II semester of M.Sc. (Physics) from the batch of students admitted in 2022-23 and onwards. For the syllabus and model question paper vide page no. from 22 to 23
8. It is resolved and recommend revision of syllabus and model question paper of title “Photonics” with revised course code 22PH2T7 in II semester of M.Sc. (Physics) from the batch of students admitted in 2022-23 and onwards. For the syllabus and model question paper vide page no. from 25 to 26
9. It is resolved and recommend revision of “General Physics - II” lab with revised course code 22PH2L1 in II semester of M.Sc. (Physics) from the batch of students admitted in 2022-23 and onwards. For the syllabus paper vide page no. 28
10. It is resolved and recommend revision of “C-programming and Microprocessor” lab with revised course code 22PH2L2 in II semester of M.Sc. (Physics) from the batch of students admitted in 2022-23 and onwards. For the syllabus paper vide page no. 30
11. It is resolved and recommended to continue the course structure, syllabus and model papers for IV semester of M.Sc. Physics according to R 20 regulations with course codes 20PH4T1, 20PH4T2, 20PH4T3, 20PH4T4, 20PH4L1, 20PH4L1 and Project (20PH4P1).



**P.B SIDDHARTHA COLLEGE OF ARTS & SCIENCE  
VIJAYAWADA**

***Under Choice Based Credit System***

Board of studies of

**M.Sc., PHYSICS**

***Semester – II***

(With effect from 2022-23)

# **M.Sc. Physics**

**(With effect from 2022-23 admitted batch)**

**Name of the Department: PHYSICS**

**Name of the Programme: Master of Science., Physics**

The M.Sc. (Physics) course shall be of two years' duration, extended over four semesters and grading system is followed in linewith national policies and international practices. The candidate shall be allowed a maximum of four years (8 semesters) of duration to be eligible for the award of M.Sc. (Physics) degree, failing which he / she shall have to register once again as a fresh candidate.

## **PROGRAMME OUTCOMES (POs)**

On successful completion of the M.Sc Physics programme the student will be able to:

PO1	Understand of the basic concepts of physics systematically
PO2	Apply physical principles and concepts to solve wide range of practical problems.
PO3	Plan and execute physics related investigations to analyze and evaluate the information using suitable methods.
PO4	Able to execute theoretical and experimental project work
PO5	Excel in research related to Physics and Material Characterization
PO6	Develop the ability to work independently and also in a group
PO7	Engage in life long learning and adapt to changing professional and societal needs

## M. Sc PHYSICS

(With effect from 2022-23 admitted batch)

### Course Summary:

#### Semester – II

Course Code	Course Name	Teaching Hours/ week			CORE / DSE/SEC	Internal Marks	External Marks	No. of Credits
		L	P	T				
22PH2T1	Statistical Mechanics	4	0	0	Core	30	70	4
22PH2T2	Quantum Mechanics –I	4	0	0	Core	30	70	4
22PH2T3	Solid State Physics	4	0	0	Core	30	70	4
22PH2T4	Research Methodology& IPR	3	1	0	SEC	30	70	3
<b>DOMAIN SPECIFIC ELECTIVE COURSES (CHOOSE ANY ONE)</b>								
22PH2T5	Computational Methods and Programming	4	0	0	DSE	30	70	4
22PH2T6	Applied Spectroscopy	4	0	0	DSE	30	70	4
22PH2T7	Photonics	4	0	0	DSE	30	70	4
<b>LAB PRACTICALS</b>								
22PH2L1	General Physics – II	0	6	0	Core	30	70	3
22PH2L2	C-programming and Microprocessor	0	6	0	Core	30	70	3
<b>TOTAL FOR SECOND SEMESTER</b>						<b>210</b>	<b>490</b>	<b>25</b>
At the end of 2 <sup>nd</sup> semester, every student must undergo summer Internship/Apprenticeship/Project work/Industrial training/Research based Project work for Six weeks and must prepare a report concerned as per approved project guidelines, and submit the same to the University 14 days before the commencement of third semester end examinations.								

L - Lecture, T- Tutorial & P – Practicals





## P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

Siddhartha Nagar, Vijayawada – 520 010

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### STATISTICAL MECHANICS

**Offered to :** M.Sc.(PHYSICS)

**Course Code:** 22PH2T1

**Course Type :** Core

**Course:** STATISTICAL MECHANICS

**Year of Introduction :** 2004

**Year of offering :** 2023

**Year of Revision :** 2022

**Percentage of Revision :** Nil

**Semester :** II

**Credits :** 4

**Hours Taught :** 60 hrs. per Semester

**Max.Time :** 3 Hours

**Course Description :** Statistical Mechanics (22PH2T1) is a mathematical framework that applies statistical methods and probability theory to large assemblies of microscopic entities. It does not assume or postulate any natural laws, but explains the macroscopic behavior of the nature from the behavior of such ensembles. Statistical mechanics arose out of the development of classical thermodynamics, which successfully explains macroscopic physical properties—such as temperature, pressure, and heat capacity—in terms of microscopic parameters that fluctuate about average values and are characterized by probability distributions. The Statistical mechanics introduces the statistical ensemble, which is a large collection of virtual, independent copies of the system in various states. The statistical ensemble is a probability distribution over all possible states of the system. In classical statistical mechanics, the ensemble is a probability distribution over phase points, usually represented as a distribution in a phase space with canonical coordinate axes. In quantum statistical mechanics, the ensemble is a probability distribution over pure states, and can be compactly summarized as a density matrix.

#### Course Objectives:

1. Understand the basic concepts of statistical mechanic , phase space and ensembles
2. Understand theorems and applying conclusions to specific problems related to large group of particles
3. Understand the ensembles and partition function
4. Understand the particle distributions and applications .
5. Apply statistical laws to the stellar object and particles to understand the evolution of universe and to study the properties of matter

**Course Outcomes:** At the end of this course, students should be able to:

- CO1 :Understand the basic concepts of statistical mechanics.
- CO2 :Understand theorems of statistical mechanics
- CO3 : Understand the ensembles and partition function
- CO4 : Understand the particle distributions and applications .

CO 5 : Apply statistical laws to the stellar object and particles .

<b>Syllabus</b>		
<b>Unit</b>	<b>Learning Units</b>	<b>Lecture Hours</b>
I	<b>Unit-I: Basics of Classical Statistical Mechanics</b> Introduction, Microstates and Macro states, Phase space, Volume in Phase space, Ensembles- Types of Ensembles, Ensemble average, Liouville's theorem, Conservation of extension in phase, Equation of motion and Liouville theorem, Equal a priori probability, statistical equilibrium. (CO1)	12
II	<b>Unit-II: Canonical and Grand Canonical Ensembles</b> Micro canonical ensemble – Ideal gas in micro canonical ensemble, Gibbs paradox, Canonical ensemble - Ideal gas in canonical ensemble, Grand canonical ensemble - Ideal gas in grand canonical ensemble, Comparison of various ensembles. Equipartition theorem. (CO2)	12
III	<b>Unit-III: Partition functions</b> Canonical partition function, Molecular partition function, Translational partition function, Rotational partition function, Vibrational partition function, Electronic and Nuclear partition function, Application of rotational partition function, Application of vibrational partition function to solids. (CO3)	12
IV	<b>UNIT IV: Ideal Bose -Einstein Gas</b> Bose-Einstein distribution, Bose-Einstein condensation, thermodynamic properties of an Ideal Bose-Einstein gas, liquid helium, Two-fluid model of liquid Helium II, Super fluid phases of $^3\text{He}$ . (CO4)	12
V	<b>UNIT -V: Ideal Fermi-Dirac Gas</b> Fermi-Dirac distribution, Degeneracy, electrons in metals, Thermionic emission, Magnetic susceptibility of free electrons, White Dwarfs, Nuclear Matter.	12

### Reference Books:

1. Statistical and Thermal Physics, S. LOKANADHAN and R.S. GAMBHIR(PHI).
2. Statistical Mechanics: Theory and Applications, S.K. SINHA (Tata Mc Graw-Hill).
3. Statistical Mechanics, GUPTA AND KUMAR (Pragati Prakashan, Meerut).
4. Statistical Mechanics, by SATYAPRAKASH.
5. Statistical Mechanics, K. HUANG (John Wiley & Sons).

**Course Delivery method :** Face-to-face / Blended

**Course has focus on :** Employability

**Websites of Interest :** <https://nlist.inflibnet.ac.in/vsearch.php>

**Co-curricular Activities Quiz.**

**P.B. Siddhartha College of Arts & Science, Vijayawada - 520 010.**  
**(An Autonomous College in the jurisdiction of Krishna University)**  
**M.Sc., (PHYSICS) Programme – II Semester**  
**Course Code: 22PH2T1 Title: STATISTICAL MECHANICS**  
**(w.e.f admitted batch 2022-23)**

**Time: 3 Hours**

**Max. Marks: 70**

**SECTION-A**

<b>Q.NO</b>	<b>Answer All Questions</b>		<b>5x4=20M</b>
1.	(A) Explain the concept of microstates and macrostates (Or) (B) Explain different types of ensembles	(CO1)	L2
2.	(A) Discuss ideal gas in canonical ensemble (Or) (B) Distinguish between various ensembles	(CO2)	L2
3.	(A) Explain the canonical partition function (Or) (B) Explain the molecular partition function	(CO3)	L1
4.	(A) Discuss the properties of liquid Helium (Or) (B) Discuss the thermodynamic properties of Ideal –Bose gas	(CO4)	L1
5.	(A) Explain thermionic emission (Or) (B) Discuss the nature of electrons in metals	(CO5)	L1

**SECTION-B**

**Answer All Questions**

**5x10=50M**

6.	(A) Define phase space? Explain the concept of phase trajectories. (Or) (B) State and prove Liouville's theorem	(CO1)	L2
7.	A) Discuss Gibb's paradox (Or) B) State and prove equipartition theorem	(CO2)	L2
8.	A). Discuss vibrational and rotational partition function (Or) B) Explain the applications of vibrational partition function.	(CO3)	L3
9.	A) Explain Bose-Einstein condensation. (Or) B) Discuss the B-E statistics.	(CO4)	L2
10.	A) Explain F-D statistics. (Or) B) Explain the theory of white-Dwarf stars	(CO5)	L2

**Note: Question paper contains 5 short answers with internal choice from each unit and 5 long answer questions with internal choice from each unit.**



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### **QUANTUM MECHANICS-I**

**Offered to :** M.Sc.(PHYSICS)

**Course Code:** 22PH2T2

**Course Type :** Core

**Course:** QUANTUM MECHANICS-I

**Year of Introduction :** 2004

**Year of offering :** 2023

**Year of Revision :** 2022

**Percentage of Revision :** nil

**Semester :** II

**Credits :** 4

**Hours Taught :** 60 hrs. per Semester

**Max.Time :** 3 Hours

**Course Description :** Quantum Mechanics - I (22PH2T2) course is intended to give insights to the students on origin of the Quantum Mechanics. It arose gradually from theories to explain observations which could not be reconciled with classical physics, such as the black-body radiation, the photoelectric effect etc.,. These early attempts to understand microscopic phenomena, led to the development of quantum mechanics in the mid-1920s by Niels Bohr, Erwin Schrödinger, Werner Heisenberg, Max Born, Paul Dirac and others. Quantum mechanics describes the physical systems at the scale of atoms and subatomic particles. It is the foundation of all quantum physics including quantum chemistry, quantum field theory, quantum technology, and quantum information science. Quantum mechanics differs from classical physics in that energy, momentum, angular momentum, and other quantities of a bound system are restricted to discrete values (quantization), objects have characteristics of both particles and waves (wave-particle duality), and there are limits to how accurately the value of a physical quantity can be predicted prior to its measurement, given a complete set of initial conditions (the uncertainty principle). The modern theory is formulated in various specially developed mathematical formalisms. For example, a wave function provides information, in the form of probability amplitudes, about what measurements of a particle's energy, momentum, and other physical properties may yield.

#### **Course Objectives:**

1. To solve Schrodinger equation for different systems and find energy eigen values and eigen functions.
2. To learn the mathematical formulation of quantum mechanics
3. To study equation of motion in different pictures and states of identical particles.
4. To learn solving time independent perturbation problems.
5. To learn solving time dependent perturbation problems.

**Course Outcomes :** At the end of this course, students should be able to:

CO1: Understand the basic concepts of Schrodinger equation and using it solve different problems

CO2: Define all operators of quantum mechanics.

CO3: Apply the concept of equation of motion to different problems in different pictures.

CO4: To solve time independent perturbation problems

CO5: To solve time dependent perturbation problems

<b>Syllabus</b>		
<b>Unit</b>	<b>Learning Units</b>	<b>Lecture Hours</b>
I	<b>Schrodinger wave equation and potential problems in one dimension</b> Inadequacy of classical mechanics, Necessity of quantum mechanics, Postulates of Quantum Mechanics, Physical interpretation of the wave function, Normalized and orthogonal wave functions, (i) Time independent Schrödinger equation (ii) Time dependent Schrödinger equation, Expectation values of dynamical quantities, Continuity equation, Ehrenfest theorem, Stationary states, <i>One - dimensional problems</i> : Particle in a box, Potential step, Rectangular potential barrier, Linear Harmonic oscillator by Schrodinger equation. (CO1)	12
II	<b>Linear Vector spaces and Operators</b> Linear Vector Space, Hilbert space, Linear operators: Momentum Operator, Hamiltonian Operator, Hermitian operators and their properties, Parity Operator, Projection Operator, Inverse and Unitary Operators, Eigen values and Eigen functions of an Operator, Dirac's Bra and Ket notations, Uncertainty relation between two operators, Commutator algebra. (CO2)	12
III	<b>Equation of motion and Identical Particles</b> Equation of motion in Schrodinger's picture and Heisenberg's picture, Correspondence between the two, Correspondence with classical mechanics, Application of Heisenberg's picture to Harmonic oscillator, The indistinguishability of identical particles, Symmetric and anti symmetric wave functions, Creation, Annihilation operators and their properties. (CO3)	12
IV	<b>Time-independent perturbation</b> Time-independent perturbation theory: Non-degenerate perturbation theory - evaluation of first order perturbation and second order perturbation - Ground state of Helium atom. Degenerate perturbation theory-Effect of electric field on the n=2 state of Hydrogen (Stark effect in Hydrogen), Variation method - ground state of Helium atom, WKB approximation method, Validity of WKB method. (CO4)	12
V	<b>Time dependent perturbation</b> Introduction, Time - dependent perturbation: General perturbations, variation of constants, and transition into closely spaced levels – Fermi's Golden rule, Interaction of an atom with the electromagnetic radiation, Absorption and emission of radiation, Einstein transition probabilities, Sudden and adiabatic approximation(CO5)	12

**Reference Books:**

1. Quantum mechanics: Concepts and Applications, N. ZETTILI (John Wiley & Sons).
2. Quantum Mechanics : G. Aruldas
3. Quantum Mechanics: D.J. Griffith, Prentice Hall
4. Foundations of Quantum Mechanics, R.D. RATNA RAJU (I.K. Int PubHouse).
5. Quantum Mechanics, L.I. SCHIFF(McGraw-Hill).

**Course Delivery method :** Face-to-face / Blended

**Course has focus on :** Employability

**Websites of Interest :** <https://nlist.inflibnet.ac.in/vsearch.php>

**Co-curricular Activities :** Quiz.

**P.B. Siddhartha College of Arts & Science, Vijayawada - 520 010.**  
**(An Autonomous College in the jurisdiction of Krishna University)**  
**M.Sc., (PHYSICS) Programme – II Semester**  
**Course Code: 22PH2T2 Title: Quantum Mechanics-I**  
**(w.e.f admitted batch 2022-23)**

**Time: 3 Hours**

**Max. Marks: 70**

**SECTION-A**

- | Q.No | Answer All Questions   | 5x4=20M  |
|------|--|----------|
| 1.   | (a) Explain two inadequacies of classical mechanics.<br>Or<br>(b) Briefly discuss the postulates of quantum mechanics. | (CO1) L1 |
| 2.   | (a) Discuss projection operator.<br>Or<br>(b) what is Dirac's Bra and Ket notation                                     | (CO2) L1 |
| 3.   | (a) Discuss identical particles<br>Or<br>(b) Define Schrodinger's picture and Heisenberg's picture.                    | (CO3) L1 |
| 4.   | (a) Discuss time independent perturbation theory.<br>Or<br>(b) Discuss variation method .                              | (CO4) L1 |
| 5.   | (a) Discuss time dependent perturbation method.<br>Or<br>(b) Discuss sudden approximation.                             | (CO5) L1 |

**SECTION-B**

- | Q.No | Answer All Questions  | 5x10=50M |
|------|---|----------|
| 6.   | (a) Derive Schrodinger's time independent and time dependent equations.<br>(Or)<br>(b) Find the energy eigen values of a particle in a finite well                                  | (CO1) L1 |
| 7.   | (a) Define Hermitian operator. State and prove its properties.<br>(Or)<br>(b) Derive the uncertainty relation between two operators.  | (CO2) L1 |
| 8.   | (a) Derive equation of motion in Schrodinger picture and show the correspondence with classical mechanics<br>(Or)<br>(b) Write notes on symmetric and antisymmetric wave functions. | (CO3) L2 |
| 9.   | (a) Discuss Stark effect in Hydrogen atom using time independent perturbation theory<br>(Or)<br>(b) Discuss WKB approximation method .  | (CO4) L2 |
| 10.  | (a) Explain time dependent perturbation theory and hence derive Fermi golden rule.<br>(Or)<br>(b) Discuss adiabatic approximation .   | (CO5) L2 |

**Note: Question paper contains 5 short answers with internal choice from each unit and 5 long answer questions with internal choice from each unit.**



## **P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE**

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### **SOLID STATE PHYSICS**

**Offered to :** M.Sc.(PHYSICS)

**Course Type :** Core

**Year of Introduction :** 2004

**Year of Revision :** 2022

**Semester :** II

**Hours Taught :** 60 hrs. per Semester

**Course Code:** 22PH2T3

**Course:** Solid State Physics

**Year of offering :** 2023

**Percentage of Revision :** Nil

**Credits :** 4

**Max.Time :** 3 Hours

**Course Description:** Solid State Physics (22PH2T3) will enable the student to employ classical and quantum mechanical theories needed to understand the physical properties of solids. It is the branch of physics that studies how the large-scale properties of solid materials result from their atomic-scale properties. Thus, solid-state physics forms a theoretical basis of materials science. Many properties of materials are affected by their crystal structure. This structure can be investigated using a range of crystallographic techniques, including X-ray crystallography, neutron diffraction and electron diffraction. The sizes of the individual crystals in a crystalline solid material vary depending on the material involved and the conditions when it was formed. Most crystalline materials encountered in everyday life are polycrystalline, with the individual crystals being microscopic in scale, but macroscopic single crystals can be produced either naturally (e.g. diamonds) or artificially.

#### **Course Objectives:**

1. To understand the basic theory of structure and composition of the solid.
2. To understand the properties of the crystalline materials.
3. To learn the concepts of reciprocal lattice and Brillouin zone schemes.
4. To understand the effect of magnetic and electric field on the crystalline materials.
5. To enhance the ability of students to understand electron and band theories.

#### **Course Outcomes:**

At the end of this course the students should be able to:

- CO1: Understand the basic concepts of translation vectors, lattices, symmetry operations, lattice types and simple crystal structures.
- CO2: Understand the experimental diffraction methods, reciprocal lattice and Brillouin zones
- CO3: Understand the properties of the free electron gas.
- CO4: Understand the concepts of Fermi levels and quantization of orbits in magnetic fields.
- CO5: Understand the concepts of band gap and various electronics models in solids.

<b>Syllabus</b>		
<b>Unit</b>	<b>Learning Units</b>	<b>Lecture Hours</b>
I	<b>Introduction to crystallography</b> Periodic array of atoms- Lattice translation vectors, Basis and the Crystal Structure, Primitive Lattice cell, Fundamental types of lattices-Two Dimensional lattice types, three Dimensional lattice types- Index system for crystal planes- simple crystal structures; sodium chloride- cesium chloride – Hexagonal Close Packed Structure -Diamond Structure- Zinc Sulfide structure	12
II	<b>Crystal Diffraction and Reciprocal Lattice</b> Bragg's law, scattered wave amplitude-Reciprocal Lattice vectors-Diffraction conditions- Laue Equations, Brillouin Zones - Reciprocal lattice to SC lattice, BCC lattice and FCC lattices, properties of reciprocal lattice, geometrical structure factor- BCC lattice and FCC lattices, atomic form factor.	12
III	<b>Free Electron Fermi Gas</b> Energy levels in one-dimension, Free electron gas in 3 dimensions, Heat capacity of the electron gas- Experimental heat capacity of metals, electrical conductivity and Ohms law – experimental electrical resistivity of metals, Motion in Magnetic Fields, Hall effect, thermal conductivity of metals - Ratio of thermal to electrical conductivity- Widemann Franz ratio.	12
IV	<b>Fermi Surfaces of Metals</b> Reduced zone scheme - periodic Zone schemes- Construction of Fermi surfaces- Electron orbits, hole orbits and open orbits, Experimental methods in Fermi surface studies – Quantization of orbits in a magnetic field, De-Hass-van Alphen Effect, extremal orbits, Fermi surface of Copper. Fermi surface of gold, Magnetic breakdown.	12
V	<b>Band Theory of Solids</b> Failure of free electron theory of metals, Nearly free electron model-Origin of the energy gap- The Bloch theorem- Kronig-Penney Model, wave equation of electron in a periodic potential distinction between metals, insulators and intrinsic semiconductors, Effective mass of electron-Crystal momentum of an electron-Approximate solution near a zone boundary.	12

**Text and Reference Books:**

1. Solid State Physics, A.J. DEKKER (Macmillan).
2. Introduction to Solid State Physics, CHARLES KITTEL (John Wiley & Sons).
3. Introduction to Solid State Physics, ARUN KUMAR (PHI).
4. Elements of Solid State Physics, J.P. SRIVASTAVA (PHI).
5. Solid State Physics, GUPTA and KUMAR (K. Nath & Co.)
6. Solid State Physics and electronics R.K.PURI & V.K BABBAR ( S.CHAND)

**Course Delivery method :** Face-to-face / Blended

**Course has focus on :** Employability



**Websites of Interest** :<https://nlist.inflibnet.ac.in/vsearch.php>

**Co-curricular Activities** : Quiz.

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**(An Autonomous College in the jurisdiction of Krishna University)**  
**M.Sc., (PHYSICS) Programme – II Semester**  
**Course Code: 22PH2T3 Title: SOLID STATE PHYSICS**  
**(w.e.f admitted batch 2022-23)**

**Time: 3 Hours**

**Max. Marks: 70**

**SECTION-A**

Answer all questions

5x4=20 M

1. (a) Define lattice translation vectors and Primitive lattice vectors with examples  
(or)  
(b) Explain the two Dimensional lattice types with examples. CO1, L2
2. (a) Explain Bragg's law in crystal diffraction.  
(or)  
(b) Explain the concept of Brillion zone CO1, L2
3. (a) Explain the electrical conductivity and Ohms.  
(or)  
(b) Explain the electrical resistivity of the metals. CO1, L2
4. (a) Explain the periodic zone scheme.  
(or)  
(b) Explain the construction of Fermi surfaces. CO1, L2
5. (a) What are the failures of free electron theory of metals?  
(or)  
(b) Explain the Origin of the energy gap CO1, L2

**SECTION-B**

**Answer all questions**

**5x10=50M**

6. (a) Explain classification of different three dimensional lattices  
(Or)  
(b) Explain the crystal structure of sodium chloride and diamond structures CO1,L2
7. (a) Give an account of Laue method of crystal structure analysis. CO2, L2  
(Or)  
(b) Explain the reciprocal lattice of BCC is FCC.
8. (a) Explain the free electron gas in one dimensional energy level. CO3, L2  
(Or)  
(b) Explain the motion of electron in magnetic fields.
9. (a) Explain the construction of Fermi surfaces.  
(Or)  
(b) Explain the quantization of orbits in a magnetic field CO4, L2
10. (a) Using kronig penny model explain the motion of electron in a periodic potential  
(Or)  
(b) State and explain Bloch's theorem CO5, L2

**Note: Question paper contains 5 short answers with internal choice from each unit and 5 long answer questions with internal choice from each unit.**



## **P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE**

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### **RESEARCH METHODOLOGY & IPR**

**Offered to :** M.Sc.(PHYSICS)

**Course Type :** SEC

**Year of Introduction :** 2004

**Year of Revision :** 2022

**Semester :** II

**Hours Taught :** 60 hrs. per Semester

**Course Code:** 22PH2T4

**Course: RESEARCH METHODOLOGY & IPR**

**Year of offering :** 2023

**Percentage of Revision :** 100 %

**Credits :** 3

**Max.Time :** 3 Hours

**Course Description:** Research Methodology & IPR (22PH2T4) course is aimed to develop research bent of mind (spirit of inquiry) and impart research skills to the all Post graduate students. It also encompasses the series of research methodology contents: from problem formulation, to design, to data collection, analysis, reporting and dissemination. This course also covers intellectual property rights (IPR), and intended to equip students with conceptual understandings of current scenario of IPR, and the practical issues encountered in filing patents, trademarks and copyrights.

#### **Course Objectives:**

1. To understand some basic concepts of research and its methodologies
2. To develop an understanding of the basic framework of research designs and techniques.
3. To identify various sources of information for literature review and data collection.
4. To ability to write a research Proposal, report and thesis
5. To demonstrate knowledge and understanding of IPR Filing and Rights Course Learning

**Course Outcomes:** At the end of this course, students should be able to:

CO1: Understand some basic concepts of research and its methodologies

CO2: Identify appropriate research topics

CO3: Select and define appropriate research problem and parameters

CO4: Demonstrate the ability to choose methods appropriate to research aims and objectives

CO5: Write a research report and thesis, File Patents, Trademarks and Copy Rights

<b>Syllabus</b>		
<b>Unit</b>	<b>Learning Units</b>	<b>Lecture Hours</b>
I	<b>Foundations of Research &amp; Research Design</b> Meaning of Research – Definitions of Research – Motivation in Research – General Characteristics of Research – Criteria of Good Research – Types of Research – Research Process – Research Methods vs. Methodology – Defining and Formulating the Research Problem – Review of Literature – Approaches to Critical Literature Review – Importance of Literature Review in Identifying Research Gaps and Defining a Problem – Development of Working Hypothesis.	12
II	<b>Research Design, Sampling Concepts, and Data Collection Methods</b> Meaning, Significance and Characteristics of Good Research Design–Types of Research Design: Exploratory, Conclusive Research and Experimental – Sampling Theory: Types of Sampling and Errors in Sampling – Data Collection: Types of Data – Data Collection Methods and Techniques for Primary and Secondary Data.	12
III	<b>Measurement &amp; Scaling Techniques, Hypothesis Formulation and Testing, Overview of Data Analysis and Report Writing</b> Basic measurement scales –Reliability & Validity – Definition and Types of Hypothesis–Hypothesis Formulation and Testing Procedure – Overview of Data Analysis: Methods, Process and Types–Report Writing: Significance of Report Writing, Different Steps in Writing Report, Layout of the Research Report, Types of Reports, Oral Presentation, Mechanics of Writing a Research Report Precautions for Writing Research Reports – How to Write a Research Proposal– Research Ethics, Conflict of Interest and Plagiarism.	12
IV	<b>Intellectual Property Rights (IPR)</b> Definition and Nature and Features of Intellectual Property Rights (IPR) –Types of Intellectual Property Rights – Procedure for Grants of Patents –Rights of a Patent – Scope of a Patent Rights-Licensing and Transfer of Technology–Why protection of intellectual property is important? Enforcement of IPR – Infringement of IPR	12
V	<b>Indian and International Scenario and New Developments in IPR</b> IPR Developments in India for the past Five Years – Development of IPR Laws in India – International Cooperation on IPR – New Developments in IPR – Administration of Patent System –International Patent protection – Case Studies in Indian and Global Contexts.	12

**PRACTICAL COMPONENTS:**

1. Students should identify different research problems with examples and describe the characteristics of researchable problems in their academic area/society/community/organization concerned.
2. Students are to form in groups (a group consists of 4-6 students) and conduct critical literature survey with regard to the identified research problems and prepare a brief literature review coupled with research gaps and working hypothesis.
3. Students are required to identify and develop good research design to address the defined research

problems.

4. Students are expected to write the research design on Exploratory and Descriptive Research.

5. Students are required to develop practical experience in writing a research proposal by conducting a thorough critical review of any three research proposals (examples).

6. Students are expected to develop templates for technical report writing. Students should conduct a team based mini research project, which is a unified and practical case on a topic of their choice, with approximately 4-6 students per group.

7. Students are expected to identify types of plagiarism in academic research, and how to avoid plagiarism in research.

8. Students are asked to identify and submit a brief report on Indian patents of International repute.

9. Students are asked to write on Patent registration procedure, and visit Official website of Intellectual Property India <https://ipindia.gov.in> to know how to get IPR in India.

10. Students are asked to identify and summarise remedies available against the infringement of intellectual property rights in Indian and global contexts. Students are asked to submit any five examples of ethical issues in copyright and patents.

#### **Text and Reference Books:**

1. Garg, B.L., Karadia, R., Agarwal, F. and Agarwal, U.K., 2002, An introduction to Research Methodology, RBSA Publishers.
2. Cohen, L. Lawrence, M., & Morrison, K. (2005), Research Methods in Education (5th edition). Oxford: Oxford University Press.
3. Kothari, C.R., 1990, Research Methodology: Methods and Techniques, New Age International.
4. Dornyei, Z. (2007). Research Methods in Applied Linguistics. Oxford: Oxford University Press.
5. Anthony, M., Graziano, A.M. and Raulin, M.L., 2009, Research Methods: A Process of Inquiry, Allyn and Bacon.
6. Fink, A., 2009, Conducting Research Literature Reviews: From the Internet to Paper. Sage Publications.
7. Day, R.A., 1992, How to Write and Publish a Scientific Paper, Cambridge University Press.
8. Wadehra, B.L. 2000, Law relating to patents, trade marks, copyright designs and geographical indications. Universal Law Publishing.
9. Coley, S.M. and Scheinberg, C. A., 1990, Proposal Writing, Sage Publications.
10. Carlos, C.M., 2000. Intellectual property rights, the WTO and developing countries: the TRIPS agreement and policy options, Zed Books, New York.
11. Leedy, P.D. and Ormrod, J.E., 2004, Practical Research: Planning and Design, Prentice Hall.
12. Satarkar, S.V., 2000. Intellectual property rights and Copy right. Ess Ess Publications.

**Course Delivery method :** Face-to-face / Blended

**Course has focus on :** Employability

**Websites of Interest :** <https://nlist.inflibnet.ac.in/vsearch.php>

**Co-curricular Activities :** Programming Contests&Quiz.



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### COMPUTATIONAL METHODS AND PROGRAMMING

**Offered to :** M.Sc.(PHYSICS)

**Course Type :** DSE

**Year of Introduction :** 2004

**Year of Revision :** 2022

**Semester :** II

**Hours Taught :** 60 hrs. per Semester

**Course Code:** 22PH2T5

**Course:** Computational methods and programming

**Year of offering :** 2023

**Percentage of Revision :** Nil

**Credits :** 4

**Max.Time :** 3 Hours

**Course Description:** M.Sc. (Physics) course shall be of two years' duration, extended over four semesters and grading system is followed in line with national policies and international practices. The candidate shall be allowed a maximum of four years (8 semesters) of duration to be eligible for the award of M.Sc. (Physics) degree, failing which he / she shall have to register once again as a fresh candidate.

**Course Objectives:**

1. To understand the fundamentals of C- language.
2. To improve the Programming skills.
3. To understand the importance and applications of Arrays.
4. To understand various numerical methods used in computation and C- programming.
5. To solve simple problems pertaining to Physics using these methods.

**Course Outcomes:** At the end of this course, students should be able to:

CO1: Understand the concepts of fundamentals of data types and operators.

CO2: Understand the concepts of I/O statements and control statements.

CO3: Understand the concepts of Arrays.

CO4: Solve the mathematical as well as numerical computations problems by different methods.

CO5: Understand the importance of errors and accuracy of the numerical calculations and its practical implementation in the measurements

<b>Syllabus</b>		
<b>Unit</b>	<b>Learning Units</b>	<b>Lecture Hours</b>
I	<p><b>Fundamentals and Operators</b>  <b>Fundamentals of C Language:</b> C character set-Identifiers and Keywords- Constants- Variables- Data types-Declarations of variables – Declaration of storage class - Defining symbolic constants –Assignment statement.  <b>Operators:</b> Arithmetic operators-Relational Operators-Logic Operators-Assignment operators-Increment and decrement operators –Conditional operators.</p>	12
II	<p><b>Expressions, I/O and Control Statements</b>  <b>Expressions and I/O Statements:</b> Arithmetic expressions –Precedence of arithmetic operators- Type converters in expressions –Mathematical (Library ) functions –Data input and output-The getchar and putchar functions –Scanf – Printf-Simple programs.  <b>Control statements:</b> If-Else statements –Switch statements-The operators –GO TO – While, Do-While, FOR statements-BREAK and CONTINUE statements.</p>	12
III	<p><b>Arrays and User Defined Functions</b>  <b>Arrays:</b> One dimensional and two dimensional arrays –Initialization –Type declaration - Inputting and outputting of data for arrays –Programs of matrices addition, subtraction and Multiplication  <b>User Defined Functions:</b> The form of C functions –Return values and their types – Calling a function – Category of functions. Nesting of functions. Recursion. ANSI C functions-Function declaration.</p>	12
IV	<p><b>Linear, Nonlinear and Simultaneous Equations</b>  <b>Linear and Nonlinear Equations:</b> Solution of Algebra and transcendental equations- Bisection, False position and Newton-Raphson methods-Basic principles-Formulae- algorithms  <b>Simultaneous Equations:</b> Solutions of simultaneous linear equations - Gauss elimination and Gauss Seidel iterative methods-Basic principles-Formulae-Algorithms</p>	12
V	<p><b>Interpolations, Numerical Differentiation and Integration</b>  <b>Interpolations:</b> Concept of linear interpolation-Finite differences-Newton's and Lagrange's interpolation formulae-principles and Algorithms  <b>Numerical Differentiation and Integration:</b> Numerical differentiation-algorithm for evaluation of first order derivatives using formulae based on Taylor's series-Numerical integration- Trapezoidal and Simpson's 1/3rule-Formulae-Algorithms</p>	12

**Text and Reference Books:**

1. S.S. SASTRY, Introductory methods of Numerical Analysis (PHI).
2. E. BALAGURUSAMY, Numerical Methods (McGrawHill).
3. BYRON S. GOTTFRIED , Programming with (Schaum'sOutlines).
4. E. BALAGURUSAMY, Programming in ANSI C (TataMcGraw-Hill).

**Course Delivery method :** Face-to-face / Blended

**Course has focus on :** Employability

**Websites of Interest :** <https://nlist.inflibnet.ac.in/vsearch.php>

**Co-curricular Activities :** Programming Contests&Quiz.

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**M.Sc., (PHYSICS) Programme - II Semester**

**Course Code: 20PH2T5 Title: COMPUTATIONAL METHODS AND PROGRAMMING  
(w.e.f admitted batch 2022-23)**

**Time: 3 Hours**

**Max. Marks: 70**

**Section A**

**Answer All Questions**

**5x4=20M**

1. (a) Explain C- character set and symbolic constants  
(Or)  
(b) Explain the declaration of Variables. CO1, L2
2. (a) Define scanf and printf statements  
(Or)  
(b) Discuss data input and output. CO2, L2
3. (a) Discuss the concept of Arrays  
(Or)  
(b) Discuss the form of c functions CO3, L2
4. (a) Explain linear equations.  
(Or)  
(b) Discuss simultaneous equations with examples CO4, L2
5. (a) Explain the concept of interpolation.  
(Or)  
(b) Explain numerical differentiation. CO5, L2

**Section B**

**Answer All Questions**

**5x10=50 M**

6. (a) Discuss the different Data types and constants in C- Language.  
(Or)  
(b) Explain Operators in C-Language with examples. CO1, L2
7. (a) Explain getch and putchar functions with examples.  
(Or)  
(b) Explain the operators WHILE, BREAK and FOR CO2, L2
8. (a) Explain in one dimensional Arrays with example.  
(Or)  
(b) Explain the return values and their types in C functions. CO3, L2
9. (a) Explain Newton-Raphson method to evaluate the root of equation f(x) and write its algorithm  
(Or)  
(b) Explain the Gauss elimination method for solving of simultaneous linear Equations. CO4, L2
10. (a) Explain the Lagrange's interpolation formula and write its algorithm for evaluate function.  
(Or)  
(b) Discuss the Trapezoidal rule with algorithm. CO5, L2

**Note: Question paper contains 5 short answers with internal choice from each unit and 5 long answer questions with internal choice from each unit.**



## **P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE**

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### **APPLIED SPECTROSCOPY**

**Offered to :** M.Sc.(PHYSICS)

**Course Code:** 22PH2T6

**Course Type :** DSE

**Course:** Applied spectroscopy

**Year of Introduction :** 2004

**Year of offering :** 2023

**Year of Revision :** 2022

**Percentage of Revision :** 100%

**Semester :** II

**Credits :** 4

**Hours Taught :** 60 hrs. per Semester

**Max.Time :** 3 Hours

**Course Description:** Applied Spectroscopy (22PH2T6) is the application of various spectroscopic methods for the detection and identification of different elements or compounds to solve problems in fields like forensics, medicine, the oil industry, atmospheric chemistry, and pharmacology. The spectroscopic methods are useful in determination chemical bonds through their characteristic absorption frequencies or wavelengths. This course covers the principles and use of Raman Spectroscopy, Fluorescence & Phosphorescence Spectroscopy, Rare Earth Spectroscopy, High Resolution and Photon Spectroscopy studies for structure determination. Studies will focus on the underlying theory of each technique along with instrumentation and sample requirements.

#### **Course Objectives:**

1. To understand the principle and instrumentation of the Raman Spectroscopy.
2. To understand the instrumentation on Fluorescence and Phosphorescence Spectroscopy
3. To understand the importance of rare earth spectroscopy of materials.
4. To learn the high resolution spectroscopy techniques.
5. To learn the multidisciplinary and interdisciplinary areas in spectroscopy.

**Course Outcomes:** At the end of this course, students should be able to:

CO1: Understand the various techniques in a laboratory.

CO2: Analyze and characterize substances within a laboratory

CO3: Understand the optical and spectroscopic properties of materials.

CO4: Analyze data obtained from sophisticated equipments.

CO5: Analyze the molecular structure using spectroscopic information.



<b>Syllabus</b>		
<b>Unit</b>	<b>Learning Units</b>	<b>Lecture Hours</b>
I	<b>Raman Spectroscopy</b> Introduction–Theory and instrumentation of Raman Scattering–Laser Raman Spectroscopy–Sample Handling Techniques – Polarization of Raman Scattered Light – Single Crystal Raman Spectra– Raman Investigation of Phase Transitions–Fourier Transform (FT) Raman Spectroscopy and its additional advantages over the conventional Raman Spectroscopy, Significance of confocal Raman spectrometer, Surface enhanced Raman Scattering-Coherent Anti-Stokes Raman Spectroscopy (CO1)	12
II	<b>Fluorescence and Phosphorescence Spectroscopy</b> Introduction – Normal and Resonance Fluorescence – Intensities of Transitions – Non-radiative decay of fluorescent molecules–Phosphorescence and the nature of the triplet state – Population of the triplet state–Delayed Fluorescence –Excitation spectra–Experimental methods–Emission lifetime measurements–Time resolved emission spectroscopy–Applications of Fluorescence and Phosphorescence. (CO2)	12
III	<b>Rare Earth Spectroscopy</b> Introduction –Intensity of absorption and emission bands – Oscillator strengths – Intra-configurational f-f transitions –Selection rules –Electric and Magnetic dipole transitions–Judd-Ofelt theory and evaluation of Judd-Ofelt parameters –Radiative transition probabilities of excited states of rare earth ions – branching ratios, stimulated emission cross-sections –Non-radiative process –Energy transfer – Possible mechanisms of energy transfer–Resonance energy transfer–Process of IR to visible upconversion – Applications of rare earth doped luminescent materials. (CO3)	12
IV	<b>High Resolution Spectroscopy</b> Introduction – Light detectors – Single photon counting technique –Phase sensitive detectors – Laser optogalvanic spectroscopy – Matrix isolation spectroscopy – Laser cooling and its applications.(CO4)	12
V	<b>Two Photon Spectroscopy</b> Introduction – Two photon absorption spectroscopy – Selection rules – Expression for the two photon absorption cross section – Photo acoustic spectroscopy – Experimental methodology and applications to Physics, Chemistry, Biology and Medicine (CO5)	12

**Text and Reference Books:**

1. Spectroscopy Straughan and Walker (vol. 2 & 3, John Wiley & Sons, 1976.
2. Molecular Structure and Spectroscopy BY G. Aruldas, Printice-Hall Pvt. Ltd. 2001.
3. Introduction to ligand fields, B. N. Figgis (Intersci. Pub. New York, 1966.
4. Laser and Excited states of Rare Earths, R. Reisfeld and C.K. Jorgnesen, Springer- Verlag, New York, 1977.
5. Optical Properties of Transparent Rare Earth compounds, S. Hufner, Acad. Press, 1978.

**Course Delivery method :** Face-to-face / Blended

**Course has focus on :** Employability

**Websites of Interest :** <https://nlist.inflibnet.ac.in/vsearch.php>

**Co-curricular Activities : Quiz**

**P.B. Siddhartha College of Arts & Science, Vijayawada - 520 010.**  
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**M.Sc., (PHYSICS) Programme – II Semester**  
**Course Code: 22PH2T6 Title: Applied Spectroscopy**  
**(w.e.f admitted batch 2022-23)**

**Time: 3 Hours**

**Max. Marks: 70**

**SECTION-A**

**Answer All Questions**

**5x4=20M**

1. (a) Explain the instrumentation of Laser Raman Spectroscopy  
(Or)  
(b) Explain the polarization of Raman Scattered Light CO1 L2
- 2 (a) Explain the Normal and Resonance Fluorescence.  
(Or)  
(b) Explain the Non-radiative decay of fluorescent molecules. CO2 L2
- 3 (a) Explain the intensity of absorption and emission bands  
(Or)  
(b) Explain the stimulated emission cross-sections CO3 L2
- 4 (a) Explain about Light detectors  
(Or)  
(b) Explain the Laser cooling and its applications CO4 L2
5. (a) What are the selection rules for two photon absorption spectroscopy  
(Or)  
(b) What are the applications of two photon absorption spectroscopy? CO5 L2

**Section -B**

**Answer All Questions**

**5x10=50 M**

6. (a) Discuss the Raman investigation of Phase Transitions.  
(Or)  
(b) Explain the principal and instrumentation of Surface enhanced Raman Scattering CO1 L2
7. (a) Discuss the Phosphorescence and the nature of the triplet state  
(Or)  
(b) Explain the Time resolved emission spectroscopy CO2 L2
8. (a) Explain the Judd-Ofelt theory and evaluation of Judd-Ofelt parameters  
(Or)  
(b) Explain the possible mechanisms of energy transfer CO3 L2
9. (a) Explain the Single photon counting technique with neat diagram  
(Or)  
(b) Discuss the Laser opt galvanic spectroscopy. CO4 L2
10. (a) Discuss the expression for the two photon absorption cross section  
(Or)  
(b) Explain the photo acoustic spectroscopy CO5 L2

**Note: Question paper contains 5 short answers with internal choice from each unit and 5 long answer questions with internal choice from each unit.**



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### **PHOTONICS**

**Offered to :** M.Sc.(PHYSICS)

**Course Code:** 22PH2T7

**Course Type :** DSE

**Course:** Photonics

**Year of Introduction :** 2004

**Year of offering :** 2023

**Year of Revision :** 2022

**Percentage of Revision :** 100%

**Semester :** II

**Credits :** 4

**Hours Taught :** 60 hrs. per Semester

**Max.Time :** 3 Hours

**Course Prerequisites (if any) :**

**Course Description:** Photonics (22PH2T7) course deals with light generation, amplification, guiding, manipulation, and detection for harvesting information. This course introduces some of the fundamental aspects of photonics excluding generation and detection. Though covering all light's technical applications over the whole spectrum, most photonic applications are in the range of visible and near-infrared light. The photonics developed as an outgrowth of the first practical semiconductor light emitters invented in the early 1960s and optical fibers developed in the 1970s.

#### **Course Objectives:**

1. To understand the theoretical concept on integrated optics.
2. To understand the basic concepts of optical signal processing.
3. To learn the theoretical concept of Photonic crystals and optical communications
4. To learn the latest developments in photonics and its applications
5. To understand the modulation of light for optical modulation.

**Course Outcomes:** At the end of this course, students should be able to:

CO1: Understand the theoretical concept of photonics for various applications.

CO2: Analyze the light-matter interactions

CO3: Analyze the ability to formulate problems related to photonic structures

CO4: Analyze the properties of optoelectronic devices.

CO5: Understand processes that help to manipulate the fundamental properties of light

<b>Syllabus</b>		
<b>Unit</b>	<b>Learning Units</b>	<b>Lecture Hours</b>
I	<b>Integrated Optics</b> Introduction–Planar wave guide–Channel wave guide–Y-junction beam splitters and couplers- FTIR beam splitters – Prism and grating couplers –Lens wave guide – Fabrication of integrated optical devices - Integrated photodiodes – Edge and surface emitting laser – Distributed Bragg reflection and Distributed feedback lasers - Wave guide array laser. ( CO1)	12
II	<b>Optical Signal Processing</b> Introduction-Effect of lens on a wavefront, Fourier transform properties of a single lens, Optical transfer function, Vanderlugt filter, Image spatial filtering, Phase-contrast microscopy, Pattern recognition, Image de-blurring, Photonic switches, Optical transistor, Optical Gates- Bistable systems, Principle of optical Bistability, Bistable optical devices, Self electro-optic effect device. (CO2)	12
III	<b>Photonic Crystals</b> Basics concepts, Theoretical modeling of photonic crystals, Features of photonic crystals, Methods of fabrication, Photonic crystal optical circuitry, Nonlinear photonic crystals, Photonic crystal fibers, Photonic crystals and optical communications, Photonic crystal sensors. (CO3)	12
IV	<b>Optoelectronic devices</b> Quantum well, Quantum dot and Super lattices; LED materials, Device configuration and efficiency, Light extraction from LEDs, LED structures-single heterostructures, double heterostructures, Device performances and applications, Quantum well lasers; Photodiode and Avalanche photodiodes (APDs), Laser diodes-Amplification, Feedback and oscillation, Power and efficiency, Spectral and spatial characteristics. (CO4)	12
V	<b>Modulation of Light</b> Electro-optic effect, Pockels and Kerr effects, Electro-optic phase modulation, Electro-optic amplitude modulation, Acousto-optic effect, Acousto-optic modulation, Raman-Nath and Bragg modulators: deflectors and spectrum analyzer, Magneto-optic effect, Faraday rotator as an optical isolator. Advantages of optical modulation. ( CO5)	12

**Text and Reference Books:**

1. Optical Guided Wave Signal Devices, R.Syms And J.Cozens. Mcgraw Hill, 1993.
2. Optical Electronics, A Ghatak and K. Thyagarajan, Cambridge University Press, New Delhi, 1991
3. Fundamentals of Photonics, B.E.A. Saleh and M.C. Teich, John Willy and Sons,1991
4. Introduction to Fourier Optics, Joseph W. Goodman, McGraw-Hill, 1996.
5. Nanophotonics, P.N.Prasad, Wiley Interscience, 2003.

**Course Delivery method :** Face-to-face / Blended

**Course has focus on :** Employability

**Websites of Interest :** <https://nlist.inflibnet.ac.in/vsearch.php>

**Co-curricular Activities :** Quiz

**P.B. Siddhartha College of Arts & Science, Vijayawada - 520 010.**  
**(An Autonomous College in the jurisdiction of Krishna University)**  
**M.Sc., (PHYSICS) Programme – II Semester**  
**Course Code: 22PH2T7 Title: Photonics**  
**(w.e.f admitted batch 2022-23)**

**Time: 3 Hours**

**Max. Marks: 70**

**SECTION-A**

**Answer All Questions**

**5x4=20M**

1. (a) Explain about Planar wave guide  
(Or)  
(b) Explain the Prism and grating couple CO1 L2
2. (a) Explain the Fourier transform properties of a single lens.  
(Or)  
(b) Explain the Vanderlugt filter. CO2 L2
3. (a) Explain the theoretical modeling of photonic crystals  
(Or)  
(b) What are features of photonic crystals? CO3 L2
4. (a) Explain about Quantum well  
(Or)  
(b) Explain the power and efficiency CO4 L2
5. (a) Discuss Electro-optic effect  
(Or)  
(b) Explain Electro-optic phase modulation CO5 L2

**Section -B**

**Answer All Questions**

**5x10=50 M**

6. (a) Discuss the integrated photodiodes.  
(Or)  
(b) Explain the distributed Bragg reflection and distributed feedback lasers CO1 L2
7. (a) Discuss the Phase-contrast microscopy and Pattern recognition  
(Or)  
(b) Explain the principle of optical bistability and bistable optical devices CO2 L2
8. (a) Explain the properties of nonlinear photonic crystals  
(Or)  
(b) Explain the photonic crystal sensors in detail CO3 L2
9. (a) Explain the Quantum well lasers  
(Or)  
(b) Discuss the photodiode and avalanche photodiodes (APDs). CO4 L2
10. (a) Discuss about Magneto-optic effect  
(Or)  
(b) Explain the Raman-Nath and Bragg modulators CO5 L2

**Note: Question paper contains 5 short answers with internal choice from each unit and 5 long answer questions with internal choice from each unit**



## P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

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### GENERAL PHYSICS – II

**Offered to :** M.Sc.(PHYSICS)

**Course Code:** 22PH2L1

**Course Type :** Core (P)

**Course:** GENERAL PHYSICS – II

**Year of Introduction :** 2004

**Year of offering :** 2023

**Year of Revision :** 2022

**Percentage of Revision :** Nil

**Semester :** II

**Credits :** 3

**Course Prerequisites (if any) :**

**Course Description :** M.Sc. (Physics) course shall be of two years' duration, extended over four semesters and grading system is followed in line with national policies and international practices. The candidate shall be allowed a maximum of four years (8 semesters) of duration to be eligible for the award of M.Sc. (Physics) degree, failing which he / she shall have to register once again as a fresh candidate.

#### **Course Objectives:**

1. To understand the properties of the Laser.
2. To analyze the applications of laser.
3. To observe the process of powder X- ray diffraction.
4. To understand the resistance dependence of magnetic field.
5. To analyze the properties of optical fiber.

**Course Outcomes:** At the end of this course, students should be able to:

CO1: Understand the different concepts of physics through experiments.

CO2: To apply the concepts of condensed matter physics to understand the properties of different materials

CO3: To analyze the results obtained from different experiments through graphical analysis.

<b>Syllabus</b>		
	<p><b>PRACTICAL – III</b>  <b>GENERAL PHYSICS – II</b>  <b>(22PH2L1)</b>  <b>(Minimum 10 experiments are to be done)</b></p> <ol style="list-style-type: none"> <li>1. Determination of Thickness of wire using laser CO2, L3</li> <li>2. Determination of wavelengths of the laser using grating. CO2, L3</li> <li>3. Determinations of refractive index of liquid using hallow Prism. CO2, L3</li> <li>4. Double refraction. CO2, L3</li> <li>5. Powder X-ray diffraction CO2, L3</li> <li>6. I-V characteristics of solar cell. CO2, L3</li> <li>7. Magneto Resistance. CO3, L3</li> <li>8. Determination of numerical aperture of optical fiber. CO3, L3</li> <li>9. Determination of Young’s modulus. CO3, L3</li> <li>10. Verification Amper’s law. CO3, L3</li> <li>11. DC Conductivity of ferrite material CO3, L3</li> <li>12. Determination of elastic constants of glass (and Perspex) by Cornu’s interference method CO1,L3</li> <li>13. Determine the radius of curvature of the Plano-convex lens by using Newton’s rings experiment CO1,L3</li> <li>14. Determination of the size of the lycopodium particles by diffraction method using a) Spectrometer method and b) Young’s method. CO1,L3</li> <li>15. Any two online virtual lab experiments within the syllabus have to be carried out (using MHRD web resource).</li> </ol>	

**Course Delivery method :** Face-to-face / Blended

**Course has focus on :** Employability

**Websites of Interest :** <https://nlist.inflibnet.ac.in/vsearch.php>

**Co-curricular Activities :** workshop

Continuous Internal Assessment will be done for each student on basis of performance for each practical. The total marks for CIA is evaluated for 30 marks. The external examination is evaluated for 70 marks. Total marks 70(External)+30(CIA)=100 marks



## P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

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### C – PROGRAMMING AND MICROPROCESSOR

**Offered to :** M.Sc.(PHYSICS)

**Course Code:** 22PH2L2

**Course Type :** Core (P)

**Course:** C – Programming and Microprocessor

**Year of Introduction :** 2004

**Year of offering :** 2023

**Year of Revision :** 2022

**Percentage of Revision :** Nil

**Semester :** II

**Credits :** 3

**Course Prerequisites (if any) :**

**Course Description :** M.Sc. (Physics) course shall be of two years' duration, extended over four semesters and grading system is followed in line with national policies and international practices. The candidate shall be allowed a maximum of four years (8 semesters) of duration to be eligible for the award of M.Sc. (Physics) degree, failing which he / she shall have to register once again as a fresh candidate.

**Course Objectives:**

1. To learn fundamental computational concepts underlying most programming languages
2. To make the students develop logics which will help them to create programs, applications in C
3. To teach a range of problem solving techniques using computer
4. To develop the basic computational concepts and elementary data structure
5. To make the students learn C language and apply it to solve problems in Physics

**Course Outcomes :** At the end of this course, students should be able to:

CO1: Solve problems through programming.

CO2: Write a program on a computer, edit, compile, debug, correct, recompile and run it.

CO3: Develop assembly language programming skills and performs arithmetic and logical operations on a 8085 microprocessor kit.



<b>Syllabus</b>	
<b>PRACTICAL – IV: 22PH2L2</b> <b>C – PROGRAMMING AND MICROPROCESSOR</b> <b>(Minimum 10 experiments are to be done)</b>	
1. Program for the addition of two 8 bit numbers by using Microprocessor 8085	CO3, L3
2. Program for subtraction of two 8 bit numbers by using Microprocessor 8085	CO3, L3
3. Program for multiplication of two 8 bit numbers by using Microprocessor 8085	CO3, L3
4. Program for division of two 8 bit numbers by using Microprocessor 8085	CO3, L3
5. Microprocessor 8085 program for conversion of value	CO3, L3
6. C Program to find number of odd and even numbers in given list of numbers	CO2,L3
7. Write a C program for the multiplication of two matrices using arrays	CO2,L3
8. Write a C program for the Newton-Raphson method with necessary algorithm.	CO2,L3
9. Write a C Program for Trapezoidal Rule	CO2,L3
10. C programs for Simpsons 1/3Rule.	CO2,L3
11. C programs for Euler's Method	CO2,L3
12. C programs for Solution of first order differential equations using the Runge - Kutta method	CO1,L3
13. C programs for Numerical integration using the Simpson's method	CO2,L3
14. C programs for Bisection Method	CO2,L3
15. Any two online virtual lab experiments with in the syllabus have to be carried out (usingMHRD web resource)	

**Course Delivery method :** Face-to-face / Blended

**Course has focus on :** Employability

**Websites of Interest :** <https://nlist.inflibnet.ac.in/vsearch.php>

**Co-curricular Activities :** workshop

Continuous Internal Assessment will be done for each student on basis of performance for each practical. The total marks for CIA is evaluated for 30 marks. The external examination is evaluated for 70 marks. Total marks 70(External)+30(CIA)=100 marks



## **DEPARTMENT OF BBA BUSINESS ANALYTICS**

### **Board of Studies for the academic Year 2022-23 (EVEN Semesters)**

- 1. Agenda:** Board of Studies meeting for EVEN semesters of batches (2020- 23) 6<sup>th</sup> Semester, (2021-24) 4<sup>th</sup> Semester and (2022-25) 2<sup>nd</sup> Semester)
- 2. List of members in BOS**

#### **Members present:**

1	Prof. Rajesh. C. Jampala, HOD, Commerce & Business Administration and Dean (Academics & Administration)	Chairman
2	Dr Padmaja Rani garu	University Nominee
3	Dr. B. Raja Sekhar,	Special Invitee
4	Prof Pramod Kumar Mishra	Subject Expert
5	Ravi Teja Tallam	Industry Expert
6	Sri Asgar Hussain	Alumnus
7	Sri D Vasu	In charge
8	Smt. Ch. Hanuma Jyothi	Member

## **BBA BUSINESS ANALYTICS**

### **Name of the Program: Bachelor of Business Administration – Business Analytics (BBA-BA)**

**PO1:** Ability to apply analytics techniques to analyze and interpret the data and to anticipate needs and the analytical perspective provides clearer insights through data visualization and the data gathered is vital for statistical analysis, which in turn is essential for decision making.

**PO2:** Perform strategic analysis effectively and to enhance ability to use tools such as Microsoft Excel, JASP, R & Python to solve business analytics problem.

**PO3:** Ability to understand the business problem with their knowledge in different functional areas of management and apply quantitative methods for solving business problems.

**PO4:** Demonstrate knowledge, skills and techniques to execute projects effectively and to Assess global opportunities and challenges for business growth and to demonstrate knowledge, skills and techniques to manage business operations effectively and efficiently.

**PO5:** Demonstrate the knowledge and necessary skills and understanding to take up advanced topics in the area of analytics and thus enhance their career. Collaborate effectively as a business leader.

**PO6:** To comprehend the practice of iterative, methodical exploration of an organization's data with emphasis on statistical analysis and to acquire necessary skills and indulgent to take up advanced topics in the area of analytics and thus enhance their career.

**BBA Business Analytics 2022 -23**  
**Resolutions/ Recommendations / Introduced Papers**

**Revision of the syllabus of courses**

1. To recommend the revision of syllabus & model question paper of **MACHINE LEARNING WITH R** with revised course code **MGTT44B** in IV semester of BBA Business Analytics for the batch of students admitted in 2021-22 and onwards.
2. To recommend the revision of syllabus & model question paper of **MARKETING MANAGEMENT** with revised course code **MGTT28B** in II semester of BBA Business Analytics for the batch of students admitted in 2022-23 and onwards.
3. To recommend the revision of syllabus & model question paper of **FUNDAMENTALS OF ACCOUNTING** with revised course code **MGTT29B** in II semester of BBA Business Analytics for the batch of students admitted in 2022-23 and onwards.



# P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

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## POWER BI

**Offered to:** BBA – Business Analytics

**Course Code:** SDCMGTT05

**Course Type:** Skill Development

**Year of Introduction:** 2018-2019

**Year of offering:** 2022-2023

**Year of Revision:** 2021-2022

**Percentage of Revision:** 00

**Semester:** IV

**Credits:** 2

**Hours Taught:** 30 hrs.

**Max. Time:** 4 (2+2) Hours

**Course Prerequisites (if any):**

### Course Description:

#### Course Objectives:

The process of analyzing data using the tools that are at the core of Microsoft's self-service BI

**Course Outcomes:** At the end of this course, students should be able to:

**CO1:** Understand the concept Power Pivot and interface with excel analytic way

**CO2:** Write the algorithms for combine data quickly from a variety of sources into your model

**CO3:** Prepare the data various sources, clean, merge, filter data and calculated methods

**CO4:** Compose and choose the model, relationships between in the models, user friendly models

**CO5:** Define BI environment, data clean, shaping, table relationships and analysis techniques

### Syllabus

Unit	Learning Units	Lecture Hours
I	<b>Introduction Power Pivot</b> Introduction of Pivot - Use Power Pivot – x Velocity in-memory analytics engine - Exploring the Data Model Management interface - Analyzing data using a pivot table	6
II	<b>Power BI Data Import and Data Cleaning</b> Working with Data - Import data from relational databases - Import data from text files - Import data from a data feed - Import data from other sources, Discover and import data from various sources -	6
III	<b>Data Cleaning Techniques</b> Data Munging - Getting, cleaning, and shaping data, Cleanse data - Merge, shape, and filter data - Group and aggregate data - Insert calculated columns.	6
IV	<b>Power BI Data Model</b> Creating data Model - Explain what a data model is - Create relationships between tables in the model - Create and use a star schema - Understand when and how to deformatize the data - Create and use linked tables	6
V	<b>Power BI Visuals and DAX</b> Adding calculations and measures - Incorporating time-based analysis	6

<b>Prescribed Text Books</b>			
<b>S. No</b>	<b>Author</b>	<b>Title</b>	<b>Publisher</b>
1	Powell Brett	Power BI 2021 – Volume 3 (English, Paperback, F SilvaRoger)	ISBN: 9798711316824
2	F Silva Roger	Mastering Microsoft PowerBI	Publisher: Packet Publishing Limited ISBN: 9781788297233, 9781788297233
3	Hutchinson Jeff	Microsoft Power BI Desktop - Creating Visual Reports	ISBN: 9781081588908 Independently Published

<b>Reference Text Book</b>			
	<b>Author</b>	<b>Title</b>	<b>Publisher</b>
1	Dan Clark	Beginning Power BI: A Practical Guide to Self- Service Data Analytics with Excel 2016 and Power BI Desktop Second Edition	A press

**Course Delivery method:** Face-to-face

**Course has focus on:** Foundation

**Websites of Interest:**

1. [https://books.google.co.in/books?id=Da8-DgAAQBAJ&newbks=0&printsec=frontcover&hl=en&source=newbks\\_fb&redir\\_esc=y#v=onepage&q&f=false](https://books.google.co.in/books?id=Da8-DgAAQBAJ&newbks=0&printsec=frontcover&hl=en&source=newbks_fb&redir_esc=y#v=onepage&q&f=false)

**Co-curricular Activities:** (Case Studies)

**List of Experiments**

1. Write the Procedure for preparing a Pivot in Excel and prepare a Dashboard using sample marketing data.
  - a) Offline data and online data
  - b) Online to Online using Google forms
2. Installation of Power BI and its procedure
3. Explain the procedure in importing various format files in Power BI, write its observations
4. Power BI Data Models (Schemas in Power BI)
5. How to edit data in power BI when data is Exported use few data cleaning techniques (Munging)
6. Advance Data Cleaning techniques, Data Munging and Data collection and collaboration techniques.
7. Write the procedure in building an association (Power Query) identify various schemas in Power BI
8. Data Visualization (charts for a sample data) constructions and analysis
9. Step in preparing a dashboard for the organization
10. Constructing Quick Measures and Dax formulas



## P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

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### HR ANALYTICS

**Offered to:** BBA – Business Analytics

**Course Code:** MGTT41B

**Course Type:** Core (TH)

**Year of Introduction:** 2017

**Year of offering:** 2022 - 23

**Year of Revision:** 2021

**Percentage of Revision:** 00

**Semester:** IV

**Credits:** 4

**Hours Taught:** 60 hrs.

**Max. Time:** 5 Hours

**Course Prerequisites (if any):**

**Course Description:**

**Course Objectives:**

The objective of this course is to enable student with understanding of the concepts of Human Resource Analytics and to describe with critical evaluations. The course is developed with an objective of introducing HR problems integrating concepts in statistics, data analysis, information systems and decision support system areas.

**Course Outcomes:** At the end of this course, students should be able to:

- CO1:** To provide the knowledge and necessary skills to accomplish the roles of HR with the **introduction of Analytics.**
- CO2:** To recognize the importance of Business Understanding for Human Resource Initiatives.
- CO3:** To understand the concept of Forecasting the Budget Numbers for analyzing and predicting HR Costs
- CO4:** To understand the concept of Predictive Modeling in HR.
- CO5:** To understand the concept of Data requirements and Data Exploration

Syllabus		
Unit	Learning Units	Lecture Hours
I	Introduction to HR Analytics - Concept, Importance and Evolution of HR Analytics & data sources - HCM: 21 Model - Introduction to HR Metrics and predictive analytics - Data Analytics techniques using software packages.	12
II	Creating business understanding for HR initiatives Workforce segmentation and search for critical job roles -Statistical driver analysis - Association and causation - Identifying and using key HR Metrics	12
III	Forecasting budget numbers for HR costs - Workforce planning including internal mobility and career pathing - Training and development requirement forecasting - Measuring the value and results of improvement initiatives	12



IV	Predictive modeling in HR – Employee retention and turnover –Workforce productivity and performance – Scenario Planning.	12
V	Communicating with data and visuals Data requirements - Identifying data needs and gathering data - HRdata quality, validity and consistency - Using historical data- Data exploration - Data visualization	12

<b>Prescribed Text Books</b>			
	<b>Author</b>	<b>Title</b>	<b>Publisher</b>
1	Martin R Edwards, KirstenEdwards,	“Predictive HR Analytics”	Kogan Page Limited
2	Jac fitz-Enz,	“The New HR Analytics”	Harper Collins Publications

<b>Reference Text Book</b>			
	<b>Author</b>	<b>Title</b>	<b>Publisher</b>
1	Ramesh Soundararajan, Kuldeep Singh	Winning on HR Analytics: Leveraging Data forCompetitive Advantage”	SAGE Publications l
2	Lyndon, Mr. Sundmark	Doing Hr Analytics: A PractitionersHandbook with R Examples.	Create spaceindependent
3	Rama Shankar Yadav, Sunil Maheswari,	HR Analytics connecting Data and Theory	Wiley India Pvt. Limited
4	Dr. Michael Walsh	Hr Analytics essentials you always wantedto know	Vibrant Publications

Course Delivery method: Face-to-face Course has focus on:

Foundation Websites of Interest:

1. <https://www.hrtechnologist.com/articles/hr-analytics/what-is-hr-analytics/>
2. <https://www.analyticsinhr.com/blog/what-is-hr-analytics/>
3. <https://www.altexsoft.com/blog/how-to-implement-hr-analytics/>
4. <https://talenx.io/2020/06/06/what-is-hr-analytics/>
5. <https://www.datapine.com/articles/workforce-people-hr-analytics>

Co-curricular Activities: (Case Studies)

**Model Question Paper for  
HR ANALYTICS**

**Max.: 75 Marks**

**Min. Pass: 30 Marks**

**Section-A**

**Answer any FIVE of the following**

**5X5=25Marks**

1. Define HR Analytics. Explain the importance of HR Analytics in brief.
2. Define Predictive Analytics. Explain the Importance of Predictive analytics in brief
3. Illustrate Data analytics techniques in brief?
4. How forecasting is needed for training and development requirements.
5. Define Workforce segmentation. Explain the types of workforce segmentation in brief.
6. Describe statistical driver analysis in detail.
7. How to search for critical job roles in the organization?
8. What are the Data requirements?

**SECTION-B**

**II) Answer the following**

**5X10 = 50 Marks**

9. a). Explain Human Capital Management in the 21<sup>st</sup> century Model in detail.  
(or)  
b). Describe the Evolution of HR Analytics & data sources. Explain Data Analytics techniques using software packages in detail.
10. a). Elaborate Association and causation in detail.  
(or)  
b). Brief how to Identify and use key HR Metrics.
11. a). Explain PDCA Cycle and continuous improvement Metrics in detail.  
(or)  
b). Explain Workforce planning which includes internal mobility and career pathing in brief.
12. a). Describe in detail Employee retention and turnover  
(or)  
b). Elaborate Scenario Planning in detail.
13. a). Explain in brief Data Exploration  
(or)  
b). Explain in brief Data Visualization



## P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

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### MACHINE LEARNING WITH R

**Offered to:** BBA – Business Analytics

**Course Code:** MGTT44B

**Course Type:** Core (TH)

**Year of Introduction:** 2017

**Year of offering:** 2022 - 23

**Year of Revision:** 2021

**Percentage of Revision:** 00

**Semester:** IV

**Credits:** 4

**Hours Taught:** 60 hrs.

**Max. Time:** 3 Hours

**Course Prerequisites (if any):**

**Course Description:**

**Course Objectives:**

The Objective of this course is to enable student with understanding of the concepts of Supervised and Unsupervised learning approaches in R Programming with critical evaluations.

**Course Outcomes:** At the end of this course, students should be able to:

CO1: To impart an overview of Supervised and Unsupervised Learning Methods with its contents and scope focusing on Data Preparation and Exploration Techniques.

CO2: To recognize the characteristics of Supervised and Unsupervised Learning that makes it useful to real-world problems with Prediction and Classification Techniques.

CO3: To understand the concept and practical applicability of Multiple Linear Regression, Naive Bayes and Artificial Neural Networks.

CO4: To impart the knowledge about the Association Rules and Cluster Analysis.

CO5: To understand the concept of Time Series based Forecasting and Regression based Forecasting.

Syllabus		
Unit	Learning Units	Lecture Hours
I	<b>Introduction to Machine Learning</b> Machine Learning Definition and Examples - Types of Machine Learning - Problem Solving using Machine Learning - Introduction to R Basic Statistical Techniques	12
II	<b>Data Preparation and Exploration</b> Visualization Techniques - Dimension Reduction Techniques - Principal Component Analysis (PCA) - Performance Metrics and Assessment Performance - Metrics for Prediction and Classification.	12
III	<b>Bayesian Concept Learning and Regression:</b> Bayes' Theorem, Bayes' Theorem and Concept Learning, Bayesian Belief Network. Simple linear regression, Logistic Regression, Maximum Likelihood Estimation.	12
IV	<b>Supervised Learning Methods</b> Decision Tree – KNN – Random Forest - SVM – Ensemble Techniques – Bagging and Boosting	12
V	<b>Unsupervised Learning Methods</b> Association Rules - Apriori Algorithm - Cluster Analysis - Types of Clustering Algorithms & Hierarchical Clustering	12

Prescribed Text Books			
	Author	Title	Publisher
1	<a href="#">Brad Boehmke</a> , <a href="#">Brandon M. Greenwell</a>	Hands-on Machine Learning with R	ISBN:9781000730197, 1000730190 , <a href="#">CRC Press</a> Format:Ebook
2	By <a href="#">Brett Lantz</a> · 2013	Machine Learning with R	ISBN:9781784394523, 1784394521

**Course Delivery method:** Face-to-face

**Course has focus on:** Foundation

**Websites of Interest :**

1. <https://www.datacamp.com/community/tutorials/machine-learning-in-r>
2. <https://machinelearningmastery.com/machine-learning-in-r-step-by-step/>
3. <https://www.edureka.co/blog/machine-learning-with-r/>
4. <https://towardsdatascience.com/from-0-to-machine-learning-with-r-d339a8be6004>
5. <https://www.analyticsvidhya.com/blog/2017/09/common-machine-learning-algorithms/>

**Co-curricular Activities:** (Case Studies)

**Model Question Paper Structure for Machine Learning with R**

**Course Code: MGTT44B**

**Max.: 75 Marks**

**Min.Pass : 30**

**Marks**

**Section-A**

**Answer Any Five**

**(5 x 5M = 25Marks)**

1. Define and briefly explain the area of Machine Learning
2. Explain the concepts of Support, Confidence and Lift
3. List the Various Applications of Machine Learning
4. What is meant by clustering and how many types of clustering are there?
5. What is meant by train-test split in machine learning
6. Explain the concept of Data Frame in R
7. What is meant by data cleaning? Give the list of steps in data cleaning
8. How do you graphically find out outliers in a variable? Explain.

**Section-B**

**Answer the following questions**

**(5 x 10M = 50Marks)**

9. (a) Examine the various stages in Machine Learning Workflow with an example (L2)  
or  
(b) Examine the multiple linear regression model in R-programming (L3)
10. (a) What is meant by Principal Component Analysis? How do you do it in R (L)  
or  
(b) What is Market Basket Analysis (Association Rules)? Write the various steps to implement in R (L3)
11. (a) Define a confusion matrix and explain the various accuracy metrics in classification (L4)  
or  
(b) Examine the workflow in Machine Learning using an example (L3)
12. (a) What is meant by Cluster Analysis? How do you do K Means clustering in R (L2)  
or  
(b) What are Association Rules? List the various steps to implement it in R. (L2)
13. (a) Examine the K-Nearest Neighbors Model of classification. How do you do it in R (L5)  
or  
(b) what are various rules in conducting the K-Nearest Neighbors Model of classification . How do you do it in R (L4)



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### MACHINE LEARNING WITH R - LAB

**Offered to:** BBA – Business Analytics

**Course Code:** MGTP44A

**Course Type:** LAB

**Year of Introduction:** 2017-19

**Year of offering:** 2022-23

**Year of Revision:**

**Percentage of Revision:** 00

**Semester:** IV

**Credits:** 2

**Hours Taught:** 30 hrs.

**Max. Time:** 4 Hours

**Course Prerequisites (if any):**

**Course Description:**

**Course Objectives:**

1. Make use of Data sets in implementing the machine learning algorithms
2. Implement the machine learning concepts and algorithms in R Studio

**Course Outcomes:** At the end of this course, students should be able to:

- 1) Write basic programs in R language
- 2) Use built in packages to enhance the program
- 3) Perform data visualization with R

#### Syllabus (2 hours per week Per Batch)

##### List of Experiments

Chapter No	Theme	Topics Covered
1	Basic Statistical Techniques Using R	Descriptive Statistics – Central Tendency – Skewness & Kurtosis
2	Data Visualization Using R	Histogram - Bar Chart – Boxplot – Manipulation of Charts
3	Principal Component Analysis (PCA)	Overview of PCA – Understanding & using PCA with iris data set in R Studio
4	Supervised Learning Models	Classification Algorithms
5	Supervised Learning Models	Prediction Modelling (Regression) & Multiple Linear Regression
6	Supervised Learning Models	Naive Bayes Algorithm
7	Unsupervised Learning Models	Apriori Algorithm
8	Unsupervised Learning Models	Lift Ratio and Confidence
9	Unsupervised Learning Models	Cluster Analysis
10	Measurement of Distance	Euclidean Distance Model



# P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

Siddhartha Nagar, Vijayawada – 520 010

Autonomous - ISO 9001 – 2015 Certified

## Python for Data Science

**Offered to:** BBA – Business Analytics

**Course Code:** MGTT46A

**Course Type:** Core (TH)

**Year of Introduction:**

**Year of offering:** 2022 - 23

**Year of Revision:**

**Percentage of Revision:**

**Semester:** IV

**Credits:** 4

**Hours Taught:** 60 hrs. per Semester

**Max. Time:** 4 Hours

### Syllabus

#### Course Details

Unit	Learning Units	Lecture Hours
I	<b>Unit - I</b> <b>Introduction to Python</b> Python Processes - Python in the Real World – Installing - Python Interactive Interpreter - Built in functions Python Built-in Data types - Numbers, Strings and Variables- Variables, Names, and Objects. - List and Operators - Tuples and Operators -Dictionaries Operators	12
II	<b>Unit - II</b> <b>Function and its application to business</b> Functions (applying it to the basic business principles) - Working with files Numpy - Numpy array, Numpy array operations - Indexing, Slicing - Numpy array - Numpy Exercise Pandas - Introduction to Series - Introduction to Data frame - Loc, ILOC, split, merge and append - Read, write .csv, .html, excel file.	12
III	<b>Unit - III</b> <b>Python Libraries (Matplotlib - Seaborn)</b> Visualization of data with pandas Matplot-lib- Basic plotting - Plotting terminology - Subplots, Special plot Ploty- Basic plotting – plotly - Extend Basic Plot, Plotly scatter and line chart - Bubble chart - Histogram and Distribution plot	12
IV	<b>Unit - IV</b> <b>Introduction to data analysis (Theory) package (Stats models, scipy)</b> Application of Statistical techniques using Python - Data Preprocessing, fillana groupna, missing values, outliers, duplicates, - Descriptive Statistics, Correlation (bivariate, Cross tabulation (categorical), multivariate analysis (Cross matrix), <b>simple</b> Linear Regression)	12
V	<b>Unit - V</b> <b>Multivariate analysis and EDA, Dtale and Python Profiiing, Introduction to machine learning (theory)</b>	12



**Textbook:**

1. Python Data Science Handbook by Jake VanderPlas
2. A Python Approach to Concepts, Techniques and Applications by Laura Igual; Santi Seguí

**Recommended Reference book:**

**Course Delivery method:** Face-to-face

**Course has focus on:** Foundation

**Websites of Interest:**

1. <https://realpython.com/tutorials/data-science/>
2. <https://www.coursereport.com/blog/how-is-python-used-for-data-science-metis>
3. [https://www.tutorialspoint.com/python\\_data\\_science/index.htm](https://www.tutorialspoint.com/python_data_science/index.htm)
4. <https://www.analyticsvidhya.com/learning-paths-data-science-business-analytics-business-intelligence-big-data/learning-path-data-science-python/>

**Co-curricular Activities:**

1. PYTHON DATA SCIENCE HANDBOOK: ESSENTIAL TOOLS FOR WORKING WITH DATA, Shroff/O'Reilly First edition
2. Data Science from Scratch: First Principles with Python, Second Edition, Shroff/O'Reilly; Second edition (5 May 2019), ISBN-10: 9352138325
3. Intro to Python for Computer Science and Data Science: Paul J. Deitel, CEO and Chief Technical Officer of Deitel & Associates, Inc, Pearson; 1st edition (15 February 2019)
4. Practical Statistics for Data Scientists: 50 Essential Concepts, Peter Bruce, Shroff/O'Reilly; First edition

P.B. Siddhartha College of Arts & Science  
**Bachelor of Business Administration**  
**Python for Data Science (MGTT46A)**  
**Model Question Paper**

**Max. Marks: 75**

**Semester – IV**  
**Time: 3 Hrs.**

**PART – A**

**Answer any FIVE questions:**

**5 X 5 = 25 Marks**

1. Explain the features of Python. (L1) (CO3)
2. Define a tuple and its operators (L1, L2) (CO3)
3. Write the procedure to prepare Set and Dictionary (L2 & L3) (CO3)
4. What is the importance of histogram? (L3) (CO3)
5. What are outliers and missing of data (L3) (CO3)
6. How do we merge data and types of merging? (L2) (CO3)
7. Define machine learning and its types(L2) (CO3)

**PART – B**

Answer the following:

5 X 10 = 50 Marks

**Unit – I**

8. Define a Programme for LISTS (L1, L2) (CO3)
  - i. Length of a list
  - ii. List Consisting of
  - iii. Joining of Two List
  - iv. Other List operators
9. Define a Programme for Sets and Dictionaries and perform various operators for it (L1, L3) (CO1)

**Unit – II**

10. How to Write a Function in python prepare a function in writing all arithmetic operators(L2) (CO2)

**OR**

11. Construct a Data Frame and explain the steps involved in csv file reading using pandas(L3) (CO4)

**Unit – III**

12. Prepare an array, apply the all-slicing merging and indexing operators for it (L2, L3) (CO1)

**OR**

13. Write the procedure for preparation of creating charts using seaborn explain them. (L2) (CO2)

**Unit- IV**

14. What are different types of machine learning techniques and explain them. (L1 and L2) (CO1)

**OR**

15. Explain the usage of linear regression and logistic regression techniques in machine learning (L1, L2) (CO2)

**Unit –V**

16. What is unsupervised learning and its types (L2) (CO4)

**OR**

17. Explain the concept of kmean clustering and hierarchical clustering and its application in real time business (L2, L3) (CO4)



# P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

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## Python for Data Science Lab

**Offered to:** BB A – Business Analytics

**Code:** MGTP45

**Course Type:** Core (P)

**Year of Introduction:** 2017

**Year of offering:** 2022

**Year of Revision:**

**Percentage of Revision:** 0

**Semester:** IV

**Credits:** 2

**Hours Taught:** 30 hrs. per Semester

**Max. Time:** 4 (2+2) Hours

### Syllabus

#### Course Details

1. Write a list of Operators in Python
2. Define a Programme for LISTS
  - i. Length of a list
  - ii. List Consisting of
  - iii. Joining of Two List
  - iv. Other List operators
3. Define a Programme for Sets and Dictionaries and perform various operators for it
4. How to Write a Function in python prepare a function in writing all arithmetic operators
5. Write a programme for Tuple, Assignment operators and comparison operators and execute with the examples
6. Frame steps involving handling a Data frame, Handling Missing Data - dropna, fillna, grouping data, Read, write .csv, .html, excel file,
7. Write a programme for plotting various graphs using Matplot lib
  - i. Scatter and line Chart
  - ii. Bubble Chart
  - iii. Histogram and Distribution plot
  - iv. Trend line
8. Write a programme Categorical Data, Splitting Data Testing Set Normalize Data
9. Write a programme for application of Statistical techniques using Python.
10. Write a programme for application of Statistical techniques using Python.



# P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

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## STATISTICAL DATA ANALYSIS USING JASP

**Offered to:** BBA – Business Analytics

**Course Code:** AOCANL01

**Course Type:** Addon (P)

**Year of Introduction:** 2021

**Year of offering:** 2022-23

**Year of Revision:** 2021

**Percentage of Revision:** 00

**Semester:** IV

**Credits:** 2

**Hours Taught:** 30 hrs.

**Max. Time:** 4 Hours

**Course Prerequisites (if any):**

**Course Description:**

**Course Objectives:**

**Course Outcomes:** At the end of this course, students should be able to:

### List of Experiments Syllabus (2 hours per week)

Chapter No	Theme
1	Diagrams and Graphs
2	Computation of measures of Central Tendency and Dispersion
3	Testing for normality
4	Linear Correlation and Regression
5	Logistic Regression
6	Multiple Correlation and regression analysis
7	t-Test for significance of single mean, difference means and paired t-test
8	Chi-Square test for independence of attributes and goodness of fit.
9	Analysis of Variance (ANOVA) – One way and Two way.



**P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE**

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**BUSINESS ANALYTICS WITH MS – EXCEL LAB**

**Offered to:** BBA Business Analytics

**Course Code:** LSCP 08

**Course Type:** LSC (Practical)

**Course:** Data Analysis with MS – Excel Lab

**Year of Introduction:** 2021

**Year of offering:** 2023

**Year of Revision:** -

**Percentage of Revision:** -

**Semester:** II

**Credits:** 2

**Hours Taught:** 30 hrs. Per Semester

**Max. Time:** 4 (2+2)

**Course Prerequisites (if any):** Statistical Theory in Mathematics

**Course Description:** Students learn, understand and implement Descriptive Statistical methods in Excel

**Course Objective:**

To understand the practicality of Excel

**Course Outcomes:** At the end of this course the student is able to

CO1: Create and modify charts & graphs. (PO5, PO6, PO7)

CO2: Organize worksheet and table data using multiple techniques. (PO5, PO6, PO7)

CO3: Calculating with advanced functions & formulas. (PO5, PO6, PO7)

CO4: Analyze data using Pivot Tables. (PO5, PO6, PO7)

CO5: Able to generate graphs that help in drawing useful result. (PO5, PO6, PO7)

### List of Experiments

1. Create an excel application to demonstrate formatting data and excel sheets.
2. Create an excel application to demonstrate Conditional Formatting.
3. (i) Create an excel application to demonstrate filters and auto filters.  
(ii) Create an excel application to demonstrate data validation.
4. Create an excel application to demonstrate IF and IFS analysis.  
(i). Sum Count and Average
5. Create an excel application to demonstrate logical functions.
6. Create an excel application to demonstrate statistical functions.
7. Create an excel application to demonstrate text functions.
8. Create an excel application to demonstrate date and time functions.
9. Create an excel application to demonstrate lookup (V and H) and Reference functions.
10. Create an excel application to demonstrate various types of graphs and diagrams
11. Create an excel application to demonstrate importing and exporting files.
12. (i) Create an excel application to demonstrate tracing precedents and dependents.  
(ii) Create an excel application to demonstrate sub totals, Grouping and Ungrouping.
13. Create an excel application to demonstrate pivot table.

#### Text Books:

	Author	Title	Publisher
1	John Walkenbach	Excel 2010 Bible 2010 Edition	John Wiley & Sons

#### Prescribed Books:

	Author	Title	Publisher
1	Grey Harvey	Excel 2010 for Dummies	

**Course Delivery method:** Face-to-face / Blended

**Course has focus on:** Skill Development.

#### Websites of Interest:

- <http://office.microsoft.com/en-us/>
- <http://office.microsoft.com/en-us/excel>
- <http://www.techonthenet.com/excel/formulas>

#### Structure of Practical Paper

**Total Marks: 50 Marks**

**(i) For Continuous Evaluation : 15 marks (Internal Evaluation)**

**(ii) For semester end Practical Examination : 35 marks (External Evaluation)**



## P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

Siddhartha Nagar, Vijayawada – 520 010

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### STATISTICAL DATA ANALYSIS USING R PROGRAMMING LAB

**Offered to:** BBA Business Analytics

**Course Code:** SDCMGTP03

**Course Type:** LSC (Practical)

**Course:** Statistical Data Analysis using R Lab

**Year of Introduction:** 2017

**Year of offering:** 2023

**Year of Revision:** -

**Percentage of Revision:** -

**Semester:** II

**Credits:** 2

**Hours Taught:** 30 hrs. Per Semester

**Max. Time:** 4 (2+2)

#### OBJECTIVES

1. Understand the programming concepts of R
2. Gain hands on experience in working with R

#### LEARNING OUTCOMES

1. Write basic programs in R language
2. Use built in packages to enhance the program
3. Perform data visualization with R

#### EXPERMENTS    **Topics Covered**

- 1            Introduction to R Installation, Running, Data Editor  
              Using Help in R  
              Packages and their installation
- 2            Basics of R Programming Calculations – Arithmetic, Logical, other  
              mathematical Data Types – Factors, Membership, coercion, Missing values  
              Special features – Sequences, Infinity, NaN, Repeats, Loops Vectors –  
              Indexing, Naming, Summarization, Aggregation, Sort, Rank, Order, duplicate  
              values Advanced data types – Matrices, Arrays, Lists, Data frames, Tables and  
              their associated core operations & Functions Working with Text, Date and  
              Time Functions Writing customized R Functions Input data into R from  
              different file types and formats

- 3      Graphs in R Single variable plots – Histogram, Bar chart, Box Plot, Density plots, Multiple comparison plots, Index plot, Pie Two variable plots – Scatter plot Advanced plots – Time series, strip chart, pairs, Interaction, Bubble plots, Plots with many identical values Manipulations of charts – Color, Lines, points, shapes etc.
- 4      Analysis of Variance (ANOVA) One way ANOVA  
         Two-Way ANOVA (Repeated-Measures, Mixed-Model ANOVA)
- 5      Correlation & Regression, Linear Regression, Confidence and Prediction Intervals Multiple regression – More predictors, Interpretation
- 6      Logistic Regression, Generalized Linear Models Fitting, Interpretation, Multivariate Logistic regression Multinomial Regression

### **Books recommended**

1.    A first course in statistical programming with R (Braun & Murdoch)
2.    An introduction to R (Venables & Smith)
3.    Crawley, M. J. (2006). Statistics - An introduction using R. John Wiley, London 32
4.    Purohit, S.G.; Gore, S.D. and Deshmukh, S.R. (2015). Statistics using R, second edition. Narosa Publishing House, New Delhi.
5.    Shahababa, B. (2011). Biostatistics with R, Springer, New York
6.    Verzani, J. (2005). Using R for Introductory Statistics, Chapman and Hall /CRC Press, New York.

### **Structure of Practical Paper**

**Total Marks: 50 Marks**

- |   |                                  |
|---|----------------------------------|
| (i) For Continuous Evaluation               | : 15 marks (Internal Evaluation) |
| (ii) For semester end Practical Examination | : 35 marks (External Evaluation) |





# P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

Siddhartha Nagar, Vijayawada-520010

Autonomous-ISO9001-2015 Certified

## Marketing Management

**Offered to:** BBA – Business Analytics

**Code:** MGTT28B

**Course Type:** Core (TH)

**Year of Introduction:** 2017

**Year of offering:** 2022-2023

**Year of Revision:** 2023

**Percentage of Revision:** 20%

**Semester:** II

**Credits:** 4

**Hours Taught:** 60 hrs. per Semester

**Max. Time:** 5 Hours

**Course Prerequisites (if any):**

**Course Description:**

**Course Objectives:**

The objective of this course is to provide the students with overall knowledge about various elements of marketing mix i.e., product, pricing, promotion and distribution strategies.

**Course Outcomes:** At the end of this course, students should be able to:

- CO1:** Acquire understanding of fundamental concepts, scope, and vital functions performed by the core marketing department in a business organization.
- CO2:** Understand the ethical and legal implications of product decisions, pricing decisions as well as promotional & distribution decision.
- CO3:** Appreciate the modern marketing practices and influences in the marketing situations while dealing with marketing problems and making strategies.
- CO4:** Apply the principles of marketing management to identify the most appropriate strategies that yield desired results for a given marketing organization
- CO5:** Provide the theoretical frame works for marketing analytics.

### Syllabus

#### Course Details

Unit	Learning Units	Lecture Hours
I	<b>Product Decisions</b> Definition of Product and Product Lines - Product Hierarchy - Product Classification - Product Line Decisions - Product attributes decisions - Branding and Brand Decisions - Packing and labeling decisions - Stages in Product Life Cycle - Marketing strategies for different - Stages of the product lifecycle	12

II	<b>Pricing Decisions</b> Objectives of Price Setting- Factors influencing price setting-Pricing methods and strategies-Price adapting policies (An overview)	12
III	<b>Promotion Decisions</b> Objectives of Promotion-Elements of Promotion mix- Definition of Advertising-Types of Advertising Media (An Overview)-Definition of Sales Promotion Tools of Sales promotion-Definition of Personal selling -Personal selling process-Publicity vs. Public relations (An Overview)	12
IV	<b>Distribution Decisions</b> Definition of Marketing Channels-Types of Marketing channels – Factors affecting Marketing channel decisions Importance of marketing channels.	12
V	<b>Marketing Metrics</b> Return on Investment (ROI) - Customer Lifetime Value (CLV) Customer Acquisition Cost (CAC) - Conversion Rates - Leads Generated - Customer Share - Market Share - Marketing Key Performance Indicators (KPIs)	12

**Textbook:**

- 1) Philip Kotler and Armstrong, Principles of Marketing, PHI
- 2) Philip Kotler, Marketing Management, PHI

**Recommended Reference book:**

- 3) V.S Ramaswamy and S. Nama Kumari, Marketing Management.
- 4) J. P. Gupta and Joyti Rana, Principles of Marketing Management, Chand & Co. New Delhi.
- 5) MKTG-GB.2180.00\_Marketing Metrics\_Eberhardt\_S17.pdf

**Course Delivery method:** Face-to-face

**Course has focus on:** Foundation

**Websites of Interest:**

1. <https://learn.g2.com/marketing-metrics>
2. <https://blog.hubspot.com/marketing/product-classification>
3. <https://marketing-insider.eu/branding-decisions/>
4. <https://www.twi-global.com/technical-knowledge/faqs/what-is-a-product-life-cycle#:~:text=A%20product's%20life%20cycle%20is,%2C%20packaging%20redesigns%2C%20and%20more.>
5. <https://coschedule.com/marketing-strategy/marketing-goals/marketing-metrics-kpis#why-are-metrics-important-for-marketers->

**Co-curricular Activities:(Simple Problems)**

1. [https://ccsuniversity.ac.in/bridge-library/pdf/DHA-MHA-205\\_Unit.pdf](https://ccsuniversity.ac.in/bridge-library/pdf/DHA-MHA-205_Unit.pdf)
2. <https://theinvestorsbook.com/advertising-vs-publicity.html>
3. <https://www.activecampaign.com/blog/marketing-case-study-examples>

**Model Question Paper Structure**

**COURSE Code: MGT28B**

**Max.: 70 Marks**

**Section-A**

**Answer the following questions**

**(5 x 4M = 20Marks)**

1. A) Explain Product Classifications L2 (4M)  
(OR)  
B) Enumerate the stages of Product Life Cycle. L3 (4M)
2. A) What are the kinds of Price Adaption strategies. L3 (4M)  
(OR)  
B.) Explain Price adoption strategies (4 M)
3. A) Discriminate between Sale promotion and Personal selling L2 (4 M)  
(OR)  
B) Explain objectives of Advertising L3 (4 M)
4. A) Discuss the factors effecting Marketing Channels L2 (4M)  
(OR)  
B) What is social media marketing. Explain its benefits L2 (4M)
5. A) Explain the following terms i) Customer Lifetime Value ii) Customer Acquisition cost (4 M)  
(OR)  
B) Write a short note on Marketing Key Performance Indicators (KPI's)L2 (4M)

**Section-B**

**Answer the following questions**

**(5 x 10M = 50Marks)**

6. A.) Define Marketing and discuss its significance in the Modern World. L2 (10 M)  
(OR)  
B) Explain Marketing Strategies for different stages in PLC L3 (10 M)
7. A.) Define Pricing policy of a business firm. Explain Objectives of Pricing. (10 M)  
(OR)  
B) Explain Factors influencing price setting. Describe Pricing Methods (10M)
8. A) Define Promotion. Explain the Elements of Promotionmix L3 (10 M)  
(OR)  
B.) Define Advertising. Explain features of advertising. L3 (10 M)
9. A.) What is Marketing Channel. Explain its importance. L3 (10 M)  
(OR)  
B.) Illustrate Marketing channels with suitable examples L2 (10 M)
10. A.) What is marketing Return on Investment (ROI) why is it important? (10 M)  
(OR)  
B.) what are marketing metrics. Explain its importance in present business world? (10 M)



# P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

Siddhartha Nagar, Vijayawada – 520 010

Autonomous - ISO 9001 – 2015 Certified

## Fundamentals of Accounting

**Offered to:** BBA – Business Analytics

**COURSE CODE:** MGTT29B

**Course Type:** Core (TH)

**Year of Introduction:** 2017

**Year of offering:** 2022-2023

**Year of Revision:** 2023

**Percentage of Revision:** 20

**Semester:** II

**Credits:** 4

**Hours Taught:** 60 hrs. per Semester

**Max. Time:** 5 Hours

**Course Prerequisites (if any):**

**Course Description:**

**Course Objectives:**

The main objective of this course is to provide comprehensive knowledge about the accounting principles and concepts.

**Course Outcomes:** At the end of this course, students should be able to:

- CO1:** Acquire understanding of fundamental concepts, scope, and vital functions performed by the core marketing department in a business organization.
- CO2:** Understand the ethical and legal implications of product decisions, pricing decisions as well as promotional & distribution decision.
- CO3:** Appreciate the modern marketing practices and influences in the marketing situations while dealing with marketing problems and making strategies.
- CO4:** Apply the principles of marketing management to identify the most appropriate strategies that yield desired results for a given marketing organization.

## Syllabus

### Course Details

Unit	Learning Units	Lecture Hours
I	<b>Introduction to Accounting</b> Introduction: Need – Definition – Scope of Accounting – Principles of Accounting – Systems of Accounting – Preparation of Journal and Ledger – Preparation of Trail Balance – (Simple Problem)	12
II	<b>Subsidiary books</b> Subsidiary books with special reference to cash book (Single, Double, Triple column & Petty cash book) - (Problems) <b>Depreciation</b> Depreciation: meaning – Causes – objectives of providing for depreciation – Methods of providing for depreciation – Straight line method – Diminishing balance method – Annuity method – (Simple problem)	12
III	<b>Final Accounts</b> Final Accounts of a Sole trader: Manufacturing account – Trading account – Profit and loss account and Balance Sheet – Adjustments and closing entries – (Simple Problems)	12
IV	<b>Rectification of errors</b> Errors and their rectification: Types of errors – Rectification of errors before Trail balance, after trail balance and after final accounts – (Simple Problems).	12
V	<b>Analysis of Financial Statements</b> Trend analysis – Comparative statement analysis – Common Size Statement – Ratio analysis (Liquidity, Profitability, Solvency, Turnover, Earning ratios). (Simple Problems).	12

#### Textbook:

- a. Advance Accountancy – S.P. Jain & K.L. Narang – Kalyani publishers, New Delhi.
- b. Advance Accounting – M. Radha Swamy & R.L. Gupta – Sultan Chand & Sons, New Delhi.

#### Recommended Reference book:

- i. Rajini Sofat & Preeti Hiro. Basic of Accounting, PHI – New Delhi.
- ii. S.N. Maheswari, Suneel K. Maheswari, Financial Accounting – Vikas Publication – Hyderabad.

**Course Delivery method:** Face-to-face

**Course has focus on:** Foundation

#### Websites of Interest:

1. <https://www.accountingcoach.com/financial-accounting/explanation#:~:text=Financial%20accounting%20is%20a%20specialized,statement%20or%20a%20balance%20sheet.>
2. <https://www.toppr.com/guides/accountancy/theory-base-of-accounting/systems-and-basis-of-accounting/#:~:text=Systems%20of%20accounting%20refer%20to,double%20or%20dual%20e>

- [ntry%20system.](#)
3. <https://www.trendingaccounting.com/2021/08/what-is-ledger-account-and-how-it-is.html>
  4. <https://www.vedantu.com/commerce/what-are-subsiidiary-books>
  5. <https://tallysolutions.com/accounting/bank-reconciliation-statement/>

**Co-curricular Activities: (Simple Problems)**

1. <https://www.futureaccountant.com/accounting-process/problems-solutions/journal.php>
2. <https://www.futureaccountant.com/accounting-process/problems-solutions/ledger.php>
3. <https://www.eduxir.com/curriculum/cbse/class-xi/accountancy/recording-of-transactions-ii/recording-of-transactions-ii-other-subsiidiary-books-solutions/>
4. <https://www.highradius.com/resources/Blog/how-to-solve-real-life-problems-of-bank-reconciliations-with-examples/>
5. <https://everythingaboutaccounting.info/2020/12/trial-balance-problems-and-solutions.html>
6. <https://www.patriotsoftware.com/blog/accounting/balance-sheet-problems/>

**Model Question Paper Structure for SEE**

**Max.: 70 Marks**

**COURSE CODE: MGT29B**

**Section-A**

**Answer the following questions**

**(5 x 4M = 20Marks)**

1. (A) what is account? Explain the Scope of accounting. (CO 1) **(4 M)**  
(OR)  
(B) Prepare Trial Balance for the following Balances as on 31<sup>st</sup> March 2021 **(4 M)**
- |                               |                          |
|-------------------------------|--------------------------|
| Cost of goods sold – 5,20,000 | Opening Stock – 50,000   |
| Closing stock – 50,000        | Salary and wages -50,000 |
| Plant & Machinery – 2,00,000  | Drawing – 50,000         |
| Investment – 4,30,000         | Creditors – 1,00,000     |
| Capital – 4,00,000            |                          |
2. A) Explain the causes for depreciation. **(4 M)**  
(OR)  
B) Discuss the importance of Cash book among in subsidiary books, **(4M)**
3. A) Explain the importance of Manufacturing account in business? **(4 M)**  
(OR)  
A) Discuss the difference between Trading and Profit and loss account. **(4 M)**
4. (A) Explain the Importance of rectification errors in accounts **(4 M)**  
(OR)  
B) Rectification of errors is a necessary activity – Discuss **(4 M)**
5. A) What is Ratio Analysis? Discuss the types of Ratios in detail. **(4 M)**  
(OR)  
B) Importance of financial statement analysis **(4 M)**

**Section-B**

**Answer the following questions**

**(5 x 10M = 50Marks)**

6. (A) What is accounting? explain the concepts of accounting with suitable examples. (CO 1) **(10 M)**  
(OR)  
(B) Journalese the following transactions of Mr. Ram prasad. (CO 1) **(10 M)**
- 2006 April 1 Ram prasad started business with cash Rs. 50,000, Furniture Rs. 15,000 and stock Rs. 10,000  
2 Opened current account with Andhra Bank Rs. 20,000  
5 Sold goods to Rama Rao for Rs. 3,000  
6 Withdrawn from Bank for office use Rs. 2,000  
9 Sold goods for cash Rs. 1,200 and out of that paid Rs. 800 into Bank  
10 Typewriter Purchased by cheque Rs. 5,000

- 12 Purchased goods from Sudhakar for Rs. 6,000
- 14 Returned goods to Sudhakar Rs. 2,000
- 19 Sold goods to Krishna Rs. 1,500
- 20 Salaries paid Rs. 2,000

7. (A) Define depreciation. State the methods of providing for depreciation? (CO 2) **(10M)**

(OR)

B) Enter the following transactions in a Triple Column Cash Book. (CO 2) **(10M)**

- Jan. 2006 1 Cash in hand Rs. 5,374, Balance at bank Rs. 15,490
- 3 Cash Sales Rs. 6,400
- 5 Paid into bank Rs. 7,000
- 6 Received a cheque for Rs. 700 from Satyam
- 8 Paid into bank Satyam's cheque
- 10 Paid to Anurag by cheque Rs. 980 and discount allowed by him Rs. 20.12
- 12 Cash purchased Rs. 2,500
- 14 Withdrew from bank for office use Rs. 5,000
- 15 Received cheque for Rs. 950 from Lakshman allowed him discount Rs. 50
- 18 Cash Sales Rs. 7,500
- 19 Paid into bank Lakshman's cheque and Cash Rs. 4,000.
- 21 Cash paid for Stationery Rs. 120. 23 Paid Commission to Rakesh Rs. 500
- 25 Received cheque for Rs. 1,000 from Mohan and Paid the same into Bank.
- 27 Lakshman's cheque dishonored.
- 29 Drew a cheque for Rs. 800 for personal use. 31 Paid Salaries by cheque Rs. 1,500 and by cash Rs. 500.
- 31 Bank charges Rs. 20 and Insurance Premium Rs. 520 as shown in Pass Book.

8. A) Define final accounts explain importance and uses of the final accounts? (CO 4) **(10M)**

(OR)

B) From the following Trial Balance of Smt. Girija Stores, prepare final accounts for the year ending 31-12-2015. (CO 5) **(10M)**

#### Trial Balance

Debit Balance	Amount	Credit Balance	Amount
Purchases	70,000	Sales	1,00,000
Sales Returns	1,000	Capital	80,000
Carriage	500	Purchase returns	2,000
Salaries	1,500	Creditors	25,000
Rent	1,000	Commission	2,000
Insurance	500	Provision for bad debts	2,100
Debtors	20,000	Bills payable	5,000
Plant & Machinery	50,000		
Furniture	9,000		
Cash at Bank	20,000		



Opening Stock	25,000
Bills receivable	16,000
Wages	1,100
Advertisement	500

**2,16,100**

**2,16,100**

**Adjustments:**

1. Closing stock Rs 30,000
2. Outstanding salaries Rs.200
3. Depreciate Machinery by 10%, Furniture by 5%.4.  
Provide 5% reserve for bad debts on debtors.
5. Prepaid wages Rs.100.

9. (A) What is an error in accounts? explain various types of error. (CO5) (10 M)

(OR)

B) Pass necessary journal entries rectifying the following errors (10 M)

- i. Drawing 6000 rs debited to Trade Expenses
- ii. Goods purchased from venkat was registered in sales book rs 850
- iii. Purchase of 172 rs was recorded in purchases account as 127 rs
- iv. Under cast of purchase returns book by 61 rs
- v. Cash sales to Raghu 2500 rs entered in cash book, but credited to his personal account

10. (A) Prepare comparative balance sheet of Ayush Ltd: (10 M)

Particulars	Note No	31 <sup>st</sup> March, 2020	31 <sup>st</sup> March, 2019
<b>I. Equity and Liabilities</b>			
1. Share holders' fund			
Share capital		7,20,000	6,00,000
Reserve and Surplus		3,00,000	2,40,000
2. Non-Current Liabilities			
Long term barrowings		5,10,000	3,40,000
3. Current Liabilities			
Trade Payables		2,40,000	3,00,000
Total		17,70,000	14,80,000
<b>II. Assets</b>			
1. Non-Current Assets			
Fixed Assets:			
Tangible Assets		13,00,000	10,00,000
Intangible Assets		2,00,000	2,00,000
2. Current Assets			
Trade Receivables		2,50,000	2,40,000
Cash and Bank Balances		20,000	40,000
Total		17,70,000	14,80,000

(OR)

B) The following is the Balance Sheet of a company as on 31st March:

(10 M)

Liabilities	Rs	Assets	Rs
Share capital	2,00,000	Land and Buildings	1,40,000
Profit and Loss account	30,000	Plant and Machinery	3,50,000
General Reserve	40,000	Stock	2,00,000
12% Debentures	4,20,000	Sundry Debtors	1,00,000
Sundry Creditors	1,00,000	Bills Receivable	10,000
Bills payable	50,000	Cash at Bank	40,000
	<b>8,40,000</b>		<b>8,40,000</b>

Calculate:

1. Current ratio
2. Quick ratio
3. Inventory to working capital
4. Debt to Equity ratio
5. Proprietary ratio
6. Capital gearing ratio
7. Current assets to fixed assets

**DEPARTMENT OF BUSINESS ADMINISTRATION  
(BBA GENERAL & BBA-RM PROGRAMMES)**

**BOARD OF STUDIES (FOR II, IV & VI SEMESTERS DURING 2022-23)**

**Date: 4<sup>th</sup> March 2023**

Minutes of the meeting of Board of Studies in Business Administration (For BBA General & BBA-RM programmes) conducted in the Department of Business Administration:

**Members Present:**

1.	Prof.Rajesh.C.Jampala, HOD, Commerce & Business Administration and Dean (Academics & Administration)	Chairman
2.	Dr.D.Suryachandra Rao, Professor, Business Management, Krishna University,Machilipatnam.	University Nominee
3.	Prof. B.K.S Prakasa Rao, College of Business and Economics, Bule Hora, Ethiopia.	Subject Expert
4.	Prof. Murali Manohar, Dean, DY Patil Agricultural & Technical University, Talsande, Kolhapur, Maharashtra.	Subject Expert
5.	Sri.Ravi Teja Tallam, HR Manager, Trigyn Technologies Ltd., Vijayawada.	Industry Expert
6.	Mr.K.V. Ramesh Chandra, Lecturer in BBA	Member
7.	Mr.K. Vijay, Lecturer in BBA	Member
8.	Ms.V.G.V.Rajani, Lecturer in BBA	Member

**Resolutions:**

1. It is resolved and recommended to introduce '**Basics of Retail Management**' with course code RMTT21 in II semester of B.B.A. Retail Management Programme for the batch of students admitted in 2022-23 and onwards. For the syllabus and Model Question paper vide Page numbers from 2 to 3.
2. It is resolved and recommended to introduce '**Retailing in India**' with course code RMTT22 in II semester of B.B.A. Retail Management Programme for the batch of students admitted in 2022-23 and onwards. For the syllabus and Model Question paper vide Page numbers from 4 to 6.
3. It is resolved and recommended to introduce new pattern model Question paper for Courses 'Accounting For Managers' with course code MGTT22A and 'Business Environment' with course code MGTT25 in II semester of B.B.A. General Programme for the batch of students admitted in 2022-23 and onwards. For the syllabus and Model Question paper vide Page numbers from 7 to 10.

**BASICS OF RETAIL MANAGEMENT**

**COURSE CODE: RMTT21**

**SEMESTER – II**

**No. of Credits: 4**

**Objective:** The main objective of this course is to provide the student with a conceptual understanding of Retail Management concepts and basic functions of Retail Management.

**Course Outcomes:**

At the end of the course, the student will be able to –

- CO1 Outline the Retail Management functions in terms of their relevance in running a Retail business effectively. (PO5, PO7, PSO1)
- CO2 Interpret the interdependence of various functions in Supply Chain Management process and relate how one function impacts the other. (PO5, PO7, PSO1)
- CO3 Determine various management practices adopted for Stores Management. (PO5, PO7, PSO1)
- CO4 Understand different strategies for Retail pricing and promotion as well and make an appropriate choice of strategy that can yield better results. (PO5, PO7, PSO1)
- CO5 Understand the importance of Retail consumer behaviour in ensuring that the organization is progressing in the right direction. (PO5, PO7, PSO1)

**UNIT I INTRODUCTION TO RETAIL MANAGEMENT**

**15 Hours**

- 1.1 Definition of Retail Management
- 1.2 Major functions of Retail Management
- 1.3 Types of Retail Formats: Store based, Non-Store based and Web based
- 1.4 Types of Retailers
- 1.5 Functions & Services of Retailers
- 1.6 Roles and responsibilities of a Retail Manager
- 1.7 Ethics in Retailing

**UNIT II RETAIL SUPPLY CHAIN MANAGEMENT**

**15 Hours**

- 2.1 Definition of Supply Chain Management
- 2.2 Activities in Inbound Supply chain Management
- 2.3 Challenges of Inbound Logistics
- 2.4 Activities in Outbound Supply chain Management
- 2.5 Challenges of Outbound Logistics
- 2.6 Inventory Management & its significance
- 2.7 Warehouse Management & its significance
- 2.8 Importance of Returns logistics

**UNIT III STORES MANAGEMENT IN RETAILING**

**15 Hours**

- 3.1 Types of Retail Store Layouts
- 3.2 Components of Retail Store Layout
- 3.3 Important elements of Visual Merchandising
- 3.4 Factors influencing Retail Merchandising
- 3.5 Category Management & its significance
- 3.6 Managing Store security

**UNIT IV RETAIL PRICING & RETAIL PROMOTION**

**15 Hours**

- 4.1 Factors influencing Retail price setting
- 4.2 Retail Pricing Strategies: Mark-up Pricing and Competitive Pricing
- 4.3 Retail Pricing Strategies: Everyday Pricing, Price Skimming and Psychological Pricing

- 4.4 Promotion mix for a Retail Business
- 4.5 Types of Sales promotion in Retailing

## **UNIT V RETAIL CONSUMER BEHAVIOUR**

**15 Hours**

- 5.1 Definition of Consumer Behaviour
- 5.2 Demographic characteristics of Indian Retail consumer
- 5.3 Stages in Buying decision process
- 5.4 Factors influencing Buyer's decision
- 5.5 Elements of Customer Relationship Management (CRM)

### **Text Books:**

1. Retail Management A Strategic Approach, Barry Berman, Joel Evans, Mini Mathur, Pearson.
2. Retail Management, Suja Nair, Himalaya Publishing House.

### **References:**

1. Retailing Management, Michael Levy, Borton.A.Weitz, Ajay Pundit, McGraw Hill.
2. Retail Management – Text and Cases, Arunangshu Giri, Pradip Paul, Satakshi Chatterjee, PHI Learning
3. Retailing Environment and Operations, Andrew J. Newman and Peter Cullen, Cengage Learning.

### **Web links:**

- [www.managementhelp.org](http://www.managementhelp.org)
- [www.slideshare.net](http://www.slideshare.net)
- [www.yourarticlelibrary.com](http://www.yourarticlelibrary.com)

## **CURRICULAR ACTIVITIES**

1. Class-room activities:
  - Question-answer sessions at the end of each unit
  - Scheduled Quizzes at the end of each unit
  - Written assignments on assigned topics
2. Library activities:  
Reading text books on an assigned topic and preparation of notes as per the syllabus.
3. Smart Classroom Activity:  
Setting up Google Classroom for effective delivery of subject inputs.

## **CO-CURRICULAR ACTIVITIES**

- Group discussion on Retail Management functions
- Power point presentations on assigned topics

P.B.Siddhartha College of Arts & Science  
**BBA – Retail Management**

**RETAILING IN INDIA**

**COURSE CODE:** RMTT22

**SEMESTER – II**

**No. of Credits: 4**

**Objective:** The main objective of this course is to provide the student with a conceptual understanding of Retail Industry scenario prevailing in India in terms of Government policies and Retailing trends.

**Course Outcomes:**

At the end of the course, the student will be able to –

- CO1 Outline the overview of Indian Retail Sector. (PO5, PO7, PSO1)
- CO2 Interpret the interdependence among various government measures and relate how one impacts the other. (PO5, PO7, PSO1)
- CO3 Determine the impact of various factors on the efficiency and effectiveness of Indian Retail industry. (PO5, PO7, PSO1)
- CO4 Understand the pivotal role played by various institutions across India for the development of Indian Retail business. (PO5, PO7, PSO1)
- CO5 Understand the emerging trends envisaged in Indian Retail Industry. (PO5, PO7, PSO1)

**UNIT I AN OVERVIEW ON INDIAN RETAIL SECTOR**

- 1.1 Definition and meaning of retailing
- 1.2 Evolution of organized Retailing in India
- 1.3 Formats of Retailing in India
- 1.4 Prominent Segments of Indian Retail sector
- 1.5 Organized Retail sector Vs. Unorganized Retail sector

**UNIT II GOVERNMENT MEASURES FOR INDIAN RETAIL SECTOR**

- 2.1 National Retail Trade policy
- 2.2 India FDI Policy in Retail sector
- 2.3 Government schemes in favour of Indian Retail sector
- 2.4 Retail Business regulations in India

**UNIT III RETAIL INDUSTRY IN INDIA: OPPORTUNITIES & CHALLENGES**

- 3.1 SWOT Analysis of Indian Retail industry
- 3.2 Key drivers for growth and development of Retail sector in India
- 3.3 Challenges faced by organized Retail sector in India

**UNIT IV INSTITUTIONAL SUPPORT TO INDIAN RETAIL SECTOR**

- 4.1 Role of Foreign Investment Promotion Board (FIPB)
- 4.2 Role of Central Consumer Protection Authority (CCPA)
- 4.3 Role of Retailers Association of India (RAI)
- 4.4 Role of Retailers Association's Skill Council of India (RASCI)

**UNIT V EMERGING TRENDS IN INDIAN RETAIL SECTOR**

- 5.1 Impact of E-Commerce on Retail sector
- 5.2 Smart Logistics and Supply Chain Management
- 5.3 Shift in Consumer preferences
- 5.4 Focus on Rural Retailing

**Text Books:**

- 1. Ashish Kumar, Retail Sector in India, Lulu Press, Hyderabad.

2. Nitin Mehrotra, Indian Retail Sector – A Primer, ICFAI University Press, Hyderabad.

**References:**

1. Gibson.G.Vedamani, Retail beyond Detail: The Great Indian Retailing Business, SAGE Publications.
2. Arpita Mukherjee, Nitisha Patel, FDI in Retail Sector: INDIA, Academic Foundation.

**Web links:**

<https://www.ibef.org/industry/retail-india.aspx>  
[www.slideshare.net](http://www.slideshare.net)  
[www.yourarticlelibrary.com](http://www.yourarticlelibrary.com)

**CURRICULAR ACTIVITIES**

1. Class-room activities:
  - Question-answer sessions at the end of each unit
  - Scheduled Quizzes at the end of each unit
  - Written assignments on assigned topics
2. Library activities:  
Reading text books on an assigned topic and preparation of notes as per the syllabus.
3. Smart Classroom Activity:  
Setting up Google Classroom for effective delivery of subject inputs.

**CO-CURRICULAR ACTIVITIES**

- Group discussion on Indian Government role for the growth of Indian Retail Industry
- Power point presentations on assigned topics

**Model Question Paper**  
**Semester End Examination (RMTT21 and RMTT22)**

Max. Marks : 70

Max. Time : 3 Hrs

**SECTION A (20 MARKS)**

**One Question must be set from each unit of syllabus.**

**Answer all Questions.**

- |    |     |           |    |
|----|-----|-----------|----|
| 1. | (a) | 4M        | L1 |
|    |     | <b>OR</b> |    |
|    | (b) | 4M        | L1 |
| 2. | (a) | 4M        | L1 |
|    |     | <b>OR</b> |    |
|    | (b) | 4M        | L1 |
| 3. | (a) | 4M        | L2 |
|    |     | <b>OR</b> |    |
|    | (b) | 4M        | L2 |
| 4. | (a) | 4M        | L2 |
|    |     | <b>OR</b> |    |
|    | (b) | 4M        | L2 |
| 5. | (a) | 4M        | L3 |
|    |     | <b>OR</b> |    |
|    | (b) | 4M        | L3 |

**SECTION B (50 MARKS)**

**One Question must be set from each unit of syllabus.**

**Answer all Questions.**

- |     |     |           |    |
|-----|-----|-----------|----|
| 6.  | (a) | 10M       | L1 |
|     |     | <b>OR</b> |    |
|     | (b) | 10M       | L1 |
| 7.  | (a) | 10M       | L1 |
|     |     | <b>OR</b> |    |
|     | (b) | 10M       | L1 |
| 8.  | (a) | 10M       | L2 |
|     |     | <b>OR</b> |    |
|     | (b) | 10M       | L2 |
| 9.  | (a) | 10M       | L2 |
|     |     | <b>OR</b> |    |
|     | (b) | 10M       | L2 |
| 10. | (a) | 10M       | L3 |
|     |     | <b>OR</b> |    |
|     | (b) | 10M       | L3 |



**Model Question Paper**  
**Semester End Examination**

SEMESTER : II  
COURSE CODE: MGT T22A

Time: 3 HOURS  
Max. Marks: 70M

**SECTION A (20 MARKS)**

**One Question must be set from each unit of syllabus.**

**Answer all Questions.**

1. a) Advantages of Accounting (L1) 4M  
**OR**  
b) Classification of accounts and its rules (L1) 4M
2. a) Need for Bank Reconciliation Statement (L1) 4M  
**OR**  
b) Write about the types of subsidiary books (L1) 4M
3. a) State the objectives of Trial Balance (L2) 4M  
**OR**  
b) Types of errors (L2) 4M
4. a) Types of commissions (L2) 4M  
**OR**  
b) Difference between Proforma Invoice and Account Sale (L2) 4M
5. a) Explain the Causes for depreciation with suitable examples (L3) 4M  
**OR**  
b) Explain Straight line method of depreciation with an example. (L3) 4M

**SECTION B (50 MARKS)**

**One Question must be set from each unit of syllabus.**

**Answer all Questions.**

6. a) Explain the principles of Accounting. (L1) 10M  
**OR**  
b) Journalize the following transactions: (L1) 10M  
2015 Jan 1 Started business with cash Rs. 20,000  
Jan 1 Cash deposited in the bank Rs. 10,000  
Jan 3 Amount paid to Sundar Rs 2,000  
Jan 4 Cash received from Mohan Rs 1,000  
Jan 6 Purchased goods from Ram Rs. 10,000  
Jan 10 Sold goods to Syam Rs.3,000  
Jan 17 Brought postage stamps Rs.500  
Jan 20 Paid to Ram Rs.8,000  
Jan 21 Withdrawn for personal use Rs Rs.1,000  
Jan 21 Salaries paid Rs.2,000  
Jan 22 Wages paid Rs. 4,000  
Jan 23 Rent paid Rs. 2,000  
Jan 24 Interest received Rs. 1,000  
Jan 25 Commission received Rs.500  
Jan 26 Sold goods to Ajay for cash Rs.1, 200  
Jan 27 Brought furniture from Srinu Rs. 1,500  
Jan 30 Paid for stationery Rs. 1,000

Jan 31 Goods purchased Rs. 1,000  
 Jan 31 Sold goods worth Rs. 1,500

7. a) Discuss various types of cash books and draw the proforma of them. (L1) 10M

**OR**

b) From the following transactions prepare three column cash book. (L1) 10M

2015 Jan 1 Rao commenced business with cash Rs. 30,000  
 Jan 2 Opened current account in bank Rs. 10,000  
 Jan 5 Cash sales Rs. 5,000  
 Jan 10 Paid Reddy cash Rs. 1,000 and was allowed discount of Rs.100  
 Jan 18 Withdrew from bank for office use Rs. 2,500  
 Jan 21 Brought machinery and payment made by cheque Rs. 4,500  
 Jan 23 Received commission Rs.500  
 Jan 28 Purchases from Kulkarni, payment made by cheque Rs. 3,500  
 Jan 31 Received from Sarma Rs.2, 900 in full and final settlement of his account of Rs.3, 000.

8. a) What is a Trail Balance and explain various methods for preparing trail balance (L2) 10M

**OR**

b) From the following balances of VSR ltd, prepare Trading A/C, Profit and Loss A/C for the year ending 31-03- 2015 and the balance sheet on that date. (L2) 10M

<u>Particulars</u>	<u>Debit Rs.</u>	<u>Credit Rs.</u>
Purchases	14,000	-----
Sales	-----	28,800
Opening Stock	3,000	-----
Machinery	8,000	-----
Cash	2,000	-----
Creditors	-----	1,500
Wages	3,000	-----
Printing & Stationery	1,700	-----
Capital	-----	25,000
Factory rent	300	-----
Commission received	-----	1,000
Debtors	5,000	-----
Salaries	4,800	-----
Insurance	1,200	-----
Buildings	15,000	-----
Bills payable	-----	2,000
Furniture	500	-----
Interest received	-----	800
Patents	4000	-----
Bank overdraft	-----	3,400
Totals	<u>62,500</u>	<u>62,500</u>

**Adjustments :**

1. Closing stock Rs. 5,500.
2. Outstanding printing charges Rs. 300.
3. Insurance paid in advance Rs.200.

4. Unpaid wages Rs.500.
5. Commission received in advance Rs.100.
6. Interest accrued but not received Rs. 200.

9. a) Write the Journal entries in the books of consignor and consignee (L2) 10M

**OR**

- b) On 1<sup>st</sup> July, 2012 Radio House of Mumbai consigned 200 Radios to Rawat Bros. of Bengaluru. The cost of each Radio was Rs.400/-. Radio house paid Rs.5000/- for freight and insurance. On 7<sup>th</sup> July 2012, Rawat Bros. accepted a 3 month bill drawn upon them by Radio House for Rs.50000/-. Rawat Bros. paid Rs.2200/- as rent and Rs.1300/- for advertisement and up to 31<sup>st</sup> December 2012 (on which date Radio House closed their books) they sold 180 radios at Rs.500/- each. Rawat Bros. were entitled to a commission of 5% on sales.

Prepare necessary accounts to record the above transactions in the books of Consignor. (L2) 10M

10. a) What is Depreciation and explain the factors affecting depreciation. (L3) 10M

**OR**

- b) On 1-4-2015, A firm purchased machinery worth Rs.1, 00,000 and spends Rs.10,000/- on its installation. The accounts are closed each year on 31<sup>st</sup> March. Assuming the annual depreciation to be 10%, show the machinery account for five years under straight line method and written down value method. (L3) 10M

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**Model Question Paper**  
**Semester End Examination**

SEMESTER : II  
COURSE CODE: MGT T25

Time: 3 HOURS  
Max. Marks: 70M

**SECTION A (20 MARKS)**

**One Question must be set from each unit of syllabus.**

**Answer all Questions.**

1. a) Significance of studying business environment in business decision making. (L1) 4M  
**OR**  
b) What is the role of Micro environment of Business? (L1) 4M
2. a) Explain the interface between culture and business. (L1) 4M  
**OR**  
b) Present an overview on IPR. (L1) 4M
3. a) Role of judiciary in political and legal environment of business. (L2) 4M  
**OR**  
b) What are the responsibilities of business toward the government? (L2) 4M
4. a) Write the characteristics of a capitalistic economic system. (L2) 4M  
**OR**  
b) Give an overview of 5-year plans in India. (L2) 4M
5. a) Describe the elements of International Environment. (L3) 4M  
**OR**  
b) Write the main features of an MNC. (L3) 4M

**SECTION B (50 MARKS)**

**One Question must be set from each unit of syllabus.**

**Answer all Questions.**

6. a) Describe in detail about the process of environmental scanning. (L1) 10M  
**OR**  
b) Explain the influence exerted by various elements of Macro environment of business with Examples. (L1) 10M
7. a) Explain the role played by Research and Development in Business Environment. (L1) 10M  
**OR**  
b) Discuss the salient features of technological policy followed in India. (L1) 10M
8. a) Discuss the features and functions of consumer disputes redressal system in India. (L2) 10M  
**OR**  
b) Discuss major legislations introduced in India during the post-independence period. (L2) 10M
9. a) Describe the new industrial policy initiatives undertaken by the government of India after 1991. (L2) 10M  
**OR**  
b) Explain the major elements being dealt with in the fiscal policy of government of India. (L2) 10M
10. a) Discuss the role of MNCs in India. (L3) 10M  
**OR**  
b) Explain different types of accounts that can be maintained by non-resident Indians and persons of Indian origin in India. (L3) 10M

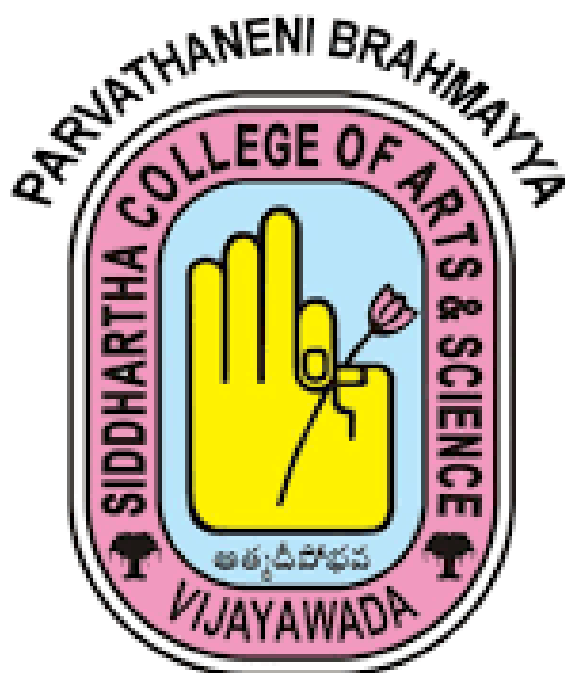
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PARVATHANENI BRAHMAIAH SIDDHARTHA COLLEGE OF ARTS AND  
SCIENCE,

VIJAYAWADA.

# DEPARTMENT OF BOTANY

## BOTANY COURSE STRUCTURE UNDER CBCS II, IV & VI SEMESTERS



Since 1975

BOARD OF STUDIES  
2022-23  
PROPOSED SYLLABUS

**Department of Botany**  
**Board of Studies for the academic Year 2022-2023 (Even Semesters)**

**Agenda**

1. To evaluate the syllabus in relation to its socio-economic relevance.
2. To explore the possibilities of introducing any new subjects as additional optional subjects, or new combinations of subjects.
3. To assess the potential of the courses against the employment prospects, necessary certification courses.
4. To make academic flexibilities like honors with extra credits acquired through either advanced study of same courses or with procuring additional credits from additional courses.

**Minutes of meeting of Board of studies in Botany held on 09-03-2023 at 02.00 p.m. in the Department of Botany.**

**Members present:**

1	Dr.P.Srinivasa Rao, HOD, Botany	Chairman	Sd/-
2	Dr.J.Naveena Lavanya Latha,	University Nominee	Sd/-
3	Dr.G.Rosaiah	Subject Expert	Sd/-
4	Dr.N.Savithamma	Subject Expert	Sd/-
5	M.Chandrasekhara Reddy	Industrialist	Sd/-
6	A.Amani	Alumnus	Sd/-
7	D.Sravani	Member	Sd/-

**List of Courses to be introduced / revised**

DEPARTMENT OF BOTANY								
LIST OF THE COURSES REVISED/ INTRODUCED IN II SEMESTER-2022-23								
S.NO	TITLE OF THE COURSE	Course Code	Offered in SEM	Type of the Paper	Year of Introduction	Year of Revision	OBE with BTL	Offered to
1	Basics of Vascular plants and Phytogeography (Pteridophytes, Gymnosperms, Taxonomy of Angiosperms and Phytogeography)	BOTT21A	II	CORE	2020-21	QUESTION PAPER	YES	BSc.(B.Z.C)
2	Basics of Vascular plants and Phytogeography (Pteridophytes, Gymnosperms, Taxonomy of Angiosperms and Phytogeography)	BOTP21A	II	CORE	2020-21	QUESTION PAPER	YES	BSc.(B.Z.C)
3	Plant Nursery Management	SDCBOTP01	II	SKILL DEVELOPMENT	2020-21	QUESTION PAPER	YES	BA(EMS)/ BSc.(B.Z.C)

The following resolutions are made in Board of Studies in Botany for EVEN Semesters to recommend to the 47<sup>nd</sup> Academic Council for its approval.

### **Resolutions/Recommendations**

1. It is resolved and recommend the revision of the model question paper of “Basics of Vascular Plants and Phytogeography” with course code **BOTT21A** in II semester of BSc.(BZC) for the batch of students admitted in 2022-23 and onwards. For the revised model question paper vide Page Number 4 to 8.
2. It is resolved and recommend the revision of the model question paper of “Basics of Vascular Plants and Phytogeography” with course code **BOTP21A** in II semester of BSc.(BZC) for the batch of students admitted in 2022-23 and onwards. For the revised model question paper vide Page Number 9 to 10.
3. It is resolved and recommend the revision of the model question paper of “Plant Nursery Management” with course code **SDCBOTP01** in II semester of BSc.(BZC) & BA.(EMS) for the batch of students admitted in 2022-23 and onwards. For the revised model question paper vide Page Number **11 to 13**.



## P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

Siddhartha Nagar, Vijayawada – 520 010

Autonomous - ISO 9001 – 2015 Certified

### Title of the Paper: Basics of Vascular Plants and Phytogeography

(Pteridophytes, Gymnosperms, Taxonomy of Angiosperms and Phytogeography)

**COURSE CODE: BOTT21A**

**Offered to:** BSc. BZC with Programme code US03

**Course Type:** Core (TH)

**Year of Introduction:**

**Year of Revision:**

**Percentage of Revision:**

**Semester: II**

**Credits: 04**

**Hours Taught:** 60 hrs. per Semeste

**Max.Time:** 3 Hours

**Course Prerequisites:** Knowledge of Pteridophytes, Gymnosperms, Taxonomy of Angiosperms and Phytogeography studied in intermediate.

#### Course Description:

This course will provide one with a basic and comprehensive understanding of anatomical structure and functions. Enable the student with depth of topics and helps them to gain an appreciation in the embryology of Angiosperms. On the other hand, importance of understanding plant ecology and biodiversity provides an extensive knowledge to the student.

#### Course Objectives:

1. The study of Pteridophytes
2. The study of Gymnosperms
3. Knowledge of Basic aspects of Taxonomy
4. Study of Systematic Taxonomy
5. Knowledge of Phytogeography

**Course Outcomes:** At the end of this course, students should be able to:

**CO1:** Gain knowledge in the classification and comparison of Pteridophytes and Gymnosperms based on their morphology, anatomy, reproduction and life cycle.

**CO2:** Justify evolutionary trends in Tracheophytes to adapt for land habitat. Evaluate the ecological, ethnic and economic value of different tracheophytes and summarize their good and services for human welfare

**CO3:** Explanation of the process of fossilization and compare the characteristics of extinct and extant plants.

**CO4:** Analyze the morphology of the most common Angiosperm plants of their localities and recognize their families.

**CO5:** Locate different Phytogeographical regions of the world and India and can analyze their floristic wealth.

### Syllabus

#### Course Details

Unit	Learning Units	Lecture Hours
I	1.1 General characteristics of Pteridophyta; classification of Smith (1955) upto divisions. 1.2 Occurrence, morphology, anatomy, reproduction (developmental details are not needed) and life history of (a) <i>Lycopodium</i> (Lycopsida) and (b) <i>Marsilea</i> (Filicopsida).	12



	1.3Stelar evolution in Pteridophytes 1.4Heterospory and seed habit.	
II	2.1General characteristics of Gymnosperms; Sporne classification upto classes. 2.2Occurrence, morphology, anatomy, reproduction (developmental details are not needed) and life history of (a) <i>Cycas</i> ( <i>Cycadopsida</i> ) and (b) <i>Gnetum</i> ( <i>Gnetopsida</i> ). 2.3Outlines of geological time scale. 2.4A brief account on Cycadeoidea.	12
III	<b>Basic aspects of Taxonomy</b> 3.1 Aim and scope of taxonomy; Species concept: Taxonomic hierarchy, species, genus and family. 3.2 Plant nomenclature: Binomial system, ICBN- rules for nomenclature. 3.3 Herbarium and its techniques, BSI herbarium and Kew herbarium; concept of digital herbaria. 3.4 Bentham and Hooker system of classification 3.5 Systematic description and economic importance of the following families: (a) Annonaceae (b) Curcurbitaceae	12
IV	<b>Systematic Taxonomy</b> 4.1Systematic description and economic importance of the following families: (a) Asteraceae (b) Asclepiadaceae (c) Amaranthaceae (d) Euphorbiaceae (e) Arecaceae (f) Poaceae 4.2 Outlines of Angiosperm Phylogeny Group (APG IV).	12
V	<b>Phytogeography</b> 5.1Principles of Phytogeography, Distribution (wides, endemic, discontinuous species) 5.2Endemism – types and causes. 5.3Phytogeographic regions of World. 5.4Pytogeographic regions of India. 5.5Vegetation types in Andhra Pradesh	12

**Textbook:**

- 1.Botany – I (Vrukshasastram-I): Telugu Akademi, Hyderabad
- 2.Botany – II (Vrukshasastram-II): Telugu Akademi, Hyderabad
- 3.Acharya, B.C., (2019) Archchegoniates, Kalyani Publishers, New Delhi
- 4.Bhattacharya, K., G. Hait-&Ghosh, A. K., (2011) A Text Book of Botany, Volume II, New Central Book Agency Pvt. Ltd., Kolkata
- 5.Hait, G., K. Bhattacharya-& A.K. Ghosh (2011) A Text Book of Botany, Volume-I, New Central Book Agency Pvt. Ltd., Kolkata
- 6.Pandey, B.P. (2013) College Botany, Volume-I, S. Chand Publishing, New Delhi Pandey, B.P. (2013) College Botany, Volume-II, S. Chand Publishing, New Delhi

**Recommended Reference book:**

1. Smith, G.M. (1971) Cryptogamic Botany Vol. II., Tata McGraw Hill, New Delhi
2. Sharma, O.P. (2012) Pteridophyta. Tata McGraw-Hill, New Delhi
3. Kramer, K.U. & P. S. Green (1990) The Families and Genera of Vascular Plants, Volume –I: Pteridophytes and Gymnosperms (Ed. K. Kubitzki) Springer-Verlag, New York
4. Bhatnagar, S.P. & Alok Moitra (1996) Gymnosperms. New Age International, New Delhi
5. Coulter, J.M. & C.J. Chamberlain (1910) Morphology of Gymnosperms, The University of Chicago Press, Chicago, Illinois
6. Govil, C.M. (2007) Gymnosperms : Extinct and Extant. KRISHNA Prakashan Media (P) Ltd. Meerut & Delhi
7. Sporne, K.R. (1971) The Morphology of Gymnosperms. Hutchinsons Co. Ltd., London
8. Arnold, C.A., (1947) An introduction to Paleobotany McGraw –Hill Book Company, INC, New York Stewart, W.N., and G.W. Rothwell (2005) Paleobotany and the evolution of plants Cambridge University Press, New York
9. Lawrence, George H.M. (1951) Taxonomy of Vascular Plants. The McMillan Co., New York
10. Heywood, V. H. and D. M. Moore (1984) Current Concepts in Plant Taxonomy. Academic Press, London. Jeffrey, C. (1982) An Introduction to Plant Taxonomy. Cambridge University Press, Cambridge. London. Sambamurty, A.V.S.S. (2005) Taxonomy of Angiosperms I. K International Pvt. Ltd., New Delhi
11. Singh, G. (2012). Plant Systematics: Theory and Practice. Oxford & IBH Pvt. Ltd., New Delhi.
12. Simpson, M.G. (2006). Plant Systematics. Elsevier Academic Press, San Diego, CA, U.S.A.
13. Cain, S.A. (1944) Foundations of Plant Geography Harper & Brothers, N.Y.
14. Good, R. (1997) The Geography of flowering Plants (2nd Edn.) Longmans, Green & Co., Inc., London & Allied Science Publishers, New Delhi
15. Mani, M.S (1974) Ecology –& Biogeography of India Dr. W. Junk Publishers, The Hague

**Course Delivery method:** Face-to-face / Blended

**Course has focus on:** Foundation

**Websites of Interest:**

<https://www.youtube.com/watch?v=VA2LNWkZNW0>

<https://www.youtube.com/watch?v=zDUCacewuAg>

<https://www.youtube.com/watch?v=sfFDOSM->

[EuAhttps://www.youtube.com/watch?v=wKNox2weqW4](https://www.youtube.com/watch?v=wKNox2weqW4)

**Co-curricular Activities:****A. Measurable:**

1. Collection and identification of Pteridophytes from their native locality/ making an album by collecting photographs of Pteridophytes.
2. Collection and identification of Gymnosperms from their native locality/ making an album by collecting photographs of Gymnosperms.
3. Collection of information on famous herbaria in the world and preparation of a report.
4. Collection of information on famous botanic gardens in the world and preparation of a report.
5. Collection of data on plants of ethnic and ethnobotanical importance from Their native locality.
6. Preparation of a local flora by enlisting the plants of their native place.

**c. Assignments:** Written assignment at home / during '0' hour at college;

Lycopodium-life cycle, Marselia-life cycle, Cycas-life cycle, Gnetum-life cycle, Bentham & Hooker classification, Stellar evolution in Pteridophytes, characteristics of Cycadeoidea, Asteraceae-taxonomy, Asclepiadaceae-taxonomy, Euphorbiaceae-taxonomy, Cucurbitaceae-taxonomy, Principles of phytogeography, Endemism types & causes, Phytogeographic regions of India. Preparation of charts with drawings, making models etc., on topics included in syllabus.

**B. General:**

1. Quiz

**SEE MODEL PAPER**

**Max. Marks : 70**

**COURSE CODE: BOTT21A Max. Time : 3 Hrs**

**Section-A (20 Marks)**

**Answer all Questions**

**(Restrict to a maximum of 2 sub divisions)**

1. (a) What is meant by heterospory? Justify the advantages of heterospory. CO1, L1. **4M**  
OR  
(b) Write about Protocorm and its morphological nature. CO1, L6. **4M**
2. (a) Explain the characteristics of Cycadeoidea. CO2, L2. **4M**  
OR  
(b) Enumerate Geological time scale. CO2, L1. **4M**
3. (a) Describe ICBN rules for nomenclature. CO3, L2. **4M**  
OR  
(b) Describe the vegetative characters of family Annonaceae CO3, L2. **4M**
4. (a) Write a note on Angiosperms Phylogeny Group. CO4, L6. **4M**  
OR  
(b) Describe the inflorescence in Arecaceae. CO4, L2. **4M**
5. (a) Discuss about the Vegetation types in Andhra Pradesh. CO5, L2. **4M**  
OR  
(b) Explain the causes and types of Endemism. CO5, L2. **4M**

**Section-B (50Marks)**

**Answer all Questions**

**(Restrict to a maximum of 2 sub divisions)**

9. (a) Describe diverse gametophytes present in the *Lycopodium* species. CO1, L2. **10M**  
or  
(b) What is sporocarp? Describe the structure of *Marselia* Sporocarp. CO1, L2. **10M**
10. (a) Describe the anatomy of *Cycas* leaflet. Add a note on xerophytic features of it. CO2, L2. **10M**  
or  
(b) Describe the structure of *Gnetum* male and female cones. CO2, L2. **10M**
11. (a) What is Natural System of Classification, Bentham and Hooker System of Classification? CO3, L1. **10M**  
or  
(b) Describe vegetative and floral characters of Cucurbitaceae. Add a note on and economic Importance CO3, L1. **10M**
12. (a) Elucidate floral characters of Asteraceae. CO4, L1. **10M**  
or  
(b) Describe floral characters of Poaceae. Add a note on economic importance CO4, L1. **10M**
13. (a) What is Phytogeography? Explain principles of Phytogeography. CO5, L2. **10M**  
or  
(b) Explain about Phytogeographic region of India. CO5, L1. **10M**

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# P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

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*Autonomous - ISO 9001 - 2015 Certified*

**Title of the Paper: Basics of Vascular Plants and Phytogeography**  
(Pteridophytes, Gymnosperms, Taxonomy of Angiosperms and Phytogeography)

**COURSE CODE : BOTP21A**

**Offered to:** BSc. BZC with Programme code US03

**Course Type:** Core (P)

**Year of Introduction:**

**Year of Revision:**

**Percentage of Revision:**

**Semester:** II

**Credits:** 02

**Hours Taught:** 30hrs. per Semester

**Max. Time:** 3 Hours

**Course Prerequisites:** Knowledge of Pteridophytes, Gymnosperms, Taxonomy of Angiosperms and Phytogeography studied in intermediate.

## **Course Description:**

This course will provide one with a basic and comprehensive understanding of anatomical structure and functions. Enable the student with depth of topics and helps them to gain an appreciation in the embryology of Angiosperms. On the other hand, importance of understanding plant ecology and biodiversity provides an extensive knowledge to the student.

## **Course Objectives**

1. The study of Pteridophytes
2. The study of Gymnosperms
3. Knowledge of Basic aspects of Taxonomy
4. Study of Systematic Taxonomy
5. Knowledge of Phytogeography

**Course Outcomes:** At the end of this course, students should be able to:

**CO1:** Demonstrate the techniques of section cutting, preparing slides, identifying of the material and drawing exact figures.

**CO2:** Compare and contrast the morphological, anatomical and reproductive features of vascular plants.

**CO3:** Identify the local angiosperms of the families prescribed to their genus and species level and prepare herbarium.

**CO4:** Exhibit skills of preparing slides, identifying the given twigs in the lab and drawing figures of plant twigs, flowers and floral diagrams as they are.

**CO5:** Prepare and preserve specimens of local wild plants using herbarium techniques.

## **Syllabus**

1. Study/ microscopic observation of vegetative, sectional/anatomical and reproductive structures of the following using temporary or permanent slides/ specimens/ mounts:
  - a. Pteridophyta: *Lycopodium* and *Marselia*
  - b. Gymnosperms: *Cycas* and *Gnetum*
2. Study of fossil specimens of Cycadeoidea and Pentoxylon (photographs /diagrams can be shown if specimens are not available).
3. Demonstration of herbarium techniques.

4. Systematic / taxonomic study of locally available plants belonging to the families prescribed in theory syllabus. (Submission of 30 number of Herbarium sheets of wild plants with the standard system is mandatory).
5. Mapping of phytogeographical regions of the globe and India.

**Textbook:**

1. A text book of Practical Botany-I Ashok Bendra and Ashok kumar
2. Practical manual of College Botany I and II- B.S..Reddy and S.M.Reddy

**Course Delivery method:** Face-to-face / Blended.

**Course has focus on:** Skill Development

**Websites of Interest:**

<https://youtu.be/RJsOOhws5gI>

<https://youtu.be/9xtB1G4kISQ>

<https://youtu.be/2wFN9YmkBOQ>

**Model Question Paper Structure for SEE**

**Time: 3hrs.**

**Max. Marks 35M**

1. Take T.S. of the material 'A' (Pteridophyta), make a temporary slide and justify the identification with apt points. **6M**
2. Take T.S. of the material 'B' (Gymnosperms), make a temporary slide and justify the identification with apt points. **6M**
3. Describe the vegetative and floral characters of the material 'C' (Taxonomy of Angiosperms) and derive its systematic position. **8M**
4. Identify the specimen 'D' (Fossil Gymnosperm) and give specific reasons. **2M**
5. Locate the specified phytogeographical regions the world / India (E) map supplied to you **2X2=4M**
6. Record + Herbarium , Field note book & Viva voce **5+1+1+2=9M**



## P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

Siddhartha Nagar, Vijayawada – 520 010

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### Title of the Paper: Plant Nursery Management

**Offered to:** BSc.BZC with Programme code US03

**COURSE CODE:** SDCBOTP01

**Course Type:** SDCBOTP01

**Year of Introduction:**

**Year of Revision:**

**Percentage of Revision: Semester: II**

**Credits: 02**

**Hours Taught:** 30 hrs. per Semester

**Max. Time:** 3 Hours

**Course Prerequisites:** Knowledge of herbarium methodology studied in intermediate.

**Course Description:** This course will provide one with a basic and comprehensive understanding of herbarium. Enable the student with depth of topics and helps them to gain an appreciation in collection and processing of specimens. On the other hand, importance of understanding maintenance of herbarium, handling of specimens provides an extensive knowledge to the student.

#### **Course Objectives:**

1. To study importance of nursery.
2. To study the basic requirements for nursery.
3. To study the management of nursery.
4. To study seasonal activities and routine operations in a nursery.
5. To study vegetative propagation techniques.

**Course Outcomes:** At the end of this course, students should be able to:

CO1: Understand the importance of plant nursery, basic infrastructure to establish it.

CO2: Explain the basic material, tools and techniques required for nursery.

CO3: Demonstrate expertise related to various practices in a nursery

CO4: Comprehend knowledge and skills to get an employment or to become an entrepreneur in plant nursery sector.

### Syllabus

#### Course Details

Unit	Learning Units	Lecture Hours
I	<b>Introduction to Plant Nursery</b> 1. Plant nursery: definition, importance. 2. Different types of nurseries on the basis of duration, plant parts used for propagation. 3. Basic facilities for a nursery: layout and components of a good nursery 4. Plant propagation structures in brief 5. Bureau of Indian standards (BIS-2008) related to nursery.	6

II	<b>Basic Requirements for Nursery</b> 1. Nursery beds – types and precautions to be taken during preparation. 2. Growing media, nursery tools and implements, containers for plant nursery in brief. 4. Outlines of vegetative propagation techniques to produce planting material. 5. Sowing methods of seeds and planting material.	6
III	<b>Management of Nursery</b> 1. Seasonal activities and routine operations in a nursery. 2. Nursery management- watering, weeding and nutrients: pests and diseases. 3. Common possible errors in nursery activities. 4. Economics of nursery development, pricing and record maintenance. 5. Online nursery information and sales systems.	6
	<b>Practical Syllabus</b> 1. Demonstration of Nursery bed making of propagation media. 2. Demonstration of preparation of media for Nursery. 3. Hands on training on vegetative propagation techniques. 4. Hands on training on showing methods of seeds and other material. 5. Visit to an agriculture/horticulture/forest nursery. 6. Case study on establishment and success of a plant nursery	12

**Recommended Reference book:**

- 1.Ratha Krishnan, M., et..al (2014) plant nursery management: principles and practices, Central arid Zone Research Institute ( ICAR), Jodhpur, Rajasthan.
- 2.Kumar, N., (1997) Introduction to Horticulture, Rajalakshmi Publications Nagercoil.
- 3.Kumar Mishra.,N.K. Mishra and Satish Chand (1994) Plant Propagation, John Wiley & Sons. New Jersey

**Course Delivery method:** Face-to-face / Blended.

**Course has focus on:** Foundation/Skill Development

**Websites of Interest:**

<https://youtu.be/Y6BgWWPFGss>

<https://www.youtube.com/watch?v=9Dc-NYGz-9w>



**Model Question Paper Structure for SEE**

**Course Type: SDCBOTP01**

**Time: 3Hrs**

**Max.Marks: 40M**

- |   |               |
|---|---------------|
| 1. Describe experiment "A" -----                                      | <b>8M</b>     |
| 2. Identify the given propagation technique "B" and write notes-----  | <b>8M</b>     |
| 3. Identify the given propagation technique "C" and write notes ----- | <b>10M</b>    |
| 4. Identify the following Vegetative Propagule "D"-----               | <b>3M</b>     |
| 5. Identify the given garden tools "E" and "F"-----                   | <b>2X2=4M</b> |
| E:  |               |
| F:  |               |
| 6. Field note Book-----   | <b>2M</b>     |

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# Department of Chemistry

Minutes of the meeting of the Board of studies in **Chemistry** held on 13/03/2023 through online at 04:00 PM.

## **BOS Members List**

***Dr.M.Manoranjani***

HOD, Chemistry

P.B.Siddhartha College of Arts & Science

**Chairman**

***Dr D.Ramasekhara Reddy,***

Department of Chemistry,

Krishna University,

Machilipatnam..

**University Nominee**

***Prof.C. Suresh Reddy,***

Department of Chemistry (Organic)

Sri Venkateswara University,

Tirupati.

**Subject Expert**

***Prof.Ch.Subrahmanyam***

Professor & Dean of Academics,

IIT,

Hyderabad.

**Subject Expert**

***Sri Ch.Sekhar***

Director,

CIPET, Vijayawada.

**Industry Expert**

***Dr.M.Sivanadh***

HOD, Department of Chemistry,

ANR College,

Gudivada,

**Alumni**

***Dr.P.T.S.R.K.Prasad Rao***

I/C, Dept of Chemistry

P.B.Siddhartha College of Arts & Science

**Member**

***Smt.V.Visalakshamma***

Lecturer, Dept of Chemistry

P.B.Siddhartha College of Arts & Science

**Member**

***E. Nagarjuna Babu***

Lecturer, Dept of Chemistry

P.B.Siddhartha College of Arts & Science

**Member**

## RESOLUTIONS

DEPARTMENT OF CHEMISTRY							
LIST OF THE COURSES REVISED IN II SEMESTER -2022-23							
S.NO	TITLE OF THE COURSE	Course Code	Offered in SEM	Type of the Paper	Year of Introduction	OBE with BTL	Offered to
1	ORGANIC & GENERAL CHEMISTRY	CHET21A	II	CORE	2021-22	YES	BSC MPC & BZC
2	ORGANIC & GENERAL CHEMISTRY	CHEP21A	II	CORE LAB	2021-22	YES	BSC MPC & BZC

1. It is resolved and recommend the revision of model question paper of **ORGANIC & GENERAL CHEMISTRY** with course code **CHET21A** in II semester of B.Sc.(M.PC& BZC) for the batch of students admitted in 2022-23 and onwards. For the revised model question paper vide Page Number 3 to 8.
2. It is resolved and recommend the revision of model question paper of **ORGANIC & GENERAL CHEMISTRY** with course code **CHEP21A** in II semester of B.Sc.(M.PC& BZC) for the batch of students admitted in 2022-23 and onwards. For the revised model question paper vide Page Number 9 to 10.



## P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

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### Title of the Paper (**ORGANIC & GENERAL CHEMISTRY**) (**COURSE CODE CHE T21A**)

**Offered to:** I B.Sc MPC & BZC

**Course Type :** Core (TH)

**Year of Introduction:** 2021

**Year of offering:** 2021

**Year of Revision:** 2021 -22

**Percentage of Revision:** -

**Semester:** II

**Credits:** 4

**Hours Taught:** 60 hrs. Per Semester

**Max.Time :** 4 Hours

**Course Prerequisites (if any):** Organic Chemistry Nomenclature, types of hydrocarbons and stereochemistry of compounds.

**Course Description:** This course provides a study of nomenclature, structure, properties, and mechanisms of hydrocarbons in Organic Chemistry. Understand the adsorption processes, colloidal properties and MO diagrams for diatomic molecules.

#### **Course Objectives:**

At the end of the course, the student will be able to;

1. Understand and explain the differential behavior of organic compounds based on fundamental concepts learnt.
2. Formulate the mechanism of organic reactions by recalling and correlating the fundamental properties of the reactants involved.
3. Learn and identify many organic reaction mechanisms including Free Radical Substitution, Electrophilic Addition and Electrophilic Aromatic Substitution.
4. Correlate and describe the stereo chemical properties of organic compounds and reactions.

#### **Course Outcomes:**

**CO1.**Remember the nomenclature of aliphatic and aromatic hydrocarbons. **PO1**

**CO2.** Understand the preparations, properties and structures of alkanes and cycloalkanes. **PO1**

**CO3.** Apply different reaction mechanisms to alkenes and alkynes. **PO7**

**CO4.** Analyze benzenoid and non benzenoid compounds based on Huckel rule. **PO1,PO7**

**CO5.** Evaluate bond orders and magnetic properties of diatomic molecules by MO theory. **PO1,PO7**

**CO6.** Create awareness on configurational, confirmations and optical isomers of different Organic compounds- **PO1,PO7**

## ORGANIC CHEMISTRY

36h

### UNIT-I

#### Recapitulation of Basics of Organic Chemistry

##### Carbon-Carbon sigma bonds (Alkanes and Cycloalkanes)

12h

General methods of preparation of alkanes- Wurtz and Wurtz Fittig reaction, Corey House synthesis, physical and chemical properties of alkanes, Isomerism and its effect on properties, Free radical substitutions; Halogenation, concept of relative reactivity v/s selectivity. Conformational analysis of alkanes (Conformations, relative stability and energy diagrams of Ethane, Propane and butane). General molecular formulae of cycloalkanes and relative stability, Baeyer strain theory, Cyclohexane conformations with energy diagram, Conformations of monosubstituted cyclohexane.

### UNIT-II

#### Carbon-Carbon pi Bonds (Alkenes and Alkynes)

12h

General methods of preparation, physical and chemical properties. Mechanism of E1, E2, E1cB reactions, Saytzeff and Hoffmann eliminations, Electrophilic Additions, mechanism (Markownikoff/Anti markownikoff addition) with suitable examples,, *syn* and *anti*-addition; addition of H<sub>2</sub>, X<sub>2</sub>, HX. Oxymercuration- demercuration, hydroboration-oxidation, ozonolysis, hydroxylation, Diels Alder reaction, 1,2- and 1,4-addition reactions in conjugated dienes. Reactions of alkynes; acidity, electrophilic and nucleophilic additions, hydration to form carbonyl compounds, Alkylation of terminal alkynes.

### UNIT-III

#### Benzene and its reactivity

12h

Concept of aromaticity, Huckel's rule - application to Benzenoid (Benzene, Naphthalene) and Non - Benzenoid compounds (cyclopropenyl cation, cyclopentadienyl anion and tropylium cation) Reactions - General mechanism of electrophilic aromatic substitution, mechanism of nitration, Friedel-Craft's alkylation and acylation. Orientation of aromatic substitution - ortho, para and meta directing groups. Ring activating and deactivating groups with examples (Electronic interpretation of various groups like NO<sub>2</sub> and Phenolic). Orientation of (i) Amino, methoxy and methyl groups (ii) Carboxy, nitro, nitrile, carbonyl and sulphonic acid groups

(ii) Halogens

(Explanation by taking minimum of one example from each type)

## GENERAL CHEMISTRY

24 h

### UNIT-IV

#### 1. Surface chemistry and chemical bonding

##### Surface chemistry

6h

**Colloids-** Coagulation of colloids- Hardy-Schulze rule. Stability of colloids, Protection of Colloids, Gold number.

**Adsorption-** Physical and chemical adsorption, Langmuir adsorption isotherm, applications of adsorption.

#### 2. Chemical Bonding

6h

Valence bond theory, hybridization, VB theory as applied to  $\text{ClF}_3$ ,  $\text{Ni}(\text{CO})_4$ , Molecular orbital theory - LCAO method, construction of M.O. diagrams for homo-nuclear and hetero-nuclear diatomic molecules ( $\text{N}_2$ ,  $\text{O}_2$ ,  $\text{CO}$  and  $\text{NO}$ ).

#### 3. HSAB

2h

Pearson's concept, HSAB principle & its importance, bonding in Hard-Hard and Soft-Soft combinations.

### UNIT-V

#### Stereochemistry of carbon compounds

10h

Molecular representations- Wedge, Fischer, Newman and Saw-Horse formulae.

Optical isomerism: Optical activity- wave nature of light, plane polarised light, optical rotation and specific rotation. Chiral molecules- definition and criteria (Symmetry elements)- Definition of enantiomers and diastereomers – Explanation of optical isomerism with examples- Glyceraldehyde, Lactic acid, Alanine, Tartaric acid, 2,3-dibromopentane.

D,L, R,S and E,Z- configuration with examples.

Definition of Racemic mixture – Resolution of racemic mixtures (any 3 techniques)

**Co-curricular activities and Assessment Methods** Continuous Evaluation: Monitoring the progress of student's learning Class Tests, Worksheets and Quizzes Presentations, Projects and Assignments and Group Discussions: Enhances critical thinking skills and personality

Semester-end Examination: critical indicator of student's learning and teaching methods adopted by teachers throughout the semester.

#### List of Reference Books Theory:

Morrison, R. N. & Boyd, R. N. Organic Chemistry, Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).

Finar, I. L. Organic Chemistry (Volume 1), Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).

Finar, I. L. Organic Chemistry (Volume 2: Stereochemistry and the Chemistry of Natural Products), Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).

Eliel, E. L. & Wilen, S. H. Stereochemistry of Organic Compounds; Wiley: London, 1994. Kalsi, P. S. Stereochemistry Conformation and Mechanism; New Age International, 2005.

**Additional Resources:**

Solomons, T. W. G.; Fryhle, C. B. & Snyder, S. A. Organic Chemistry, 12th Edition, Wiley.

Bruice, P. Y. Organic Chemistry, Eighth Edition, Pearson.

Clayden, J.; Greeves, N. & Warren, S. Organic Chemistry, Oxford.

Nasipuri, D. Stereochemistry of Organic Compounds: Principles and Applications, Third Edition, New Age International.

Gunstone, F. D. Guidebook to Stereochemistry, Prentice Hall Press, 1975.

**Course Delivery method:** Face-to-face / Blended

**Course has focus on:** Employability / Entrepreneurship

**Websites of Interest:**

1. [https://acikders.ankara.edu.tr/pluginfile.php/104797/mod\\_resource/content/0/Alkanes%20and%20Cycloalkanes.pdf](https://acikders.ankara.edu.tr/pluginfile.php/104797/mod_resource/content/0/Alkanes%20and%20Cycloalkanes.pdf)
2. <https://byjus.com/chemistry/methods-of-preparation-of-alkenes/#:~:text=In%20order%20to%20form%20trans,dissolving%20potassium%20hydroxide%20in%20alcohol.>
3. <https://byjus.com/chemistry/aromatic-compounds/#:~:text=Aromatic%20compounds%20are%20chemical%20compounds,examples%20are%20toluene%20and%20benzene.>

**MODEL PAPER**  
**FIRST YEAR B.Sc., DEGREE EXAMINATION**  
**SEMESTER-II**  
**COURSE CODE CHE T21A**  
**CHEMISTRY COURSE -II: ORGANIC & GENERAL CHEMISTRY**

Time: 3 hours

Maximum Marks: 70  
5 X 4 = 20 Marks

**SECTION- A**

Answer all the following questions. Each carries **FOUR** marks

1. a) List out different conformations of n-butane. Explain their relative stability. **L1-CO1**  
Or  
b) Describe Wurtz fitting reaction with examples **L1-CO2**
2. a) Classify 1,2- & 1,4- addition reactions of conjugated dienes. **L2-CO3**  
Or  
b) Explain Saytzeff rule with examples **L2 –CO3**
3. a) Explain the orientation effect of halogens on mono substituted benzene. **L2-CO4**  
Or  
b) Explain each with one example ring activating and deactivating groups **L2-CO4**
4. a) Explain the structure of ClF<sub>3</sub> by Valency Bond theory. **L2- CO5**  
Or  
b) What are Hard & soft acids & bases? Explain with examples. **L2-CO5**
5. a) Draw the Wedge, Fischer, Newmann & saw-Horse representations for Tartaric acid. **L2-CO6**  
  
or  
b) Define Enantiomers and Diastereomers and give two examples for each. **L1-CO6**

**SECTION - B**

5 X 10 = 50 Marks

Answer **ALL** the questions. Each carries **TEN** marks

- 6.(a). (i) Write the preparation of alkanes by Wurtz and Corey-House reaction.  
(ii) Explain Halogenation of alkanes. Explain the reactivity and selectivity in free radical substitutions. **L1- CO2**  
(or)  
(b). (i) Explain Baeyer Strain Theory  
(ii) Draw the conformations of Cyclohexane and explain their stability by drawing energy profile diagram. **L1-CO2**
- 7.(a). (i) Write any two methods of preparation of alkenes.



(ii) Explain the mechanism of Markownikoff and Anti-Markownikoff addition of HBr to alkene. **L2-CO3**

(or)

- (b). (i) Explain the acidity of 1-alkynes  
(ii) How will you prepare acetaldehyde and acetone from alkynes?  
(iii) Write alkylation reaction of terminal alkene. **L2-CO3**

8.(a). Define Huckel rule of aromatic compounds. What are benzenoid and non-benzenoid aromatic compounds? Give examples. **L1-CO4**

(or)

(b). Explain the mechanisms of Nitration and Friedel-Craft's alkylation of Benzene. **L1-CO4**

9.(a). (i) Define Hardy-Schulze rule & Gold number.  
(ii) Differentiate Physisorption & Chemisorption. Explain Langmuir adsorption isotherm. **L2-CO5**

(or)

(b). Construct the Molecular Orbital diagram for O<sub>2</sub> and NO and explain their bond order and magnetic property. **L2-CO5**

10.(a). Define racemic mixture. Explain any two techniques for resolution of racemic mixture. **L2-CO6**

(or)

- (b).(i) Define Optical activity and Specific rotation.  
(ii) Draw the R- & S- isomers of Alanine, Glyceraldehyde.  
(iii) Write the E- & Z- isomers of 2-butene. **L2-CO6**

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## P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

Siddhartha Nagar, Vijayawada – 520 010

Autonomous - ISO 9001 – 2015 Certified

### Title of the Paper (Volumetric Analysis) CHE P21A

**Offered to:** II B.Sc MPC & BZC

**Course Type:** Core (Pr)

**Year of Introduction:** 2021

**Year of offering:** 2021

**Year of Revision:** 2021-22

**Percentage of Revision:** -

**Semester:** II

**Credits:** 2

**Hours Taught:** 30 hrs. Per Semester

**Max.Time :** 2 Hours

**Course Prerequisites (if any):** Basics of Volumetric analysis

#### LABORATORY COURSE-II

30hrs (2 h / w)

#### Practical-II Volumetric Analysis

(At the end of Semester-II)

**Course Description:** Volumetric analysis and titration are in wide use in a variety of industries because they are considered a basic technique in analytical chemistry. It provides skills preparation of different concentration of solutions and to know the concentrations of unknown solutions using volumetric analysis.

#### Course Objectives:

At the end of the course, the student will be able to;

1. Use glassware, equipment and chemicals and follow experimental procedures in the laboratory
2. Understand and explain the volumetric analysis based on fundamental concepts learnt in ionic equilibria
3. Learn and identify the concepts of a standard solutions, primary and secondary standards
4. Facilitate the learner to make solutions of various molar concentrations. This may include: The concept of the mole; Converting moles to grams; Converting grams to moles; Defining concentration; Dilution of Solutions; Making different molar concentrations.

#### Course outcomes:

CO1 Understand and explain the volumetric analysis-PO1

CO2 identify and learn the concepts of a standard solutions, primary and secondary standards-PO7

CO3 Defining concentration; Dilution of Solutions; Making different molar concentrations-

PO1

#### Volumetric analysis

50 M

1. Estimation of sodium carbonate and sodium hydrogen carbonate present in a mixture.
2. Determination of Fe (II) using  $\text{KMnO}_4$  with oxalic acid as primary standard.
3. Determination of Cu (II) using  $\text{Na}_2\text{S}_2\text{O}_3$  with  $\text{K}_2\text{Cr}_2\text{O}_7$  as primary standard.

4. Estimation of water of crystallization in Mohr's salt by titrating with  $\text{KMnO}_4$

**Practical reference books** : Ahluwalia, V.K. & Aggarwal, R. Comprehensive Practical Organic Chemistry: Preparation and Quantitative Analysis, University Press (2000).

Ahluwalia, V.K. & Dhingra, S. Comprehensive Practical Organic Chemistry: Qualitative Analysis, University Press (2000). Furniss, B.S.; Hannaford, A.J.; Smith, P.W.G.; Tatchell, A.R. Practical Organic Chemistry, 5th Ed., Pearson (2012)

FIRST YEAR B.Sc., DEGREE EXAMINATION

**SEMESTER-II**

**COURSE CODE : CHE P21A**

**CHEMISTRY COURSE -II: Volumetric Analysis**

Course Code: CHE P21A

Maximum Marks: 50M

Time: 3Hrs

**CONTINUOUS INTERNAL ASSESSMENT -- 15M**

**SEMESTER END ASSESSMENT --- 35M**

**BOARD OF STUDIES IN COMMERCE (ODD SEMESTERS 2022-23)**

**DATE: 10-03-2023**

**AGENDA**

1. To discuss and recommend the syllabi, and model question papers for the programme B.Com BFSI for the 4<sup>th</sup> semester as per the guidelines and instruction under CBCS prescribed by APSHE from the academic year 2022-2023.
2. To discuss and recommend the model question papers for all streams in B.Com programme for the 2<sup>nd</sup> semester from the academic year 2022-2023.

**Minutes of the meeting of Board of Studies in Commerce held on 10-03-23 at 10.30 o clock.**

**Members present:**

1. Prof. Rajesh.C.Jampala	Chairperson	Sd/-
2. Dr. M Sravani	University Nominee	Sd/-
3. Dr N V R Jyothi Kumar	Academic Expert	Sd/-
4. Dr K S Arun Kumar	Academic Expert	Sd/-
5. CA B Deena Dayal Kumar	Industry Expert	Sd/-
6. Dr. Dokku Srinivasa Rao	Alumni	Sd/-
7. Sri K. Narayana Rao	Member	Sd/-
8. Sri P. Subhakar	Member	Sd/-
9. Sri Ch. Prasanna Kumar	Member	Sd/-
10.Sri V.V.K. Dharmendra	Member	Sd/-
11.Smt E Suvarnanjali	Member	Sd/-
12.Smt. M Sivaranjani	Member	Sd/-
13.Smt. V Kanaka Durga	Member	Sd/-
14.Dr. ANV Durga Anupama	Member	Sd/-
15.Smt. O.padmaja	Member	Sd/-
16.Sri. B. Venkateswara Rao	Member	Sd/-
17.Sri B.Phani Krishna	Member	Sd/-
18.Sri K Rajasekhar	Member	Sd/-
19.Sri T Srinivas	Member	Sd/-
20.Dr V Srinivas	Member	Sd/-
21.Dr. B Sankar Babu	Member	Sd/-

Department of Commerce (UG)								
LIST OF THE COURSES REVISED/ INTRODUCED IN II/ IV SEMESTERS -2022-23								
S.NO	Course	Course Code	Offered in SEM	Type of the Paper	Year of Intro.	Revision /Introduce	OBE with BTL	Offered to
1	Corporate Accounting	COMT41A	IV	CORE	2021-22	No Revision	YES	B.Com GEN/CA/BFSI
2	Cost and Management Accounting	COMT45	IV	CORE	2021-22	No Revision	YES	B.Com GEN/CA/BFSI
3	Auditing	COMT46	IV	CORE	2021-22	No Revision	YES	B.Com GEN/CA/BFSI
4	Taxation	COMT47	IV	CORE	2021-22	No Revision	YES	B.Com CA/BFSI
5	Marketing of Financial Services	COMT48	IV	CORE	2022-23	Introduced	YES	B.Com BFSI
6	Business Statistics	COHT23A	II	CORE	2022-23	Revision 40%	YES	B.Com A&F ,TPP,BPM
7	Accounting & Finance	COMT23A	II	CORE	2022-23	Revision 30%	YES	BCA

1. It is resolved to implement the syllabus & model paper of **Corporate Accounting** with course code **COMT41A** to **B.Com (BFSI)** in semester IV for the students admitted in the academic year 2021-22 onwards. Model paper prepared with levels of Bloom's Taxonomy is appended at the end of the syllabus pg. No **04-05**
2. It is resolved to implement the syllabus & model paper of **Cost Management Accounting** with course code **COMT45** to **B.Com (BFSI)** in semester IV for the students admitted in the academic year 2021-22 onwards. Model paper prepared with levels of Bloom's Taxonomy is appended at the end of the syllabus pg. No **06-07**
3. It is resolved to implement the syllabus & model paper of **Auditing with** course code **COMT46** to **B. Com (BFSI)** in semester IV for the students admitted in the academic year 2021-22 onwards. Model paper prepared with levels of Bloom's Taxonomy is appended at the end of the syllabus pg. No **08-09**
4. It is resolved to implement the syllabus & model paper of **Taxation with** course code **COMT47** to **B.Com (BFSI)** in semester IV for the students admitted in the academic year 2021-22 onwards. Model paper prepared with levels of Bloom's Taxonomy is appended at the end of the syllabus pg. No **10-11**
5. It is resolved and recommend to introduce **Marketing of Financial Services** with course code **COMT48** in IV semester of **B.Com (BFSI)** for the batch of students admitted in 2021-22 and onwards. For the syllabus and model question paper vide Page number from 12 to 14

6. It is resolved and recommend the revision of the model question paper of **Financial Accounting with course code COMT21A** in II semester of **B.Com GEN,CA, BFSI** for the batch of students admitted in 2022-23 and onwards. For the revised model question paper vide Page Number 15to19
7. It is resolved and recommend the revision of the model question paper of **Banking Theory &Practice with course code COMT22B** in II semester of **B.Com GEN** for the batch of students admitted in 2022-23 and onwards. For the revised model question paper vide Page Number 20 to22.
8. It is resolved and recommend the revision of the model question paper of **Banking Theory & Law and Practice with course code COMT24** in II semester of **B.Com BFSI** for the batch of students admitted in 2022-23 and onwards. For the revised model question paper vide Page Number 23 to 26.
9. It is resolved and recommend the revision of the model question paper of **Financial Accounting-I with course code COHT21A** in II semester of **B.Com (Hon) Accounting & Finance ,B.Com(TPP),B.Com(BPM)** for the batch of students admitted in 2022-23 and onwards. For the revised model question paper vide Page Number 27 to 31
- 10.It is resolved and recommend the revision of the model question paper of **Business Environment with course code COHT22A** in II semester of **B.Com (Hon) Accounting & Finance, B.Com(TPP)** for the batch of students admitted in 2022-23 and onwards. For the revised model question paper vide Page Number 32 to 35
- 11.To recommend the revision of syllabus & model question paper of **Business statistics** with revised course code **COHT23A** in **II SEM of B.Com(Hon)Accounting& Finance, B.Com(TPP), B.Com(BPM)** for the batch of students admitted in 2022-23 and onwards. For the revised syllabus and model question paper vide Page number from. 36. To39
- 12.It is resolved and recommend the revision of the model question paper of **Elements of Financial Management with course code COHT24** in II semester of **B.Com (Hon) Accounting & Finance ,B.Com(TPP),B.Com(BPM)** for the batch of students admitted in 2022-23 and onwards. For the revised model question paper vide Page Number 40 to 43
- 13.It is resolved and recommend the revision of the model question paper of **FINANCE AND ACCOUNTING FOR BPS with course code COHT25** in II semester of **B.Com(BPM)** for the batch of students admitted in 2022-23 and onwards. For the revised model question paper vide Page Number 45 To 47
- 14.To recommend the revision of syllabus & model question paper of **Accounting & Finance** with revised course code **COMT23A** in II semester of **BCA** for the batch of students admitted in 2022-23 and onwards. For the revised syllabus and model question paper vide Page number from. 48. To51

**P.B .SIDDHARTHA COLLEGE OF ARTS &SCIENCE: VIJAYAWADA-10.**  
(An Autonomous college in the jurisdiction of Krishna University, Machilipatnam)

<b>Semester:</b>	IV	<b>Credits :</b>	<b>4</b>
Offered to	B. Com (General)(CA)(BFSI)	<b>Course Code</b>	COMT41A
Course Type	<b>Core (Theory)</b>	<b>Year of Introduction</b>	<b>2021-22</b>
<b>Year of Revision:</b>	--	<b>Percentage of Revision:</b>	--
<b>Hours Taught</b>	75 hrs. Per Semester		
<b>Course Prerequisites (if any):</b> Intermediate level			

**Corporate Accounting**

**Course Outcomes:**

1. **CO 1:** The students will have a good command on issue of shares and also forfeiture and reissue of shares. (PO.1)
2. **CO 2:** The students will be able to apply various modes for redemption of Debentures and also they can be able to utilize the free reserves for issue of bonus shares. (PO.4)
3. **CO 3:** The student will be able to determine the value of goodwill by using different methods. (PO.4)
4. **CO 4:** The students will have a good command on ascertainment of value of share by using Asset backing method and Yield method. (PO.4)
5. **CO 5:** The students will acquire the knowledge of preparing final accounts of companies as per the provisions of Companies Act 2013. (PO.7)

**Unit-I:**

**Accounting for Share Capital:** Kinds of Shares – Types of Preference Shares – Issue of Shares at Par, Discount and Premium – Forfeiture and Reissue of Shares (including problems).

**Unit-II:**

**Issue and Redemption of Debentures and Issue of Bonus Shares:** Accounting Treatment for Debentures Issued and Repayable at Par, Discount and Premium -Issue of Bonus Shares –Issue of right shares- Buyback of Shares - (including problems).

**Unit-III:**

**Valuation of Goodwill:** Need and Methods - Average Profit Method, Super Profits Method – Capitalization Method and Annuity Method (Including problems).

**Unit –IV:**

**Valuation Shares:** Need for Valuation - Methods of Valuation - Net Assets Method, Yield Basis Method, Fair Value Method (including problems).

**UNIT – V:**

**Company Final Accounts:** Provisions of the Companies Act, 2013 - Preparation of Final Accounts – Adjustments Relating to Preparation of Final Accounts – Profit and Loss Account and Balance Sheet – (including problems with simple adjustments).

**Text Books:**

1. Corporate Accounting – T.S Reddy and Murthy, Margham Publications, Chennai.
2. Advanced Accounts: M C Shukla, T S Grewal and S C Gupta, S Chand Publications

**Reference Books:**

3. Corporate Accounting – Haneef & Mukherji, Tata McGraw Hill Publications.
4. : Arulanandam & Raman, Himalaya Publishing House.

**Suggested Co-Curricular Activities:**

- Assignments
- Problem Solving Exercises
- Collect and fill the share application form of a limited Company
- Collect Prospectus of a company and identify its salient features
- Collect annual report of a Company and List out its assets and Liabilities.
- Collect the annual reports of company and calculate the value of goodwill under different methods
- Power point presentations on types of shares and share capital



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<b>Semester:</b>	IV	<b>Credits :</b>	4
Offered to	B. Com (General)(CA)/BFSI)	<b>Course Code</b>	COMT45
Course Type	<b>Core (Theory)</b>	<b>Year of Introduction</b>	2021-22
<b>Year of Revision:</b>		<b>Percentage of Revision:</b>	
<b>Hours Taught</b>	75 hrs. Per Semester		
<b>Course Prerequisites (if any):</b> Intermediate level			

**Cost and Management Accounting**

**Course Outcomes:**

1. **CO1:** Impart knowledge on the fundamental concept of cost accounting and management accounting. **(PO1)**
2. **CO2:** Comprehend the knowledge in effective control of raw materials, work in progress, and labour cost. **(PO2)**
3. **CO3:** Students will understand the profit making decisions in complex situations of any business Organisation. **(PO 4, 6)**
4. **CO4:** Students will critically understanding the financial and management accounting importance in understanding the business operations using different tools. **(PO 1)**
5. **CO5:** Students will critically understanding the cash and fund flow concept and impact of cash flow on business operations. **(PO 1, 7)**

**UNIT-I: Introduction:**

Cost Accounting: Definition – Features – Objectives – Functions – Scope – Advantages and Limitations -  
Management Accounting: Features – Objectives – Functions –  
Elements of Cost - Preparation of Cost Sheet (including problems)

**UNIT-II: Material and Labour Cost:**

Techniques of Inventory Control – Valuation of Material Issues: FIFO - LIFO - Simple and Weighted Average Methods  
Labour: Direct and Indirect Labour Cost – Methods of Payment of Wages- Incentive Schemes -Time Rate Method, Piece Rate Method, Halsey, Rowan Methods and Taylor Methods only (including problems)

**UNIT-III: Marginal Costing:**

Meaning and Features of Marginal Costing – Contribution –Profit Volume Ratio- Break Even Point – Margin of Safety – Estimation of Profit and Estimation of Sales(including problems)

**UNIT-IV: Financial Statement Analysis and Interpretation:**

Financial Statements - Features, Limitations. Need, Meaning, Objectives, and Process of Financial Statement Analysis- Comparative Analysis – Common Size Analysis and Trend Analysis (including problems)

## **UNIT-V: Cash Flow Statement**

Introduction and meaning - Accounting standard 3-Comparison between funds and cash flow statements - Uses and significance of cash flow statement -Limitations of cash flow statement-Procedure for preparing a cash flow statement -Sources of cash inflows - Application of cash or cash outflows.(Problems).

### **Text Books:**

1. S.P. Jain and K.L. Narang – Advanced Cost Accounting, KalyaniPublishers.

### **References:**

2. M.N. Arora – A test book of Cost Accounting, Vikas Publishing House Pvt.Ltd.

### **Suggested Co-Curricular Activities:**

- ◆ Debate on methods of payments of wages
- ◆ Seminar on need and importance of financial statement analysis
- ◆ Graphs showing the breakeven point analysis
- ◆ Identification of elements of cost in services sector by Visiting any service firm
- ◆ Cost estimation for the making of a proposed product
- ◆ Listing of industries located in your area and methods of costing adopted bythem
- ◆ Collection of financial statements of any two organization for two years and prepare a common Size Statements
- ◆ Collection of cost sheet and pro-forma of quotation
- ◆ Examinations (Scheduled and surprise tests)

**P.B .SIDDHARTHA COLLEGE OF ARTS &SCIENCE: VIJAYAWADA-10.**  
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<b>Semester:</b>	IV	<b>Credits :</b>	<b>4</b>
Offered to	B. Com (General)(CA)(BFSI)	<b>Course Code</b>	COMT46
Course Type	<b>Core (Theory)</b>	<b>Year of Introduction</b>	<b>2021-22</b>
<b>Year of Revision:</b>		<b>Percentage of Revision:</b>	
<b>Hours Taught</b>	75 hrs. Per Semester		
<b>Course Prerequisites (if any):</b> Intermediate level			

**Auditing**

**Course Outcomes:**

1. **CO1:** Students will develop the knowledge & importance of auditing and accounting in modern era. **(PO1)**
2. **CO2:** Students will have the ability of understanding the applicability of auditing types for different organizations. **(PO1, PO2)**
3. **CO3:** Students will have knowledge in planning the effectiveness of auditing of any Organisation. **(PO5, PO6, PO7)**
4. **CO4:** Students will have proper understanding of the requirements of documentary evidence for the completion of audit. **(PO1, PO2, PO3)**
5. **CO5:** Students will have the knowledge of the competency of person, his rights and duties regarding auditing and audit report. **(PO 6, PO7)**

**Unit-I: Introduction:** Meaning – Objectives – Importance of Auditing – Characteristics - Book Keeping vs Auditing - Accounting vs Auditing – Role of Auditor in Checking Corporate Frauds.

**Unit-II: Types of Audit:** Based on Ownership, Time and Objective - Independent, Financial, Internal, Cost, Tax, Government, Secretarial Audits

**Unit-III: Planning of Audit:** Steps to be taken at the Commencement of a New Audit – Audit Programme - Audit Note Book– Audit Working Papers - Audit Evidence - Internal Check, Internal Audit and Internal Control.

**Unit-IV: Vouching and Investigation:** Definition and Importance of Vouching – Objectives of Vouching -Vouching of Cash and Trading Transactions – Investigation - Auditing vs. Investigation

**Unit-V: Company Audit and Auditors Report:** Auditor's Qualifications – Appointment and Reappointment – Rights, Duties, Liabilities and Disqualifications - Audit Report: Contents – Preparation - Relevant Provisions of Companies Act, 2013.

**Text Books:**

1. N.D. Kapoor, “Auditing”, S Chand, New Delhi.
2. R.G. Saxena, “Principles and Practice of Auditing”, Himalaya Publishing House New Delhi

**References:**

1. JagadshPrakesh, “Principles and Practices of Auditing”, Kalyani Publications.

**Suggested Co-Curricular Activities:**

1. Seminars
2. Visit the audit firms.
3. Visit an audit firm, write about the procedure followed by them in Auditing the books of accounts of a firm.
4. Guest lecture by an auditor.
5. Collect the information about types of audit conducted in any one Organization.
6. Collection of audit reports.
7. Group Discussions.
8. Draft an audit program.

**P.B .SIDDHARTHA COLLEGE OF ARTS &SCIENCE: VIJAYAWADA-10.**  
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<b>Semester:</b>	IV	<b>Credits :</b>	<b>4</b>
Offered to	B. Com (CA)(BFSI)	<b>Course Code</b>	COMT48
Course Type	<b>Core (Theory)</b>	<b>Year of Introduction</b>	<b>2021-22</b>
<b>Year of Revision:</b>		<b>Percentage of Revision:</b>	
<b>Hours Taught</b>	75 hrs. Per Semester		
<b>Course Prerequisites (if any):</b>			

### **Taxation**

**Course Outcomes:**

- CO1:** Impact knowledge on the provisions of income tax law and practice **(PO4)**
- CO2:** Enlist the ability of provisions of income from salary and House property its taxability **(PO4)**
- CO3:** The student can acquire knowledge in calculation of business income and professional income **(PO6)**
- CO4:** Acquaint the students with basic principles of goods and service tax. **(PO1,PO2)**
- CO5:** To impart knowledge and best practices in corresponding to trade appliance at customs. **(PO6)**

**Unit-I: Introduction:**

**12 P**

Objectives- Principles of Taxation- Brief History- Basic Concepts- Capital and Revenue- Basis of Charge- Exempted Incomes - Residential Status -Incidence of Taxation.

**Unit-II: Computation of income from Salary**

**23 P**

Income from Salary; Salary-Allowance -Perquisites – Deductions U/S 16- Deductions u/s80

**Unit-III: Computation of Income from House Property**

**15 P**

Income from House Property- Rental values – gross annual value – Net Annual Value – Deductions U/S24 (Simple problems)

**Unit-IV: Computation of income from Business and Profession**

**15 P**

Definition of Business and Profession -Admissible and inadmissible expenses-Computation of Business income: **Income from Profession:** Admissible Receipts and Payments - Computation of Professional income(Simple Problems)

**Unit V: Introduction and Administration to GST AND Customs**

**10 P**

Meaning of GST- Nature and scope of GST - Merits and demerits of GST - Models of GST -CGST-SGST-IGST - Definitions: adjudicating- authority, agent, business, goods, places of business, In put tax credit ,**CUSTOMS:** Meaning and Introduction of Customs ,Salient features of Customs Act 1962

**Text Books:**

1. Vinod K. Singhania Direct Taxes - Law and Practice, Taxman Publication.
2. B.B. Lal: Direct Taxes, Konark Publisher (P) Ltd.

**Reference Text Books:**

1. Bhagwati Prasad: Direct Taxes – Law and Practice, WishwaPrakashan.
2. Dr. Mehrotra and Goyal: Direct Taxes – Law and Practice, SahityaBhavan Publication.

**Suggested Co-Curricular Activities:**

1. Seminars on direct tax and Indirect tax
2. Quiz
3. Problem solving exercises
4. Practice and provisions of taxation
5. Visit a tax firm.
6. Guest lecture by Chartered Accountant
7. Examinations (Scheduled and surprise tests)

**P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE :: VIJAYAWADA-10.**  
(An Autonomous college in the jurisdiction of Krishna University, Machilipatnam)

<b>Semester:</b>	IV	<b>Credits :</b>	4
Offered to	B. Com (BFSI)	<b>Course Code</b>	COMT48
Course Type	<b>Core (Theory)</b>	<b>Year of Introduction</b>	2022-23
<b>Year of Revision:</b>		<b>Percentage of Revision:</b>	
<b>Hours Taught</b>	75 hrs. Per Semester		
<b>Course Prerequisites (if any):</b> Intermediate level			

### **Marketing of Financial Services**

**Course Objectives:**

1. The objective of this course is to introduce students about financial services.
2. To create an idea about concepts of consumer behaviour and segmentation in relation to financial services.
3. To impart the knowledge about pricing and distribution channels of financial services.

**Course Outcomes:**

1. **CO1:** To enlighten the students about the concepts and introduction of financial services. **(PO1, PO6)**
2. **CO2:** To create awareness about overview of financial services marketing. **(PO1, PO7)**
3. **CO3:** Develop an idea about the role of consumer behavior and segmentation in marketing of financial services. **( PO4, PO5)**
4. **CO4:** Contributes to the development of strategies for the efficient and effective pricing and distribution of services. **(PO3, PO7)**
5. **CO5:** To create awareness about various Channels of promoting Financial Services. **(PO2)**

**Unit – I Introduction to Financial Services:**

**15P**

Meaning and definition of Financial Services – Characteristics of Financial Services – Nature and scope of Financial Services – Types of Financial Services (Introduction of Hire purchase, Leasing, Bill discounting, Loan Syndication, Factoring, Forfeiting, Venture Capital, Credit Rating, Merchant Bankers, Insurance Services) – Importance of Financial Services – Drawbacks in Financial Services Sector – Regulatory framework of Financial Services in India.

**Unit – 2 Overview about the Financial Services Marketing:**

**15P**

Meaning and definition of Marketing and Services Marketing – Functions of Services Marketing – Importance of Services Marketing – Marketing Concepts – Evolution of marketing in the Financial Service Sector – Elements of Services Marketing mix – Differences between marketing of financial services and physical products – Financial Services: Different types of Products and Financial Services: Different types of Services – Challenges in Marketing Financial Services

**Unit – 3 Consumer Behavior and Segmentation in relation to financial services: 15P**

**Consumer Behavior:** Meaning and definition of consumer behavior and Organizational buying behavior – Consumer buying decision process – Factors influencing consumer behavior – Evaluating the customer experiences – Importance of Service quality – The gap model of service quality.

**Segmentation:** Meaning and definition of segmentation – Need for segmentation of financial services – Importance of segmentation – Approaches or basis to segmenting consumer markets (Customer oriented segmentation, product oriented segmentation)

#### **Unit – 4 Pricing and Distribution of Financial Services:**

**15P**

**Pricing of Financial Services:** Meaning and definition of Pricing – Objectives of pricing of Financial Services – Importance – Factors influencing the pricing of financial services – The challenges in pricing of Financial Services – Methods for determining price (Cost based approach, Competitive approach, Market orientation approach) – Explicit and Implicit pricing – Price determination process.

**Distribution of Financial Services:** Meaning and definition of Distribution – Features of distribution – Distribution methods (Direct and indirect distribution) – Types of distribution channels – Factors affecting selection of services distribution channels – Advantages and disadvantages of channels of distribution.

#### **Unit – 5 Channels of promoting Financial Services:**

**15P**

**Advertising:** Media Selection – AIDA model of Advertising – Importance – Measuring Advertising effectiveness.

**Public Relations:** Tools of public relations – Importance of Public Relations.

**Social Media Marketing:** Reasons for choosing social media – problems faced in social media marketing – Effective social media engagements – Social networks as marketing channels – E-mail marketing – Mobile Marketing

**Personal Selling:** Personal selling process – Merits and demerits.

#### **Text Book:**

1. Christine T. Ennew and Nigel Waite, “Financial Services Marketing”, Elsevier Ltd.
2. The Financial Services Marketing Handbook (Tactics and Techniques that produce results), Evelyn Ehrlich and Duke Fanelli Edition 1, Boloomberg press.
3. The Financial Services Marketing Handbook (Tactics and Techniques that produce results), Evelyn Ehrlich and Duke Fanelli Edition 2, Boloomberg press.

#### **Ref Books:**

1. Marketing of Financial services, Kalyani Publications Jyothi Prakash Rath ,Mahesharsahu (Unit1 to Unit4)
2. Aradhani “Marketing of Financial services”: Himalaya Publishing House

#### **Suggested Co-Curricular Activities:**

1. Seminars
2. Quiz
3. Guest lectures by experts in financial service providers
4. Examinations (Scheduled and surprise tests)



**P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE, VIJAYAWADA**

**II B.Com BFSI**

**Course Code: COMT48**

**MARKETING OF FINANCIAL SERVICES**

**Duration: 3 Hrs.**

**Max Marks: 75M**

**Model Paper**

**Section – A**

**Answer and FIVE of the following questions:**

**5 X 5M = 25M**

1. Explain briefly about the importance of Financial Services. (CO1) L2
2. Write a short note on Factoring. (CO1) L2
3. What are the functions of Services Marketing? (CO2) L2
4. What are the challenges in marketing financial services? (CO2) L2
5. Explain the need of segmentation in financial services. (CO3) L2
6. What are the objectives of pricing financial services? (CO4) L2
7. What are the features of distribution of financial services? (CO4) L2
8. Write a short note on Social Media Marketing. (CO5) L2

**Section – B**

**Answer the following:**

**5 X 10M = 50M**

9. a. Explain in detail about various types of innovative of financial services. (CO1) L2  
(or)  
b. Define Financial Services. Explain briefly about its nature and scope. (CO1) L2
10. a. Explain in detail about various concepts of marketing. (CO2) L2  
(or)  
b. Discuss about the elements of Services Marketing Mix. (CO2) L2
11. a. Explain briefly about the basis of segmentations of Financial Services Market. (CO3) L2  
(or)  
b. Define Consumer Behavior. Explain briefly about various factors influencing Consumer Behavior. (CO3) L2
12. a. Explain in detail about various methods for price determination. (CO4)L2  
(or)  
b. Explain briefly about various distribution channels of financial services. (CO4) L2
13. a. What is meant by Advertising? Explain briefly about AIDA model of Advertising. (CO5) L2  
(or)  
c. What is meant by Public Relations? Explain in detail about various tools of Public Relations. (CO5) L2

**P.B .SIDDHARTHA COLLEGE OF ARTS &SCIENCE: VIJAYAWADA-10.**  
(An Autonomous college in the jurisdiction of Krishna University, Machilipatnam)

<b>Semester:</b>	II	<b>Credits :</b>	<b>4</b>
Offered to	B. Com (GENERAL) (CA) (BFSI)	<b>Course Code</b>	COMT21A
Course Type	<b>Core (Theory)</b>	<b>Year of Introduction</b>	<b>2022-23</b>
<b>Year of Revision:</b>		<b>Percentage of Revision:</b>	
<b>Hours Taught</b>	75 hrs. Per Semester		
<b>Course Prerequisites (if any):</b> Intermediate level			

### Financial Accounting

**Learning Objective:**

1. This course will enable the students to combine practice and theoretical knowledge of financial accounting.
2. The students of this course will be active learners and develop awareness of emerging trends in financial accounting,
3. The course will provide decision making skills to the students in the financial analysis context,
4. The students of this course will have the ability to identify and analyze financial accounting problems and opportunities in real life situations.

**COURSE OUTCOMES:**

1. **CO1:** Determine the useful life and value of the depreciable assets and maintenance of Reserves in business entities.
2. **CO2:** Demonstrate the applicability of the concept of Provisions and reserves to understand the managerial Decisions and financial statements.
3. **CO3:** Appreciate the need for negotiable instruments and procedure of accounting for bills honored and dishonored.
4. **CO4:** Understand the concept of Consignment and learn the accounting treatment of the various aspects of consignment.
5. **CO5:** Distinguish Joint Venture and Partnership and to learn the methods of maintaining records under Joint Venture.

**Unit-I:** Depreciation: Meaning and Causes of Depreciation - Methods of Depreciation: Straight Line – Written Down Value –Annuity and Depletion Method (including Problems).

**Unit-II:** Provisions and Reserves: Meaning – Provision vs. Reserve – Preparation of Bad Debts Account – Provision for Bad and Doubtful Debts – Provision for Discount on Debtors – Provision for Discount on Creditors - Repairs and Renewals Reserve A/c (including Problems).

**Unit-III:** Bills of Exchange: Meaning of Bill – Features of Bill – Parties in the Bill – Discounting of Bill – Renewal of Bill – Entries in the Books of Drawer and Drawee (including Problems).

**Unit-IV:** Consignment Accounts: Consignment - Features - Proforma Invoice - Account Sales – Del-credere Commission - Accounting Treatment in the Books of Consigner and Consignee - Valuation of Closing Stock - Normal and Abnormal Losses (including Problems).

**Unit-V:** Joint Venture Accounts: Joint Venture - Features - Difference between Joint Venture and Consignment – Accounting Procedure – Methods of Keeping Records–One Vendor Keeps the Accounts and Separate Set off Books Methods (including Problems).

**Test Book Prefer:**

1. Financial Accounting By: S.P.Jain & K.L. Narang. Kalyani Publishers – New Delhi.

**Reference text books:**

1. Financial Accounting – Himalaya Publishers
2. Financial Accounting – Pragathi prakesh Publishers

**Suggested Co-Curricular Activities:**

1. Quiz Programs
2. Problem Solving Exercises
3. Seminar
4. Group Discussions on problems relating to topics covered by syllabus
5. Collection of proforma of bills and promissory notes
6. Examinations (Scheduled and surprise test)

**Web Links:**

1. <https://www.vedantu.com/commerce/difference-between-provision-and-reserve>
2. <https://youtu.be/BYR9wp2maY>
3. <https://youtu.be/L1ex2P4NNiA>
4. <https://youtu.be/IYihGJ5nhQ0>

**P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE, VIJAYAWADA**

**Financial Accounting  
B.com (General, CA & BFSI)  
Model Question paper**

**Max Marks:70**

**Max Time: 3Hrs**

**Section –A**

**Answer all Questions**

1. (a) Explain the need for providing depreciation. (CO1) 4M  
or  
(b) Causes of Depreciation. (CO1) 4M
2. (a) Distinguish between provisions and Reserves (CO2) 4M  
Or  
(b) Explain provision for discount on debtors (CO2) 4M
3. (a) What is the Renewal of bill? (CO3) 4M  
Or  
(b) Explain the features of bill. (CO3) 4M
4. (a)What is Proforma invoice? (CO4) 4M  
Or  
(b) What are the different types of commissions in consignment (CO4) 4M
5. (a) Differences between joint venture and consignment (CO5) 4M  
Or  
(b) What is joint venture? Explain its features (CO5) 4M

**Section -B**

**Answer all Questions**

**Unit - I**

6. (a) on 1-1-20 a machinery was purchased for Rs 20,000 installation charges being Rs 4,000. On 1-7-2021 another machinery was purchased for Rs 40,000 on 01-04-2022 one more machinery was brought for Rs 50,000/- wages paid for installation amounted to Rs 2,000 carriage paid on the machinery Rs 8,000.

Show machinery account up to 31-12-2022 assuming 10% depreciation per annum on straight line basis  
(CO1) 10M

Or

(b) on 01-01-2002 a limited company purchased machinery for Rs 12,000 and on 30-06-2003 acquired additional machinery at a cost of Rs 2000. On 01-03-2004 one of the original machines which had cost Rs 500 was found to have become obsolete and was sold as scrap for Rs 50. It was replaced on that date by a new machinery costing Rs 800.

Depreciation is to be provided at the rate 15% per annum on written down value. (CO1) 10M

## Unit - II

7. (a) The following information is extracted from the Trial Balance of M/S Neha Traders on 31-03-2002

Particulars	Amount
Sundry Debtors	80,500
Bad debts	1000
Provision for Bad debts	5000

Additional Information

1. Bad debts Rs500
2. Provision is to be maintained at 2% of Debtors
3. Prepare Bad debts account, provision for Bad debts account (CO2) 10M

Or

(b) From the following figures prepare the following accounts

1. Bad debts account
2. Provision for bad debts account

Date	Particulars	Amount
2013 Jan 1	Provision for Bad debts	3600
Dec 31	Bad debts(Dr)	1960
Dec 31	Bad debts ( Cr)	240
Dec 31	Debtors	40,000

Other Information

- i) Further Bad debts Rs400/-
- ii ) Make a provision for bad debts at 5% on debtors. (CO2) 10M

## Unit - III

8. (a) Ramesh drew a bill on 1-09-2001 for Rs 2000 on Ramana for 3 months. Ramana accepted the same and returned it to Ramesh. Before maturity Ramesh sent the bill to the bank for collection. Ramesh received the intimation from the bank that the bill was duly honored on its due date and the bank charged Rs 20 for collection.

Pass the necessary entries in the books of Ramesh and Ramana. (CO3) 10M

Or

(b) Rama purchased goods worth Rs 10,000 from Krishna on credit on 01-01-1999 and gave two acceptances of Rs 5000 each. The first bill was for 2 months and the second for 3 months. Krishna discounted the first bill with his banker immediately @10% per annum and retained the second bill till its maturity. On the due dates Rama honored the first bill but failed to honor the second bill.

Pass the necessary journal entries in the books of both the parties (CO3) 10M

## Unit - IV

9. (a) Srinivas of Tirupathi consigned 100 T.V each costing Rs 15,000 to Nagarjuna of Guntur to be sold on consignment basis. He incurred the following expenses. Freight Rs 1,000 loading and unloading charges Rs 200 and insurance Rs 500.

Nagarjuna sold 85 T.V for Rs 14,45,000 and paid Rs 1,000 as shop rent which is to be borne by Srinivas as per terms and conditions of consignment. Consignee is entitled for a commission of Rs 100 per TV sold. Assuming that Nagarjuna settled the account by sending bank draft to Srinivas.

Prepare the books of Srinivas and Nagarjuna. (CO4) 10M

Or

(b) Swastik consigned 5000 Kg of oil to Ram traders at Rs 32 per kg. They paid Rs 3,340 toward freight and Rs 1,000 as insurance.

Ram traders reported that 4000 kg of oil was sold at Rs 42 per kg. They spent Rs 5000 as selling expenses and Rs 200 as godown rent. They were entitled to a commission of 5% on sales. They also reported a shortage of 20 kg due to leakage which was considered normal.

Prepare the books of consignor and consignee

(CO4) 10M

**Unit - V**

10. (a) X and Y entered into joint venture to sell a timber sharing profits and losses equally. X provides timber form stock at mutually agreed value of Rs 50,000. He pays expenses amounting to Rs 2500. Y incurs further expenses on cartage, storage of Rs 6500 and receives cash for sales Rs 30,000. He also takes over goods to the value of Rs 10,000 for his own use. At the close X takes over the balance stock in hand which valued at Rs 11000

Pass journal entries to record the above transactions in the book of X and Y (CO5) 10M

Or

(b) Kumar and Kartik entered into a joint venture sharing profits and losses in the ration of 3:2 kumar supplied goods costing Rs 10,000 and incurred expenses amounting to Rs 1000. Kartik also supplied goods of the value of Rs 8000 and the expenses amounted to Rs 400.

Kumar and kartik sold the goods for Rs 16,000 and Rs 12,000 respectively on which they get a commission of 10%. Unsold goods valued at Rs 1200 were taken over by kumar and kartik in their profit sharing ratio. They settled their accounts by cash.

Pass journal entries to record the above transactions in the books of Kumar and Kartik. (CO5) 10M

**P.B .SIDDHARTHA COLLEGE OF ARTS &SCIENCE: VIJAYAWADA-10.**  
(An Autonomous college in the jurisdiction of Krishna University, Machilipatnam)

<b>Semester:</b>	II	<b>Credits :</b>	<b>4</b>
Offered to	B. Com (GENERAL)	<b>Course Code</b>	COMT22B
Course Type	<b>Core (Theory)</b>	<b>Year of Introduction</b>	<b>2022-23</b>
<b>Year of Revision:</b>		<b>Percentage of Revision:</b>	
<b>Hours Taught</b>	75 hrs. Per Semester		
<b>Course Prerequisites (if any):</b> Intermediate level			

**Banking Theory &Practice**

**Course objectives:**

The course will enable students to:

1. Introduce the students to the basic concepts of banking as a financial disintermediation service.
2. Discuss and evaluate the theories relating to the role of banks as financial intermediaries.
3. Describe and analyse the various bank performance measures.

**Course Outcomes:**

At the end of the course, the student will able to:

- CO1.** Understand the basic concepts of banks and functions of commercial banks.
- CO2.** Demonstrate an awareness of law and practice in a banking context.
- CO3.** Engage in critical analysis of the practice of banking law.
- CO4.** Organize information as it relates to the regulation of banking products and services.
- CO5.** Formulate the procedure for better service to the customers from various banking innovations.

**Unit-I: Introduction:**

Meaning & Definition of Bank – Functions of Commercial Banks – Credit Creation with Examples - Kinds of Banks – Central Banking Vs. Commercial Banking.

**Unit-II: Banking Systems:**

Unit Banking, Branch Banking, Investment Banking - Innovations in Banking – E banking -Online and Offshore Banking, Internet Banking - Anywhere Banking - ATMs – RTGS-NEFT – Mobile Banking

**Unit-III: Types of Banks:**

Indigenous Banking - Cooperative Banks, Regional Rural Banks, SIDBI, NABARD - EXIM bank

**Unit -IV: Banker and Customer:**

Meaning and Definition of Banker and Customer – Types of Customers – General Relationship and Special Relationship between Banker and Customer - KYC Norms.

**Unit-V: Collecting Banker and Paying Banker:**

Concepts - Duties & Responsibilities of Collecting Banker – Holder for Value – Holder in Due Course – Statutory Protection to Collecting Banker - Responsibilities of Paying Banker -Payment gateways.

**Text Book:**

Banking theory law and practice - Himalaya publishing House

**Reference books:**

1.Banking theory and practice - Himalaya publishing house

2. Banking - New age international publishers
3. Banking theory and practice- kalyani publishers

**Curricular and co- curricular activities:**

1. Debate
2. Student seminars
3. Quiz programs
4. Visit to bank premises
5. Know about KYC norms

**Practical Work/suggested activities:**

1. filling of Bank account opening form
2. filling of RTGS form
3. Filling of NEFT form
3. filling of cheque form

**Web Links:**

1. <https://youtu.be/BoQokZOjx94>
2. <https://youtu.be/8x0-MiFKXag>
3. <https://youtu.be/59PC3B7HpDI>
4. <https://youtu.be/vJp2P7lt14>
5. <https://youtu.be/TdbEbq5e2Jc>



**P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE, VIJAYAWADA**  
(An Autonomous college in the jurisdiction of Krishna University, Machilipatnam)  
**B.com (General)**

**Banking Theory & Practice**

**Max Marks:70**

**Model Question paper**

**Max Time: 3Hrs**

**Section-A**

**Answer all Questions**

- (a) What is the meaning of banking? Define it (CO1) 4M  
or  
(b) Kinds of Banks (CO1) 4M
1. (a) Off shore banking (CO2) 4M  
Or  
(b) NEFT (CO2) 4M
2. (a) EXIM Bank (CO3) 4M  
Or  
(b) Objectives of SIDBI (CO3) 4M
3. (a) KYC norms (CO4) 4M  
Or  
(b) Define the terms Bank, Banker and Customer (CO4) 4M
4. (a) Paying Gateways (CO5) 4M  
Or  
(b) Holder in due course (CO5) 4M

**Section-B**

**Answer all Questions**

**Unit - I**

- 6) (a) What are the functions of Commercial Banks? (CO1) 10M  
Or  
(b) Distinguish between Central Banking Vs Commercial Banking. (CO1) 10M

**Unit - II**

- 7) (a) What is Branch Banking? Explain its advantages and disadvantages (CO2) 10M  
Or  
(b) What is Electronic banking? What are the objectives of Electronic banking? (CO2) 10M

**Unit - III**

- 8) (a) What are the functions and problems of Regional Rural Banks (CO3) 10M  
Or  
(b) What are the main functions of NABARD? (CO3) 10M

**Unit - IV**

- 9) (a) What are the general relationship between banker and customer? (CO4) 10M  
Or  
(b) Explain different kinds of customers (CO4) 10M

**Unit - V**

- 10) (a) Write about duties and responsibilities of collecting banker. (CO5) 10M  
Or  
(b) Explain the statutory protection to collecting banker. (CO5) 10M

**P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE:: VIJAYAWADA-10.**

(An Autonomous college in the jurisdiction of Krishna University, Machilipatnam)

<b>Semester:</b>	<b>II</b>	<b>Credits :</b>	<b>4</b>
<b>Offered to</b>	<b>B. Com (BFSI)</b>	<b>Course Code</b>	<b>COMT24</b>
<b>Course Type</b>	<b>Core (Theory)</b>	<b>Year of Introduction</b>	<b>2022-23</b>
<b>Year of Revision:</b>		<b>Percentage of Revision:</b>	
<b>Hours Taught</b>	<b>75 hrs. Per Semester</b>		
<b>Course Prerequisites (if any):</b> Intermediate level			

**Banking Theory Law and Practice**

**Course Objectives:**

1. Introduce the students to the basic concepts of banking as a financial disintermediation service.
2. Discuss and evaluate the theories relating to the role of banks as financial intermediaries.
3. Describe and analyse the regulatory framework and innovations in banking.

**Course outcomes:**

After completing this programme the students will be able to –

1. **CO1:** Articulate the operations, structure and importance of various financial institutions. **(PO1, PO6)**
2. **CO2:** Analyse the organisation structure and working of RBI. **(PO1, PO6)**
3. **CO3:** Employ the services of e-banking services. **(PO1, PO6)**
4. **CO4:** Articulate the regulatory framework of banks. **(PO1, PO6)**
5. **CO5:** Appraise the relationship of a banker with his customers. **(PO1, PO6)**

**UNIT – I Introduction to Banking**

**15 P**

Origin and growth of banking, Meaning and definition of bank; **Types of Banks:** Commercial Banks, Central Bank, Foreign Banks, Regional Rural Banks, Co-operate Banks; Non-Banking Financial Institutions (NBFCs); Micro Finance Institutions, Functions of Commercial Banks, Role of Commercial banks in economic development; **Licensing of banks in India:** Branch Licensing; Deposit services to Non-Resident Indians; KYC Norms.

**UNIT – II Reserve Bank of India**

**15 P**

**RBI:** Origin, Organizational structure, Functions of RBI, **Credit Control Techniques:** Quantitative Methods: Repo Rate, Reverse Repo Rate, OMOs, CRR; Selective Credit Control Techniques; Role of RBI in economic development.

**UNIT – III Innovations in Banking**

**15P**

Introduction, Diversification in banking, Para banking activities, evolving trends in modern commercial banking, Digital Banking, Traditional Banking Vs. E-Banking, Electronic Delivery, Net Banking Transactions, Fintech Companies, Interbank Mobile Payment Service, Mobile Banking, Unified Payment Interface, Credit Cards, New Types of Credit Card and Debit Cards, E-Wallet Card, RTGS, NEFT, IMPS

**UNIT – IV Regulatory Framework****15 P**

**Banking Regulations Act 1949:** Introduction to Banking Regulations Act 1949; **Negotiable Instruments Act 1881:** Meaning, characteristics, Types of cheques, crossing of cheques, Types of Endorsement; **SARFAESI Act:** Meaning and brief introduction of SARFAESI Act; **NPA Management:** Definition of NPA, Types, Asset Reconstruction Companies in India.

**UNIT – V Banker and Customer Relationship****15P**

Definition, General and Special features of relationship between banker and customer; Types of Customers: Minor, Married Woman, Joint Stock Company, Partnership Firm, Joint Account; Payment of Cheques, Responsibilities of Paying Banker, Dishonouring of Cheques, Consequences of wrongful dishonour, Statutory protection to Paying Banker; Duties and responsibilities of Collecting Banker, Statutory protection to Collecting Banker.

**Text Book:**

1. Dr. A. V Ranganadha Chary, Dr. R. R Paul, Banking and Financial Systems, Kalyani Publishers, 3<sup>rd</sup> Edition, New Delhi.
2. Dr. A. V Ranganadha Chary, Rudra Sai Baba, Banking Theory and Practice, Kalyani Publishers, New Delhi.

**Reference books:**

1. Banking theory and practice - Himalaya publishing house
2. Banking - New age international publishers
3. Banking theory and practice- Kalyani publishers

**Curricular and co- curricular activities:**

1. Debate
2. Student seminars
3. Quiz programs
4. Visit to bank premises
5. Know about KYC norms

**Practical Work/suggested activities:**

1. filling of Bank account opening form
2. filling of RTGS form
3. Filling of NEFT form
4. filling of cheque form

**P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE, VIJAYAWADA**  
(An Autonomous college in the jurisdiction of Krishna University, Machilipatnam)

**Banking Theory Law & Practice**

**B.com (BFSI)**

**Max Marks:70**

**Model Question paper**

**Max Time: 3Hrs**

**Section – A**

**Answer all Questions:**

**(5 X 4M = 20M)**

1. (a) KYC Norms (CO1) 4M  
OR  
(b) Non-Banking Financial Institutions (CO1) 4M
2. (a) Role of RBI in economic development (CO2) 4M  
Or  
(b) Organizational structure of RBI (CO2) 4M
3. (a) Traditional Banking Vs E- Banking (CO3) 4M  
Or  
(b) NEFT (CO3) 4M
4. (a) Write a short note on NPA (CO4) 4M  
Or  
(b) Types of Endorsement (CO4) 4M
5. (a) What are the precautions taken by banker in case of opening a minor account? (CO5) 4M  
Or  
(b) Paying banker (CO5) 4M

**Section – B**

**Answer the following:**

**(5 X 10 = 50M)**

**UNIT – I**

- 6) (a) What are the functions of Commercial Banks? (CO1) 10M  
Or  
(b) Explain the role of commercial banks in economic development (CO1) 10M

**UNIT – II**

- 7) (a) What are the credit control techniques of RBI (CO2) 10M  
Or  
(b) Describe the functions of Reserve Bank of India (CO2) 10M

**UNIT - III**

- 8) (a) Explain the types of credit cards (CO3) 10M  
Or

(b) Define E-Banking. Explain the advantages and disadvantages of E banking (CO3) 10M

**UNIT – IV**

9) (a) Define Cheques. Explain about crossing of Cheques. (CO4) 10M

Or

(b) Briefly explain about SARFAESI Act. (CO4) 10M

**UNIT – V**

10) (a) Explain the general relationship between banker and customer. (CO5) 10M

Or

(b) Explain the duties and responsibilities of Collecting banker (CO5) 10M

**P.B.SIDDHARTHA COLLEGE OF ARTS &SCIENCE:: VIJAYAWADA-10.**

(An Autonomous college in the jurisdiction of Krishna University, Machilipatnam)

<i>Semester:</i>	<b>II</b>	<b>Credits :</b>	<b>4</b>
<i>Offered to</i>	<b>B. Com (Honours) A &amp;F/TPP/BPM</b>	<b>Course Code</b>	<b>COHT21A</b>
<i>Course Type</i>	<b>Core (Theory)</b>	<b>Year of Introduction</b>	<b>2022-23</b>
<i>Year of Revision:</i>		<b>Percentage of Revision:</b>	
<i>Hours Taught</i>	<b>75 hrs. Per Semester</b>		
<b>Course Prerequisites (if any):</b> Intermediate level			

**FINANCIAL ACCOUNTING – I**

6. **CO1:** Gain an understanding with regard to special transactions related to accounting for consignment. **PSO1**
7. **CO2:** Grasp the accounting treatment in issue of negotiable instruments and also learn the techniques of accounting to bills. **PSO1,PO4**
8. **CO3:** Gain the knowledge with regard to special transactions relating to joint Venture business. **PSO1, PO7**
9. **CO4:** Able to ascertain the profitability and financial position of an enterprise by using statement of affairs method and conversion method. **PSO1**
10. **CO5:** Get the knowledge of importance of inventory in ascertainment of profitability and financial position by determining the correct value of inventory. **PSO1, PO5**

**UNIT 1: Bills of Exchange**

**15hrs**

Meaning and Definition – Promissory Note and bill of exchange - Recording of Bills Transactions in Journal and Ledger – In Books of Drawer and Drawee - Honour and Dishonour of Bills, Renewal of Bills, Retiring a Bill under Rebate-Insolvency of Drawee.

**UNIT 2: Consignment Accounts.**

**15hrs**

Features of Consignment, Performa Invoice, Account Sales and Commission- Accounting Treatment in the Books of Consignor and Consignee- Consignment Stock, Normal Loss and Abnormal Loss Invoicing Goods At Higher Than Cost Price (Invoice Price Treatment)

**UNIT 3: Joint Venture**

**15hrs**

Features of Joint Venture, Joint Venture Vs Partner Ship and Joint Venture Vs Consignment - Accounting Treatment- In the Books of Ventures — Separate Set of Books

**UNIT 4: Accounts From Incomplete Records**

**15hrs**

Features - Ascertainment of Profit on the Basics Statement of Affairs- Conversion Method

**UNIT 5: Inventory Valuation**

**15hrs**

Meaning- Inventory Valuation, and Basis of Inventory Valuation - Inventory Recording System and Methods of Inventory Recording System - Perpetual Inventory System and Periodical Inventory System

Stock Taking (Problems) (Excluding Stores ledger , Stock levels)

**Text book:**

1. Financial Accounting by SP Jain & Narang Kalyani Publicataion

**Refernece Books:**

1. Financial Accounting by Kona Narayana Rao & Subhakar Pragathiprakashn publication
2. Advanced Accounting By M. RadhaSwamy And R.L.Gupta. Sultan Chand And Sons

**Suggested Co-Curricular Activities:**

- Practice of Terminology of Accounting
- Seminar
- Problem Solving Exercises
- Group Discussions on problems relating to topics covered in syllabus

**Web Links:**

1. <https://www.vedantu.com/commerce/difference-between-provision-and-reserve>
2. <https://youtu.be/BYYR9wp2maY>
3. <https://youtu.be/L1ex2P4NNiA>
4. <https://youtu.be/IYihGJ5nhQ0>

**Financial Accounting - I**

**Max Time 3 hrs**

**Max Marks 70**

**Course Code: COHT21A**

**SECTION – A**

**Answer the following:**

**(5 X 4 = 20M)**

1. a) Define a bill of exchange. Explain its features  
(Or)  
b) Who are the parties in a bill of exchange?
2. a) What are the differences between Consignment and Sale?  
(Or)  
b) What is meant by Consignment? Explain the features of Consignment.
3. a) What is Joint Venture? What are the features of Joint Venture Business?  
(Or)  
b) What are the different methods for recording Joint Venture transactions?
4. a) What is a Single Entry System? Explain the disadvantages in Single Entry System,  
(Or)  
b) Distinguish between Single Entry System and Double Entry System.
5. a) Explain Accounting Standard - 2  
(Or)  
b) Explain about Stock Taking.

**SECTION – B**

**Answer the following:**

**(5 X 10M = 50M)**

**UNIT - I**

6. a) On 15-4-14 Srinivas sold goods to Govind for Rs.2,000 and drew upon him a bill for 3 months for the amount which the later accepted. Govind expressed his inability to meet the bill and offered to pay Rs.500 in cash and to accept a new bill for the balance plus interest at 6 % p.a. for 4 months. Srinivas agreed to the proposal. On the due date the bill was dishnoured on account of insolvency of Govind and 25 paise in rupee was received from his estate. Write entries in the books of both parties.  
(Or)  
b) Jagannadh purchases goods worth Rs.15,000 from Viswanath on 1-1-05. Viswanath draws a bill on jagannadh for Rs.15,000 for 4 months, which is accepted by jagannadh. Viswanadh discounts the same for Rs.14,900. On maturity Jagannadh fails to honour the bill and requests Viswanadh to draw a new bill for 3 months for the original amount plus interest at 10% per annum plus discounting charges of the original bill. Viswanadh agrees to the proposal. Make Journal entries in the books of Viswanadh ledger accounts in the books of Jagannadh.

**UNIT - II**

7. a) Bharat cycles of Vijayawada consigned to Hind Bros. of Guntur 1,000 bicycles at Rs.300 each. Bharat cycles paid freight Rs.20,000 and insurance Rs.3,000. During the transit 100 bicycles were totally damaged by fire. Hind Bros. took delivery of the remaining cycles and paid Rs.1,500 for Octroi.



Hindu Bro. sent a bank draft for Rs.1,00,000 as advance payment and later sent an account sales showing that 800 bicycles were sold at Rs.400 each. Expenses incurred for rent and insurance amounted to Rs.4,000. Hind Bros. is entitled to commission at 5% on sales. Prepare necessary accounts in the books of Bharat cycles assuming that the insurance claim was settle for Rs.28,000.

(Or)

b) Desai of Mumbai sent 1,000 Sewing Machines to Dilip of Hyderabad costing of Rs.500 each. Expenses incurred by Desai amounted to Rs.4,500. Dilip is entitled to a commission of 6 % sales. Dilip took delivery of the machines and spent Rs.1,900 towards expenses. He sold the entire consignment of 1,000 Sewing Machines at the rate of Rs 510 each. Dilip sent the account sales to desai and sent a bank draft for the amount due by him. Pass necessary journal entries and prepare ledger accounts in books of both the parties.

### UNIT - III

8. a) A and B doing business separately as building contractors, undertake jointly to construct a building for a newly started joint stock company for a contract Price of Rs.1,00,000 payable as to Rs.80,000 by instalments in cash and Rs.20,000 in fully paid shares of the company. A banking account is opened in their joint names. A paying in Rs.25,000 and B Rs.15,000. They are to share profits and losses in the proportions of 2/3 and 1/3 respectively. Their transactions were as follows

	<b>Rs.</b>
Paid wages	30,000
Bought materials	70,000
Materials Supplied by A	5,000
Materials supplied by B	4,000
Architect's Fees paid by A	2,000

The contract was completed and the Price (cash and shares) duly received. The joint venture was closed by A taking up all the shares of the company at an agreed valuation of Rs.16,000 and B taking up the stock of materials at an agreed valuation of Rs.3,000. Show the necessary ledger accounts.

(Or)

b) A and B enter into a joint venture to sell a consignment of timber sharing profits and losses equally. A provides timber from his stock at a mutually agreed value of Rs.5,000. He pays expenses amounting to Rs.250. B incurs further expenses on cartage, storage etc. amounting to Rs.650 and receives cash for sales Rs.3,000. He also takes over goods of the value of Rs.1,000 for his use in his own business. At the date of close A takes over the balance of stock in hand which is valued at Rs.1,100. Prepare joint venture account and co-venture's account in the book of A.

### UNIT - IV

9. a) Mr. Sanjeev maintains books on single entry. He gives you the following information.

<b>Particulars</b>	<b>On 31.3.2002</b>	<b>On 31.3.2003</b>
Bank balance	1,200	2,000
Cash in hand	200	300
Stock of goods	10,000	12,000
Debtors	12,000	8,000

Furniture	4,000	4,000
Buildings	20,000	20,000
Creditors	7,000	8,000

Sanjeev introduced a fresh capital of Rs.10,000 on 1st July 2002 and withdrawn Rs.5,000 during the year. You are required to find out the profit made by Sanjeev after providing 5% depreciation on Buildings, 10% depreciation of Furniture and for the year ended 31.3.2003.

(Or)

b) Sunil does not keep a systematic record of his transactions. He is able to give you the following information regarding his assets and liabilities.

	<b>Dec. 31 2014</b>	<b>Dec. 31. 2015</b>
	<b>Rs.</b>	<b>Rs.</b>
Creditors for goods	25,000	30,000
Creditors for expenses	2,000	2,500
Bills Payable	8,000	11,000
Sundry Debtors	30,000	35,000
Stock (at cost)	28,000	30,000
Furniture	12,000	15,000
Cash	10,000	?

**Additional Information:**

Bills payable issued Rs.21,000 ;Cash Sales Rs.20,000; Payment to Creditors Rs.32,000; Expenses paid Rs.8,000; Drawings Rs.9,000; Bad Debts during the year were Rs.1,000. He always sells goods at cost plus 25%. Furniture is to be depreciated at 10% on the opening balance.

Prepare Trading and Profit and Loss Account for the year 2005 and Balance Sheet as on 31st December, 2015

**UNIT - V**

10. a) Distinguish between Periodic Inventory system and Perpetual Inventory system.

(Or)

b) Determine the value of stock to be taken for Balance Sheet as at 31st March, 2007 from the following information: The stock was physically verified on 23rd March 2007 and was valued at Rs 6,00,000. Between 23rd March 2007 and 31st March 2007 the following transactions had taken place:

- 1 Purchases Rs 50,000 of this, goods worth Rs 20,000 were delivered on 5th April, 2007.
2. Out of goods sent on consignment, goods worth Rs 30,000 (at cost) were unsold.
3. Sales was of Rs 1,70,000. This includes goods worth Rs 40,000 sent on approval. Half of these were returned before 31st March. As regards remaining, no intimation was received.
4. Normally the firm sells goods on cost plus 25%. However, a lot of goods costing Rs 30,000 was sold for Rs 15,000.

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**P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE: VIJAYAWADA-10.**  
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<b>Semester:</b>	<b>II</b>	<b>Credits :</b>	<b>4</b>
<b>Offered to</b>	<b>B. Com (Honours)A&amp;F/TPP</b>	<b>Course Code</b>	<b>COHT22A</b>
<b>Course Type</b>	<b>Core (Theory)</b>	<b>Year of Introduction</b>	<b>2022-23</b>
<b>Year of Revision:</b>		<b>Percentage of Revision:</b>	
<b>Hours Taught</b>	<b>75 hrs. Per Semester</b>		
<b>Course Prerequisites (if any):</b> Intermediate level			

### **Business Environment**

**Course objectives:**

- This course aims at acquainting the students with emerging issues in business at the National and International level in the light of policies of liberalization and Globalization.
- evaluate the economic, social political and legal environment components in business decision making.

**Course out comes:**

1. **CO1:** Understand how an entity systematically explores the external environment in which business operates.
2. **CO2:** To enlighten/familiarize the impact of economic environment and its effect on government policies for development of business.
3. **CO3:** To acquire specialized knowledge relating to economic policies in India.
4. **CO4:** critically examine the economic, social political and legal environment components in business decision making.
5. **CO5:** synthesize multiple perspectives to formulate responses to opportunities and institutions in international environment.

**Unit - I: Overview of Business Environment**

**15 hrs**

Business Environment – Meaning- Micro Dimensions of Business Environment- Macro Dimensions of Business Environment - Changing Scenario and implications – Indian Perspective – Global Perspective.

**Unit – II: Economic environment**

**12 hrs**

Meaning of Economic growth - Factors Influencing Development- Balanced Regional Development -Meaning -Types of plans- Main objects of planning in India- NITI Ayog and its role in economic development -NDC.

**Unit –IV : Economic Policies**

**15 hrs**

Economic Reforms and New Economic Policy- New Industrial Policy -Trade policy- Fiscal Policy – Objectives and Limitations- Union budget – Structure and importance of Union budget- Monetary policy and RBI.

**Unit – IV: Social, Political and Legal Environment:** Concept of Social Responsibility of Business towards Stakeholders - Demonetization, GST and their Impact - Political Stability - Legal Changes.

**Unit–V: Global Environment:** Globalization – Meaning – Role of WTO – WTO Functions -IBRD– Trade Blocks, BRICS, SAARC, ASEAN in Globalization

**Text book:** . Rosy Joshi and Sangam Kapoor :Business Environment

#### Referece Books

1. K. Aswathappa : Essentials of Business Environment, Himalaya PublishingHouse
2. Francis Cherunilam : Business Environment,HimalayaPublishingHouse
3. Dr S Sankaran: : Business Environment, MarghamPublications

#### Co-curricular activities

- ◆ Seminar on overview of business environment
- ◆ Debate on micro v/s macro dimensions of businessenvironment
- ◆ Seminar on Monetary policies ofRBI
- ◆ Debate on social, political and legalenvironment
- ◆ Group Discussions on Global environment and its impact onbusiness
- ◆ To learn about NITI Ayog and National DevelopmentCouncil
- ◆ Seminars on Economic policies like New Industrial policy, Fiscal policyetc.
- ◆ Reports on WTO,BRICS, SAARC

#### Web Links :

1. <http://keydifferences.com-difference-between-micro-internal-and-macro-external-environment.html#:~:text=micro%20environment%20is%20defined%20as,working%20of%20all%20busines%20enterprises.&text=>
2. <http://niti.gov.in-objectives-and-features>
3. <http://www.jagranjosh.com-general-knowledge-national-development-council-1438068500-1>
4. <http://www.jagranjosh.com-general-knowledge-new-economic-polocoy-of-1991-objectives-features-and-impacts-1448348633-1>
5. <http://www.bankbazar.com-finance-tools-emi-calculator-monetary-policy.html>

**BUSINESS ENVIRONMENT**  
**MODEL PAPER**

**Duration: 3 Hrs.**

**Max Marks: 70M**

**SECTION – A**

**Answer the following:**

**(5 X 4M = 20M)**

1. a. Discuss the changing scenario and implications of Business Environment in Indian perspective. (CO1) L2 4M  

(or)

b. What is the role of Business Environment in economic development? (CO1) L2 4M
  
2. a. What are the differences between Economic Development and Economic Growth? (CO2) L4 4M  

(or)

b. Write a short note on Balanced Regional Development. (CO2) L1 4M
  
3. a. What is the importance of Union Budget? (CO3) L2 4M  

(or)

b. Explain in detail about the monetary policy of RBI. (CO3) L2 4M
  
4. a. Explain the concept of political stability. (CO4) L2 4M  

(or)

b. What is meant by GST? Explain its impact on National Income. (CO4) L2 4M
  
5. a. What are the objectives of SAARC? (CO5) L2 4M  

(or)

b. Write a short note on Trade Blocks. (CO5) L2 4M

**SECTION – B**

**Answer the following:**

**(5 X 10M = 50)**

**UNIT – I**

6. a. Define Business Environment. Explain in detail about the external environment. (CO1) L2 10M  

(or)

b. Explain briefly about the characteristics of Business Environment. (CO1) L2 10M

**UNIT – II**

7. a. What is meant by Economic Growth and Economic Development? Explain the various factors effecting Economic Growth. (CO2) L2 10M  

(or)

b. Explain in detail about various Five Year Economic Plans. (CO2) L2 10M

**UNIT – III**

8. a. Explain briefly about the objectives and provisions of New Industrial Policy. (CO3) L2 10M  
(or)  
b. What is meant by Fiscal Policy? Explain its objectives and evaluation. (CO3) L2 10M

**UNIT – IV**

9. a. Explain in detail about the concept of Social Responsibility of Business towards Stakeholders. (CO4) L2 10M  
(or)  
b. What is meant by demonetization? Explain briefly about its advantages and disadvantages. (CO4) L2 10M

**UNIT – V**

10. a. What are the objections and functions of International Bank for Reconstruction and Development? (CO5) L2 10M  
(or)  
b. Explain briefly about the role and functions of WTO. (CO5)L2 10M

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<b>Offered to</b>	<b>B. Com (Honours)A&amp;F/TPP/BPM</b>	<b>Course Code</b>	<b>COHT23A</b>
<b>Course Type</b>	<b>Core (Theory)</b>	<b>Year of Introduction</b>	<b>2022-23</b>
<b>Year of Revision:</b>	<b>2022-23</b>	<b>Percentage of Revision:</b>	<b>40%</b>
<b>Hours Taught</b>	<b>75 hrs. Per Semester</b>		
<b>Course Prerequisites (if any):</b> Intermediate level			

### Business Statistics

After completing this programme the students will be able to –

**Course Objective:**

1. The objective of this course is to impart knowledge on the application of statistical tool and techniques in business decision making.
2. Students will be able to understand basic theoretical and applied principles of statistics.
3. Students will gain proficiency in using statistical for data analysis.

**Course Outcomes:**

1. **CO-1:** Students will be able to understand the basic knowledge and characteristics of business statistics. **PO5, PO7**
2. **CO-2:** Determine the value of the mean, the median, and the mode of ungrouped data. **PO5, PO7**
3. **CO-3:** Explains the disparity of data from one another delivering a precise view of the distribution of data. **PO5, PO7**
4. **CO-4:** Design, Evaluate and apply regression analysis. **PO5, PO7**
5. **CO-5:** Students will able to understand interpret indexes to identify trends in a data set. And what the trend, seasonality, cyclical irregularity in time series. **PO5, PO7**

**UNIT:1 Introduction to Statistics & Measures of Central tendency**

Meaning, Definition, Functions, Importance and limitations of Statistics- Collection of data – Primary and secondary data – Schedule and Questionnaire- Frequency distribution – Tabulation- Diagram and Graphic representation of Data- Statistical System in India. Definition, Objectives and Characteristics of Central tendency- Types of Averages: Arithmetic mean, Geometric mean, Harmonic mean, Median, Mode, Quartiles.

**UNIT:2 Dispersion and Skewness**

Meaning, Definition, Objectives of Dispersion- Range and Quartile Deviation- Mean Deviation- Standard Deviation- Coefficient of Variation- Definition and Objectives of Skewness- Karl Pearson's and Bowley's measures of Skewness.

**UNIT:3 Measures of Relation.**

Meaning, Definition and uses of Correlation- Types of Correlation- Karl Pearson's Correlation Co-efficient- Spearman's Rank Correlation, Probable error.

**Unit:4 Regression Analysis**

Meaning and utility of Regression analysis- Comparison between correlation and regression- Regression Equations- Interpretation of Regression co- efficient.

### **UNIT:5 Analysis of Time Series & Index Numbers**

Meaning and utility of time series, -Components of Time series, Measurement of trend and Seasonal Variations- Techniques of Time series analysis- Methods of averages (Semi , Moving averages)- Least square method, Index Numbers, Methods of Construction of Index numbers, Price index numbers, Limitations of index numbers.

#### **Text books:**

1. Business statistics, S.L.Aggrwal, S.L Bhardwa. Kalyani publishers.
2. Fundamentals of Applied statistics.S.C. Gupta, V.K.Kapoor. Sultan chand and son's.

#### **Reference Text Books:**

1. Fundamentals of Mathematical Statistics. S.C.Gupta, V.K.Kapoor. Sultan Chand and son's.
2. Abstract Algebra, Dipak Chatterjee. Second addition, PHI learning and private limited.
3. Algebra,R.M.Khan, New central book agency.

#### **Suggested co- curricular activities:**

1. Quiz.
2. Seminars on collection of data and statistics relevant topics
3. Problem solving exercise
4. Grouping discussion on problem related topics.

#### **Web Links:**

1. [https://www.google.com/url?sa=t&source=web&rct=j&url=https://influentialpoints.com/Training/binomial\\_and\\_poisson\\_distributions-principles-properties-assumptions.htm&ved=2ahUKEwjS69SD4crvAhXi7HMBHbRXC10QFjAOegQIGBAC&usg=AOvVaw13MHzzGNgmJGo7Q5DDUhJU&cshid=1616651755032](https://www.google.com/url?sa=t&source=web&rct=j&url=https://influentialpoints.com/Training/binomial_and_poisson_distributions-principles-properties-assumptions.htm&ved=2ahUKEwjS69SD4crvAhXi7HMBHbRXC10QFjAOegQIGBAC&usg=AOvVaw13MHzzGNgmJGo7Q5DDUhJU&cshid=1616651755032)
2. [https://www.google.com/url?sa=t&source=web&rct=j&url=https://www.math.drexel.edu/~jwd25/LM\\_SPRING\\_07/lectures/lecture4B.html&ved=2ahUKEwjn3bWh4crvAhU6\\_XMBHff6Ce4QFjAdegQIKxAC&usg=AOvVaw0iEfxiKhNrvm51KpjMd9HD&cshid=1616651855819](https://www.google.com/url?sa=t&source=web&rct=j&url=https://www.math.drexel.edu/~jwd25/LM_SPRING_07/lectures/lecture4B.html&ved=2ahUKEwjn3bWh4crvAhU6_XMBHff6Ce4QFjAdegQIKxAC&usg=AOvVaw0iEfxiKhNrvm51KpjMd9HD&cshid=1616651855819)
3. <https://www.google.com/url?sa=t&source=web&rct=j&url=https://www.includehelp.com/basics/set-theory-and-types-of-set-in-discrete-mathematics.aspx&ved=2ahUKEwiPxOes4srvAhUv4jgGHSPpC1UQFjAaegQIFRAC&usg=AOvVaw3CpEdAZgdPJ2do-zPrHm9V&cshid=1616652125493>
4. [https://www.google.com/url?sa=t&source=web&rct=j&url=http://mospi.nic.in/142-present-indian-statistical-system-organisation&ved=2ahUKEwiesz5vf4srvAhWBwjgGHSMfA6oQFjABegQIAxAF&usg=AOvVaw3p vjlFUQgZSX\\_d\\_wsljvsah&cshid=1616652268184](https://www.google.com/url?sa=t&source=web&rct=j&url=http://mospi.nic.in/142-present-indian-statistical-system-organisation&ved=2ahUKEwiesz5vf4srvAhWBwjgGHSMfA6oQFjABegQIAxAF&usg=AOvVaw3p vjlFUQgZSX_d_wsljvsah&cshid=1616652268184)
5. <https://www.google.com/url?sa=t&source=web&rct=j&url=https://m.youtube.com/watch%3Fv%3DIaTFpp-uzp0&ved=2ahUKEwigpavP58rvAhVj7HMBHYv2DTkQt9IBMA96BAggEAg&usg=AOvVaw2hw3kRqxysUmotnqeKF0G9>



**BUSINESS STATISTICS**  
**MODEL PAPER**

**Duration: 3 Hrs.**

**Max Marks: 70M**

**SECTION – A**

**Answer the following:**

**(5 X 4M = 20M)**

1. A) What are the Importance of statistics? CO1, L  
OR  
B) What are the Source of Primary data? CO1, L
  
2. A) Explain the meaning and definition of Dispersion. CO2, L  
OR  
B) What are the objectives of skewness? CO2, L
  
3. A) Explain the different types of Correlation CO3 , L  
OR  
B) What is Probable error? CO3, L
  
4. A) What ate the advantages of Regression analysis? CO4, L  
OR  
B) Explain the any three difference between Regression and Correlation. CO4, L
  
5. A) Explain the components of Time series. CO5, L  
OR  
B) What are the Index numbers techniques? CO5, L

**SECTION – B**

**Answer the following:**

**(5 X 10M = 50)**

**UNIT – I**

6. A) . Compute Mean and Median for the following data

X Less than	500	450	400	350	300	250	200	150	100
Frequency	150	146	130	93	47	26	15	7	3

**OR**

- B) . Calculate Mode for the following data

C I	0-20	20-40	40-60	60-80	80-100	100-120	120-140	140-160
Frequency	14	26	33	36	39	18	6	2

**UNIT – II**

7. A) Calculate Standard Deviation and coefficient of variation for the following data

Class Interval	0-10	10-20	20-30	30-40	40-50
Frequency	5	15	30	65	80

**OR**

**B)** Find the Karl Pearson's Skewness for the following data

Size	45-50	51-56	57-62	63-68	69-74
Frequency	12	17	22	18	11

**UNIT – III**

8. **A)** Calculate Rank correlation for the following data

Marks In Accounts	20	24	21	27	29	40	38	31	60	50
Marks In Auditing	110	115	127	111	152	141	138	131	161	159

**(OR)**

**B)** Calculate Coefficient correlation for data given below

X	9	28	45	60	70	50
Y	100	60	50	40	33	57

**UNIT – IV**

9. **A)** Find the two regression equations from the following particulars

X	1	5	3	2	1	2	7	3
Y	6	1	0	0	1	2	1	5

**OR**

**B)** Find the two regression for the age of Husband and Wife

Age of Husband	60	55	50	45	40	35	30
Age of Wife	52	48	46	41	37	30	26

**UNIT – V**

10. **A)** Show that Fisher's formula satisfies , Time reversal Test and Factor Reversal Test using the following data

Commodity	2000		2001	
	Price	Qty	Price	Qty
A	10	12	12	12
B	5	8	6	9
C	20	3	25	4
D	8	10	8	9

**OR**

**B)** Following are the data of production of computers in a factory. Fit a straight line trend. **CO5,L4**

Year	2000	2001	2002	2003	2004
Production (in Lakhs)	4	6	9	10	11

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<b>Offered to</b>	<b>B. Com (Honours)A&amp;F/TPP/BPM</b>	<b>Course Code</b>	<b>COHT24</b>
<b>Course Type</b>	<b>Core (Theory)</b>	<b>Year of Introduction</b>	<b>2022-23</b>
<b>Year of Revision:</b>	<b>2022-23</b>	<b>Percentage of Revision:</b>	<b>40%</b>
<b>Hours Taught</b>	<b>75 hrs. Per Semester</b>		
<b>Course Prerequisites (if any):</b> Intermediate level			

### Elements of Financial Management

**Course Objectives:**

1 To help the students to develop cognizance and understanding of the overall role and Importance of financial management in corporate valuation.

2. Communicate effectively using standard business terminology.

**Course Outcomes:**

- CO1:** Impart thorough knowledge about financial management and how it has evolved over a Period of time.
- CO2:** Able to identify the importance of financial planning for corporate companies.
- CO3:** Demonstrate knowledge of the value of money over the time and its uses.
- CO4:** Develop an idea about multiple sources of finance and analyse the main ways of rising Capital and their respective advantages and disadvantages in different circumstances.
- CO5:** Analyse the complexities associated with management of cost of funds in the capital Structure.

**Unit – I: Scope and Objective of Financial Management**

**12 Hours**

Meaning and Definition of Financial Management- Evolution of Financial Management-Nature, scope and importance of Financial Management - Goals/Objectives of Financial Management-Conflicts in Profit maximization and Wealth maximization.-Role and functions of Financial Manager -Relationship of Financial Management with related disciplines

**Unit – II: Financial Planning**

**12Hours**

Meaning and Definition of Financial plan - Objectives of Financial plan - Characteristics of a sound financial plan - Process of financial plan – Long term and Short term financial plans -Factors effecting financial plan - Limitations.

**Unit – III Time Value of Money**

**15 Hours**

Concept of time value of money- Reasons why money in the future is worth less-than similar money today-Simple interest, compound interest and Effective rate of interest-

Present value, Future value-Annuity, Sinking fund- Determination of doubling period.

**Unit – IV: Sources of Finance**

**12 Hours**

Long-term Sources of Finance- Equity Capital, Preference share capital, Retained Earnings, Debentures or Bonds, Loans from Financial Institutions, Loans from Commercial Bank-Short term Sources of Finance.

**Unit – V:Cost of Capital:****24 Hours**

Measurement of Cost of Capital- Cost of Debt, Cost of Preference Shares, Cost of Equity, Cost of Retained Earnings -Weighted-Average Cost of Capital.

**Text Books:**

1. Khan M.Y. and Jain P.K.: Financial Management, Text and Problems, Tata McGraw Hill, New Delhi.

**References Text Books:**

1. Prasanna Chandra: Financial Management Theory and Practice, Tata McGraw Hill, New Delhi.

**Suggested Co-Curricular Activities:**

- power point presentations
- role play
- Seminar
- Problem Solving Exercises
- quiz using google forms.
- field trips

**Web Links:**

1. <https://www.managementstudyguide.com/financial-management.htm>
2. <https://www.managementstudyguide.com/financial-planning.htm>
3. [https://en.m.wikipedia.org/wiki/Time\\_value\\_of\\_money](https://en.m.wikipedia.org/wiki/Time_value_of_money)

ELEMENTS OF FINANCIAL MANAGEMENT  
MODEL PAPER

**Duration: 3 Hrs.**

**Max Marks: 70M**

**SECTION – A**

**Answer the following:**

**(5 X 4 = 20M)**

1. (a) Explain importance of financial management. CO1, L2 4M  
**OR**  
(b) Discuss the Role of Financial Manager. CO1, L2 4M
2. (a) Explain limitations of sound financial plan. CO2, L2 4M  
**OR**  
(b) write about process of financial plan. CO2, L2 4M
3. (a) Discuss about Present value and Future value of Money. CO3, L2 4M  
**OR**  
(b) What is the concept of Time value of money? CO3, L2 4M
4. (a) Explain the types of Debentures. CO4, L2 4M  
**OR**  
(b) Write about characteristics of Equity shares. CO4, L2 4M
5. (a) Write about Redeemable and irredeemable cost of Debt. CO5, L3 4M  
**OR**  
(b) What is cost of equity? CO5, L3 4M

**SECTION – B**

**Answer the following:**

**(5 X 10M = 50)**

**UNIT I**

11. (a) Explain the nature, scope and importance of financial management. CO1, L2 10M  
**OR**  
(b) Explain about objectives of Financial Management CO1, L2 10M

**UNIT II**

7. (a) Explain the characteristics of sound financial plan. CO2, L2 10M  
**OR**  
(b) What are factors that effecting financial plan? CO2, L2 10M

**UNIT III**

8. (a) A company offers @ 10% interest on its Deposits .What is the effective rate of Interest , if the compounding is done 1. Monthly 2. Quarterly 3.Half-yearly. CO3, L2 10M

**OR**

(b) Mr.X deposits Rs. 5,000 @8% at the beginning of the year for a period of 5 years how much amount did he receives at the end of 5<sup>th</sup> year. CO3, L2 10M

**UNIT IV**

9. (a) Briefly explain the features and importance of preference shares as a long-term finance. CO4 L2 10M

**OR**

(b) Briefly explain about short term sources of finance. CO4, L2 10M

**UNIT V**

10 (a) A firm has the following capital structure and after -tax costs for the different sources of funds used:

Sources of funds	Amount (RS)	Proportion (%)	After-tax cost (%)
Debt	15,00,000	25	5
Preference shares	12,00,000	20	10
Equity shares	18,00,000	30	12
Retained earnings	15,00,000	25	11
<b>TOTAL</b>	<b>60,00,000</b>	<b>100</b>	

You are required to compute the weighted average cost of capital. CO5, L3 10M

**OR**

(b) From the following capital structure of a company , calculate the overall cost of capital using A. Book value weights B. Market value weights.

SOURCES	BOOK VALUE	MARKET VALUE
Equity shars	45,000	90,000
Retained	15,000	-
Preference	10,000	10,000
Debentures	30,000	80,000

The after tax cost of Different sources of finance is as follows:

Equity share – 14%  
 Retained -13%  
 Preference -10%  
 Debentures – 5%

CO5, L3 10M

**P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE: VIJAYAWADA-10.**  
(An Autonomous college in the jurisdiction of Krishna University, Machilipatnam)

<b>Semester:</b>	<b>II</b>	<b>Credits :</b>	<b>4</b>
<b>Offered to</b>	<b>B. Com BPM</b>	<b>Course Code</b>	<b>COHT25</b>
<b>Course Type</b>	<b>Core (Theory)</b>	<b>Year of Introduction</b>	<b>2022-23</b>
<b>Year of Revision:</b>		<b>Percentage of Revision:</b>	
<b>Hours Taught</b>	<b>75 hrs. Per Semester</b>		
<b>Course Prerequisites (if any):</b> Intermediate level			

**FINANCE AND ACCOUNTING FOR BPS**

**COURSE OBJECTIVES:**

After completion of the course, the students will be able to

1. Define Business process services and various types of BPS.
2. Illustrate the various phases of supply chain management process.
3. Elucidate the maintenance of accounts payable and accounts receivable incorporating all credit transactions of Suppliers and customers.
4. Generate Final Accounts and statutory reports of Business Process services.
5. Examine the emerging trends in Finance & Accounting technology and the basic accounting standards in the context of Business Process services.
6. Illustrate the different security and control measures in Business process service industry in compliance with ISO standards and CMMI certification.
7. Design the overall operating model of Business Process Services in the context of transaction flows, process documents and Governance model.

**Unit 1: Basics of Businesses, Outsourcing Need and its current Trend**

**10 Hrs**

Types of Business Organisations ; Business Partnerships, Types of BPSs, Merits and De-Merits on various BPS options, Accounting Business Process Cycle, Evolving of Outsourcing, Need for outsourcing Horizontal Services, Current Trend in F&A Outsourcing

**Unit 2: Supply Chain**

**10 Hrs**

Activities before Purchasing, Quotations, Negotiation, Costs associated with Purchases etc., Raising of Purchase Order , types of Purchase Orders, Contracts etc., Warehouse Receipt procedures, Returns, Issues and various Documents, Accounting Impact, Inventory control, Types of discount offered by Vendors, Basics of Distribution Strategies, Integration of Strategic Partnering, Outsourcing and Procurement Strategies, Freight Negotiation, FTL Payments and Conditions etc.,

**Unit 3: Accounts Receivable and Accounts Payable**

**13 Hrs**

**Accounts payable**

Various Activities in Accounts Payable and Accounting Impact, Types of Invoice Matching and resolving issues, Payment, Procedures and Mode of payment , Employee Payment (T&E and Various Cards), Debit Balance, Write back, Discount adjustments and various actions, Help desk and support Activities, Vendor Account Reconciliation, Latest developments (Vendor Portal, EDI, E-Invoicing, Tools etc.,)

**Accounts receivables**

Various Activities in Accounts Receivable and Accounting Impact, Background check for Customers (D&B Report, Credit Rating) Credit Limit, Customer Contract / Order Management) Mode of receiving Payment, Actions for non-receipt, Netting off, Revenue Recognition, Collection, Cash Applications, Adjustment of Discounts, Rebate, QPS discount Write off etc., Disputes Handling procedures , Customer Help desk and support Activities, Customer Account Reconciliation, Latest Developments (Customer Portal, E-Invoicing, Tools etc.,)

Effective management of AR leads to working Capital improvement

#### **Unit 4 : General ledger**

**22 Hrs**

Activities in General Ledger, Subsidiary and Control Accounts, Chart of Accounts and maintenance, Cost Centre, Profit Centre, Cost Allocation etc. Adjustment journals, Bank Reconciliation , Fixed Asset Maintenance, Inter Company - Accounting and Reconciliation,

Tax Accounting - Transactional Element, Generation of Final Accounts, Various Reports (Statutory Reports, Schedules, Variance Analysis)

#### **Emerging trend in F&A Technology and Accounting Standards**

Modules and usage of ERPs, Basic Screens required to be understood for F&A process , Report generation, XBRL, Platform, Counting, Data Privacy Law etc., Basics of Accounting Standard and Differences between various GAAPs (US, UK, Indian and IFRS)

#### **Unit 5: Controls and Compliance**

**20 Hrs**

COSO, Internal Controls & Audit, ISO Standards (applicable to BPS) / CMMI Certification etc., PCI Data Security Standard / Security Audit / Data Privacy and Protection, SOX Compliance / SSAE 16 / ISAE 3402, SOD, Access, Incident Management, BCP etc.,

#### **Operating model of Business Process services**

Understanding Transaction flows, BPS Terminologies , Importance of Process Documents, Service Level Measurements, Contractual elements, Governance model, Internal Reporting, Delivery Excellence, Integration of support functions, Future Challenges

#### **Books for Reference:**

❖ *TCS reference Manual for Accounting and Finance for BPS*



**P. B. Siddhartha College of Arts & Science, Vijayawada-10**  
**Model Paper**

**B.Com BPM**

**Course Code: COHT25**

**FINANCE AND ACCOUNTING FOR BPS (FABPS)**

**Time: 3 Hrs**

**Max Marks: 70**

**SECTION – A**

**(5 X 4M = 20M)**

**Answer the following:**

1. a. What is accounting? What are the basic accounting rules? (CO1, L1) 4M  
(Or)  
b. Differentiate Horizontal domain services and Vertical domain services handled by BPS. (CO1, L1) 4M
2. a. Distinguish Trade discounts and Cash discounts. (CO2, L1) 4M  
(Or)  
b. What are Lot Size Decision Rules? (CO2, L1) 4M
3. a. What are the Key fields in Vendor Master File? (CO3, L1) 4M  
(Or)  
b. Define Competitor Analytics in Business. (CO3, L1) 4M
4. a. Write any five needs for ERP. (CO4, L2) 4M  
(Or)  
b. What is COA (Chart of Accounts)? (CO4, L2) 4M
5. a. What is COSO. (CO5, L2) 4M  
(Or)  
b. Define Risk. What is an Operational Risk? (CO5, L2) 4M

**Unit - I**

6. a. Define BPS. Write about the BPS Industry in India and its Challenges. (CO1, L1) 10M  
(Or)  
b. Explain the merits and demerits of Business Process Outsourcing? (CO1, L1) 10M

**Unit - II**

7. a. What do you mean by Supply Chain Management? Explain the various processes involved in Supply chain Management. (CO2, L1) 10M  
(Or)  
b. What is Inventory Management? Briefly elaborate on the methods of Inventory Control. (CO2, L1) 10M

**Unit – III**

8. a. What is OCR. State the pros, cons, and limitations of OCR. (CO3, L1) 10M  
(Or)

**b. What is Invoice Processing? Explain the Process of Invoice Processing. What can go wrong and how it can impact Invoice Processing? (CO3, L1) 10M**

**Unit - IV**

**9. a. Distinguish between Indian GAAP and US GAAP. (CO4, L2) 10M**

**(Or)**

**b. What are the various reports to be maintained in an organization? Explain its contents. (CO4, L2) 10M**

**Unit - V**

**10 a. Bring out the requirements to be met by an entity to prevent accounting fraud according to the guidelines set by Sarbanes Oxley Act 2002. (CO5, L3) 10M**

**(Or)**

**b. Explain the role of Quality in the Transaction Flows of a Business Process Service. (CO5, L3) 10M**

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**P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE :: VIJAYAWADA-10.**  
(An Autonomous college in the jurisdiction of Krishna University, Machilipatnam)

<b>Semester:</b>	<b>II</b>	<b>Credits :</b>	<b>4</b>
<b>Offered to</b>	<b>BCA</b>	<b>Course Code</b>	<b>COMT23A</b>
<b>Course Type</b>	<b>Core (Theory)</b>	<b>Year of Introduction</b>	<b>2022-23</b>
<b>Year of Revision:</b>		<b>Percentage of Revision:</b>	
<b>Hours Taught</b>	<b>75 hrs. Per Semester</b>		
<b>Course Prerequisites (if any):</b> Intermediate level			

**Accounting and Finance**

**COURSE OBJECTIVES:**

1. To make the students acquire the conceptual knowledge of accounting.
2. To equip the students with the knowledge of accounting process and preparation of final accounts.

**UNIT – I Introduction of Accounting**

**15 Hours**

Need for Accounting-Definition-Objectives-Scope of Accounting-Advantages and disadvantages  
Classification of accounts and its rules- Double entry book Keeping-Journal -Posting to ledgers and balancing of ledger accounts(problems)

**Unit – II Subsidiary books**

**15 Hours**

Definitions- types of subsidiary books- purchase book-sales book-purchase returns book-sales returns book- Bills receivable Book-Bills payable book - Cash Book-Three columns cash books-Petty cash book(problems)

**Unit – III Trail balance and Final accounts**

**15 Hours**

Trail Balance-Preparation of trail Balance-Preparation of final Accounts-Trading Account-Profit and loss Account-Balance Sheet-Final accounts with adjustments

**Unit – IV: Introduction to Finance**

**18 Hours**

Meaning – Definition- Nature and Functions of Financial Management - Role of key finance personnel - Goals of Financial Management. - Meaning and Characteristics of financial Planning -Factors in estimating the Financial Requirements - Limitations of financial Planning.

**Unit - V : Sources of Finance:**

**12 Hours**

Long-term Sources of Finance- Equity Capital, Preference share capital, Retained Earnings, Debentures or Bonds, Loans from Financial Institutions, Loans from Commercial Bank-Short term Sources of Finance

**Text Book:**

1. Fundamental of Accounting-I Kalyani publishers Auth:Jain&Narang

**Reference Text Books:**

1. Fundamental of Accounting-1Pragathi Prakashan publishers Auth: Sagar, K Narayana Rao, P Subhakar
2. Fundamentals of Accounting I Himalaya publications

**P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE, VIJAYAWADA**  
Semester – II **Course Code: COMT23A**

**Accounting & Finance**  
**MODEL PAPER**

**Duration: 3 Hrs.**

**Max Marks: 70M**

**SECTION – A**

**Answer the following:**

**(5 X 4M = 20M)**

1. A) What are the Objectives of Accounting?

**OR**

B) What are double entry rules and explain them?

2. A) Explain the advantages of subsidiary books?

**OR**

B) When you are use the Debit note and Credit Note?

3. A) What are the different types of preparation of trial balance?

**OR**

B) Explain the treatment of Out-standing and Pre-paid Expenditure

4. A) What are the goals of financial management

**OR**

B) Explain the characteristics of Financial Planning

5. A) List out the types of Preference shares.

**OR**

B) What are the short term sources available for business

**SECTION – B**

**Answer the following:**

**(5 X 10M = 50)**

**UNIT – I**

6. A) What are the difference between Accounting and Book keeping?

**OR**

B) ) Journalise the following transactions:

2014

January 1	Purchased goods for cash	5,000
3	Sold goods for cash	8,000
4	Purchased goods from Bose	2,000
6	Sold goods to Kavitha	3,000
9	Cash paid to Bose	1,600
11	Received cash from Kavitha	2,500
13	Sold goods to Bose for cash	1,800
14	Purchased goods from Kavitha for cash	1,800
19	Paid rent	400
22	Received Commission	100
24	Goods returned to Bose	200
25	Goods returned by Kavitha	150
29	Purchased furniture from Mr. Ramu and Co.	1,500
31	Paid Salary	1,800

7. A) What are the different types of subsidiary books and explain them.

**OR**

B) Enter the following transactions in suitable subsidiary books:

2022 Jan		Rs.
1	Purchased goods from Rekaha	7,500
4	Sold goods to Midhun	8,000
5	Returned goods to Rekha	500
6	Sridevi bought goods from us	4,000
8	Received goods returned by Midhun	400
10	Rajesh sold goods to us	4,000
15	Sold goods to Kishore	3,000
16	Returned goods to Rajesh	600
20	Kishore returns goods	500

8. A) Give up the Trading and Profit & Loss account proforma and

**OR**

B) From the following Trial Balance of Ravi, prepare final accounts for the year ended 31-3-2015:

Debit balance	Rs.	Credit Balance	Rs.
Drawings	4,500	Capital	24,000
Purchases	20,000	Sales	30,500
Sales returns	1,500	Discounts	1,900

Opening stock	8,000	Creditors	10,000
Salaries	4,200	Bills payable	2,500
Wages	1,200		
Rent	350		
Bad debts	400		
Discounts	700		
Debtors	14,000		
Cash in hand	6,200		
Insurance	400		
Trade expenses	300		
Printing	150		
Furniture	2,000		
Machinery	5,000		
	<b>68,900</b>		<b>68,900</b>

**Adjustments:**

- (a) Closing Stock Rs.7, 000
- (b) Prepaid Insurance Rs.60
- (c) Outstanding salary Rs.500, wages Rs.200
- (d) Depreciate machinery at 5% and furniture at 10%

9. A) Explain the nature and functions of Financial Management.

**OR**

B) What are the factors effecting the financial requirements?

10. A) Explain the different types Debentures.

**OR**

B) What are the Long term sources of finance for a Company organisation?

**DEPARTMENT OF COMPUTER SCIENCE ( UG)**

Minutes of the Board of Studies meeting in the Department of Computer Science for Under Graduate Programmes held on 06/03/2023 at 11:30 AM in offline/online mode.

**LIST OF BOS MEMBERS**

<b>Name of the Member</b>	<b>Role</b>
Dr.T.S.RaviKiran, HOD, Dept. of CS, P.B. Siddhartha College of Arts & Science. Mobile: 9440446847, Email:tsravikiran@pbsiddhartha.ac.in	Chairman
Dr.R.VijayaKumari, Head, Department of Computer Science, Krishna University, Machilipatnam. Ph : 9948593964, Email: <a href="mailto:vijayakumari28@gmail.com">vijayakumari28@gmail.com</a>	University Nominee, Krishna University
Dr. M. Babu Reddy, Principal, Krishna University College of Engineering and Technology, Krishna University, Machilipatnam. Mobile: 9963436460 Email: <a href="mailto:m_babureddy@yahoo.com">m_babureddy@yahoo.com</a>	Subject Expert
Dr.P.Deepalakshmi, ME, Ph.D. , Professor and Dean, School of Computing, Kalasalingam Academy of Research and Education, Krishnankoil - 626126. Viradhunagar(Dist.), Tamil Nadu, India. Email: <a href="mailto:deepa.kumar@klu.ac.in">deepa.kumar@klu.ac.in</a> , <a href="mailto:deansoc@klu.ac.in">deansoc@klu.ac.in</a> Mobile: 9865061291, 8838010443	Subject Expert
Bharat Kumar Reddy Gujavarti (MCA, PGDHRM), Hyderabad Founder & CEO, Pragmatiq Systems Inc. Director, Sunblue Technologies Co-founder, Edify Email: <a href="mailto:bharat@pragmatiq.in">bharat@pragmatiq.in</a> Mobile: 8978191977	Industrialist
Shankar Lakkaraju, Product Director, Blue Yonder India Email: <a href="mailto:shankar.lakkaraju@gmail.com">shankar.lakkaraju@gmail.com</a> Mobile: 98851 65651	Alumni MCA: 1999-2002
Mr. K. Sudhir	Member
Mr. K. Sridhar	Member
Mrs. M. Bhadraraja	Member
Mr. R. Gopi	Member
Mr. S. Rajesh	Member
Mrs. Y. J. N. Lakshmi	Member
Mrs. V. Jhansi Lakshmi	Member
Mrs. T. Malleswari	Member
Mr. E. V. V. S. Siva Kumar	Member
Mr. K. Veerendranath	Member
Mrs.M.Vijitha	Member
Ms. A. Prathyusha	Member
Mrs. B. Tarmila Devi	Member
Mr. K. Ravisankar	Member
Mrs. Sk. John Bee	Member
Dr. K. UdayaSree	Member
Mrs.M.Gayathri	Member
Mrs.V.Munni	Member
Mrs.V.Sreerekha	Member
Mr. V. Ravi Kiran	Member
Mrs. V. Lakshmi Ravali	Member

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**P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE**  
Siddhartha Nagar, Vijayawada – 520 010  
(An Autonomous College under the Jurisdiction of Krishna University)  
*Re – Accredited at ‘A+’ by NAAC – III Cycle*  
*College with Potential for Excellence (Awarded by the UGC)*  
*ISO 9001 – 2015 Certified*

<b>DEPARTMENT OF COMPUTER SCIENCE (UG)</b>						
<b>LIST OF COURSES MODIFIED IN II SEMESTER 2022 - 2023</b>						
<b>Sl. No.</b>	<b>Title</b>	<b>Course Code</b>	<b>Offered in Sem</b>	<b>Year of Introduction</b>	<b>OBE with BTL</b>	<b>Offered To</b>
1	Computer Networks	CGST22A	II	2022 - 2023	YES	B. Sc (CSCS)
2	Computer Networks Lab	CGSP22A	II	2022 - 2023	YES	B. Sc (CSCS)
3	Process Management	CGST42A	IV	2022 - 2023	YES	B. Sc (CSCS)

**RESOLUTIONS**

1. It is resolved and recommended to revise the syllabus & model question paper of Computer Networks with revised course code CGST22A in II semester of B. Sc (CSCS) programme for the batch of students admitted in 2021-22 academic year and onwards. For the revised syllabus and model question paper vide Page number from 3 to 7.
2. It is resolved and recommended to revise the syllabus & model question paper of Computer Networks Lab with revised course code CGSP22A in II semester of B. Sc (CSCS) programme for the batch of students admitted in 2021-22 academic year and onwards. For the revised syllabus and model question paper vide Page number from 8 to 9.
3. It is resolved and recommended to revise the syllabus & model question paper of Process Management with revised course code CGST42A in II semester of B. Sc (CSCS) programme for the batch of students admitted in 2021-22 academic year and onwards. For the revised syllabus and model question paper vide Page number from 10 to 12.
4. It is resolved and recommended to drop DevOps Lab with course code CGSP42 from the curriculum as per recommendation of TCS for B. Sc. (CSCS) programme in their IV semester with effect from 2021-22 admitted batch and onwards.
5. It resolved and recommended the revision of the model question paper of E - Commerce and Web Designing with course code CABT24 in II semester of B. COM (CA) programme for the batch of students admitted in 2022-23 and onwards. For the revised model question paper vide Page Number 13.
6. It is resolved and recommended the revision of the model question paper of Data Structures with course code CSCT21B CGST21 for B. Sc. (CSCS) and CSCT22B for B. C. A programme in II semester for the batch of students admitted in 2022-23 and onwards. For the revised model question paper vide Page Number 14 to 15.
7. It is resolved and recommended the revision of the model question paper of Web Programming with course code CSCT28 in II semester of B. C. A programme for the



batch of students admitted in 2022-23 and onwards. For the revised model question paper vide Page Number 16 to 17.

8. It is resolved and recommended the revision of the model question paper of Security Analyst - I with course code SDCCSCT01 in II semester of B. C. A programme for the batch of students admitted in 2022-23 and onwards. For the revised model question paper vide Page Number 18.
9. It is resolved and recommended the revision of the model question paper of Digital Marketing with course code SDCCSCT02 in II semester of B. Sc. (CAMS, MSCS) programmes for the batch of students admitted in 2022-23 and onwards. For the revised model question paper vide Page Number 19.

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*(An Autonomous College under the Jurisdiction of Krishna University)*  
*Re – Accredited at ‘A+’ by NAAC – III Cycle*  
*College with Potential for Excellence (Awarded by the UGC)*  
**ISO 9001 – 2015 Certified**

<b>COMPUTER SCIENCE</b>	<b>CGST22A</b>	<b>2023-2024</b>	<b>B.Sc. (CSCS)</b>
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**SEMESTER – II**

**Credits – 4**

**Total: 60 Hrs.**

**COMPUTER NETWORKS**

**Course Objectives:**

1. Learn about Network hardware and software
2. Learn basics about Networking.
3. Learn about IP Addressing and Switches
4. Learn about VLAN and Routing Protocols.
5. Learn about Network Monitoring, WLAN, NAT

Course Outcome No	Upon successful completion of this course, students should have the knowledge and skills to:	Program Outcome No
CO1	Understand about Network hardware and software	PO7
CO2	Understand the concept of Networking	PO1
CO3	Understand the concepts of IP Addressing and Switching	PO7
CO4	Understand and know about VLAN and Routing protocols	PO1
CO5	Understand and know about Network Monitoring, WLAN, NAT	PO1

**Unit I : Need of Network**

**10 Periods**

Network classifications LAN, MAN, WAN, Data and signals analog and digital, periodic analog signals, digital signals, bit rate, baud rate, bandwidth, Transmission impairments - attenuation, distortion and noise, Data Communication protocols & standards, Network models - OSI model layers and their functions, TCP/IP protocol suite.

**Unit II: Bandwidth Utilization and Multiplexing**

**12 Periods**

Multiplexing - FDM, TDM, Spread spectrum - Frequency hopping spread spectrum, Direct sequence spread spectrum, Transmission media - guided and unguided media, Switching

message, circuit and packet switched networks, Datagram networks and virtual circuit networks.

### **Unit III:IP Addressing**

**14 Periods**

IP Addressing Version 4 – IP Addressing Version 6, Subnetting Advanced VLSM - Switch Basic, VLAN - VTP /CDP - Subnetting Basic Version 4, Network Quiz - Routing Static.

### **Unit IV: Routing Algorithms**

**12 Periods**

Routing algorithms – Congestion Control Algorithms, CISCO IOS / Managing / Password recovery, Routing Dynamic Routing protocols OSPF RIP EIGRP, Network Advanced Routing Dynamic Routing protocols – OSPF RIP EIGRP.

### **Unit V: Monitoring Network Devices**

**12 Periods**

Overview of ACL(Access Control List),NAT(Network **Address Translation**),WAN(Wide area network) and Wireless Technologies.

#### **Recommended Books:**

- B A Forouzan, Data Communications and Networking, 4th Ed., M C Graw Hill Publications [[PDF](#)]
- David J.Wetherall, Andrew S.Tanenbaum, "Computer Networks", 5th Edition, Pearson Education, 2012 [[PDF](#)]

#### **Online Resources:**

<https://www.youtube.com/watch?v=-6Uoku-M6oY>

<https://www.youtube.com/watch?v=ZhEf7e4kopM>

<https://youtu.be/8npT9AALbri?t=70>

#### **Recommended Co – Curricular Activities:**

(Co-curricular activities shall not promote copying from textbook or from others work and shall encourage self/independent and group learning)

##### **A. Measurable**

1. Assignments (in writing and doing forms on the aspects of syllabus content and outside the syllabus content. Shall be individual and challenging)
2. Student seminars (on topics of the syllabus and related aspects (individual activity))
3. Quiz (on topics where the content can be compiled by smaller aspects and data (Individuals or groups as teams))
4. Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual

participation and contribution of students shall be ensured (team activity))

**B. General**

1. Group Discussion
2. Others

**RECOMMENDED CONTINUOUS ASSESSMENT METHODS:**

Some of the following suggested assessment methodologies could be adopted;

1. The oral and written examinations (Scheduled and surprise tests),
2. Closed-book and open-book tests,
3. Programming exercises,
4. Practical assignments and laboratory reports,
5. Observation of practical skills,
6. Individual and group project reports.
7. Efficient delivery using seminar presentations,
8. Viva voce interviews.
9. Computerized adaptive testing, literature surveys and evaluations,
10. Peers and self-assessment, outputs form individual and collaborative work.



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**SEMESTER END MODEL QUESTION PAPER**

**TITLE: COMPUTER NETWORKS**

**COURSE CODE: CGST22A**

**SECTION: B.SC CSCS**

**SEMESTER: II**

**TIME: 3 Hrs.**

**MAX: 75M**

---

**SECTION A**

**ANSWER THE FOLLOWING QUESTIONS .**

**5 X 4 = 20 Marks**

1. (a) Explain LAN with an example. (CO1, L2)

**OR**

- (b) Summarize types of communication signals. (CO1, L2)

2. (a) Describe the Spread spectrum? (CO2, L1)

**OR**

- (b) Describe circuit and packet switched networks. ? (CO2, L1)

3. (a) Explain IP addressing. (CO3, L2)

**OR**

- (b) Explain Subnetting. (CO3, L2)

4. (a) Explain routing. (CO4, L2)

**OR**

- (b) Summarize Congestion Control Algorithms (CO4, L2)

5. (a) Explain ACL. (CO5, L2)

**OR**

- (b) Write about WAN. (CO5, L2)

**SECTION B**

**ANSWER THE FOLLOWING QUESTIONS .**

**5 X 10 = 50 Marks**

6. (a) Classify and explain various types of Networks with neat diagrams. (CO1, L2)

**OR**

(b) Summarize various layers in the OSI model. (CO1, L2)

7. (a) Explain Multiplexing. (CO2, L2)

**OR**

(b) Explain guided Transmission media.(CO2, L2)

8. (a) Explain IPV4. (CO3, L2)

**OR**

(b) Explain IPV6. (CO3, L2)

9. (a) Illustrate configuring the OSPF Protocol with an example.(CO4, L2)

**OR**

(b) Illustrate configuring the Routing Information Protocol with an example.(CO4, L2)

10. (a) Explain NAT (CO5, L2)

**OR**

(b) Explain Wireless Communication.(CO5, L2)

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COMPUTER SCIENCE	CGSP22A	2023-2024	B.Sc. (CSCS)
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**SEMESTER – II**

**Credits – 1**

**COMPUTER NETWORKS LAB**

COURSE OUTCOME NO	Upon successful completion of this course, students should have the knowledge and skills to:	PROGRAM OUTCOME NO
CO1	Demonstration of Cisco packet tracer software	PO7
CO2	Perform Configuration of a Switch	PO1
CO3	Perform Configuration of a Router	PO1
CO4	Demonstration of Routing protocols OSPF, RIP	PO1
CO5	Demonstration of Routing protocol EIGRP	PO1

**Requirements:**

**Cisco packet tracer software (Freeware)**

**Exercises**

1. Installation of Cisco Packet Tracer
2. Perform an Initial Switch Configuration
3. Configuring Switch Interfaces
4. Performing an Initial Router Configuration
5. VLAN and VTP Configuration
6. Basic Router Setup
7. Demonstrate Static Routing
8. Demonstrate Dynamic Routing
9. Demonstrate Dynamic Routing protocol OSPF
10. Demonstrate Dynamic Routing protocol RIP

## 11. Demonstrate Dynamic Routing protocol EIGRP

### Faculty & Student Resources:

- Software Download
  - Cisco Packet Tracer Software (Details provided in Getting Started Course)
- Free Online Courses for Cisco Packet Tracer
  - [Getting Started with Cisco Packet Tracer](#)
  - [Exploring Networking with Cisco Packet Tracer](#)
  - [Introduction to Packet Tracer Exam](#)
- Lab Resources
  - [Free Cisco Lab](#)
  - [Free CCNA Lab](#)
  - [Cisco Virtual Lab Simulations](#)
  - [Packet Tracer Labs](#)





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**PROCESS MANAGEMENT**

<b>Offered To:</b>	<b>B.Sc CSCS</b>	<b>Course Code:</b>	CGST42A
<b>Course Type:</b>	Core (Theory)	<b>Course:</b>	Process Management
<b>Year of Introduction:</b>	2022 – 2023	<b>Year of offering:</b>	2023 – 2024
<b>Year of Revision:</b>	-	<b>Percentage of Revision:</b>	-
<b>Semester:</b>	IV	<b>Credits:</b>	4
<b>Hours Taught:</b>	60 hrs. per semester	<b>Max. Time:</b>	3 Hrs

**Course Prerequisites (if any):** Basic knowledge in computers and internet.

**Course Description:** This course focuses towards Software Engineering, Agile and Scrum, DevOps Tools and Design Thinking

**Course Objectives:**

1. Understanding the concept of Software Engineering.
2. To Know about Agile and Scrum.
3. To implement DevOps Tools.
4. Understanding the concept of Design Thinking.

**Course Outcomes:** At the end of this course, students should be able to

**CO1: Understand** about Software Engineering. (PO5,PO6, PO7)

**CO2: Learn** about Agile. (PO5, P07)

**CO3: Learn** about Scrum (PO5, P07)

**CO4: Know** about DevOps. (PO5, P07)

**CO5: Understand** Design Thinking is about. (PO5,PO6, PO7)

<b>Syllabus</b>		
<b>Unit</b>	<b>Learning Units</b>	<b>Lecture Hours</b>
I	<b>Software and Software Engineering (15 Hrs.)</b> The Nature of Software, The Unique Nature of WebApps, Software Engineering- Software Process, Software Engineering Practice-Software Myths. Software Process Model: A Generic Process Model, Process Assessment and Improvement, Perspective Process Models, Specialized Process Model, The Unified Process. Software Engineering Code of Ethics.	12
II	<b>Agile (14 Hrs.)</b> What Is Agile, Understanding Agile Value, Agile Manifesto, Principles of Agile, Agile Methodologies, Advantages and Disadvantages of Agile - Agile anti-patterns, Scaled Agile Framework, Why Lean UX, The Three Foundations of Lean UX, Principles of Lean UX.	12
III	<b>Scrum (14 Hrs.)</b> Definition of Scrum, Uses of Scrum, Scrum Theory, Scrum Values, The Scrum Team, Scrum Events, Scrum Artifacts, Artifact Transparency.	12
IV	<b>DevOps (15 Hrs.)</b> Introduction to DevOps, methodologies, principles, strategies, Automation, Performance Measurement through KPIS and Metrics, Agile and DevOps, Agile Infrastructure, Velocity, Lean Startup UPS.	12
V	<b>Design Thinking (14 Hrs.)</b> Introduction to Design Thinking – Lean thinking, Actionable Strategy, The Problem with Complexity, Vision and Strategy, Defining Actionable Strategy Act to Learn, Leading Teams to Win.	12

Text Books			
	<b>Author</b>	<b>Title</b>	<b>Publisher</b>
1	Roger S Pressman,	“Software Engineering A Practitioner's Approach”	7 <sup>th</sup> Edition 2010
2	Kallori Vikraman,	“Introduction to Devops”	1 <sup>st</sup> Edition, 2016.
3	Stephen Haunts	Essential of Scrum” Addison-Wesley Professional	1 <sup>st</sup> Edition, 2012
4	Jonny Schneider	“Understanding Design Thinking, Lean, and Agile”	O’Reilly Media 2017.
5	Jeff Gothelf	"Lean vs. Agile vs. Design Thinking”	Sense and Respond Press,2017

**Course Delivery method :** Face-to-face / Blended

**Course has focus on :** Skill Development

**Websites of Interest:**

<https://www.javatpoint.com/devops>

[https://www.tutorialspoint.com/scrum/scrum\\_overview.htm](https://www.tutorialspoint.com/scrum/scrum_overview.htm)

<https://www.javatpoint.com/agile>

[https://www.tutorialspoint.com/design\\_thinking/design\\_thinking\\_introduction.htm](https://www.tutorialspoint.com/design_thinking/design_thinking_introduction.htm)

**Co-curricular Activities:** Programming Contests, Assignments & Quiz



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**PROCESS MANAGEMENT**  
**SEMESTER END MODEL QUESTION PAPER**

**COURSE CODE: CGST42A**  
**CLASS: B.Sc. (CSCS)**

**Max.Marks:75M**  
**Semester IV**

**Section-A**

**Answer any five questions.**

**5\*5=25M**

1. Explain the nature of Software.(CO1, L2)
2. Describe the unique nature of WebApps.(CO1,L1)
3. List and explain principles of Agile.(CO2, L2)
4. Explain Scrum Roles.(CO2, L2)
5. Summarize the need of DevOps. (CO3, L2)
6. Discuss Velocity in Agile.(CO3, L2)
7. What is Sprint? Explain. (CO4, L2)
8. Explain the Actionable Strategy for Design Thinking.(CO5, L2)

**Section-B**

**ANSWER THE FOLLOWING QUESTIONS5x10M=50M**

9. (A)Summarize software myths. (CO1, L2)  
OR  
(B)Explain Software Process Models (SPM). (CO1, L2)
10. (A) Classify and explain agile methodologies.(CO2, L2)  
OR  
(B) Summarize scrum artifacts. (CO2, L2)
11. (A) Illustrate measuring performance through KPIS and its metrics. (CO3, L2)  
OR  
(B) Explain about Lean Startup UPS.(CO3, L2)
12. (A) Illustrate staggering a sprint with an example. (CO4, L2)

OR

(B) Illustrate coordinating multiple Lean UX teams. (CO4, L2)

13. (A) Explain Lean Thinking and its Principles?(CO5, L2)

OR

(B) Explain the vision and Strategy of Design Thinking.(CO5, L2)

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### APPENDIX - III

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### **SEMESTER END MODEL QUESTION PAPER**

**COURSE CODE: CABT24**

**Max.Marks:70M**

**CLASS: B.Com(CA)**

**Semester II**

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### SECTION A

**ANSWER THE FOLLOWING QUESTIONS**

**5 X 4 = 20 Marks**

1. A) Explain the need of E - Commerce. (CO1, L2)  
OR  
B) Differentiate between traditional and electronic commerce. (CO1, L3)
2. A) Explain about E - Advertising. (CO2, L2)  
OR  
B) Explain Internet marketing. (CO2, L2)
3. A) Summarize the procedure of electronic payment. (CO3, L3)  
OR  
B) Differentiate traditional and modern payment systems. (CO3, L3)
4. A) Illustrate formatting tags in HTML with example, (CO4, L2)  
OR  
B) Illustrate ordered and unordered lists with example, (CO4, L2)
5. A) Illustrate adding video from youtube to the web site using WIX Editor. (CO5, L2)  
OR  
B) Explain gallery management in WIX Editor with examples. (CO5, L2)

### SECTION A

**ANSWER THE FOLLOWING QUESTIONS**

**5 x 10 Marks**

6. A) Explain E Commerce transactional issues and challenges. (CO1, L2)  
OR

- B) Explain various business models. (CO1, L2)
7. A) Explain characteristics, benefits and goals of E - SCM. (CO2, L2)  
OR  
B) Discuss about E - CRM architectural components. (CO2, L2)
8. A) Summarize types of EPS. (CO3, L2)  
OR  
B) Discuss about E - Payment security. (CO3, L2)
9. A) Illustrate creating tables and table attributes in HTML with examples. (CO4, L3)  
Or  
B) Illustrate forms and frame tags in HTML with examples, (CO4, L3)
10. A) Illustrate arranging content on your web page using WIX editors with examples, (CO5, L3)  
OR  
B) Illustrate adding an image to your page background using WIX Editor with examples, (CO5, L3)

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**MODEL Question Paper: 2022-2023**

**TITLE: DATA STRUCTURES**

**COURSE CODE : CSCT21B /CGST21/CSCT22B**

**SECTIONS: B.Sc. (CAMS / CAME / MSCS / MPCS / MECS / CSCS ), BCA SEMESTER: II**

**TIME: 3 Hrs.**

**MAX: 70M**

### SECTION A

**Answer the following questions**

**5 x 4 = 20 Marks**

1. A) Differentiate between primitive and non primitive data types. (CO1, L2)  
OR  
B) Differentiate between abstract data types, data types and data structures. (CO1, L2)
2. A) Design an algorithm to insert a node in the middle of the single linked list. (CO2, L6)  
OR  
B) Design a C program to print factorials of a given number using recursion. (CO2, L6)
3. A) Differentiate between stacks and queues. (CO3, L2)  
OR  
B) Explain about representation of stacks with examples, (CO3, L2)
4. A) Design an algorithm to traverse binary trees in post order technique. (CO4, L6)  
OR  
B) Illustrate creating a binary tree from given traversals (CO4, L6)  
Inorder: D B E A F C  
Postorder: A B D E C F
5. A) Illustrate bubble sort algorithm for the values 6 3 1 2 7 (CO5, L2)  
OR

B) Illustrate binary search with an example. (CO5, L2)

### SECTION B

Answer the following questions

5 x 10 = 50 Marks

6. A) Explain different types of approaches for designing an algorithm. (CO1, L2)

OR

B) Explain about algorithm analysis with example, (CO1, L2)

7. A) Design an algorithm to perform (CO2, L6)

i) create doubly linked list - 5M

ii) insert a node in the middle of doubly linked list - 5M

OR

B) Explain various types of linked lists. (CO2, L2)

8. A) Design a C program to demonstrate stack operations using arrays. (CO3, L6)

OR

B) Discuss about various applications of queues with examples, (CO3, L2)

9. A) Illustrate BST creation from given preorder traversal (CO4, L2)

preorder: {10, 5, 1, 7, 40, 50}

OR

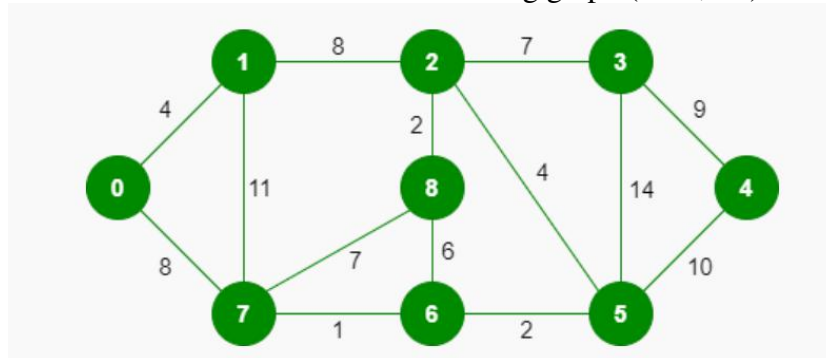
B) Illustrate the following operations on the given inorder: {1, 3, 4, 6, 7, 8, 10, 14}

(CO4, L2)

i) Searching for node 6 -5M

ii) Inserting a node 12 - 5M

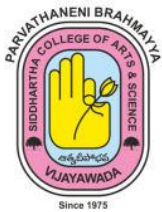
10. A) Illustrate the creation of MSP from the following graph (CO5, L2)



OR

B) Explain various applications of graphs with examples. (CO5, L2)

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MODEL Question Paper: 2022-2023

**TITLE: WEB PROGRAMMING**

**COURSE CODE : CSCT28**

**SECTIONS: BCA**

**SEMESTER: II**

**TIME: 3 Hrs.**

**MAX: 70M**

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**SECTION-A**

**ANSWER THE FOLLOWING QUESTIONS**

**5X4=20M**

1. (A) Discuss the need of web browsers. {CO1, L2}

(OR)

- (B) Explain HTTP functionality. {CO1, L2}

2. (A) Distinguish between tag and attributes with examples. {CO2, L2}

(OR)

- (B) Illustrate embedding images in Web document {CO2, L2}

3. (A) Illustrate the use of checkbox and radio button in input fields with examples. {CO3, L2}

(OR)

- (B) Describe properties and values in CSS {CO3, L2}

4. (A) Explain the role of java script in web development. {CO4, L2}

(OR)

- (B) Explain operators in java script {CO4, L2}

5. (A) Discuss XML and its features. {CO5, L2}

(OR)

(B) Create XML code for breakfast menu with items and price. . {CO5, L6}

**SECTION-B**

**5X10=50M**

**ANSWER THE FOLLOWING QUESTIONS**

6. A) Give a brief note on various services offered by the internet and the types of internet connections. {CO1, L2}

(Or)

B) Explain about internet protocols. {CO1, L2}

7. A) Illustrate creating a table in HTML with various attributes. {CO2, L2}

(Or)

B) Describe the structure of HTML documents with examples. {CO2, L2}

8. A) Illustrate frame set and frame attributes by writing a program. {CO3, L3}

(Or)

B) Design a form with various tags with suitable examples. {CO3, L6}

9. A) Illustrate control statements in java script with examples. {CO4, L2}

(Or)

B) Create a java script function to find if the given number is prime or not. {CO4, L6}

10. A) What is DTD? Explain the building blocks of DTD. {CO5, L2}

(Or)

B) Illustrate XML schema with an example. {CO5, L2}

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**Life Skill Courses and Skill Development Courses**

MODEL Question Paper: 2022-2023

**TITLE: Security Analyst - I**

**COURSE CODE :SDC CSCT01**

**SECTIONS: B. C. A**

**SEMESTER: II**

**TIME: 90 mins.**

**MAX: 35M**

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**Section A (15 Marks)**

**Answer any THREE Out of FIVE questions**

**Each Question carries 5 Marks**

1. Write about common vulnerabilities and exposures. (CO1, L1)
2. Write about the need of a security analyst. (CO1, L1)
3. Write about Key Performance Indicators (KPI). (CO2, L1)
4. What is the need of information security policy? (CO3, L1)
5. What is risk analysis? How is it useful in providing data security? (CO3, L1)

**Section B (20 Marks)**

**Answer any TWO questions**

**Each Question carries 10 Marks**

1. Explain various types of attacks. (CO1, L1)
2. Explain risks of data leakage. (CO2, L1)
3. Explain characteristics of critical information. (CO2, L1)
4. Write about roles and responsibilities of the information security management team. (CO3, L1)

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**Life Skill Courses and Skill Development Courses**

MODEL Question Paper: 2022-2023

**TITLE: Digital Marketing**

**COURSE CODE :SDCCSCT02**

**SECTIONS: B.Sc. (CAMS/MSCS )**

**SEMESTER: II**

**TIME: 90 mins.**

**MAX: 35M**

**Section A (15 Marks)**

**Answer any THREE Out of FIVE questions**

**Each Question carries 5 Marks**

1. Discuss latest trends in Digital Marketing. (CO1, L2)
2. Explain Google Trend.(CO2, L2)
3. Distinguish between Google and Bing Search Engines. (CO2, L2)
4. Explain link building. (CO2, L2)
5. What is Product Marketing and how does it differ from Service Marketing? (CO3, L2)

**Section B (20 Marks)**

**Answer any TWO questions**

**Each Question carries 10 Marks**

6. Distinguish between traditional marketing and digital marketing. (CO1, L2)
7. Explain social media marketing. (CO2, L2)
8. What is SEO? Explain content writing and rewriting. (CO3, L2)
9. Differentiate free marketing and paid marketing. (CO3, L2)

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Proposals for the Board of Studies meeting in the Department of Computer Science for UnderGraduate Programmes held on 14-03-2023 at 11:00 AM in offline/online mode.

**LIST OF BOS MEMBERS**

<b>Name of the Member</b>	<b>Role</b>
Dr.T.S.RaviKiran, HOD, Dept. of CS, P.B. Siddhartha College of Arts & Science. Mobile: 9440446847, Email: tsravikiran@pbsiddhartha.ac.in	Chairman
Dr.R. Kiran Kumar, Associate Professor, Department of Computer Science, Krishna University, Machilipatnam. Mobile: 9440872455, Email: kirankreddi@gmail.com	Nominee, Krishna University
Dr. Yogesh Kumar Meena Associate Professor, Department of CSE, MNIT Jaipur. Mobile: 7891005056 Email : ymeena.cse@mnit.ac.in	Subject Expert
Sri. Prashant R. Nair Associate Professor, Vice- Chairman- IQAC, Dept. of CSE, Amrita Viswa Vidyapeetham, Coimbatore. Email: prashant@amrita.edu; Mobile: 9943984483	Subject Expert
Ms. ReemaThareja Professor, Dept. of Computer Science, Shyama Prasad Mukherji College (W), University of Delhi. reemathareja@gmail.com	Subject Expert
Bharat Kumar Reddy Gujavarti (MCA, PGDHRM), Hyderabad Founder & CEO, Pragmatiq Systems Inc. Director, Sunblue Technologies Co- founder, Edify Email:bharat@pragmatiq.in Mobile: 8978191977	Industrialist
Shankar Lakkaraju, M.C.A: 1999-2002 Director, Software Engineer, Lowe's Services Pvt. Ltd.. Bengaluru. Email: shankar.lakkaraju@lowes.com Mobile: 98851 65651	Alumni Representative MCA: 1999-2002
Mr. K. Sudhir	Member
Dr .K. Udaya Sri	Member
Mr. K. Sridhar	Member

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<b>DEPARTMENT OF COMPUTER SCIENCE (UG)</b>						
<b>LIST OF COURSES INTROI IN EVEN SEMESTERS 2022 - 2023 (NO NEW COURSES ARE INTRODUCED)</b>						
<b>Sl. No.</b>	<b>Title</b>	<b>Course Code</b>	<b>Offered in Sem</b>	<b>Year of Introduction</b>	<b>OBE with BTL</b>	<b>Offered To</b>
1	Introduction to Machine Learning	AIMLT41	4	2022 - 2023	YES	B. Sc (AIML)
2	Machine Learning Lab	AIMLP41	4	2022 - 2023	YES	B. Sc (AIML)
3	Data Mining	AIMLT42	4	2022 - 2023	YES	B. Sc (AIML)
4	Data Mining Lab	AIMLP42	4	2022 - 2023	YES	B. Sc (AIML)
5	Operating Systems	AIMLT43	4	2022 - 2023	YES	B. Sc (AIML)
6	Operating Systems Lab	AIMLP43	4	2022 - 2023	YES	B. Sc (AIML)

### **RESOLUTIONS**

- It is resolved and recommended to introduce “Introduction to Machine Learning” with course code AIMLT41 and “Machine Learning Lab ” with course code AIMLP4 in fourth semester for B. Sc. (AIML) programme with effect from 2021-22 admitted batch and onwards. For syllabus and model paper vide page numbers from 23 to 26.
- It is resolved and recommended to introduce “Data Mining” with course code AIMLT42 and “Data Mining Lab ” with course code AIMLP42 in fourth semester for B. Sc. (AIML) programme with effect from 2021-22 admitted batch and onwards. For syllabus and model paper vide page numbers from 27 to 31.
- It is resolved and recommended to introduce “Operating Systems” with course code AIML43 and “Operating Systems Lab” with course code AIMLP43 in fourth semester for B. Sc. (AIML) programme with effect from 2021-22 admitted batch and onwards. For syllabus and model paper vide page numbers from 32 to 37.
- It is resolved and recommended to revise the model paper for “Data Structures” with course code AIMLT21 in second semester for B. Sc. (AIML) programme with effect from 2022 - 2023 admitted batch and onwards. For revised model paper vide page number 38.
- It is resolved and recommended to revise the model paper for “Python for Data Analysis” with course code AIMLT22 in second semester for B. Sc. (AIML) programme with effect from 2022 - 2023 admitted batch and onwards. For revised model paper vide page number 39.

- It is resolved and recommended to revise the model paper for “Data Structures” with course code DSCT21 in second semester for B. Sc. (MSDS) programme with effect from 2022 - 2023 admitted batch and onwards. For revised model paper vide page number 40.
- It is resolved and recommended to introduce internship in the 6th Semester for the students admitted in the academic year 2020-21 in B.Sc.,(MSDS) Programme.



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<b>Computer Science</b>	<b>Course</b> AIMLT41	<b>Code:</b>	<b>Introduced from :</b> 2022 - 2023 A. Y	<b>Programme:</b> B.Sc., (AI & ML)
<b>Semester-IV</b>	<b>Credits:4</b>		<b>Introduction to Machine Learning</b>	<b>Total: 60Hrs</b>

**Course Objective:**

The objective of the course provides the basic concepts and techniques of Machine Learning and helps to use recent machine learning software for solving practical problems. It enables students to gain experience by doing independent study and research.

**Course Outcomes:**

<b>COURSE OUTCOME NO</b>	<b>Upon successful completion of this course, students should have the knowledge and skills to:</b>	<b>PROGRAM OUTCOME NO</b>
CO <sub>1</sub>	Identify the characteristics of machine learning	PO2,PO7
CO <sub>2</sub>	Summarize the Model building and evaluation approaches	PO3, PO6
CO <sub>3</sub>	Apply Bayesian learning and regression algorithms for real-world Problems	PO4, PSO2
CO <sub>4</sub>	Apply supervised learning algorithms to solve the real-world Problems	PO1, PO5
CO <sub>5</sub>	Apply unsupervised learning algorithms for the real world data	PO5, PO7

**UNIT-I: Introduction to Machine Learning and Preparing to Model**

**13**

**Periods**

**Introduction to Machine Learning-** Introduction, What is Human Learning? Types of Human Learning, What is Machine Learning? Types of Machine Learning, Reinforcement Learning, Problems Not To Be Solved Using Machine Learning, Applications of Machine Learning.

**Preparing to Model-** Introduction, Machine Learning Activities, Basic Types of Data in Machine Learning, Exploring Structure of Data, Data Quality and Remediation, Data Pre-Processing

**UNIT-2: Modelling & Evaluation, Basics of Feature Engineering**

**10 Periods**

**Modelling & Evaluation-** Introduction, Selecting a Model, Training a Model (for Supervised Learning), Model Representation and Interpretability, Evaluating Performance of a Model.

**Basics of Feature Engineering-** Introduction, Feature Transformation, PCA.

**UNIT-3: Bayesian Concept Learning and Regression**

**12 Periods**

**Bayesian Concept Learning -** Introduction, Why Bayesian Methods are Important?, Bayes' Theorem, Bayes' Theorem and Concept Learning, Bayesian Belief Network.

**Regression:** Introduction, Regression Algorithms - Simple linear regression, Logistic Regression, Maximum Likelihood Estimation.

**UNIT-4: Supervised Learning: Classification, Ensemble Learning 10 Periods**

**Classification-** Introduction, Example of Supervised Learning, Classification Model, Classification Learning Steps, Common Classification Algorithms - k-Nearest Neighbour (kNN), Decision tree, Random forest model, Support vector machines.

**Ensemble Learning-** Boosting, Bagging, Semi-supervised Learning.

**UNIT-5: Unsupervised learning 15 Periods**

**Unsupervised Learning-** Introduction, Unsupervised vs Supervised Learning, Application of Unsupervised Learning, Clustering –Clustering as a Machine Learning task, Different types of clustering techniques, Partitioning methods, Hierarchical clustering.

**Text Books:**

1. Subramanian Chandramouli, Saikat Dutt, Amit Kumar Das, “Machine Learning”, Pearson Education India ,1<sup>st</sup> edition.
2. Tom M. Mitchell, “Machine Learning”, MGH, 1997.

**Reference Books:**

1. The Hundred-Page Machine Learning Book by Andriy Burkov
2. Machine Learning For Absolute Beginners by Oliver Theobald
3. Machine Learning for Hackers by Drew Conway and John Myles White
4. An Introduction to Statistical Learning by Gareth James, Daniela Witten, Trevor Hastie, and Robert Tibshirani
5. [Ben\_Stephenson]\_The\_Python\_Workbook\_\_A\_Brief\_Intr(z-lib.org)
6. Peter Harington, “Machine Learning in Action” , Cengage, 1<sup>st</sup> edition, 2012.
7. Peter Flach, “Machine Learning: The art and science of algorithms that make sense of data”, Cambridge university press,2012.
8. Foundations of Machine Learning by Mehryar Mohri Afshin Rostamizadeh Ameet Talwalkar.

**Student Activity:**

1. Load any new operating system into your computer.
2. Partition the memory in your system
3. Create a semaphore for process synchronization.

**Recommended Co – Curricular Activities:**

**A. Measurable**

1. Assignments (in writing and doing forms on the aspects of syllabus content and outside the syllabus content. Shall be individual and challenging)
2. Student seminars (on topics of the syllabus and related aspects (individual activity))
3. Quiz (on topics where the content can be compiled by smaller aspects and data (Individuals or groups as teams))
4. Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual participation and contribution of students shall be ensured (team activity))

**B. General**

1. Group Discussion
2. Others

**RECOMMENDED CONTINUOUS ASSESSMENT METHODS:**

1. Programming exercises,
2. Practical assignments and laboratory reports,
3. Observation of practical skills,
4. Individual and group project reports.
5. Efficient delivery using seminar presentations,
6. Viva voce interviews.
7. Computerized adaptive testing, literature surveys and evaluations,
8. Peers and self-assessment, outputs form individual and collaborative work.

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**MODEL PAPER**

**TITLE: Introduction to Machine Learning**

**COURSE CODE: AIMLT41**

**CLASS: B.Sc. (AI & ML)**

**Max. Marks: 75**

**Semester IV**

**Time: 3 Hrs.**

**SECTION - A**

**Answer any five of the following:**

**5 X 5= 25 MARKS**

1. Discuss various types of human learning. (CO1, L2)
2. Write about applications of machine learning. (CO1, L3)
3. Write about the role of modelling in machine learning. (CO2, L3)
4. Describe model training. (CO2, L1)
5. Write a short note on maximum likelihood estimation. (CO3, L4)
6. Describe the need of Bayesian models. (CO3, L1)
7. Briefly write about boosting. (CO4, L4)
8. Discuss about unsupervised and supervised learning. (CO5, L2)

**SECTION – B**

**Answer all the following questions**

**5 X 10 = 50 MARKS**

9. (a) Explain about types of machine learning. (CO1, L1)  
OR  
(b) Explain about data pre-processing. (CO1, L1)
10. (a) Summarize performance evaluation of a model. (CO2, L2)  
OR  
(b) Briefly feature transformation. (CO2, L2)
11. (a) Explain about polynomial regression model. (CO3, L1)  
OR  
(b) Describe about Bayes theorem. (CO3, L1)
12. (a) Explain about random forest model with example. (CO4, L1)  
OR  
(b) Implement the k – nearest neighbour for given data. (CO4, L1)
13. (a) What are the applications of unsupervised learning. (CO5, L2)  
OR  
(b) Summarize various clustering techniques? (CO5, L2)

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<b>Computer Science</b>	<b>CourseCode: AIMLP41</b>	<b>Introduced from : 2022 - 2023 A. Y</b>	<b>Programme: B.Sc., (AI &amp; ML)</b>
<b>SEMESTER IV</b>	<b>CREDITS: 1</b>	<b>Machine Learning LAB</b>	<b>Total: 30 Periods</b>

**Course objectives:**

This course will enable students to make use of Data sets in implementing the machine learning algorithms, Implement the machine learning concepts and algorithms in any suitable language of choice.

**Course outcomes:**

<b>COURSE OUTCOME NO</b>	<b>Upon successful completion of this course, students should have the knowledge and skills to:</b>	<b>PROGRAM OUTCOME NO</b>
CO <sub>1</sub>	Understand the implementation procedures for the machine learning algorithms.	PO2,PO6
CO <sub>2</sub>	Design Python programs for various Learning algorithms.	PO3, PO5
CO <sub>3</sub>	Apply appropriate data sets to the Machine Learning algorithms.	PO4, PSO7
CO <sub>4</sub>	Identify and apply Machine Learning algorithms to solve real world problems.	PO5, PO7

**Lab Experiments:**

**Lab Experiments:**

1. Write a python program to import and export the data using pandas library.
2. Create random data for Student and Employees and save the file as .csv Using the student and Employees data set calculate the Descriptive Statistics methods.
3. Data pre-processing - Handling missing values `isnull()` `notnull()` `dropna()` `fillna()` `replace()` `interpolate()`
4. Dimensionality Reduction . Implementing PCA
5. Write a python program to demonstrate various data visualisation
6. Supervised Learning - Implementation of Linear Regression (Salary Dataset)
7. Implementation of Logistic regression
8. Implementation of Decision tree classification
9. Implementation of K-nearest Neighbour (Iris\_data)
10. Implementation of Naïve Bayes classifier algorithm
11. Implementing Random Forest
12. Unsupervised Learning Implementing K-means Clustering
13. Build Artificial Neural Network model with back propagation

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<b>COMPUTER SCIENCE</b>	<b>Course AIMLT42</b>	<b>Code:</b>	<b>Introduced from : 2022 - 2023 A. Y</b>	<b>B.Sc. (AI &amp;ML)</b>
<b>SEMESTER – IV</b>	<b>Credits – 4</b>		<b>Data Mining</b>	<b>Total: 60Prds.</b>

**Course Objective:**

To understand data mining principles and techniques: Introduce DM and acquaint the students with the DM techniques for building competitive advantage through proactive analysis, predictive modeling. Develop and apply critical thinking, problem-solving, and decision-making skills.

**Course Outcomes:**

<b>COURSE OUTCOME NO</b>		<b>PROGRAM OUTCOME NO</b>
	Upon successful completion of this course, students should have the knowledge and skills to:	
CO1	Understand the knowledge discovery in databases	PO2,PO4
CO <sub>2</sub>	Understands OLAP operations and types of OLAP	PO5,PO7
CO <sub>3</sub>	Apply Apriori and FP-Growth algorithms to generate frequent item sets in a dataset.	PO3,PO4
CO <sub>4</sub>	Apply Decision tree induction and Bayesian algorithm to classify the unknown sample.	PO1,PO7
CO <sub>5</sub>	Preparing data for clustering, clustering methods.	PO5,PO7

**UNIT –I: Data Mining Systems and Knowledge Discovery Process: 12 Periods**

**Data Warehouse and OLAP Technology:** An Overview- What Is a Data Warehouse. A Multidimensional Data Model - Need for Online Analytical Processing - OLTP V/s OLAP - OLAP Operations in Multidimensional Data Model. Data Warehouse Architecture, From Data Warehousing to Data Mining.

**Need and Usage of Data Mining Technologies** - Overview of Knowledge Discovery Process from Databases—What Motivated Data Mining - Why Is It Important - Data Mining Functionalities—What Kinds of Patterns Can Be Mined? Are All of the Patterns Interesting Classification of Data Mining Systems, Data Mining Task Primitives, Major Issues in Data Mining.

**UNIT–II: Data Preprocessing: 12 Periods**

**Data Exploration:** Data Objects and attribute types -Statistical description of data- Descriptive Data Summarization-Data Visualization - Data similarity and dissimilarity measures.

**Data Pre-processing:** Why Pre-process the Data -Data Cleaning-Data Integration-Data Reduction- Data Transformation and Data Discretization.

**UNIT–III: Classification: 12 Periods**

Basic issues regarding classification and predication - General Approach to solving a classification problem- Decision Tree Classification, Attribute Selection Measures, Tree Pruning. **Classification Model Evaluation and Selection** - Accuracy and Error measures, Cross Validation, Comparing Classifier performance using ROC Curves.

**UNIT–IV: Mining Frequent Patterns and Association Rules: 12 Periods**

Basic Concepts-Problem Definition- Market Basket Analysis- Frequent Itemsets- Closed Itemsets and Association Rules - Frequent Pattern Mining - Efficient and Scalable Frequent Itemset Mining Methods- the Apriori Algorithm for finding Frequent Itemsets Using Candidate Generation - Generating Association Rules from Frequent Itemsets - A pattern growth approach for mining Frequent Itemsets- FP-Growth Algorithm

**UNIT V: Cluster Analysis: 12 Periods**

Basics and Importance of Cluster Analysis-Strengths and Weaknesses. Hierarchical Methods (Agglomerative, Divisive) - Density-Based Methods (DBSCAN, OPTICS), Text Mining, Sentiment Analysis.

**Text Books:**

- i. Introduction to Data Mining: Pang-Ning Tan & Michael Steinbach, Vipin Kumar, Pearson.
- ii. Data Mining concepts and Techniques, 3/e, Jiawei Han, Michel Kamber, Elsevier.

**References:**

- i Data Mining Techniques and Applications: An Introduction, Hongbo Du, Cengage Learning.
- ii Data Mining :VikramPudi and P. Radha Krishna, Oxford.
- iii Data Mining and Analysis - Fundamental Concepts and Algorithms; Mohammed J. Zaki, Wagner Meira, Jr, Oxford
- iv Data Warehousing Data Mining & OLAP, Alex Berson, Stephen Smith, TMH.

**E-resources:**

- i. [http://onlinecourses.nptel.ac.in/noc18\\_cs14/preview](http://onlinecourses.nptel.ac.in/noc18_cs14/preview) (NPTEL course by Prof.Pabitra Mitra)
- ii. [http://onlinecourses.nptel.ac.in/noc17\\_mg24/preview](http://onlinecourses.nptel.ac.in/noc17_mg24/preview)  
(NPTEL course by Dr. Nandan Sudarshanam & Dr. Balaraman Ravindran)
- i iii. [http://www.saedsayad.com/data\\_mining\\_map.htm](http://www.saedsayad.com/data_mining_map.htm)
1. [https://doc.lagout.org/Others/Data%20Mining/Data%20Mining\\_%20The%20Textbook%20%5B%20Aggarwal%202015-04-14%5D.pdf](https://doc.lagout.org/Others/Data%20Mining/Data%20Mining_%20The%20Textbook%20%5B%20Aggarwal%202015-04-14%5D.pdf)
2. [https://textbooks.elsevier.com/manualsprotectedtextbooks/9780123814791/Instructor's\\_manual.pdf](https://textbooks.elsevier.com/manualsprotectedtextbooks/9780123814791/Instructor's_manual.pdf)

**Recommended Co – Curricular Activities:**

(Co-curricular activities shall not promote copying from textbook or from others work and shall encourage self/independent and group learning)

**a. Measurable**

1. Assignments (in writing and doing forms on the aspects of syllabus content and outside the syllabus content. Shall be individual andchallenging)
2. Student seminars (on topics of the syllabus and related aspects (individualactivity))
3. Quiz (on topics where the content can be compiled by smaller aspects and data (Individuals or groups as teams))
4. Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual participation and contribution of students shall be ensured (team activity))

**b. General**

1. Group Discussion
2. Others

**RECOMMENDED CONTINUOUS ASSESSMENT METHODS:**

Some of the following suggested assessment methodologies could be adopted;

1. The oral and written examinations (Scheduled and surprise tests),
2. Closed-book and open-book tests,
3. Programming exercises,
4. Practical assignments and laboratory reports,
5. Observation of practical skills,
6. Individual and group project reports.
7. Efficient delivery using seminar presentations,
8. Viva voce interviews.
9. Computerized adaptive testing, literature surveys and evaluations,
10. Peers and self-assessment, outputs form individual and collaborative work.

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**MODEL PAPER**  
**TITLE: Data Mining**

**COURSE CODE: AIMLT42**  
**CLASS: B.Sc. (AI & ML)**

**Max.Marks:75M**  
**Semester IV**

**SECTION - A**

**Answer any five of the following:**

**5 X 5= 25 MARKS**

- 1 How to classify data mining systems? Discuss. (CO1, L2)
2. Compare OLTP and OLAP. (CO1, L6)
3. Write the Aprori Algorithm. (CO2, L6)
4. Write a note attribute selection measures? (CO2, L1)
5. Classify various Clustering methods. (CO3, L6)
6. What is Bayes theorem? Explain (CO3, L1)
- 7.. Write the FP Growth Algorithm. (CO4, L6)
- 8.. Roll up operation (CO5, L2)

**SECTION – B**

**Answer all the following questions**

**5 X 10 = 50 MARKS**

9. (a) Explain about the Three-tier data warehouse architecture with a neat diagram. (CO1, L1)  
OR  
(b). Evaluate the Major issues in Data mining? (CO1, L1)
10. (a) Describe in brief about Data warehouse implementation (CO2, L2)  
OR  
(b). Write a brief note on Data warehouse implementation (CO2, L2)
11. (a). Describe the data classification process with a neat diagram. How does the Naive Bayesian classification works? Explain. (CO3, L1)  
OR  
(b). How does the Naïve Bayesian classification works? Explain in detail. (CO3, L1)
12. (a). Explain about the Apriori algorithm for finding frequent item sets Consider the following dataset and we will find frequent itemsets and generate association rules for them.

TID	items
T1	1, 12 , 15
T2	12,14
T3	12,13
T4	11,12,14
T5	11,13
T6	12,13
T7	11,13
T8	11,12,13,15
T9	11,12,13

minimum support count is 2, minimum confidence is 60% (CO4, L1)

OR

- (b). What are the various Constraints in Constraint based Association rule mining? Explain. (CO4, L1)
13. (a)?. Define Clustering? Explain about Types of Data in Cluster Analysis? (CO5, L2)  
OR  
(b)? What are outliers? Discuss the methods adopted for outlier detection (CO5, L2)

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<b>COMPUTER SCIENCE</b>	<b>Course AIMLP42</b>	<b>Code:</b>	<b>2022 - 2023</b>	<b>B.Sc. (AI &amp;ML)</b>
<b>SEMESTER – IV</b>	<b>Credits – 1</b>		<b>Data Mining Lab</b>	<b>Total: 30 Periods.</b>

**Course Objective:**

The objective of this course is to impart knowledge on implementing various data mining models and algorithms and to characterize patterns obtained by association , classification and cluster rule process.

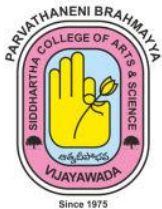
**Course Outcomes:**

<b>COURSE OUTCOME NO</b>	Upon successful completion of this course, students should have the knowledge and skills to:	<b>PROGRAM OUTCOME NO</b>
CO1	Apply logical skills to analyze a given problem	PO1,PO7
CO <sub>2</sub>	Data Collection and Preprocessing techniques	PO3,PO4
CO <sub>3</sub>	Analyse the datasets by applying different algorithms	PO2,PO6
CO <sub>4</sub>	Compare the results of different data on different techniques	PO4,PO7
CO <sub>5</sub>	Interpret the Accurate results on the datasets	PO5,PO7

**Experiments List**

- Week 1. Demonstration of pre-processing on dataset student.arff
- Week 2. Demonstration of pre-processing on dataset labor.arff
- Week 3. Demonstration of Association rule process on dataset contactlenses.arff using apriori algorithm
- Week 4. Demonstration of Association rule process on dataset test.arff using apriori algorithm
- Week 5. Demonstration of classification rule process on dataset student.arff using j48 algorithm
- Week 6. Demonstration of classification rule process on dataset employee.arff using j48 algorithm
- Week 7. Demonstration of classification rule process on dataset employee.arff using id3 algorithm
- Week 8. Demonstration of classification rule process on dataset employee.arff using naïve bayes algorithm
- Week 9. Demonstration of clustering rule process on dataset iris.arff using simple k-means
- Week 10. Demonstration of clustering rule process on dataset student.arff using simple k-means.

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<b>Computer Science</b>	<b>AIMLT43</b>	<b>2022 - 2023</b>	<b>BSc(AI &amp; ML)</b>
<b>SEMESTER – IV</b>	<b>CREDITS: 4</b>	<b>Operating Systems</b>	<b>Total : 60 Periods</b>

**Course Objective:**

The main objective of this course is to understand main concepts of OS and to analyze the different CPU scheduling policies, process synchronization and deadlock management, memory management and virtual memory techniques , Appreciate the concepts of storage and file management, Study OS protection and security concepts.

**Course Outcomes:**

<b>COURSE OUTCOME NO</b>	<b>Upon successful completion of this course, students should have the knowledge and skills to:</b>	<b>PROGRAM OUTCOME NO</b>
CO <sub>1</sub>	Know basic components of an operating system.	PO2, PO7
CO <sub>2</sub>	Will be able to control access to a computer and the files that may be shared	PO1, PO4
CO <sub>3</sub>	Demonstrate the knowledge of the components of computers and their respective roles in computing	PO3, PO6
CO <sub>4</sub>	Ability to recognize and resolve user problems with standard operating environments.	PO1, PO4
CO <sub>5</sub>	Gain practical knowledge of how programming languages, operating systems, and architectures interact and how to use each effectively.	PO2, PO5

**UNIT I** **10 Prds**

**Operating System Overview:** Objectives and functions, Computer System Architecture, Evolution of Operating Systems, System Services, System Calls, System Programs, OS Structure, Virtual machines. Process Management: Process concepts, CPU scheduling-criteria, algorithms with evaluation, Preemptive / Non-Preemptive Scheduling, Threads, Multithreading Models.

**UNIT II** **15 Prds**

**Concurrency:** Process synchronization, the critical-section problem, Peterson's Solution, synchronization Hardware, semaphores, classic problems of synchronization, monitors. Deadlocks: Principles of deadlock-system model, deadlock characterization, deadlock prevention, detection and avoidance, recovery from deadlock.

**UNIT III** **10 Prds**

**Memory Management:** Swapping, contiguous memory allocation, paging, structure of the page table, segmentation. Virtual Memory: Demand paging, page replacement algorithms, Allocation of Frames, Thrashing.

**UNIT IV** **15 Prds**

**Mass-storage structure:** Overview of Mass-storage structure, Disk structure, disk attachment, disk scheduling, swap-space management. File System implementation: Access Methods, File system structure, file system implementation, directory implementation, allocation methods, free-space management. Protection: Goals and Principles of Protection, Implementation of Access Matrix,

**UNIT V** **10 Prds**

Overview of different Types of Operating Systems. Single User, Multiuser, linux, Android, Ubuntu, Ios, raspberrypi, Development of a mobile application using android.

**TEXT Books**

1. Operating System Concepts Essentials, 9th Edition by Avi Silberschatz, Peter Galvin, Greg Gagne, Wiley Asia Student Edition.
2. Operating Systems: Internals and Design Principles, 5th Edition, William Stallings, Prentice Hall of India.
3. Ashwin Pajankar, Raspberry\_Pi\_Image\_Processing

**REFERENCE BOOKS:**

1. Operating System: A Design-oriented Approach, 1st Edition by Charles Crowley, Irwin Publishing
2. Operating Systems: A Modern Perspective, 2nd Edition by Gary J. Nutt, AddisonWesley
3. Android App Development in Android Studio: Java+Android Edition for Beginners
4. Operating Systems, R. Elmasri, A. G. Carrick and D. Levine, Mc Graw Hill.
5. Operating Systems in depth, T. W. Doeppner, Wiley

**Student Activity:**

1. Load any new operating system into your computer.
2. Partition the memory in your system
3. Create a semaphore for process synchronization.

**Recommended Co – Curricular Activities:**

**A. Measurable**

1. Assignments (in writing and doing forms on the aspects of syllabus content and outside the syllabus content. Shall be individual and challenging)
2. Student seminars (on topics of the syllabus and related aspects (individual activity))
3. Quiz (on topics where the content can be compiled by smaller aspects and data (Individuals or groups as teams))
4. Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual participation and contribution of students shall be ensured (team activity))

**B. General**

1. Group Discussion
2. Others

**RECOMMENDED CONTINUOUS ASSESSMENT METHODS:**

1. Programming exercises,
2. Practical assignments and laboratory reports,
3. Observation of practical skills,



4. Individual and group project reports.
5. Efficient delivery using seminar presentations,
6. Viva voce interviews.
7. Computerized adaptive testing, literature surveys and evaluations,
8. Peers and self-assessment, outputs form individual and collaborative work.

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**MODEL PAPER**  
**TITLE: Operating Systems**

**COURSE CODE: AIMLT43**

**Max.Marks:75M**

**CLASS: B.Sc. (AI & ML)**

**Semester IV**

**Answer any FIVE questions**

**5\*5=25M**

1. Write about Components of Computers. (CO1, L1)
2. Write about Central Processing Unit (CO1, L2)
3. Explain the operations in Processes. (CO2, L2)
4. Write about multiprocessor scheduling. (CO2, L1)
5. What is meant by paging? (CO3, L2)
6. Explain how to protect a File. (CO4, L2)
7. What are server roles on Windows Server 2016? (CO5, L2)

**Answer all the questions**

**5\*10=50M**

9.(a)What are the various Applications of Computers? (CO1, L2)

OR

(b)Explain about various types of operating System. (CO1, L2)

10.(a)Briefly explain about Scheduling Algorithms. (CO2, L2)

OR

(b)Write about CPU Scheduling. (CO2, L2)

11.(a)What are the various Memory management strategies? (CO3, L2)

OR

(b)Explain about Page Replacement Techniques and Algorithms (CO3, L2)

12.(a)Explain various File Access Methods. (CO4, L2)

OR

(b) Write about File Allocation Methods and Free Space Management(CO4, L2)

13. (a)Demonstrate the steps to be followed for Windows Client OS installation (CO5, L2)

OR

(b)Explain the steps to be followed to configure DHCP. (CO5, L2)

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<b>Computer Science</b>	<b>AIMLP43</b>	<b>2021 - 2022</b>	<b>BSc (AI &amp; ML)</b>
<b>SEMESTER – IV</b>	<b>CREDITS: 1</b>	<b>OPERATING SYSTEMS LAB</b>	<b>Total: 30 Periods</b>

**Course Objectives:**

1. Learn different types of CPU scheduling algorithms.
2. Demonstrate the usage of semaphores for solving synchronization problems.
3. Understand Banker’s algorithm used for deadlock avoidance.
4. Understand memory management techniques and various page replacement policies.
5. Learn various disk scheduling algorithms and different file allocation methods.

**Course outcomes:**

<b>COURSE OUTCOME NO</b>	<b>Upon successful completion of this course, students should have the knowledge and skills to:</b>	<b>PROGRAM OUTCOME NO</b>
CO <sub>1</sub>	Evaluate the performance of different types of CPU scheduling algorithms	PO5, PO7
CO <sub>2</sub>	Implement producer-consumer problem, reader-writers problem, and Dining philosophers’ problem using semaphores.	PO5, PO7
CO <sub>3</sub>	Simulate Banker’s algorithm for deadlock avoidance	PO5, PO7
CO <sub>4</sub>	Implement paging techniques and page replacement policies, memory allocation techniques in memory management. .	PO5, PO7
CO <sub>5</sub>	Implement disk scheduling techniques and file allocation strategies	PO5, PO7

**Lab Experiments:**

**TASK 1**

Practice the following commands in UNIX environment a) cp b) rm c) mv d) chmod e) ps f) kill

**TASK 2**

Write a program that makes a copy of a file using standard I/O and system calls.

**TASK 3**

Simulate the following Scheduling algorithms. a) FCFS b)SJF c)Round Robin

**TASK 4**

Simulate the Producer Consumer problem using semaphores.

**TASK 5**

Simulate the Dining Philosophers problem using semaphores

**TASK 6**

Simulate Bankers Algorithm for Deadlock Avoidance.

**TASK 7**

Simulate First Fit and Best Fit algorithms for Memory Management

**TASK 8**

Simulate page replacement Algorithms. a)FIFO b)LRU

**TASK 9**

Develop a Mobile Application for basic working

**TASK 10**

Develop a mobile application using Android.

Text Books/ References:

1. Operating System Concepts- Abraham Silberchatz , Peter B. Galvin, Greg Gagne 7th Edition, JohnWiley.
2. Operating Systems– Internal and Design Principles Stallings, Fifth Edition–2005, Pearson education/PHI.

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**P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE**

Siddhartha Nagar, Vijayawada – 520 010

*(An Autonomous College under the Jurisdiction of Krishna University)*

*Re – Accredited at ‘A+’ by NAAC – III Cycle*

*College with Potential for Excellence (Awarded by the UGC)*

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**TITLE: DATA STRUCTURES**

**SECTIONS: B.Sc. (AIML)**

**COURSE CODE : AIMLT21**

**SEMESTER: II**

**TIME: 3 Hrs.**

**MAX: 70M**

**SECTION A (20 MARKS)**

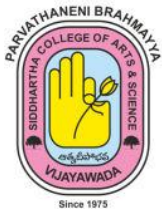
- 1.(a) Define Data Structure and mention the classification of data structures. 4M  
(CO1,L1)  
OR  
(b) List the applications of stack? 4M CO1,L1
- 2.(a) Define path in a tree. 4M CO2,L1  
OR  
(b) List and explain types of graph 4M CO2,L1
- 3.(a) Difference between linear search and binary search? 4M CO3,L2  
OR  
(b) Define DFS and BFS. What is the difference between them. 4M CO3,L2
4. (a) Define Queue and Dequeue. 4M CO4,L2  
OR  
(b) Differentiate Circular Queue and Linear Queue. 4M CO4,L2
5. (a) Implement bubble sort for the following data : 12,34,33,44,56,2,35 4M CO5,L3  
OR  
(b) Differentiate Circular Queue and Linear Queue 4M CO5,L3

**SECTION B ( 50MARKS)**

**Answer all Questions. (Restrict to a maximum of 2 subdivisions)**

- 6.(a) Write an algorithm to insert new node at the beginning, at middle position and at the end of a singly linked list. 10M CO1,L1  
OR  
(b) Define ADT. Explain different types of Data Structures available. 10M CO1,L1
- 7.(a) Show code for insertion and deletion of nodes in a single linked list. 10M CO2,L1  
OR  
(b) Write code for insertion and display of values in circular linked list . 10M CO2,L1
8. (a) Demonstrate stack. Classify functions for various stack operations using arrays. 10M  
CO3,L2  
OR  
(b) Interpret code to implement circular queues using arrays. 10M  
CO3,L2
- 9.(a) Explain deleting a node in a binary search tree with examples. 10M CO4,L2  
OR  
(b) Explain binary tree traversals with examples. 10M CO4,L2
10. (a) Give an algorithm for quick sort. Trace the algorithm for the following data: 65 70 75  
80 85 60 55 50 45. . 10M CO5,L3  
OR  
(b) Discover Depth first traversal with an example. 10M CO5,L3

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**TITLE: PYTHON FOR DATA ANALYSIS**

**COURSE CODE : AIMLT22**

**SECTIONS: B.Sc. (AIML)**

**SEMESTER: II**

**TIME: 3 Hrs.**

**MAX: 70M**

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**SECTION A (20 MARKS)**

**Answer all the questions**

**5 x 4 = 20 M**

1. a) Create a python program to demonstrate operators. (CO1, L6)  
OR  
b) Discuss type casting with examples. (CO1, L2)
2. a) Create a python program to print the grade of the student. (CO2, L6)  
OR  
b) Create a python program to demonstrate break, continue and pass statements. (CO2, L6)
3. a) Create a python program to print the factorial of a given number using recursive method. (CO3, L6)  
OR  
b) Create a python program to demonstrate user defined modules. (CO3, L6)
4. a) Discuss about set operations with examples, (CO4, L2)  
OR  
b) Discuss about accessing and modifying dictionaries in python with examples. (CO4, L2)
5. a) Create scatter plot using following data set:  
price = [2.50, 1.23, 4.02, 3.25, 5.00, 4.40]  
sales\_per\_day = [34, 62, 49, 22, 13, 19]  
OR  
b) Discuss about exporting and importing data using data frames with examples. (CO4, L2)

**SECTION B ( 50 MARKS)**

**Answer all the questions**

**5 x 10 = 50 M**

6. a) Discuss about various string operations in python with examples. (CO1, L2)  
OR  
b) Explain python features. (CO1, L2)
7. a) Illustrate branching control statements with examples. (CO2, L2)  
OR  
b) Illustrate loop control structures with examples. (CO2, L2)
8. a) Discuss defining and accessing user defined functions in python with examples., (CO3, L2)  
OR  
b) Discuss about the packages in python with examples. (CO3, L2)
9. a) Illustrate list operations and methods with examples. (CO4, L2)  
OR  
b) Illustrate set operations and methods with examples. (CO4,L2)
10. a) Illustrate creating, accessing and modifying data frames with examples. (CO5, L2)  
OR  
b) Differentiate univariate and bivariate plots. Illustrate histograms and box plots with examples. (CO5, L2)

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**TITLE: DATA STRUCTURES**

**COURSE CODE : DSCT21**

**SECTIONS: B.Sc. (MSDS)**

**SEMESTER: II**

**TIME: 3 Hrs.**

**MAX: 70M**

**SECTION A (20 MARKS)**

- 1.(a) Define Data Structure and mention the classification of data structures. 4M  
(CO1,L1)  
OR  
(b) List the applications of stack? 4M CO1,L1
- 2.(a) Define path in a tree. 4M CO2,L1  
OR  
(b) List and explain types of graph 4M CO2,L1
- 3.(a) Difference between linear search and binary search? 4M CO3,L2  
OR  
(b) Define DFS and BFS. What is the difference between them. 4M CO3,L2
4. (a) Define Queue and Dequeue. 4M CO4,L2  
OR  
(b) Differentiate Circular Queue and Linear Queue. 4M CO4,L2
5. (a) Implement bubble sort for the following data : 12,34,33,44,56,2,35 4M CO5,L3  
OR  
(b) Differentiate Circular Queue and Linear Queue 4M CO5,L3

**SECTION B ( 50 MARKS)**

**Answer all Questions. (Restrict to a maximum of 2 subdivisions)**

- 6.(a) Write an algorithm to insert a new node at the beginning, at middle position and at the end of a singly linked list. 10M CO1,L1  
OR  
(b) Define ADT. Explain different types of Data Structures available. 10M CO1,L1
- 7.(a) Show code for insertion and deletion of nodes in a single linked list. 10M CO2,L1  
OR  
(b) Write code for insertion and display of values in circular linked list . 10M CO2,L1
8. (a) Demonstrate stack. Classify functions for various stack operations using arrays. 10M  
CO3,L2  
OR  
(b) Interpret code to implement circular queues using arrays. 10M  
CO3,L2
- 9.(a) Explain deleting a node in a binary search tree with examples. 10M CO4,L2  
OR  
(b) Explain binary tree traversals with examples. 10M CO4,L2
10. (a) Give an algorithm for quick sort. Trace the algorithm for the following data: 65 70 75  
80 85 60 55 50 45. . 10M CO5,L3  
OR  
(b) Discover Depth first traversal with an example. 10M CO5,L3

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**P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE, Vijayawada-10**

(An Autonomous College in the Jurisdiction of Krishna University)

Siddhartha Nagar, Vijayawada – 520 010

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**DEPARTMENT OF ECONOMICS**

Minutes of **Board of Studies in Economics** meeting held on **11-03-2023** at 11:00 am in the Department of Economics for **ODD SEMESTER** of 2022-2023 academic year.

**Members Present**

<b>S.No</b>	<b>Name of the Member</b>	<b>Designation</b>	<b>Singnature</b>
1.	<b>Dr. Ch. Surya Prakasa Rao</b>	Chairman	
2.	<b>Dr. B. Narayana Rao</b>	University Nominee	
3.	<b>Prof. T.Koti Reddy</b>	Subject Expert	
4.	<b>Sri V. Keshava Rao</b>	Industrialist	
5.	<b>Smt. Ch. V. R. Kusuma</b>	Member	



## Resolutions

The following resolutions are approved by The Board of studies in Economics, held on 11-3-2023 at 11.00 am in the Department of Economics for EVEN Semester of 2023-24 recommend to Academic council for its approval.

DEPARTMENT OF ECONOMICS								
LIST OF THE COURSES REVISED IN II SEMESTERS -2022-23								
S.NO	TITLE OF THE COURSE	Course Code	Offered in SEM	Type of the Paper	Year of Introduction	YEAR OF REVISION	OBE with BTL	Offered to
1	MACRO ECONOMIC ANALYSIS	ECOT21B	II	CORE	2020-21	NO REVISION	YES	B.A.(E.M.S)
2	BUSINESS ECONOMICS	ECOT22B	II	CORE	2020-21	NO REVISION	YES	B.Com (General, C.A.,BFSI)

1. It is resolved and recommend the revision of model question paper of **MACRO ECONOMIC ANALYSIS** with course code ECOT21B in II semester of BA(EMS) for the batch of students admitted in 2022-23 and onwards. For the revised model question paper vide page numbers from 3 to 5.
2. It is resolved and recommend the revision of model question paper of **BUSINESS ECONOMICS** with course code ECOT22B in II semester of BCOM (G, CA, BFSI) for the batch of students admitted in 2022-23 and onwards. For the revised model question paper vide page numbers from 6 to 8.

**P.B. SIDDHARTHA COLLEGE OF ARTS AND SCIENCE, VIJAYAWADA - 10**  
(An Autonomous College in the Jurisdiction of Krishna University)  
**MACRO ECONOMIC ANALYSIS**  
**Course Code ECOT 21B**

**B.A. SEMESTER - II**

w.e.f. 2020-21

- Co1 To acquire the knowledge about the scope, importance of macro economics and national Income
- Co2 To acquire the knowledge about the theories of employment, consumptions and investment functions.
- Co3 To acquire the knowledge about the functions of money, theories of money and functions commercial Central Bank.
- Co4 To acquire the knowledge about the Inflation and trade cycles.
- Co5 To acquire the knowledge about the the financial system in India and insurance.

**UNIT - I INTRODUCTION & NATIONAL INCOME**

**1.1 AN INTRODUCTION IS MACRO ECONOMICS**

- 1.1.1 Defintions, Scope and Importance of Macro Economics
- 1.1.2 Evolution of Macro Economics.
- 1.3 Macro Economics Paradoxes
- 1.4 Circular Flow of Income and Expenditure in **Two, Three and Four sector Economy**

**1.2 NATIONAL INCOME**

- 1.2.1. Meaning and defintions of National Income - **Marshall, Pigou, Fisher**
- 1.2.2 National Income Aggregates - GDP, GNP, NDP, NNP, NNPfc, P.I, DI, P.CI, RNI, RPCI.
- 1.2.3 Measurement of Natinal Income - **Product, Inocme and Expenditure methods.**
- 1.2.4 Concept of Green Accounting

**UNIT - II THEORIES OF EMPLOYMENT**

**2.1. THEORIES OF EMPLOYMENT**

- 2.1.1. Classical Theory of Employment
- 2.1.2 Say's Law of Markets
- 2.1.3 Keynesian Theory of Employment.

**2.2 THEORIES OF CONSUMPTION**

- 2.2.1 Average and marginal propensity to consume
- 2.2.2 Keynes psychological Law of Consumption
- 2.2.3 Brief review of **Absolute, Relative, Life cycle and Permanent Income hypothesis**

**2.3 THEORIES OF INVESTMENT**

- 2.3.1 Marginal Efficiancy of Capital (MEC)
- 2.3.2 Multiplier Principle Concept and its Working
- 2.3.3 The Acceleration Principle

**2.4 Aggregate Demand Function - Algebraic Explanation**

**2.5 IS - LM Curves - Equations**

**2.6 The Goods Market and Money Market Equilibrium - Algebraic Explanation.**

## **UNIT - III MONEY AND BANKING**

### **3.1. THEORY OF MONEY**

- 3.1.1 Meaning, Definitions and Functions of Money
- 3.1.2 Gresham's Law
- 3.1.3 R.B.I Classification of Money (NM<sub>1</sub>,NM<sub>2</sub>,NM<sub>3</sub>)
- 3.1.4 Fisher's Quantity Theory of Money
- 3.1.5 Cambridge Approach (**Marshall, Pigou, Robertson and Keymes Equations**).

### **3.2. THEORY OF BANKING**

- 3.2.1 Definitions and Types of Banking
- 3.2.2 Functions of Commercial Banks
- 3.2.3 Functions of Central Banks
- 3.2.4 Credit Control by Central Bank
- 3.2.5 Factors Contributing to the Growth of NBFC's

## **UNIT - IV INFLATION AND TRADE CYCLES**

### **4.1. THEORY OF INFLATION**

- 4.1.1 Meaning, Definitions and Concepts of Inflation
- 4.1.2 Demand pull and Cost-push inflation
- 4.1.3 Philip's Curve Hypothesis
- 4.1.4 Measurement of Inflation - C.P.I and W.P.I
- 4.1.5 Causes and Effects of Inflation

### **4.2. THEORY OF TRADE CYCLES**

- 4.2.1 Trade Cycles Meaning and Definitions
- 4.2.2 Phases of Trade Cycles
- 4.2.3 Causes for Trade Cycles
- 4.2.4 Measures to Control Trade Cycles.

## **UNIT - V FINANCE AND INSURANCE**

### **5.1. THEORY OF FINANCE**

- 5.1.1 Financial Assets and Financial Intermediaries
- 5.1.2. Structure of Financial system.
- 5.1.3 Functions of Money Market
- 5.1.4 Functions of Capital Market
- 5.1.5 Functions of Stock Exchanges
- 5.1.6 Bombay Stock Exchange (BSE) and National Stock Exchange. (NSE)

### **5.2 THEORY OF INSURANCE**

- 5.2.1 Concept and Origin of Insurance,
- 5.2.2. Types of Insurance
- 5.2.3 Importance of Insurance

**Model Question paper**  
**I B.A. (EMS)**  
**SEMESTER – II**  
**Macro Economic Analysis**  
**Course Code ECOT 21B**  
**(w.e.f. 2023-24)**

Time : 3 Hrs

Section – A

Max.Marks 70M

**Answer the Following**

**5X4=20M**

- |      |  |   |    |  |
|------|--|---|----|--|
| 1 a) | What are Macro Economic Paradoxes                    | - | L1 |  |
|      | OR   |   |    |  |
| b)   | Explain the concept of Green Accounting              | - | L1 |  |
| 2 a) | Explain the Absolute Income Hypothesis               | - | L2 |  |
|      | OR   |   |    |  |
| b)   | Write the IS-LM equations                            | - | L2 |  |
| 3 a) | What is Greesham's Law                               | - | L3 |  |
|      | OR   |   |    |  |
| b)   | R.B.I Classification of Money                        | - | L3 |  |
| 4 a) | Explain the Philips curve Hypothesis                 | - | L4 |  |
|      | OR   |   |    |  |
| b)   | Write about the controlling measures of Trade cycles | - | L4 |  |
| 5 a) | Write about Bombay Stock Exchange                    | - | L1 |  |
|      | OR   |   |    |  |
| b)   | What is the Importance of Insurance                  | - | L1 |  |

**Section-B**

**Answer the Following**

**5X10=50**

- |       |  |   |    |   |
|-------|--|---|----|---|
| 6 a)  | Define Macro Economics and Explain the scope and Importance of Macro Economics- L1 |   |    |   |
|       | OR   |   |    |   |
| b)    | Define National Income and Expenditure various Concepts of National Income         | - | L1 |   |
| 7 a)  | Critically explain the classical theory of Employment                              |   |    | - |
|       | L2   |   |    |   |
|       | OR   |   |    |   |
| b)    | Explain the working process of Multiplier  | - | L1 |   |
| 8 a)  | Explain the Fischer's Quantity Theory of Money                                     |   | L1 |   |
|       | OR   |   |    |   |
| b)    | Explain the Functions of commercial Banks  | - | L1 |   |
| 9 a)  | Discuss the effects of Inflation   | - | L3 |   |
|       | OR   |   |    |   |
| b)    | Write about the various causes for Trade cycles                                    |   | L3 |   |
| 10 a) | Explain the structure of Indian Financial System                                   |   | L2 |   |
|       | OR   |   |    |   |
| b)    | Explain the various types of Insurances  |   | L2 |   |

**P.B . SIDDHARTHA COLLEGE OF ARTS & SCIENCE, VIJAYAWADA**

**BUSINESS ECONOMICS  
Course Code ECOT 22B**

**B.Com General & B.Com C.A., B.Com BFSI**

**SEMESTER – II**

**w.e.f. 2020-21**

**No. Credits 4**

- Co1 Students are able to acquire the knowledge about definition , nature and scope of business economics
- Co2 Students are able to acquire the knowledge about demand and supply analysis
- Co3 Students are able to acquire the knowledge about production cost and revenue analysis
- Co4 Students are able to acquire the knowledge about different market structures
- Co5 Students are able to acquire the knowledge about national income and trade cycles

**Unit-I INTRODUCTION** Hours per week : 5

- 1.1 Meaning and Definition of Economics  
1.1.1 Wealth Definition  
1.1.2 Welfare Definition  
1.1.3 Scarcity Definition
- 1.2 Meaning and Definition of Business Economics  
1.2.1 Nature and Scope of Business Economics
- 1.3 Micro Economics and Macro Economics

**Unit-II DEMAND AND SUPPLY ANALYSIS**

- 2.1 Meaning and Definition of demand
- 2.2 Determinants of Demand – Demand Function
- 2.3 Law of Demand – Demand curve – exceptions
- 2.4 Elasticity of Demand  
2.4.1 Types of Price Elasticity of Demand  
2.4.2 Methods to measure Price Elasticity of Demand
- 2.5 Law of Supply-Exceptions to the Law

**Unit-III PRODUCTION, COST AND REVENUE ANALYSIS**

- 3.1 Production Analysis – Production Function - Meaning  
3.1.1 The law of variable proportions  
3.1.2 The law of Returns to Scale
- 3.2 Cost Analysis**  
3.2.1 Short Run Cost Curves  
3.2.2 Relationship between AC & MC Curves
- 3.3 Revenue Analysis**  
3.3.1 Revenue Concepts & Revenue curves  
3.3.2 Meaning of Breakeven point & Breakeven charts

**Unit-IV MARKET STRUCTURES**

- 4.1 Classification of markets
- 4.2 Features of Perfect competition
- 4.3 Price determination under perfect competition
- 4.4 Features of Monopoly market
- 4.5 Features of monopolistic competition market
- 4.6 Features of Oligopoly market
- 4.7 Kinky Demand Curve analysis

**Unit – V      NATIONAL INCOME AND TRADE CYCLES**

- 5.1 National Income
  - 5.1.1 Meaning and Definition of National Income (Marshall, Pigou, Fisher)
  - 5.1.2 Concepts of National Income – GDP, GNP, NDP, NMP, NNPFC, PI, DI, PCI, RNI, RPCI
  - 5.1.3 National Income Measurement (Product, Income & Expenditure Methods)
  - 5.1.4 Problems in measuring National Income
- 5.2 Trade Cycles
  - 5.2.1 Meaning and Definition of Trade cycles
  - 5.2.2 Phases of Trade Cycles
  - 5.2.3 Causes for Trade Cycles
  - 5.2.4 Controlling Measures of Trade Cycles

**Text Books :**

Business Economics – A.V. Ranganadhachary – Kalyani Publishers

Business Economics – Telugu Academy

**Reference Books**

H.L. AHUJA – Business Economics – S.Chand & Company Publishers

P.N. CHOPRA – Business Economics – Kalyani Publishers

D.M. MITHANI-Fundamentals of Business Economics-Himalaya Publishers

DEEPASHREE – General Economics – Tata Mc. GrawHills

**Model Question paper**  
SEMESTER – II  
I B.Com General, I B.Com CA & I B.com BFIS  
Business Economics  
Course Code ECOT 22B  
(w.e.f. 2023-24)

Time : 3 Hrs

Section – A

Max.Marks 70M

**Answer the Following**

**5X4=20M**

- |      |  |   |    |
|------|--|---|----|
| 1 a) | Write about welfare definition                       | - | L1 |
|      | OR   |   |    |
| b)   | Write about the Adam Smith's wealth definition       | - | L1 |
| 2 a) | Write about the exceptions to the Law of Demand      | - | L2 |
|      | OR   |   |    |
| b)   | Explain the law of supply                            | _ | L2 |
| 3 a) | State the relationship between Ac & MC curves        | - | L1 |
|      | OR   |   |    |
| b)   | Explain the Breakeven point                          | _ | L1 |
| 4 a) | Classification of Markets                            | - | L2 |
|      | OR   |   |    |
| b)   | What are the features of Monopoly market             | _ | L2 |
| 5 a) | What are the problems of National Income measurement | - | L1 |
|      | OR   |   |    |
| b)   | What are the controlling measures of Trade cycles    | _ | L2 |

**Section – B**

**Answer the following**

**5X10=50M**

- |       |  |   |    |
|-------|--|---|----|
| 6 a)  | Explain the Nature and scope of Business Economics                 | - | L2 |
|       | OR   |   |    |
| b)    | Distinguish between Macro and Micro economics                      | _ | L2 |
| 7 a)  | Explain the various types of Price elasticity of demand            | - | L1 |
|       | OR   |   |    |
| b)    | Explain the various methods to measure price elasticity of demand  | - | L2 |
| 8 a)  | Explain the law of variables proportions                           | - | L2 |
|       | OR   |   |    |
| b)    | Explain the relationship between different short run cost curves   | _ | L2 |
| 9 a)  | Explain the Price determination under perfect competition market-  |   | L3 |
|       | OR   |   |    |
| b)    | Explain the Kinky Demand curve                                     | _ | L3 |
| 10 a) | Write about the various methods to measure National Income         | - | L1 |
|       | OR   |   |    |
| b)    | Define Trade cycles and explain the various phases of trade cycles | _ | L1 |

## Department of Electronics

Board of studies for the academic year 2022-2023(EVEN semesters) on 08-03-2023.

### AGENDA

1. To evaluate the syllabus in relation to its socio-economic relevance.
2. To explore the possibilities of introducing any new subjects as additional optional subjects, or new combinations of subjects.
3. To assess the potential of the courses against the employment prospects.
4. To assess the compatibility of practical courses to theory courses.
5. Any other item with the permission of the Chairman.

### List of members in BOS

1	Sri K.S.V.SAMBASIVA RAO, HOD, Electronics	Chairman	Sd/-
2	Smt.P.SAILAJA ,S.R.R & C.V.R govt degree college ,vijayawada.	University Nominee	Sd/-
3	Dr..B.T.P.MADHAV Professor & Associate dean (Academic research), Department of ECE, K.L.University.	Subject Expert	Sd/-
4	Dr.A. NARENDRA BABU, Professor, Department of ECE, Lakkireddy Balareddy Engineering College.	Subject Expert	Sd/-
5	Sri.N.VARAPRASAD ARETE IT SOLUTIONS, Vijayawada.	industrialist	Sd/-
6	Smt.J.PRASMAI KANTI, Head, dept.of.Electronics, SDMS Degree College, Vijayawada.	Alumnus	Sd/-
7	D. SRINIVASA REDDY, Lecturer in Electronics.	Member	Sd/-
8	G. NAGA SASANKA, Lecturer in Electronics.	Member	Sd/-



### Resolutions/recommendations

The following are the resolutions are made in the Board of studies in Electronics for EVEN semester to recommend to the 47<sup>th</sup> Academic council for its approval.

Department of Electronics								
List of the courses Revised in II Semesters 2022-23								
S.NO	Title of the course	Course code	Offers in SEM	Type of the paper	Year of Introduced	Year of Revision	OBE with BTL	Offered to
1	DIGITAL ELECTRONICS	ELET21C	II	CORE	2021-22	NO REVISION	YES	B.Sc(MECs&Ca.M.E)
2	DIGITAL ELECTRONICS	ELEP21C	II	CORE LAB	2021-22	NO REVISION	YES	B.Sc(MECs&Ca.M.E)

1. It is resolved and recommend to introduce DIGITAL ELECTRONICS with course code ELET21C in II semester of B.Sc.(M.E.Cs,CA.M.E) for the batch of students admitted in 2022-23 and onwards. For the syllabus and model question paper vide page number from 3 to 5.
2. It is resolved and recommend to introduce DIGITAL ELECTRONICS LAB with course code ELEP21C in II semester of B.Sc.(M.E.Cs,CA.M.E) for the batch of students admitted in 2022-23 and onwards. For the syllabus and model question paper structure vide page number from 6 to 6.



**P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE**  
**Siddhartha Nagar, Vijayawada – 520 010**  
*Autonomous -ISO 9001 – 2015 Certified*

**Title of the Paper :DIGITAL ELECTRONICS**

**Offered to : B.SC(M.ECs,CA.M.E) –ELET21C**

**Course Type : Core (TH)**

**Year of Introduction:2021-22**

**Year of Revision:**

**Semester : II**

**Credits : 4**

**Hours Taught : 60P/ Semester**

**Max.Time : 3 Hours**

**Course Objectives:**

- 1.To understand the number systems, Binary codes and Complements.
2. To understand the Boolean algebra and simplification of Boolean expressions.
3. To analyze logic processes and implement logical operations using combinational logic circuits.
- 4.To understand the concepts of sequential circuits and to analyze sequential systems in terms of state machines
5. To understands characteristics of memory and their classification.
6. To implement combinational and sequential circuits using VHDL.

**Course Outcomes:** At the end of this course, students should be able to:

CO1 : Remember the binary number theory of digital circuits

CO2 : Understand the concepts of Boolean algebra and have knowledge to analyze and design combinational systems using standard gates and minimization methods (such as karnaugh maps).

CO3 : Apply design various logical inputs of different IC- logic families

CO4 : Analyze design flip-flops and latches for sequential systems composed of standard sequential modules, such as counters and registers

CO5 : Evaluate combinational systems composed of standard combinational modules, such as multiplexers and decoders and understand various data manipulation circuits

**SYLLABUS**

UNIT-1 (10hrs)

**NUMBER SYSTEM AND CODES:**

Decimal, Binary, Hexadecimal, Octal, BCD, Conversions, Compliments (1's, 2's, 9's and 10's), Addition, Subtraction, Gray, Excess-3 Code, Code conversion from one to another.

Unit – II(12hrs)

**BOOLEAN ALGEBRA AND THEOREMS:**

Boolean Theorems, De-Morgan's laws, Digitallogic gates, Multi level NAND & NOR gates. Standard representation of logic functions (SOP and POS), Minimization Techniques (Karnaugh Map Method: 3,4,5 variables),don't care condition.

Unit – III (12hrs)

**COMBINATIONAL DIGITAL CIRCUITS:**

(Adders-Half & full adder, Sub-tractor-Half and full sub-tractors,Parallel binary adder, Magnitude Comparator, Multiplexers (2:1,4:1)) and De-multiplexers (1:2,4:1), Encoder (8-line-to-3-line) and Decoder (3-line-to-8-line).

**IC-LOGIC FAMILIES:** TTL logic, DTL logic, RTL Logic, CMOS Logic families (NAND&NOR Gates), Bi-CMOS inverter.

Unit – IV (12hrs)

Sequential digital circuits:

Flip Flops: S-R FF, J-K FF, T and D type FFs, Master-Slave FFs, Excitation tables, Registers:-shift left register, shift right register, Counters -Asynchronous-Mod16, Mod-10,Mod-8,Down counter, Synchronous 4-bit counter

Unit – V (10hrs)

MEMORIES:

General Memory Operations, ROM, RAM (Static and Dynamic), PROM, EPROM, EEPROM, EAROM,PLA (Programmable logic Array), PAL (Programmable Array Logic).

Textbook:

M.Morris Mano, “ Digital Design “ 3<sup>rd</sup> Edition, PHI, New Delhi.

Ronald J. Tocci. “Digital Systems-Principles and Applications” 6/e. PHI. New Delhi. 1999.(UNITS I to IV )

G.K.Kharate-Digital electronics-oxford university press

S.Salivahana&S.Arivazhagan-Digital circuits and design

Fundamentals of Digital Circuits by Anand Kumar

Reference Books:

Herbert Taub and Donald Schilling. “Digital Integrated Electronics” . McGraw Hill. 1985.

S.K. Bose. “Digital Systems”. 2/e. New Age International. 1992.

D.K. Anvekar and B.S. Sonade. “Electronic Data Converters : Fundamentals & Applications”. TMH. 1994.

Malvino and Leach. “ Digital Principles and Applications”. TMG Hill Edition.

Course Delivery method:Face-to-face / Blended

Course has focus on:Foundation and Skill Development

Websites of Interest:<https://www.javatpoint.com/>, <https://www.geeksforgeeks.org/>

Co-curricular Activities: Assignments,PPT's,Miniprojects.

**SECTION – A**

**Answer the following:**

**5 x 4 = 20 M**

- 1.a) Discuss briefly about 9's complement method. (co1)-(L1)-4M  
(or)  
b) Perform BCD addition for  $(1010)_2$  and  $(1111)_2$ . (co1)-(L1)-4M  
2.a) Simplify the Boolean expression if  $Y=A+AB$ .-(co2)-(L2)-4M  
(or)  
b) Write about SOP and POS in brief.-(co2)-(L2)-4M  
3.a) Explain about Bi-MOS inverter.-(co3)-(L1)-4M  
(or)  
b) Discuss about RTL not gates (co3)-(L1)-4M  
4.a) Explain the working of Shift register.-(co4)-(L1)-4M  
(or)  
b) Discuss about T-Flip-flop in brief. (co4)-(L1)-4M  
5.a) Difference between SRAM and DRAM. (co5)-(L1)-4M  
(or)  
b) Explain about a) PROM b) EPROM-(co5)-(L1)-4M

**SECTION – B**

**Answer the following:**

**5 x 10 = 50 M**

- 6.a) Explain about rules of 1's complement and 2's complement method.-(co1)-(L1)-10M  
(or)  
b) Convert the following grey code to binary vice-versa.  
(1) 11101 (2) 100110—(co1)-(L1)-10M  
7.a) Simplify the following functions in sum of products using K-map and draw their implementation.  
(i)  $F(A, B, C, D) = \sum (7, 13, 14, 15)$   
(ii)  $F(W, X, Y, Z) = \sum (1, 3, 7, 11, 15) + d \sum (0, 2, 5)$  -(co2)-(L3)-10M  
b) Explain briefly about canonical and standard form of Boolean algebra.-(co2)-(L3)-10M  
8.a) Define the following terms (i) Half adder (ii) Full adder (iii) Decoder. Explain the design procedure of Full subtractor (co3)-(L2)-10M  
(or)  
b) Discuss about the construction and working of TTL NAND gate and Characteristics. (co3)-(L2)-10M  
9. a) Explain the difference between combinational and sequential logic circuits. & Explain the operation of JK-Flip-flop and draw the timing diagram. (co4)-(L3)-10M.  
(or)  
b) Define counter and Explain briefly about ripple counter. (co4)-(L3)-10M  
10.a) Discuss briefly about Programmable logic array (PLA) (co5)-(L2)-10M  
(or)  
b) Explain briefly about Semiconductor memories.-(co5)-(L2)

\*\*\*



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Title of the Paper : DIGITAL ELECTRONICS LAB

Offered to: B.SC(M.ECs,CA.M.E) –ELEP21C

Course Type : Core (P)

Year of Introduction: 2021-22

Semester : II

Credits : 1

CO1 : Remember the binary number theory of digital circuits

CO2 : Understand the concepts of Boolean algebra and have knowledge to analyze and design combinational systems using standard gates and minimization methods (such as karnaugh maps).

CO3 : Apply design various logical inputs of different IC- logic families

**LAB LIST:**

1. Verification of IC-logic gates
2. Verification of De-Morgan's laws
3. Realization of basic gates using discrete components (resistor, diodes & transistor)
4. Realization of basic gates using Universal gates (NAND & NOR gates)
5. Verify Half adder and full adder using gates
6. Verify Half subtract-or and full subtract-or using gates.
7. Verify the truth table of RS , JK, T-F/F using NAND gates
8. 4-bit binary parallel adder and subtract-or using IC 7483
9. BCD to Seven Segment Decoder using IC -7447/7448

Lab experiments are to be done on breadboard and simulation software (using Multisim) and output values are to be compared and justified for variation.

**LAB MANUAL ARE SUPPLIED BY DEPARTMENT**

**DEPARTMENT OF ENGLISH**  
**BOARD OF STUDIES – 2022-23**

13<sup>th</sup> March, 2023

The members of the Board of Studies, Department of English met in the Department at **11 am** to discuss the following agenda.1. Syllabus and 2. Model Paper

**Members present:**

Dr. G. Srilatha	HOD Dept of English
Prof. P. Hari Padma Rani	Padmavathi Mahila University, Tirupati
Dr. M. Koteswara Rao	University Nominee – Krishna University
Dr. K. Santha Kumari	Deputy HOD English
Sri K. Perachary	Lecturer in English
Smt. Ch. Anantha Sai Lakshmi	Lecturer in English
Dr. Ch Rajeswari	Lecturer in English
Sri K. Siluva Raju	Lecturer in English
Mrs. K. Swarupa Rani	Lecturer in English
Sri S. Gopal Rao	Lecturer in English

**RESOLUTIONS**

1. The course codes and the titles are listed below:

<b>DEPARTMENT OF ENGLISH</b>								
<b>LIST OF THE COURSES REVISED/ INTRODUCED IN II &amp; IV SEMESTERS -2022-23</b>								
S. No	Title Of The Course	Course Code	Offered In Semester	Type Of The Paper	Year Of Introduction	Year of Revision	OBE with BTL	Offered to (Name of the Programme)
1	ENGLISH PRAXIS – II	ENGT21B	II	First Language	2020-21	Model Question Paper	YES	B.Sc.(BZC,MSCs, CAMS,MECS,MPCS,MPC,CAME) , BA(EMS), BCA, BCOM(G, CA) -12
2	BUSINESS ENGLISH II	ENGT25	II	First Language	2020-21	2022-23 (10%)	YES	BBA, BBA (BA), BBA (RM), B.COM (A&F), B.COM (TPP), BPM, BFSI, B.SC (MSDS), B.Sc (CSCS) and B.Sc. (AI&ML)-10
3	ENGLISH PRAXIS –III	ENGTO1A	IV	First Language	2022-23	No Revision	YES	B.Sc.(MPC,MPCS,BZC,MECS,CAME,CAMS, MSCS-A,MSCS-B), BA(EMS)-9
4	COMMUNICATION SKILLS FOR EMPLOYABILITY-I	SDC ENG T04A	II & IV	Skill Development	2022-24	2022-23 (10%)	YES	BBA RM, B.COM G, A&F, CA, B.COM TPP, BPM, BFSI- II SEM(7) B.Sc.(CSCS, MSDS, AI&ML, MSCS A, MSCS B, MSCA, MECS, CAME), BCA-IV SEM (9)
5	COMMUNICATION SKILLS FOR EMPLOYABILITY-II	SDC ENG T05A	II & IV	Skill Development	2021-22	2022-23 (10%)	YES	BBA RM, B.COM G, A&F, CA, B.COM TPP, BPM, BFSI- II SEM(7) B.Sc.(CSCS, MSDS, AI&ML, MSCS A, MSCS B, MSCA, MECS, CAME), BCA-IV SEM (9)
6	STEP Certificate Online Course	CCENGT01	II	Certificate Online Course	2021-22	No Revision	YES	B.Sc(BZC,CAMS,MECS,MPCS,MSDs,MPC, CSCS) , BBA G, BA(EMS), BCA, BBA BA. -11

2. It is resolved and recommended the revision of the model question paper of **English Praxis II** with course code **ENGT21B** in the II semester of B.A, B.Com & B.Sc Courses for the batch of students admitted in 2022-23 and onwards. For the revised model question paper vide page no 4 to 7.
  3. To recommend the revision of syllabus and model question paper of **Business English II** with course code **ENGT25** in II semester of BBA, BBA BA, BBA RM, B.COM A&F, B.COM TPP, BPM, BFSI, B.SC MSDS, CSCS and AI&ML for the batch of students admitted in 2022-23 and onwards. For the revised syllabus and model question paper vide page no 8 to 13.
  4. To recommend the revision of syllabus and model question paper of **English Praxis III** with course code **ENGT 01 A** in IV semester of B.Sc.(MPC, MPCS, BZC, MECS, CAME, CAMS, MSCS-A, MSCS-B) & BA(EMS) for the batch of students admitted in 2022-23 and onwards. For the revised syllabus and model question paper vide page no 14 to 17.
  5. To recommend the revision of syllabus and model question paper of **Communication Skills for Employability - I** with course code **SDC ENG T04** in II semester of BBA RM, B.COM G, A&F, CA, B.COM TPP, BPM, BFSI for the batch of students admitted in 2022-23 and for IV Semester of CSCS, MSDS, AI&ML, MSCS A, MSCS B, MSCA, BCA, MECS, CAME for the batch of students admitted in 2021-22. For the revised syllabus and model question paper vide page no 18 to 21.
  6. To recommend the revision of syllabus and model question paper of **Communication Skills for Employability - II** with course code **SDC ENG T05** in II semester of BBA RM, B.COM G, A&F, CA, B.COM TPP, BPM, BFSI for the batch of students admitted in 2022-23 and for IV Semester of CSCS, MSDS, AI&ML, MSCS A, MSCS B, MSCA, BCA, MECS, CAME for the batch of students admitted in 2021-22. For the revised syllabus and model question paper vide page no 22 to 23.
  7. To recommend STEP Certificate Online course for the students of II Semester of CSCS, BBA G, BA, BZC, CAMS, MECS, MPCS, MSDS, MPC, BCA, BBA (BA) for the batch of students admitted in 2022-23. For the syllabus and model question paper vide page no 24 to 25.
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**College with Potential for Excellence**  
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**DEPARTMENT OF ENGLISH**

**GENERAL ENGLISH SYLLABUS FOR B.A/ B.COM/B.SC COURSES UNDER CBCS**  
**SEMESTER-II (2022-23)**

**COURSE CODE: ENGT21B**

**Max. Marks: 100**

**No. of Hours per Week: 4**

**External: 70M**

**No. of Credits: 3**

**Internal: 30M**

**Course Structure and Syllabi under CBCS**

<b>Sl No.</b>	<b>Semester</b>	<b>Course Code</b>	<b>Name Of The Subject</b>	<b>Teaching Hours</b>	<b>Credits</b>
1	II Semester	ENGT21B	English Praxis -II	4	3

**OBJECTIVE:** The main objective of this course is to facilitate the learners to acquire the linguistic competence essentially required in a variety of life situations and develop their intellectual, personal and professional abilities.

**COURSE OUT COMES:**

**At the end of the course the learners will be able to:**

- C01: Acquaint the learner with some widely used words which appear to be similar but are semantically different and also help them to realize the importance of meanings, and understand the grammatical structures in writing. **PO7**
- C02: Speak clearly, effectively and appropriately with correct pronunciation, pause and articulation of voice for a variety of audiences and purposes. **PO2**
- C03: Analyze, interpret, appreciate and comprehend the specified text and the contexts in terms of their content, purpose, and form. **PO1**
- C04: Think critically; convey their own interpretations, perspectives, producing new creative and artistic works following grammatical structures in oral and written assignment. **PO7**
- C05: Write effectively for a variety of professional and social settings adapting other writer's ideas as they explore and develop their own. **PO3**





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**DEPARTMENT OF ENGLISH**

**GENERAL ENGLISH SYLLABUS FOR B.A/ B.COM/B.SC COURSES UNDER CBCS**  
**SEMESTER-II (2022-23)**

**COURSE CODE: ENGT21B**

**Max. Marks: 100**

**No. of Hours per Week: 4**

**External: 70M**

**No. of Credits: 3**

**Internal: 30M**

**English Praxis Course-II**

**A Course in Reading & Writing Skills**

**I. UNIT**

<b>Prose:</b> 1. How to Avoid Foolish Opinions	Bertrand Russell	12
<b>Skills:</b> 2. Vocabulary: Conversion of Words		
: 3. One Word Substitutes		
: 4. Collocations		

**II. UNIT**

<b>Prose :</b> 1. The Doll's House	Katherine Mansfield	
<b>Poetry :</b> 2. Ode to the West Wind	P B Shelley	
<b>Non-Detailed Text :</b> 3. Florence Nightingale	Abrar Mohsin	12
<b>Skill :</b> 4. Skimming and Scanning		

**III. UNIT**

<b>Prose :</b> 1. The Night Train at Deoli	Ruskin Bond	
<b>Poetry :</b> 2. Upagupta	Rabindranath Tagore	12
<b>Skill :</b> 3. Reading Comprehension		
: 4. Note Making/Taking		

**IV. UNIT**

<b>Poetry :</b> 1. Coromandel Fishers	Sarojini Naidu	12
<b>Skill :</b> 2. Expansion of Ideas		
: 3. Notices, Agendas and Minutes		

**V.UNIT**

<b>Non-Detailed Text :</b> 1. An Astrologer's Day	R K Narayan	12
<b>Skills :</b> 2. Curriculum Vitae and Resume		
: 3. Letters :		
4. E-Correspondence		



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**Course Code: ENG T21B**

**Title: English Praxis– II (Semester-II)**

**Credits: 3**

**Time: 3 Hours**

**Max. Marks: 70**

**Pass Marks: 28**

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**MODEL PAPER**

**SECTION-A**

**I. Answer the following questions: 2x5=10 M**

1. (a) What are the ways in which you can make yourself aware of your own biases?

**OR**

(b) What was the main attraction of the doll's house for Kezia? Why?

2. (a) What happened when the train stopped at the Deoli station?

**OR**

(b) According to the author Bertrand Russell, what are the methods by which one can get rid of dogmatism?

**II. Answer the following questions: 2x5=10 M**

1. (a) What are the qualities of the West Wind that the poet admires?

**OR**

(b) Why was the dance girl driven out of the town?

2. (a) How does Sarojini Naidu describe a day in the lives of the fishermen?

**OR**

(b) How did Upagupta treat the suffering dancing girl?

**SECTION -B**

**III. Answer the following questions: 2x10=20 M**

1. (a) How does Florence Nightingale describe the hospital in Scutari in one of her letters to her friend?

**OR**

- (b) Why was Florence Nightingale called as 'The Lady with the Lamp'?
2. (a) Retell the story 'An Astrologer's day' from the point of view of Guru Nayak.

**OR**

- (b) Attempt a character sketch of the astrologer.

**SECTION – C**

**IV.A. Change the following sentences as directed without changing their sense. L1 CO1  
2X1=2M**

1. The audience listened to the leader with 'patience'. (Use adverb of patience)
2. At last he was successful in his venture. (Use verb of successful)

**B. Choose the right meaningful substitute word for the following statements. L5 CO1  
2x1 =2M**

1. One who looks at the bright side of things. \_\_\_\_\_
2. One believes in God. \_\_\_\_\_

**C. Complete the following collocations using the words given in the brackets.L1CO3  
2x1=2M**

**(get, come, make)**

1. \_\_\_\_\_ a home
2. \_\_\_\_\_ a trouble

**V. Read the following passage and make notes. L3 CO3 1 x4 =4M**

There are different forms of environmental pollution. Air pollution is caused by the burning of coal and oil. It can damage the earth's vegetation and cause respiratory problems in humans. A second type of pollution is noise pollution. It is the result of the noise aircrafts and heavy traffic. Further loud music

Is also a cause if noise pollution which has been seen to effect peoples hearing and give them severe headache and high blood pressure. Another source of pollution is radio activity which occurs when there is a leak from a nuclear power station. It kills and causes irreparable harm to those exposed to it.

**VI. Prepare curriculum vitae in response to the following advertisement. L3 CO5 1X4=4M**

M. Suman Karthik -aged 28 years -MA(English) BEd, -good communication and problem solving skills. -MA from S V University, Tirupati, 72% marks. BA (Adv English) from Govt Degree College, Ananthapuram, 76% marks. BEd, S K University, Ananathapuram – intermediate (HEC), Govt Jr College, Ananthapuram –worked as a teacher in English for three years. Apply for the post of junior lecturer in English in St Joseph Jr. College, Ongole.

**VII. Write a letter to the principal of your college requesting to organize a study hour.**

**L3 CO5**

**1X4=4M**

**VIII. Expand any ONE of the following proverb.**

**L4 CO5**

**1X4=4M**

1. Honesty is the best policy.
2. Where there is a will there is a way.

**IX. Read the following passage and answer the following questions. L2 CO5 5X1=5M**

In every country people imagine that they are the best and the cleverest and the others are not so good as they are. The English man thinks that he and his country are the best; the French man is very proud of France. The Germans and the Italians think no less of their countries and many Indians imagine that India is in many ways the greatest country in the world. This is wrong. Everybody wants to think well of himself and his country. But really there is no person who has not got some good and some bad qualities. In the same way, there is no country which is not partly good and partly bad. We must take the good wherever we find it and try to remove the bad wherever it may be. We are off course, most concerned with our own country, India. Unhappily it is in a bad way today. Most of our people are and unhappy. They have no joy in their lives. We have to find out how we can make them happier. We have to see what is good in our ways and customs try to keep it, and whatever is bad we have to throw away. If we find anything good in other countries, we should certainly take it.

**Answer the following questions.**

1. What do people think in every country?
2. What must we do?
3. What should be our attitude towards other countries?
4. Write the antonym for the following word.  
Worst
5. Write the synonym for the following word.  
Sorrow

**X. You are the secretary of Good Habits Club. Write an agenda for the meeting on the activities to be conducted on the eve of Independence day, using proper format. L3 CO4**

**1X3=3M**

**P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE, VIJAYAWADA-10.**

**DEPARTMENT OF ENGLISH**

**Course Structure and Syllabi under CBCS 2022-23**

<b>Sl No.</b>	<b>Semester</b>	<b>Course Code</b>	<b>Name Of The Subject</b>	<b>Teaching Hours</b>	<b>Credits</b>
1	II Semester	ENGT25	Business English-II	4	3

**P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE**

**DEPARTMENT OF ENGLISH**

**ENGT25 BUSINESS ENGLISH-II**

**Semester-II**

**Max. Marks: 100**

**No. of Hours per Week: 4**

**External: 70M**

**No. of Credits: 3**

**Internal: 30M**

**OBJECTIVE:** The main objective of this course is not only to facilitate the learners to acquire the linguistic competence with a focus on business contexts and environments but also to help them practice and enrich their communication skills by using English in specific business settings and situations and develop their intellectual, personal and professional abilities.

**COURSE OUTCOMES:**

At the end of the course, the learners will be able to:

CO 1. Develop the skills of writing an effective sales letter by providing detailed guidance on how to arrest the potential buyer's attention and to induce in him an irresistible desire to buy the product. **PO2**

CO2. Acquaint the learner how credit is requested, how it is accepted and when it is rejected and also to make him aware of the procedure for collecting the credit. **PO3**

CO3. Describe the characteristic features of reports written in professional contexts and to impress upon the learner the need for acquiring the skill of report writing. **PO4**

CO4. Describe the various elements of the structure of a report and to provide detailed guidance on how to write them. **PO1**

CO5. Acquaint the learner with some widely used words which appear to be similar but are semantically different and also help them to realize the importance of punctuation and understand the significance of capitalization in writing. **PO1**



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**Course Code: ENGT25**

**Max Marks: 70**

**Title: Business English-II**  
**SEMESTER II (2022-23)**

**Time: 3 hours**  
**No. of Credits: 3**

**FOR BBA, BBA BA, BBA RM, B.COM AF, B.COM TPP, BPM, BFSI, B.SC MSDS, CSCS  
AND AI&ML**

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**SYLLABUS**

**UNIT – I SALES AND CIRCULAR LETTERS**                      **page no: 142 to 154**                      **10hrs**

- Communication Core
- Writing a Sales Letter
- Circular Letters
- Review Questions
- Exercises

**UNIT – II CREDIT AND COLLECTION LETTERS**                      **page no: 163 to 171**  
**14hrs**

- Communication Core
- Nature of a Credit Letter
- Types of Credit Letters
- Collection Procedure
- Distinctive Features of Business Letters
- Review Questions
- Exercises

**UNIT – III BUSINESS AND TECHNICAL REPORTS**                      **page no: 211 to 221**  
**12hrs**

- Communication Core
- Characteristics
- Importance
- Types
- Routine Reports
- Review Questions
- Exercises

**UNIT – IV STRUCTURE AND LAYOUT OF REPORTS**                      **page no: 222 to 236**  
**14hrs**

- Communication Core
- Elements of Structure

- Front Matter
- Main Body
- Back Matter
- Review Questions
- Exercises

**UNIT – V PLANNING AND PREPARATION**

**page no: 237 to 243**

**10hrs**

- Preparatory Steps
- Words Often Confused
- Punctuation and Capitalization
- Suffixes and Prefixes                      Reference: CSS-I, Orient Black Swan Page no:1-31
- Antonyms and Synonyms
- One word substitutes
- Question Tags                      Reference Praxis – I Page no:74-77

**Reference book:** Business Correspondence and Report Writing **5 th Edition** –RC .Sharma. Kishnamohan.

**Web links:**

1. Sales letter - [Sales Letter in Business Communication: Format, Advantages, Types, Tips \(toppr.com\)](#)  
[Sales Letter In Business Communication - Letter \(letternay.blogspot.com\)](#)
2. Circular letter - [What is Circular Letter? Meaning of Circular Letter in Business \(bizcommunicationcoach.com\)](#)
3. Credit letters - [Letter of Credit Sample with its Definition \(businesscommunicationarticles.com\)](#)
4. Collection letters - [Collection letter | eCollect.org](#)

[Collection Letter: Types of Collection Letter in Business Communication \(toppr.com\)](#)

5. Business and Technical Reports - [What Are Business and Technical Reports? \(thoughtco.com\)](#)  
[Basics Steps to Writing a Technical Report \(bizfluent.com\)](#)



**Parvathaneni Brahmayya Siddhartha College of Arts & Science, Vijayawada-10**  
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**Reaccredited at the level 'A' by the NAAC**  
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**SEMESTER-II (2022-23)**

**Course Code: ENG T25**

**Course Title: Business English-II**

**No. of Credits: 3**

**FOR BBA, BBA BA, BBA RM, B.COM AF, B.COM TPP, BPM, BFSI, B.SC MSDS, CSCS  
AND AI&ML**

**Max Marks: 70**

**Pass Marks: 28**

**Time: 3 hours**

**SECTION – A**

**I. Answer the following questions.**

**2x5=10M**

1. (a) “Every business letter, in principle, is a sales letter”. Discuss the qualities of the sales letter in the light of this statement. L2

**Or**

(b) What are the different ways of starting a sales letter? Illustrate your answer with examples. L2

2. (c) In what way does a collection letter differ in tone and style from a sales letter? L1

**Or**

(d) Why buying and selling on credit has become a way of financial transactions in modern business? L1

**SECTION – B**

**II. Answer the following questions.**

**2x10=20M**

1. (a) As the Sales Officer of a company, write a letter to housewives to promote the sale of an electric milk boiler that it has recently manufactured. The boiler has a device which automatically cuts off the electricity supply after the milk has boiled. L2

**Or**

(b) As the Company Secretary of Sunshine Garments Private Limited, 53-A, Satpura Extension Lajpat Rai Road, New Delhi-110027. Write a circular letter to Branch Managers based in Chandigarh, Chennai, Hyderabad, Kanpur, Kolkata, Mumbai and Pune, asking them to send budget proposals 2023-24, latest by March 2023. Inform them that the budget for the next financial year would be discussed in the Board of Directors meeting to be held on 17<sup>th</sup> March, 2023. L2

2. (c) As a Credit Manager of the Modern Departmental Store, Vigyanpur, you have received a request from the Chief Warden of a local college for the supply of 250 kg of atta every month on credit basis. Inventing the necessary details write a granting credit letter. L4



**Or**

(d) The main branch of Navyug Commercial Bank, Hyderabad has not paid Rs 23,500 to the local Super Bazar for the supply of food materials to its canteen. The amount has been outstanding for the last three months. As the Credit Manager of the Super Bazar, write a collection letter to the Bank Manager. L4

### **SECTION – C**

**III. Answer the following questions.**

**2x5=10M**

1. (a) Why has the importance of reports increased in our times? L2

**Or**

(b). Distinguish clearly between an informational and interpretive report. Is the latter different from a recommendatory report? L2

2. (c). What elements must appear in the structure of every report and why? L2

**Or**

(d). What is the difference between an abstract and a summary? In what circumstances should both be given in a report? L2

### **SECTION – D**

**IV. Answer the following questions**

**2x5=10M**

1. (a) What are routine reports? How do they differ from other formal reports? L4

**Or**

(b). Assuming yourself to be the Senior Manager of Production in Stella Steel Manufacturing Company Limited, Amritpura, write the annual assessment report of Assistant Manager (Production) for 2023-24. Invent the necessary details. L4

2. (c) Write about the role of Cover and Frontispiece in the layout of the report. L4

**Or**

(d) Write about the preparatory steps while planning and preparing the report. L4

### **SECTION –E**

**V. A. Choose the correct words from the following pairs given in the brackets and fill up the blanks. 3x1=3M**

1. The manager gladly ----- to my request. (accede, exceed)

2. I am not -----at photography. (adopt, adept)

3. Due to the ----- weather conditions, the aeroplane was diverted to another airport. (adverse, averse)

**B. Rewrite the following sentences using the correct punctuation marks. 2X1=2M**

1. John A Burgan observes people in technical fields need to express their ideas clearly
2. Hari has to perform dual function to handle correspondence with other branches organizations and the government and to maintain accounts

**C. Write the correct synonyms of the following words: 3X1=3M**

1. abundant
2. accomplish
3. advocate

**D. Write the correct antonyms of the following words: 2X1=2M**

1. active x
2. appreciate x

**E. Write one word substitutes for the following : 2X1=2M**

1. One who is present everywhere
2. One who settles in another country

**F. Add the correct question tags for the following: 3X1=3M**

1. Gopi broke the glass, -----
2. Mohan dosen't work hard, -----
3. Your sister cooks well, -----

**G. Write the correct prefix of the following words: 3X1=3M**

1. spell
2. happy
3. comfortable

**H. Write the correct suffix of the following words: 2X1=2M**

1. skill
  2. separate
- .....



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**DEPARTMENT OF ENGLISH**

**SYLLABUS FOR B.A/ B.COM/ B.SC COURSES UNDER CBCS**

**SEMESTER-IV (2022-23)**

**Title of the Paper: English Praxis- III**

**Course Code: ENG T01A**

**No. of Hours per Week: 4**

**No. of Credits: 3**

**Max. Marks: 100**

**External: 75M**

**Internal: 25M**

**Course Structure and Syllabi under CBCS**

<b>S. No</b>	<b>Semester</b>	<b>Course Code</b>	<b>Title of the Paper</b>	<b>Teaching Hours</b>	<b>Credits</b>
1	IV Semester	ENG T01A	English praxis -III	4	3

**OBJECTIVE:** The main objective of this course is to enrich student's abilities to speak fluently, participate confidently in any social interaction, face any professional discourse, demonstrate critical thinking and enhance conversational skills by deserving the professional interviews.

**COURSE OUT COMES: At the end of the course the learners will be able to:**

**CO1.** Analyze interpret, appreciate and comprehend the specified text and the contexts in terms of their content, purpose and form. **PO1**

**CO2.** Comprehend effectively for a variety of professional and social settings, adapting other writer's ideas as they explore and develop their own. **PO2**

**CO3.** Engage in simple, common and basic social and academic conversations, demonstrating the ability to open and close a conversation and to ask for clarification, information or assistance, as well as agreeing/disagreeing and giving examples. **PO3**

**CO4.** Convey their own interpretations by building dialogues and developing the learner's performance level in spoken English through the activities. **PO4**

**CO5.** Acquaint the learner with the skills to debate, describe and role play. **PO5**



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**DEPARTMENT OF ENGLISH**

**ENGLISH PRAXIS -III SYLLABUS FOR B.A/ B.COM/ B.SC COURSES UNDER CBCS**  
**SEMESTER-IV (2022-23)**

**Title of the Paper: English Praxis –III**

**Course Code: ENG T01A**

**No. of Hours per Week: 4**

**No. of Credits: 3**

**Max. Marks: 100**

**External: 75M**

**Internal: 25M**

**ENGLISH PRAXIS -III**

**Learning Outcomes**

*By the end of the course the learner will be able to:*

- Speak fluently in English
- Participate confidently in any social interaction
- Face any professional discourse
- Demonstrate critical thinking
- Enhance conversational skills by observing the professional interviews

**SYLLABUS**

**I. UNIT**

**Speech:** 1. Tryst with Destiny Jawaharlal Nehru

**Skills:** 2. Greetings  
3. Introductions

**II. UNIT**

**Speech:** 1. Yes, We Can Barack Obama

**Interview:** 2. A Leader Should Know How to Manage Failure Dr.A.P.J.Abdul Kalam/ India Knowledge at Wharton

**Skills:** 3. Requests

**III. UNIT**

**Interview:** 1. Nelson Mandela's Interview with Larry King

**Skills:** 2. Asking and Giving Information  
3. Agreeing and Disagreeing

**IV. UNIT**

**Interview:** 1. JRD Tata's Interview with T.N.Ninan

**Skills:** 2. Dialogue Building  
3. Giving Instructions/Directions

**V. UNIT**

**Speech:** 1. You've Got to Find What You Love Steve Jobs

**Skills:** 2. Debates  
3. Descriptions  
4. Role Play



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**SEMESTER-IV (2022-23)**

**Title of the Paper: English Praxis –III**

**Course Code: ENG T01A**

**No. of Hours per Week: 4**

**No. of Credits: 3**

**Max. Marks: 100**

**External: 75M**

**Internal: 25M**

**MODEL PAPER**

**SECTION-A**

**I. Answer any FIVE of the following questions.**

**5x6=30M**

1. What was the pledge that Jawaharlal Nehru wanted every citizen of India to take?  
CO 1 L2
2. What does Barack Obama in his speech say that change has come to America?  
CO4 L4
3. What are the challenges that the Americans are expected to face? CO1 L3
4. What are the six leadership traits that Kalam talks about? CO1 L2
5. Why did Nelson Mandela say that he never got angry? CO3 L2
6. What are the major changes in Indian business that were noticed by J.R.D.Tata?  
CO2 L4

**SECTION-B**

**II. Answer any FIVE of the following questions.**

**5x2=10M**

1. Why did Steve Jobs become interested in Calligraphy? CO4 L4
2. What was the first lesson in European etiquette that Gandhiji learned? CO1 L1
3. How does Dr. A.P.J. Abdul Kalam describe his spirituality? CO3 L2
4. How does Tata describe Birla? CO3 L2
5. What does freedom and power bring? CO2 L4
6. What was the ambition of the greatest man of our generation? CO1 L4

**SECTION-C**

**35 M**

**III. Mr Krishna meets Ms Bhaskar, his son's teacher, at the school. Write a dialogue between them. CO2. L2 1x4=4M**

**IV. Jagadish from Tiruamla Technologies, Tirupathi, goes to the office at Hyderabad to meet the Company's Finance Manager, on his prior appointment. Jagadish introduces himself to the Finance Manager's secretary, explaining who he is, where he is from, and why he is there. CO3. L1 1x4=4M**

- V. List any five debate points on Impact of Social Media on Youth. **CO4. L4 1x4=4M**
- VI. Build up a conversation based on the hints given below.  
 Good morning – new to this place – in the Air Force – what do you do? – How fortunate!  
 Need to enroll my daughter in a school – tell me about good schools in Vishakapatnam –  
 thank you. **CO. L3 1x4=4M**
- VII. Rahul is a new student in the college. He asks Bharat for directions to the library. Give some  
 directions. **CO3. L3 1x4=4M**
- VIII. Anu asks her friend Rajesh to get her college admission form from the college. Write a  
 dialogue of request. **CO4. L2 1x4=4M**
- IX. Construct a dialogue between the customer and a shop keeper seeking information about the  
 price of the groceries. **CO4. L1 1X4=4M**
- X. Your parents insist that you should cut down your extra-curricular activities in order to focus  
 on your studies. Construct a dialogue either agreeing or disagreeing with your parent.  
**CO4. L1 1x4=4M**
- XI. Plan a role play between the principal and a parent asking him/her to take care of his/her  
 child's attendance . **CO5. L2 1x3=3M**



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**Course Title: Communication Skills for Employability – I**

**Course Code: SDCENGTO4**

**Maximum Marks: 35**

**No. of Credits: 2**

**Time: 90 min**

**FOR II Semester of BBA RM, B.COM G, A&F, CA, B.COM TPP, BPM, BFSI.**

**FOR IV Semester of CSCS, MSDS, AI&ML, MSCS A, MSCS B, MSCA, BCA, MECS, CAME.**

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### **UNIT – I GRAMMAR - I**

#### **1. PARTS OF SPEECH**

**(NOUN, PRONOUN, ADJECTIVES, VERBS, ADVERBS, PREPOSITIONS, CONJUNCTIONS, INTERJECTIONS)**

#### **2. DEGREES OF COMPARISON**

#### **3. CLAUSES**

#### **4. TENSES**

#### **5. VOICE**

### **UNIT – II GRAMMAR – II**

#### **1. REPORTED SPEECH**

#### **2. ARTICLES**

#### **3. PREPOSITIONS**

#### **4. CONCORD (SUBJECT, VERB, AGREEMENT)**

#### **5. ERROR DETECTION AND CORRECTION**

### **UNIT – III VOCABULARY**

#### **1. VOCABULARY (SYNONYMS AND ANTONYMS)**

#### **2. ONE WORD SUBSTITUTE**

#### **3. WORDS OFTEN CONFUSED**

#### **4. PHRASAL VERBS**

#### **5. IDIOMS AND PHRASES**

#### **6. SENTENCE COMPLETION**

**Model Question Paper**  
**Semester End Examination-2022-23**

**Course Title: Communication Skills for Employability – I**

**Course Code: SDCENGTO4**

**Max. Marks: 35**

**Max. Time: 90 Min.**

**Section-A (15 Marks)**

**I. Answer any THREE out of FIVE questions.**

**Marks (3X5=15)**

**Each question carries 5 Marks**

**Q.1. Fill in the banks with appropriate pronouns. 5x1=5**

1. I wash my clothes \_\_\_\_\_.
2. \_\_\_\_\_ said these words?
3. Please try to understand \_\_\_\_\_ I say.
4. Love the neighbour as you love \_\_\_\_\_.
5. One should not forget \_\_\_\_\_ duty.

**Q2. Fill in the blanks in the following sentences, using appropriate tense forms of the verbs given in the brackets. 5x1=5**

1. He \_\_\_\_\_ (drink) the wine greedily last night.
2. They \_\_\_\_\_ (pick) the mangoes in May.
3. He \_\_\_\_\_ (thank) me for what I \_\_\_\_\_ (do) for him.
4. She \_\_\_\_\_ (complete) cooking before the guests arrived.
5. The train \_\_\_\_\_ (left), before we reached the station.

**Q 3. In the following sentences fill in the blanks with the correct verb in agreement with the subject (Concord) 5x1=5**

1. The horse and the carriage \_\_\_\_\_ at the door. (is/are)
2. Twenty thousand rupees \_\_\_\_\_ not a big sum for him to contribute. (is/are)
3. The major and the Colonel \_\_\_\_\_ dead. (is/are)
4. Two and two \_\_\_\_\_ four. (makes/ make)
5. Death or disgrace \_\_\_\_\_ before him. (are/is)

**Q4 Rewrite the sentences as directed. 5x1=5**

1. Ramana is the cleverest boy in the class. (change into comparative degree)
2. Pathan bowls faster than Nehra. (change into correct positive degree)



3. The Nile is the longest river in the world.(change in to comparative degree)
4. India is larger than any other democracy in the world.( change into superlative degree)
5. Varsha is not taller than some other girls in the class.(change into superlative degree)

**Q5. Change the following sentences from direct to reported speech. 5x1=5**

1. She said, “Do you live near the school?” \_\_\_\_\_
2. Abhi said to me, “How old are you?” \_\_\_\_\_
3. She said to him, When will you be back in your office? \_\_\_\_\_
4. I said to him, “What are you doing there?” \_\_\_\_\_
5. She said , “Let us not waste our time.” \_\_\_\_\_

### Section-B (20 Marks)

**II. Answer any TWO out of FOUR questions.**

**Marks (2X10=20)**

**Each question carries 10 Marks.**

**Q1 (a) Rewrite the following sentences as directed. 5x1=5**

1. She said to her good morning. (Change into indirect speech)
2. The boys are making kites. (Change into passive voice)
3. My friend said , “ Let us go to the Cinema. (Change indirect speech)
4. She broke the glass. (Change into passive voice)
5. She exclaimed bitterly that she had lost her purse (Change into direct speech)

**b) Correct the following sentences. 5x1=5**

1. I have finished three-fourth of this book.
2. My sister and myself are pleased to accept your invitation to dinner.
3. I get a allowance of hundred rupees.
4. He sold three dozens mangoes.
5. I have just taken my meals.

**Q2 (a) Write the synonyms for the following words 5x1=5**

- i) a) ability b) abundant c) beautiful d) cheerful e) Desire

**(b) Write the antonyms for the following words. 5x1=5**

- ii) a) arrive b) beginning c) comfortable d)debit e) evil

**Q3 (a) Write one word substitutes for the following words. 5x1=5**

1. One who looks at the bright side of things.
2. One who cannot read and write.
3. One who loves mankind.
4. A war of religion
5. A number of sheep

**(b) Use the following idioms in your own sentences 5x1=5**

1. Out of my depth
2. Take heart
3. Tried his hand at
4. Make both ends meet
5. He left no stone unturned.

**Q4 (a) Fill the blanks with suitable articles. 5x1=5**

1. I saw \_\_\_ dog in the street. (a/ an/the)
2. He is \_\_\_\_\_ able man. (a/ an/the)
3. She remained in the market for an hour and \_\_\_half. (a/an /the)
4. Her father was \_\_\_ eminent artist. (a /an/ the)
5. He applied for \_\_\_ post of a lecturer (a/ an/ the)

**(b) Fill in the blanks with appropriate prepositions. 5x1=5**

1. The child has been sleeping \_\_\_ six o' clock. I have not met her \_\_\_ two days. He has been ill \_\_\_ Monday. He has not been coming to class \_\_\_ five days. I have not seen him \_\_\_\_\_ a long time. ( Since/for/from/by)



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**Course Title: Communication Skills for Employability – II**

**Course Code: SDCENGTO5**

**Maximum Marks: 35**

**No. of Credits: 2**

**Time: 90 min**

**FOR II Semester of BBA RM, B.COM G, A&F, CA, B.COM TPP, BPM, BFSI.**

**FOR IV Semester of CSCS, MSDS, AI&ML, MSCS A, MSCS B, MSCA, BCA, MECS, CAME.**

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**UNIT – I**

- 1. RESUME WRITING AND COVER LETTER**
- 2. E-MAIL WRITING**
- 3. ESSAY WRITING**

**UNIT – II**

**VERBAL AND NON-VERBAL SKILLS**

- 1. GROUP DISCUSSION**
- 2. INTERVIEW SKILLS**
- 3. MOCK INTERVIEWS**
- 4. BODY LANGUAGE AND JAM (JUST A MINUTE)**

**UNIT – III**

- 1. PARAJUMBLES**
- 2. READING COMPREHENSION**
- 3. COGNITIVE STRATEGIES OF EFFECTIVE READERS**
- 4. TECHNIQUES OF READING**
- 5. CLOZE TEST**

**Model Question Paper**  
**Semester End Examination-2022-23**

**Course Title: Communication Skills for Employability – II**

**Course Code: SDCENGTO5**

**Max. Marks: 35**

**Max. Time: 90 Min.**

**Section-A (15 Marks)**

**Answer any THREE out of FIVE questions.**

**(3x5=15)**

**Each question carries 5 Marks.**

**Q1** What are the tips in writing an effective resume?

**Q2** Write a note on do's in an interview.

**Q3** Explain scanning and how the technique helps in improving reading skills.

**Q4** Write a detailed note on body language.

**Q5** Explain the benefits of Group Discussion.

**Section-B (20 Marks)**

**Answer any TWO out of FOUR questions.**

**(2x10=20)**

**Each question carries 10 Marks.**

**Q1.** What are the types of CV? Explain the important aspects to be included to make your resume an effective one.

**Q2.** What are the various purposes for which group discussion is held? Elaborate in detail.

**Q3.** What are the techniques used in reading comprehension? How are they helpful?

**Q4.** What are the steps to prepare for interview? Explain.

**CERTIFICATE COURSE  
IN COLLABORATION WITH THE HINDU**

**Title of the Paper: STEP** Standardized Test for English Proficiency

**Duration: Three Months**

**ONLINE: 50 Hours**

**OFFLINE: 15 Hours**

**Course Code:**

**Course Objectives:**

Personalized learning content based on student's proficiency  
To teach English language as a skill and not as a subject  
To develop English language proficiency among students  
To enhance the English speaking skills and confidence among students  
Adaptive learning appropriate for all levels

**Course Outcomes:**

CO1: The students are introduced to personalized, online programme which helps in their holistic development  
CO2: The students are exposed to four basic skills of communication.  
CO3: The students understand the concept of self- learning methodology.  
CO4: The students are accustomed to spontaneous use of English with confidence.  
CO5: The students learn the importance of language in various fields of communication.

**SYLLABUS**

**Course Details**

<b>Unit</b>	<b>Learning Units</b>	<b>Blended mode of Teaching</b>
<b>Unit 1</b>	Listening Skills	10
<b>Unit 2</b>	Speaking Skills	10
<b>Unit 3</b>	Reading Skills	10
<b>Unit 4</b>	Writing Skills	10
<b>Unit 5</b>	Practice Session	10

**Evaluation Pattern:**

<b>CEFR</b>	<b>LEVEL</b>	<b>STEP</b>	<b>REQUIRED FOR ROLES IN ...</b>
C2	MASTERY	<b>11-12</b>	Consulting Business Development
C1	ADVANCED	<b>9-10</b>	Global MNCs
B2	UPPER INTERMEDIATE	<b>7-8</b>	Indian Corporate
B1	INTERMEDIATE	<b>5-6</b>	SMES (vocational)
A2	ELEMENTARY	<b>3-4</b>	Low skilled retail (vocational)
A1	BEGINNER	<b>1-2</b>	No English requirements

**Note:**

- The course consists of 50 hours online training on English Proficiency.
- Each student should be registered with an e-mail and mobile number to get the credentials on App.
- The App based learning tool, start with an assessment test of 45 questions and 70 minutes of duration.
- The test result would be announced in a scale of 1-10.
- Based on the score, the methodology and syllabus are adaptable to improve proficiency
- A mid assessment test will be conducted to evaluate the progress on course and to track the student engagement.
- Periodical dashboard of each student engagement in terms of course progress/completion will be shared to respective administrative authorities.

# Department of Hindi

## BOARD OF STUDIES 2022-23 (EVEN SEMESTERS)

Date: 14-03-2023

Minutes of the meeting of Board Of Studies in Hindi, conducted in Online in the Dept. Of Hindi On 14th March 2023 at 3:15 P.M

Members present:

### BOS Chairperson,

1. Smt.M.Jayalakshmi, H.O.D, Dept. of Hindi,P.B.S. College of Arts & Science, VJA-10.

### University Nominee,

2. Dr.V.MohanaRao ,Principal, K.R.K.Govt.DegreeCollege,Singarakondapalem, ddanki,Bapatla Dist ., A.P.

### Subject Expert

3. Dr.J.Atmaram, Assistant Professor, Dept.of Hindi, University of Hyderabad,

### Poet & Critic,

4. DoddaSeshuBabu,Associate Professor, Dept.of Hindi, Maulana Azad National Urdu University, Gachibowli , Hyderabad-500032, T.S.

### Alumnus

5. Yash Sankhlecha, Bangalore-560004.

### Member

6. Smt. M.Bhavya, Lecturer in Hindi, P.B.S. College of Arts & Science,Vijayawada-10.

HINDI DEPARTMENT									
LIST OF THE COURSES REVISED/INTRODUCED IN II SEMESTER-2021-2022									
S.NO	TITLE OF THE COURSE	COURSE CODE	OFFERD IN SEM	TYPE OT THE PAPER	YEAR OF INTRODUCTI ON	YEAR OF REVISION	PAGE NUMBERS	OBE WITH BTL	OFFERED TO
1	HINDI-II	HINT21A	II	Second Language	2021-22	NO REVISION	2 - 5	YES	ALL UG PROGRAMMES
2	HINDI-III	HINT01A	IV	Second Language	2022-23	REVISED (10%)	6 - 9	YES	B.COM(G,CA,TPP,A & F , BPM,BFSI), BBA(G), BBA(BA), B.Sc.(CSCS, AI&ML, MSDs), BCA

### The following are the Resolutions:

1. To recommend the revision of syllabus & model question paper of HINDI III with revised course code **HINT01A** in IV semester of B.COM(G,CA,TPP, A & F, BPM,BFSI), BBA(G), BBA(BA), B.Sc.(CSCS, AI&ML, MSDs), BCA for the batch of students admitted in 2021-22 and onwards. For the revised syllabus and model question paper vide Page number from 2 to 5.
2. It is resolved and recommend the revision of model question paper of HINDI II with course code **HINT21A** in II semester of all UG programs for the batch of students admitted in 2022-23 and onwards. For the revised model question paper vide Page Number 6 to 9.

**PARVATHANENI BRAHMAIAH SIDDHARTHA COLLEGE OF ARTS AND SCIENCE; VIJAYAWADA-10**

(An autonomous college in the jurisdiction of Krishna University)

**SEMESTER- II**

**PAPER - II**

**TITLE OF THE PAPER: HINDI-II**

**NO OF HOURS: 60**

**CREDITS: 03**

**WEF: 2021-22**

**COURSE CODE: HINT21A**

### **COURSE OUTCOMES:**

1. मानव मूल्यों से विद्यार्थी अवगत होंगे तथा इस दिशा में आगे बढ़ेंगे।
2. आधुनिक युग की भावनाओं को पहचानकर, निरंतर सामाजिक समस्याओं का सामना करते हुए, आगे बढ़ेंगे।
3. विषय के विश्लेषण से सामाजिक दायित्व को निभाने में अग्रसर होंगे।
4. ग्रहण किये गये पाठ्यांशों के द्वारा विद्यार्थियों का ज्ञान मापन बढ़ेगा तथा अपने क्षेत्र में भी आगे होंगे।
5. भाषा की प्रवीणता और प्रयोग से विद्यार्थी उज्वल भविष्य की ओर बढ़ेंगे।



PARVATHANENIBRAHMAIAH SIDDHARTHA COLLEGE OF ARTS AND SCIENCE; VIJAYAWADA-10

(An autonomous college in the jurisdiction of Krishna University)

SEMESTER- II

PAPER - II

TITLE OF THE PAPER: HINDI-II

NO OF HOURS: 60

CREDITS: 03

WEF: 2021-22

COURSE CODE: HINT21A

## SYLLABUS:

### I. गध्य संदेश:

1. संस्कृति और साहित्य का परस्पर संबंध
2. भारत एक है
3. एच.आई.वी. / एड्स

### II. कथा लोक

1. ज़रिया
2. भूख हड़ताल
3. परमात्मा का कुत्ता

### III. कार्यालयीन हिन्दी शब्दावली

(हिन्दी से अंग्रेजी में बदलना तथा अंग्रेजी से हिन्दी में बदलना)

### IV. व्याकरण: संधि विच्छेद, वाक्य प्रयोग

### V. पत्र लेखन: आवेदन पत्र, पुस्तक विक्रेता के नाम पत्र

### Recommended Books:

1. गध्य संदेश- Dr. V. L. Narasimham Siva Koti
2. कथा लोक- Dr. Ghana Shyam

Course Code: HINT21A  
Time: 3 Hrs.

Max. Marks: 70M  
Pass Min. : 30M

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### SECTION-I

निम्नलिखित प्रश्नों का उत्तर लिखिए।

4×5=20

1. (a) भारत की मध्यकालीन संस्कृति कैसी रही है? L1  
(अथवा)  
(b) विविधता के भीतर भारत की एकता कैसे समायी हुई है? स्पष्ट कीजिए। L1
2. (c) एच.आई.वी./ एड्स के लक्षणों पर प्रकाश डालिए। L2  
(अथवा)  
(d) "अधेड आदमी" चरित्र चित्रण कीजिए। L2
3. (e) "ज़रिया" कहानी का उद्देश्य क्या है? L2  
(अथवा)  
(f) "भूख हड़ताल" की विशेषताएँ क्या-क्या हैं? L2
4. (g) अनुवाद किसे कहते हैं? L1  
(अथवा)  
(h) संधि किसे कहते हैं तथा उसके कितने प्रकार के हैं? L1

### SECTION-II

1×10=10

1. (a) एच.आई.वी./ एड्स के इतिहास पर प्रकाश डालिए। L2  
(अथवा)  
(b) 'भारत एक है' पाठ का सारांश लिखिए। L2

**SECTION-III****1×10=10**

6. (a) "ज़रिया" कहानी का सारांश लिखिए। L2

(अथवा)

(b) "भूख हड़ताल" कहानी का सारांश लिखिए। L2

**SECTION-IV**

7.(a) किन्हीं दस शब्दों को अंग्रेजी से हिंदी में अनुवाद कीजिए। L1

**10×1=10**

- 1.Camp Office 2.Embassy 3.Municipal Corporation 4.Governor 5.Applicant  
6.Charge 7.Absence 8.Supervisor 9.Court 10. Building division  
11.District board 12.Cash section 13. Branch office 14.Complaint office  
15.Enquiry office

(अथवा)

(b) किन्हीं दस शब्दों को हिंदी से अंग्रेजी में अनुवाद कीजिए। L1

- 1.प्रशासनअधिकारी 2.विज्ञापन 3.लेखा परीक्षक 4.प्राचार्य 5.स्वीकार करना  
6.अतिथि गृह 7.प्रयोगशाला 8.हृदय-रोग विभाग 9.जिला बोर्ड 10.कलकटरी  
11.सिविल न्यायालय 12.वन विभाग 13.प्रसारण केन्द्र 14.बजट अनुभाग 15.अस्पताल

8.(a) किन्हीं पाँच शब्दों का संधि विच्छेद कीजिए। L3

**5×2=10**

- 1.रामावतार 2.परमौषध 3.यद्यपि 4.गायक  
5.उन्नति 6.प्रत्येक 7.यशोधरा 8.निराशा

(अथवा)

(b) किन्हीं पाँच शब्दों को वाक्यों में प्रयोग कीजिए। L3

- 1.विरासत 2.अज्ञानांधकार 3.इकट्टा करना 4.बसर करना  
5.दुर्भिक्ष 6.पथ प्रदर्शक 7.हवन 8.चिरस्थाई

**SECTION-V****1×10=10**

9.(a) अनुवादक की नौकरी के लिए प्रबन्धक के नाम पत्र लिखिए। L3

(अथवा)

(b) किसी पुस्तक विक्रेता के नाम पत्र लिखिए। L3

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## Cos:

- 1.दोहों के द्वारा विद्यार्थियोंमें समाज सुधार की भावना, मानव मूल्यों का विकास हो सकेगा।
2. हिंदी साहित्य के इतिहास के द्वारा हिन्दी भाषा और साहित्य की प्रमुखता से परिचित हो सकेंगे।
3. समाज कल्याण के विषयों को समझकर विद्यार्थिअपने ज्ञान का विकास कर सकेंगे।
4. समाज में हिन्दी भाषा के परिचित हो सकेंगे और हिन्दी भाषा का ज्ञानप्राप्तकर दूसरों से आसानी से संप्रेषित करने में सक्षम हो सकेंगे।
- 5.प्रयोजनमूलक हिन्दी प्राप्तकर सकेंगे और हिन्दी में पत्राचार का कौशल विकसित कर सकेंगे।

PARVATHANENI BRAHMAIAH SIDDHARTHA COLLEGE OF ARTS AND SCIENCE; VIJAYAWADA-10

(An autonomous college in the jurisdiction of Krishna University)

SEMESTER- III/IV

PAPER – III/IV

TITLE OF THE PAPER: HINDI-III/IV

NO OF HOURS: 60

CREDITS: 03

WEF: 2021-22

COURSE CODE: HINT01A

## SYLLABUS

### I. काव्य दीपः

- साखी- 1-10 - कबीरदास  
बालवर्णन - सूरदास  
मातृभूमि - मैथिलीशरण गुप्त  
तोडती पत्थर - सूर्यकांत त्रिपाठी निराला  
गीत फरोश - भवानी प्रसाद मिश्र

### II. हिन्दी साहित्य का इतिहासः

काल विभाजन - आचार्य रामचन्द्र शुक्ल के अनुसार  
भक्ति काल : ज्ञानाश्रयी शाखा - कबीर

प्रेमाश्रयी शाखा - जायसी

### III. साधारण निबन्धः समाचार पत्र, पर्यावरण और प्रदूषण,

बेकारी की समस्या, कंप्यूटर

### IV. अनुवाद : (हिन्दी से अंग्रेजी में बदलना तथा अंग्रेजी से हिन्दी में बदलना)

### V. प्रयोजनमूलक हिन्दी: परिपत्र, कार्यालय ज्ञापन, राष्ट्र-भाषा हिन्दी

Recommended Books:

1. काव्य दीप- SRI B. RADHA KRISHNA MURTHY

Course Code: **HINT01A**

Time: 3 Hrs.

Max. Marks: 75M

Pass Min. : 30M

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**PART-A**

I. निम्नलिखित प्रश्नों में से किन्हीं पाँच प्रश्नों का उत्तर दीजिए: 5×5=25M

1. व्याख्या कीजिए। L2

पाहन पूजे हरि मिलै, तो मैं पूजूँ पहाड़।

ताते ये चाकी भली , पीस खाय संसार ।।

2. किसी एक कवि का साहित्यिक परिचय दीजिए। L1

(i) कबीर (ii) सूर्यकांत त्रिपाठी 'निराला'

3. मातृभूमिकविता की विशेषताएँ लिखिए। L1

4. व्याख्या कीजिए । L2

जी गीत जनम का लिखूँ, मरन का लिखूँ,

जी गीत जीत का लिखूँ, शरण कर लिखूँ।

5. ज्ञानमार्ग शाखा की विशेषताएँ बताइए। L2

6. प्रदूषण के निवारणोपाय लिखिए। L1

7. परिपत्र की परिभाषा दीजिए। L1

8. अनुवाद किसे कहते हैं? L2

**PART-B**

II. निम्नलिखित प्रश्नों का उत्तर दीजिए: 5×10=50M

9. किसी एक कविता का सारांश विशेषताओं के सहित लिखिए। L2

(i) गीत फरोश (ii) तोड़ती पत्थर

10. (अ) हिन्दी साहित्य का इतिहास - काल विभाजन के बारे में लिखिए। L2  
अथवा

(आ) प्रेमाश्रय शाखा की विशेषताओं का परिचय दीजिए।

11. किसी एक निबंध पर प्रकाश डालिए। L2

(i) बेकारी की समस्या (ii) पर्यावरण और प्रदूषण (iii) कंप्यूटर

12. (अ) हिन्दी में अनुवाद कीजिए। L2

(i) India is our country

(ii) We should respect our parents

(iii) How many students are there in the class room?

(iv) Where are you going now?

(v) This is our college.

अथवा

(आ) अंग्रेजी में अनुवाद कीजिए।

(i) हम कॉलेज जाते हैं।

(ii) हिन्दी हमारी राष्ट्रभाषा है।

(iii) रमा नाचती है।

(iv) मानव सेवा ही माधव सेवा है।

(v) कल रविवार था।

13. किसी एक पर टिप्पणी लिखिए। L1

(i) परिपत्र (ii) कार्यालय जापन (iii) राष्ट्र-भाषा हिन्दी

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**PARVATHANENI BRAHMAYYA  
SIDDHARTHA COLLEGE OF ARTS & SCIENCE:: VIJAYAWADA – 10**

**DEPARTMENT OF MATHEMATICS**

Minutes of the **online meeting** of the members of Board of Studies in Mathematics held on 10<sup>th</sup> March 2023 through Zoom App at 3.00 p.m.

**Members Present:**

- |   |                 |                            |
|---|-----------------|----------------------------|
| 1. Prof. V. Lakshmi Prasannam<br>Professor & Head                         |                 | Chairman                   |
| 2. Dr. K. Jaya Lakshmi<br>Department of Mathematics<br>Krishna University |                 | University Nominee         |
| 3. Prof. K. K. M. Sarma<br>Department of Mathematics<br>Andhra University |                 | Subject Expert             |
| 4. Prof. Y.N. Reddy<br>Department of Mathematics,<br>NIT, Warangal.       |                 | Subject Expert             |
| 5. Dr. V. Amarendra Babu<br>Department of Mathematics, ANU                |                 | Subject Expert<br>(Alumni) |
| 6. Sri. I.V. Venkateswara Rao,<br>Sr. Asst. Professor & Incharge UG       |                 | Member                     |
| 7. Smt T. Anuradha  | Asst. Professor | Member                     |
| 8. Smt. M Venkata Ramana,   | Asst. Professor | Member                     |
| 9. Sri. Venkatesh Akurathi,   | Asst. Professor | Member                     |
| 10. Smt. K. Anupama,  | Asst. Professor | Member                     |
| 11. Smt. S.Siva Naga Lakshmi,   | Asst. Professor | Member                     |
| 12. Sri. Y Sai Subrahmanyam,  | Asst. Professor | Member                     |
| 13. Sri. A.S. Vara prasad,  | Asst. Professor | Member                     |
| 14. Dr M. Sudha Rani,   | Asst. Professor | Member                     |
| 15. Sri. Y. Ravi Babu   | Asst. Professor | Member                     |
| 16. Kum Ch. Sreedevi  | Asst. Professor | Member                     |
| 17. Smt. J. Nirmala   | Asst. Professor | Member                     |



DEPARTMENT OF MATHEMATICS								
LIST OF THE COURSES REVISED/INTRODUCED IN III & V SEMESTERS 2022-22								
S.No	TITLE OF THE COURSE	COURSE CODE	OFFERED IN SEM	TYPE OF PAPER	YEAR OF INTRODUCTION	YEAR OF REVISION	OBE WITH BTL	OFFERED TO
1	Real Analysis	MATT21B	II	CORE	2021-22	NO REVISION	YES	B.A(EMS) / B.Sc (M.P.C, M.P.Cs, M.E.Cs, M.S.Cs, CA.M.E, M.S.CA)
2	Mathematics for Data Science	MATT28	II	CORE	2020-21	NO REVISION	YES	B.Sc (MSDS)
3	Differential Equations and Graph Theory	MATT210A	II	CORE	2021-22	2022-23(40%)	YES	B.Sc(AI & ML)

## Resolutions:

1. It is resolved and recommended to revision of the model question paper for “**Real Analysis**” with course code **MATT21B** in II semester of B.A / B.Sc (M.P.C, M.P.Cs, M.E.Cs, M.S.Cs, CA.M.E, M.S.CA) for the batch of students admitted in the 2022 - 23 and onwards. For the revised model question paper vide number from 3 to 8.
2. It is resolved and recommended to revision of the model question paper for “**Mathematics for Data Science**” with course code **MATT28** in II semester of B.Sc (MSDS) for the batch of students admitted in the 2022 -23 and onwards. For the revised model question paper vide number from 9 to 14.
3. It is resolved and recommended to revision of syllabus and model question paper of “**Differential Equations and Graph Theory**” with course code **MATT210A** in II semester of B.Sc (AI &ML) for the batch of students admitted in the academic year 2022 – 23 onwards. For the syllabus and model question paper vide number from 15 to 20.

## Department of Mathematics

### COURSE STRUCTURE

Sem	Course Code	Paper	Title of the Paper	Total Marks	Internal Exam	Sem.End Exam	Teaching Hours	Credits
II	MAT T21B	CORE	REAL ANALYSIS	100	30	70	6	5

### Programme Outcomes

S. No	P.O
	At the end of the Programme the student will be able to:
1	Demonstrate the ability to use mathematical skills such as formulating and tackling mathematics related problems and identifying and applying approximate physical principles and methodologies to solve a wide range of problems associated with mathematics.
2	Apply the underlying unifying structures of mathematics and the relationships among them.
3	Investigate and apply mathematical problems and solutions in variety of contexts related to science and technology, business and industry.

### Course Outcomes of MAT T21B

S. No	C.O	Mapping
	Upon successful completion of this course, students should have the knowledge and skills to:	
1	Recognize bounded, convergent, divergent, Cauchy and monotonic sequences and to calculate the limit of a bounded sequence.	L2, PO –1,2
2	Apply the Ratio, Root, Alternating series and limit comparison tests for convergence and absolute convergence of an infinite series of real numbers.	L3, PO – 1
3	Calculate the limit and examine the continuity of a function at a point.	L2,PO – 1
4	Understand the consequences of various mean value theorems for differentiable functions.	L3, PO – 1
5	Determine the Riemann integrability and the Riemann-Stieltjes integrability of a bounded function and prove a selection of theorems concerning integration.	L3, PO – 1



PARVATHANENI BRAHMAYYA SIDDHARTHA COLLEGE OF ARTS & SCIENCE:: VIJAYAWADA-10.

(An Autonomous College in the jurisdiction of Krishna University, Machilipatnam)

MATHEMATICS	MAT T21B	2021-2022 onwards	B.A(EMS), B.Sc. (MPC, MPCS, MECS, CAME, CAMS, MSCS)
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## REAL ANALYSIS

SEMESTER-II

No of Credits: 5

**OBJECTIVE:** TO ENHANCE THE ANALYTICAL SKILLS DATA EVALUATIONAL SKILLS AND LOGICAL THINKINGNESS OF THE STUDENT.

### UNIT-I: SEQUENCES

(18 Hrs)

- 1.1 Sequences, Range of sequences, Subsequences, Bounded sequences
- 1.2 Limit of a sequences, convergent sequences, Divergent and oscillatory sequences.
- 1.3 sandwich Theorem and related problems.
- 1.4 monotonic sequences – theorems – related problems.
- 1.5 Bolzano Weistrass theorem – related problems.
- 1.6 Cauchy sequences, Cauchy general principle of convergence – Related problems.
- 1.7 Cauchy's first theorem of limits, Corollary of Cauchy's first theorem on limits, related problems, Cauchy's second theorem on limits and related problems.

### UNIT-II: INFINITE SERIES

(18 Hrs)

- 2.1 Introduction to Infinite Series, behaviour of the series, Cauchy's general principle of convergence for series,
- 2.2 series of non-negative terms, Geometric series, Auxiliary series
- 2.3 Comparison test of first type, second type, Limit Comparison test – Related Problems.
- 2.4 Cauchy's nth root test – Related problems.
- 2.5 D'Alembert's ratio test and their problems,
- 2.6 Alternating series, Leibnitz's test and Problems.
- 2.7 Absolute convergent series, conditionally convergent series.

### **UNIT-III: LIMITS AND CONTINUITY**

**(18 Hrs)**

- 3.1 Limit of a function, algebra of limits
- 3.2 Sandwich theorem, limits at infinity – Problems.
- 3.3 continuity of a function at a point and on an interval, Algebra of continuous functions,
- 3.4 Standard theorems on Continuous functions.
- 3.5 Uniform Continuity definition – theorems – problems.

### **UNIT-IV: DIFFERENTIATION**

**(18 Hrs)**

- 4.1 Derivative of a function on an interval at a point, Algebra of derivative functions
- 4.2 Increasing and decreasing functions definition and problems
- 4.3 Darboux's theorem, Rolle's Theorem, Lagrange's mean value theorem, Cauchy's mean value theorem and their problems,

### **UNIT-V: RIEMANN INTEGRATION**

**(18 Hrs)**

- 5.1 Introduction, partitions, lower and upper Riemann sums – Properties and problems.
- 5.5 Lower and Upper Riemann Integrals, Darboux's theorem, Riemann Integrability
- 5.7 Necessary and sufficient condition for R-Integrability and problems
- 5.8 Algebra of integrable functions.
- 5.10 Fundamental theorem of integral calculus and problems.
- 5.11 Integral as the limit of a sum and problems.
- 5.12 Mean value theorems of integral calculus.

### **Student Activities:**

- 1) **Class-room activities:** Power point presentations, Assignments
- 2) **Library activities:** Visit to library and preparation of notes for Assignment problems.
- 3) **Activities in the Seminars, workshops and conferences:** Participation/presentation in seminar/workshop/conference.

### **CO-CURRICULAR ACTIVITIES:**

- Quiz Competitions, Seminars
- Group Discussions

### **WEB LINKS:**

[https://drive.google.com/file/d/1BPWJAS6NqSxmYt2VMShpEEM4z52\\_pbW\\_/view?usp=sharing](https://drive.google.com/file/d/1BPWJAS6NqSxmYt2VMShpEEM4z52_pbW_/view?usp=sharing)

<https://drive.google.com/file/d/1oFNosFs8JWqB2pKGqpYtgauRI3BGtJBB/view?usp=sharing>

<b>Prescribed Text books:</b>				
S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHER	YEAR OF PUBLICATION
1	BVSS Sharma, S. AnjaneyaSastry & N. Krishna Murthy	A text book of mathematics for B.A/B.ScVol – II	S-Chand Company Ltd.	2014

<b>Reference books:</b>				
S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHER	YEAR OF PUBLICATION
1	Dr.A. Anjaneyulu	A text book of mathematics for B.A/B.ScVol – I	Deepthi Publications	2015

**SEMESTER – II**  
**Model Paper**

**COURSE CODE : MAT TT21B**

**TITLE OF THE PAPER : REAL ANALYSIS**

**Time: 3hrs.**

**Max. Marks: 70**

**Answer ALL Questions**

**SECTION – A (5 x 4 = 20 Marks)**

1. (a) Prove that every convergent sequence is bounded. (CO1,L1)  
(OR)  
(b) Prove that a convergence sequence has a unique limit. (CO1,L1)
2. (a) If  $\sum U_n$  converges then show that  $\lim_{x \rightarrow \infty} U_n = 0$  (CO2,L1)  
(OR)  
(b) Test for convergence of  $\sum_{n=1}^{\infty} \frac{\sqrt{n}}{n^2 + 1}$  (CO2,L1)
3. (a) Prove that  $\lim_{x \rightarrow 0} \frac{3x + |x|}{7x - 5|x|}$  does not exist. (CO3,L1)  
(OR)  
(b) If  $f(x) = \sin \frac{1}{x}, \forall x \in R - \{0\}$ . Prove that  $\lim_{x \rightarrow 0} \sin \frac{1}{x}$  does not exist. (CO3,L1)
4. (a) Find 'C' of Cauchy's mean value theorem  $f(x) = \frac{1}{x^2}, g(x) = \frac{1}{x}$  on  $[a, b], a, b > 0$  (CO4,L2)  
(OR)  
(b) Prove that  $f(x) = \frac{x}{\sin x}$  is increasing in  $\left[0, \frac{\pi}{2}\right]$  (CO4,L2)
5. (a) If  $f(x) = x$  on  $[0, 1]$  and  $P = \left\{0, \frac{1}{4}, \frac{2}{4}, \frac{3}{4}, 1\right\}$  compute  $L(p, f)$  and  $U(p, f)$ . (CO5,L2)  
(OR)  
(b) Prove that every constant function is Riemann integrable on  $[a, b]$ . (CO5,L2)

**Answer ALL Questions**

**SECTION – B (5 x 10 = 50 Marks)**

6. (a) If  $S_n = \frac{1}{n+1} + \frac{1}{n+2} + \dots + \frac{1}{n+n}$  then show that  $\{S_n\}$  is convergent. (CO1, L2)  
(OR)  
(b) State and Prove Cauchy's general principle of convergence for sequences. (CO1,L2)

**(P.T.O)**

7. (a) State and Prove D'Alembert's ratio test. (CO2,L3)  
(OR)
- (b) Show that the Series  $\sum_{n=1}^{\infty} (-1)^n (\sqrt{n^2 + 1} - n)$  is conditionally convergent. (CO2,L3)
8. (a) Prove that if  $f : S \rightarrow R$  is uniformly continuous then  $f$  is continuous in  $S$ . Is the converse true? Justify your answer. (CO3,L2)  
(OR)
- (b) Examine for continuity the function  $f(x) = |x| + |x-1|$  at  $x = 1$  (CO3,L2)
9. (a) State and Prove Rolle's Theorem. (CO4,L3)  
(OR)
- (b) Show that  $\frac{v-u}{1+v^2} < \tan^{-1} v - \tan^{-1} u < \frac{v-u}{1+u^2}$  for  $0 < u < v$ . Hence deduce that  

$$\frac{\pi}{4} + \frac{3}{25} < \tan^{-1} \frac{4}{3} < \frac{\pi}{4} + \frac{1}{6}$$
 (CO4,L3)
10. (a) Show that  $f(x) = 3x + 1$  is integrable on  $[1, 2]$  and  $\int_1^2 (3x + 1) dx = \frac{11}{2}$  (CO5,L3)  
(OR)
- (b) Prove that every continuous function in  $[a, b]$  is Riemann Integrable. (CO5,L3)

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## Department of Mathematics

### COURSE STRUCTURE

Sem	Course Code	Paper	Title of the Paper	Total Marks	Internal Exam	Sem.End Exam	Teaching Hours	Credits
I	MATT 28	CORE	MATHEMATICS FOR DATA SCIENCE	100	30	70	6	5

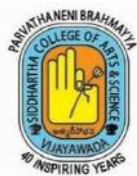
### Programme Outcomes

S. No	P.O
	At the end of the Programme the student will be able to:
1	Demonstrate the ability to use mathematical skills such as formulating and tackling mathematics related problems and identifying and applying approximate physical principles and methodologies to solve a wide range of problems associated with mathematics.
2	Apply the underlying unifying structures of mathematics and the relationships among them.
3	Investigate and apply mathematical problems and solutions in variety of contexts related to science and technology, business and industry.

### Course Outcomes of MATT

S. No	C.O	Mapping
	Upon successful completion of this course, students should have the knowledge and skills to:	
1	Evaluate system of equation's by Cramer's rule ,Matrix inversion method, Gauss elimination method	L3, PO – 1
2	Evaluate problems on PDNF and PCNF.	L5, PO – 1
3	Define various types of graphs	L3,PO – 1
4	Evaluate Hamiltonian paths and circuits	L5, PO – 1
5	Distinguish various types of trees and their properties	L3, PO – 2





PARVATHANENI BRAHMAYYA SIDDHARTHA COLLEGE OF ARTS & SCIENCE:VIJAYAWADA-10  
(An Autonomous College in the jurisdiction of Krishna University, Machilipatnam)

MATHEMATICS	MAT T28	2020 – 21 onwards	B.Sc (MSDS)
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## MATHEMATICS FOR DATA SCIENCE

### SEMESTER-II

No of Credits: 5

**OBJECTIVES:** 1. TO ENHANCE THE COMPUTATIONAL SKILLS AND APPLICATION SKILLS.

### UNIT I: MATRICES

(18 hrs)

- 1.1 Definition, addition and multiplication of matrices, various types of matrices,
- 1.2 Determinant of a square matrix, Inverse of a matrix.
- 1.3 Solution of system of non homogeneous linear equations by Cramer's rule
- 1.4 Matrix inversion method
- 1.5 Gauss Jordan method

### UNIT II: MATHEMATICAL LOGIC

(18 hrs)

- 2.1 Connectives, Negation, Conjunction, Disjunction, Conditional and Bi-Conditional statements.
- 2.2 Well formed formulae, Tautologies, Equivalence of formulae, Duality.
- 2.3 Tautological implications functionally complete set of connectives.
- 2.4 Principal Disjunctive Normal Forms (using truth tables).
- 2.5 Principal Conjunctive Normal Forms (using truth tables).

### UNIT III: GRAPHS

(18 hrs)

- 3.1 Graphs, Simple Graph, Multiple Graph, Undirected and Directed graph, degree of vertex, the Handshaking theorem.
- 3.2 Travelling Salesman problem, types of Graphs
- 3.3 Sub graphs and Isomorphism of graphs
- 3.4 Operations of graphs.
- 3.5 Adjacency and Incidence matrix
- 3.6 Paths, cycles, connectivity

### UNIT IV: CONNECTED GRAPHS

(18 hrs)

- 4.1 Connectedness in undirected graph
- 4.2 Cut vertex, cutset, bridge
- 4.3 Connectedness in directed graphs
- 4.4 Edge connectivity.
- 4.5 Eulerian graph, Eulerian trail, Eulerian Circuit, Euler Circuit, Euler path
- 4.6 Theorems on Eulerian graphs – related problems
- 4.7 Hamilton circuits, Hamilton path, Hamilton graph.

## UNIT V:TREES

(18 hrs)

5.1 Trees, properties, distance and centres in trees.

5.2 Rooted and binary trees, spanning trees, shortest spanning trees.

5.3 Weighted graph, minimal spanning trees Kruskal's algorithm and Prim's algorithm.

5.4 Tree traversals.

### Student Activities:

- 1) **Class-room activities:** Power point presentations, Assignments
- 2) **Library activities:** Visit to library and preparation of notes for Assignment problems.
- 3) **Activities in the Seminars, workshops and conferences:** Participation/presentation in seminar/workshop/conference.

### CO-CURRICULAR ACTIVITIES:

- Quiz Competitions, Seminars
- Group Discussions

### WEB LINKS:

<http://mathssnsce.weebly.com/uploads/2/5/0/1/25011348/unit-3.pdf>

<https://www.britannica.com/topic/graph-theory>

<b>Prescribed Text book:</b>				
S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHER	YEAR OF PUBLICATION
1.	J.L. Mott, A.Kandel, T.P.Baker.	Discrete mathematics for computer scientists and mathematics.	Prentice – Hall of India Private Limited.	2 <sup>nd</sup> Edition – 2009.
2.	J.P Tremblay and R.Manohar	Discrete mathematical structures with Applications to Computer Science.	Tata McGraw-Hill	1997.
3.	V. Venkateswara Rao, N. Krishna Murthy.	A text book of Mathematics for B.A/B.Sc Vol – III.	S. Chand Publication	2006

<b>Reference books:</b>				
S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHER	YEAR OF PUBLICATION
1.	J.A.Bondy and U.S.R.Murthy	Graph theory with Applications	Mac.Millan Press	
2.	Introduction to Graph theory	S.Arumugham and S.Ramachandran	Scitech Publications, Chennai-17	

**SEMESTER –II**

**MODEL QUESTION PAPER (w.e.f 2022-23)**

COURSE CODE : MAT T28

TITLE OF THE PAPER : MATHEMATICS FOR DATA SCIENCE

Time: 3hrs.

Max. Marks: 70

**Answer ALL Questions**

**SECTION – A (5 x 4 = 20 Marks)**

1.(a) Solve the equations  $x + y + 2z = 4, 3x + y - 3z = -4, 2x - 3y - 5z = -5$  by Cramer's rule. (CO1, L3)

(OR)

(b) Find the inverse of the matrix  $A = \begin{bmatrix} -2 & 2 & -3 \\ 2 & 1 & -6 \\ -1 & -2 & 0 \end{bmatrix}$  (CO1, L3)

2.(a) Define Conjunction and Disjunction (CO2, L1)

(OR)

(b) Construct the truth table for  $\sim PVQ$  (CO2, L1)

3. (a) Show that the degree of the vertex of a simple graph G on n vertices cannot exceed n-1 edges (CO3, L3)

(OR)

(b) Explain travelling sales man problem (CO3, L3)

4.(a) Explain edge connectivity, vertex connectivity with examples. (CO4, L3)

(OR)

(b) Give an example of a graph which contains an Eulerian circuit that is also a Hamiltonian cycle. (CO4, L3)

5.(a) Explain BFS algorithm. (CO5, L3)

(OR)

(b) Define binary tree with example. (CO5, L3)

**Answer ALL Questions**

**SECTION – B (5 x 10 = 50 Marks)**

6.(a) Solve the equation  $x + 2y + z = 4, 2x + y = 3, x + z = 2$  by using Gauss Jordan method (CO1, L3)

(OR)

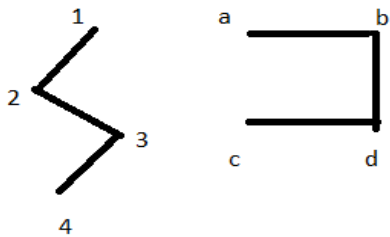
(b) Solve the equations  $x + y + z = 6; 3x + 3y + 4z = 20; 2x + y + 3z = 13$  using Matrix-Inversion method. (CO1, L3)

7.(a) Prove that  $[(p \wedge \sim q) \rightarrow r] \rightarrow [p \rightarrow (q \vee r)]$  is a tautology. (CO2, L3)  
 (OR)

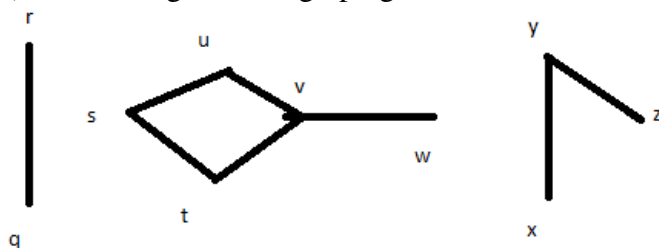
(b) Obtain the PDNF of  $P \vee (\sim P \rightarrow (Q \vee (\sim Q \rightarrow R)))$  (CO2, L3)

8.(a) Prove that Kurtowski's graph  $K_5$  is non planar (CO3, L3)  
 (OR)

(b) Show that the two graphs shown in the figure are isomorphic (CO3, L3)



9. (a) Find the  
 i) Vertex sets of the components  
 ii) Cut vertices  
 iii) Cut edges of the graph given below (CO4, L3)



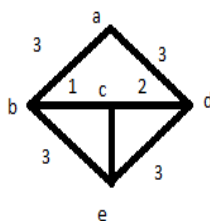
(OR)

(b) Show that the edge connectivity of a graph  $G$  cannot exceed the minimum degree of a vertex in  $G$  i.e.,  $\lambda(G) \leq \delta(G)$  (CO4, L3)

10. (a) Define Spanning tree and show that a simple graph  $G$  has a spanning tree iff  $G$  is connected. (CO5, L3)

(OR)

(b) Using Kruskal's algorithm to find a minimal spanning tree for the graph (CO5, L3)



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## Department of Mathematics

### COURSE STRUCTURE

Sem	Course Code	Paper	Title of the Paper	Total Marks	Internal Exam	Sem.End Exam	Teaching Hours	Credits
II	MATT210A		DIFFERENTIAL EQUATIONS & GRAPH THEORY	100	30	70	6	5

### Programme Outcomes

S. No	P.O
	At the end of the Programme the student will be able to:
1	Demonstrate the ability to use mathematical skills such as formulating and tackling mathematics related problems and identifying and applying approximate physical principles and methodologies to solve a wide range of problems associated with mathematics.
2	Apply the underlying unifying structures of mathematics and the relationships among them.
3	Investigate and apply mathematical problems and solutions in variety of contexts related to science and technology, business and industry.

### Course Outcomes of MATT25

S. No	C.O	Mapping
	Upon successful completion of this course, students should have the knowledge and skills to:	
1	Determine the solution of differential equations of the first order and of the first degree by Exact, Non-Exact, Linear and Bernoulli's method	L2, PO – 1
2	Understand the basic concepts of first order differential equations to find orthogonal trajectories, Newton's law of cooling, Growth and Decay	L3, PO – 1
3	Compute all solutions of second and higher order linear differential equations with constant coefficients, linear equations with variable coefficients	L2, PO – 1
4	Define various types of graphs	L3, PO – 1
5	Evaluate Hamiltonian paths and circuits	L3, PO – 1



PARVATHANENI BRAHMAYYA SIDDHARTHA COLLEGE OF ARTS & SCIENCE:VIJAYAWADA-10  
(An Autonomous College in the jurisdiction of Krishna University, Machilipatnam)

MATHEMATICS	MAT T210A	2022 – 23 onwards	B.Sc (AI & ML)
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## DIFFERENTIAL EQUATIONS AND GRAPH THEORY

**SEMESTER- II**

**No of Credits: 5**

### **OBJECTIVES:**

1. TO FAMILIARIZE A VARIETY OF WELL KNOWN SEQUENCES AND SERIES WITH A DEVELOPING INTUITION ABOUT THE BEHAVIOUR OF NEW ONES.
2. TO ENLIGHTEN THE LEARNER IN THE CONCEPT OF DIFFERENTIAL EQUATIONS.

### **UNIT I: DIFFERENTIAL EQUATIONS OF FIRST ORDER & FIRST DEGREE (18 hrs)**

- 1.1 Exact Differential Equations
- 1.2 Equations reducible to Exact form
- 1.3 Linear Differential Equations
- 1.4 Differential Equations Reducible to Linear Form, Bernoulli's differential equations.

### **UNIT II: APPLICATIONS OF DIFFERENTIAL EQUATIONS (18 hrs)**

- 2.1 Orthogonal Trajectories in Cartesian form
- 2.2 Orthogonal Trajectories in Polar form
- 2.3 Newton's Law of Cooling
- 2.4 Growth and decay

### **UNIT III: LINEAR DIFFERENTIAL EQUATIONS OF HIGHER ORDER (18 hrs)**

- 3.1 Solution of homogeneous linear differential equations of order  $n$  with constant coefficients.
- 3.2 Solution of non homogeneous linear differential equations with constant coefficients by means of polynomial operators.

- 3.3 P.I. of  $f(D)y = Q$  when  $Q = be^{ax}$
- 3.4 P.I. of  $f(D)y = Q$  when  $Q$  is  $b \sin ax$  or  $b \cos ax$ .
- 3.5 P.I. of  $f(D)y = Q$  when  $Q = bx^k$
- 3.6 P.I. of  $f(D)y = Q$  when  $Q = e^{ax} V$
- 3.7 Method of Variation of Parameters

**UNIT IV: GRAPHS**

**(18 hrs)**

- 4.1 Graphs, Simple Graph, Multiple Graph, Undirected and Directed graph, degree of vertex, the Handshaking theorem.
- 4.2 Travelling Salesman problem, types of Graphs
- 4.3 Sub graphs and Isomorphism of graphs
- 4.4 Adjacency and Incidence matrix
- 4.5 Paths, cycles, connectivity

**UNIT V:CONNECTED GRAPHS**

**(18 hrs)**

- 5.1 Connectedness in undirected graph
- 5.2 Cut vertex, cutest Connectedness in directed graphs
- 5.3 Edge connectivity.
- 5.4 Eulerian graph, Eulerian trail, Eulerian Circuit, Euler Circuit, Euler path
- 5.5 Theorems on Eulerian graphs – related problems
- 5.6 Hamilton circuits, Hamilton path, Hamilton graph.

<b>Prescribed Text book:</b>				
<b>Reference books:</b>				
S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHER	YEAR OF PUBLICATION
1.	Dr.A. Anjaneyulu	A text book of mathematics for	Deepthi Publications	2015
2.	M.D Raisinghania	B.A/B.Sc Vol – I & II	S – Chand	2003
3	J.A.Bondy and U.S.R.Murthy	Ordinary and Partial Differential Equations	Mac.Millan Press	
4	Introduction to Graph theory	Graph theory with Applications	Scitech Publications, Chennai-17	
		S.Arumugham and S.Ramachandran		



## **Student Activities:**

- 1) **Class-room activities:** Power point presentations, Assignments
- 2) **Library activities:** Visit to library and preparation of notes for Assignment problems.
- 3) **Activities in the Seminars, workshops and conferences:** Participation/presentation in seminar/workshop/conference.

## **Co – Curricular Activities:**

- Quiz Competitions, Seminars
- Group Discussions

## **Web – Links:**

[https://en.wikipedia.org/wiki/Differential\\_equation](https://en.wikipedia.org/wiki/Differential_equation)

<https://tutorial.math.lamar.edu/classes/de/de.aspx>

<https://www.mathsisfun.com/calculus/differential-equations.html>

**SEMESTER –II**

**MODEL QUESTION PAPER (w.e.f 2022-23)**

COURSE CODE: MAT T210A

TITLE OF THE PAPER: DIFFERENTIAL EQUATIONS AND GRAPH THEORY

**Time: 3hrs.**

**Max. Marks: 70M**

**ANSWER ALL QUESTIONS**

**SECTION – A (5 X4 = 20 Marks)**

- 1 (a) Determine the solution of  $2xy \, dy - (x^2 + y^2 + 1) \, dx = 0$  (CO1, L1)  
(OR)
- (b) Determine the solution of  $x \frac{dy}{dx} + 2y - x^2 \log x = 0$  (CO1, L1)
- 2 (a) Find the orthogonal trajectories of the family of rectangular hyperbolas  $xy = a^2$  where  $a$  is a parameter. (CO2, L3)  
(OR)
- (b) Find the orthogonal trajectories of the family of straight lines in a plane and passing through the origin. (CO2, L3)
- 3(a) Compute the P.I of  $(D^3 + 4D)y = \sin 2x$  (CO3, L1)  
(OR)
- (b) Compute the C.F of  $(D^3 + 3D^2 + 3D + 1)y = e^{5x}$  (CO3, L1)
4. (a) Show that the degree of the vertex of a simple graph  $G$  on  $n$  vertices cannot exceed  $n-1$  edges (CO4, L2)  
(OR)
- (b) Explain travelling sales man problem (CO4, L2)
- 5.(a) Explain edge connectivity, vertex connectivity with examples. (CO5, L1)  
(OR)
- (b) Give an example of a graph which contains an Eulerian circuit that is also a Hamiltonian cycle. (CO5, L1)

**ANSWER ALL QUESTIONS**

**SECTION – A (5 X10 = 50 Marks)**

- 6 (a). Solve  $x(1 + xy) \, dy + y(1 - xy) \, dx = 0$  (CO1, L3)  
(OR)
- (b). Solve  $x \frac{dy}{dx} + y = y^2 \log x$  (CO1, L3)

7 (a) Find the orthogonal trajectories of the family of  $r = a(1 - \cos \theta)$  where  $a$  is a parameter  
(CO2, L3)

(OR)

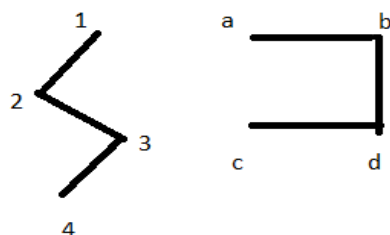
(b) Show that the family of confocal conics  $\frac{x^2}{a^2 + \lambda} + \frac{y^2}{b^2 + \lambda} = 1$  is self-orthogonal,  
where  $\lambda$  is a parameter. (CO2, L3)

8 (a) Solve  $\frac{d^2y}{dx^2} - 6\frac{dy}{dx} + 13y = 8e^{3x} \sin 2x$  (CO3, L2)  
(OR)

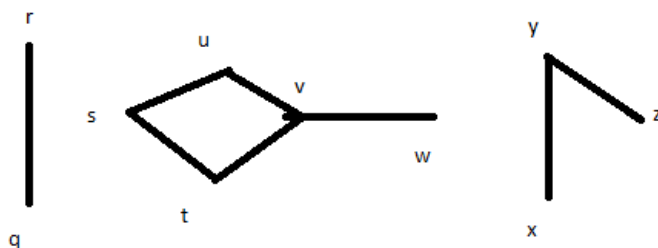
(b) Solve  $(D^2 - a^2)y = \sec ax$  by the method of variation of parameters (CO3, L2)

9 (a) State and Prove Handshaking Theorem. (CO4, L3)  
(OR)

(b) Show that the two graphs shown in the figure are isomorphic (CO4, L3)



10 (a) Find the  
i) Vertex sets of the components  
ii) Cut vertices  
iii) Cut edges of the graph given below (CO5, L3)



(OR)

(b) Show that the edge connectivity of a graph  $G$  cannot exceed the minimum degree of a vertex in  $G$  i.e.,  $\lambda(G) \leq \delta(G)$  (CO5, L3)

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## DEPARTMENT OF PHYSICS

Board of Studies meeting 2022-2023 (Even Semester) in Physics was held on 4<sup>th</sup> March 2023 for UG Programmes, in the department of Physics

### Members Present

1.	Dr. T. Srinivasa Krishna In charge UG HOD, Physics	Chairman	Sd/-
2.	Dr. P. B. Sandhya Sri	University Nominee	Sd/-
3.	Dr. R. P Vijaya Lakshmi	Subject Expert	Sd/-
4.	Dr. D. Haranath	Outside Subject Expert	Sd/-
5.	Dr.T. Srikumar	Alumna	Sd/-
6.	Sri N. Raja Sekhar, Asst Professor in Physics	Member	Sd/-
7.	Dr. Sk. Khaja Muswareen, Asst Professor in Physics	Member	Sd/-
8.	Sri J Panduranga Rao, Asst Professor in Physics	Member	Sd/-

## Resolutions

1. It is resolved and recommended the revision of the model question paper of Wave Optics with course code PHYT21C in II semester of MPC & MPCS for the batch of students admitted in 2022-23 and onwards. For the revised model question paper vide Page Number 3 to 8.
2. It is resolved and recommended the revision of the model question paper of Wave Optics with course code PHYP21C in II semester of MPC & MPCS for the batch of students admitted in 2022-23 and onwards. For the revised model question paper vide Page Number 9 to 10.
3. It is resolved and recommended the revision of the model question paper of **ELECTRIC APPLIANCES** with course code SDCPHYP01 in II semester of MPC & MPCS for the batch of students admitted in 2022-23 and onwards. For the revised model question paper vide Page Number 11 to 12.



## P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

Siddhartha Nagar, Vijayawada – 520 010

*Autonomous - ISO 9001 - 2015 Certified*

### **Title of the Paper: WAVE OPTICS**

**Offered to :** B.Sc (MPC & MPCs) PHYT21C

**Course Type :** Core (TH)

**Year of Introduction:** 2020-21

**Year of Revision:** 2021-22

**Percentage of Revision:** NIL

**Semester :** II

**Credits :** 3

**Hours Taught :** 60 hrs. per Semester

**Max.Time :** 3 Hours

#### **Course Objectives:**

- To help students to understand the nature of light, its propagation and interaction with matter which is essential to constantly emerging newest technologies.
- To create interest among the students about modern communication systems by studying wave optics.
- Students will be able to understand applications of interference, diffraction, lasers in real life situations.

#### **Course Outcomes:** At the end of this course, students should be able to:

- ❖ Understand the phenomenon of interference of light and its formation in (i) Lloyd's single, Newton's rings and Michelson interferometer.
- ❖ Distinguish between Fresnel's diffraction and Fraunhofer diffraction and observe the diffraction patterns in the case of a single slit and the diffraction grating.
- ❖ Explain the various methods of production of plane, circularly and polarized light and their detection and the concept of optical activity.
- ❖ Comprehend the basic principle of laser, the working of He-Ne laser and Ruby lasers and their applications in different fields.

## Syllabus

### Course Details

Unit	Learning Units	Lecture Hours
I	<p><b>Interference of light: (Problem)</b></p> <p><b>A) Division of Wavefront:</b> Introduction, Conditions for the interference of light, Interference of light by division of wavefront and amplitude, Phase change on reflection- Stokes' treatment, Fresnel's Bi-Prism-Determination of Wavelength of Light.</p> <p><b>B) Division of Amplitude:</b> Cosine law - colours in thin films, Newton's rings in reflected light-Theory and experiment - Determination of wavelength of monochromatic light, Michelson interferometer and determination of wavelength.</p>	12
II	<p><b>Diffraction of light (Problem)</b></p> <p><b>A) Fraunhofer Class:</b> Distinction between Fresnel and Fraunhofer diffraction, Fraunhofer diffraction at a single slit, Double slit and N-slits (No Derivation for N-Slits), Determination of wavelength of light using a diffraction grating, Resolving power of grating,</p> <p><b>B) Fresnel's Class:</b> Fresnel's half-period zones, Zone plate, comparison of zone plate with a convex lens.</p>	12
III	<p><b>Polarisation of light (Problem)</b></p> <p><b>A) Polarized light:</b> Methods of production of plane-polarized light - Polarisation by reflection (Brewster's law), Malus law, Double refraction, Nicol prism, Nicol prism as polarizer and analyzer</p> <p><b>B) Types and production of polarized Light:</b></p> <p>Quarter wave plate, Half wave plate, Plane, Circularly and Elliptically polarized light-Production and detection, Optical activity, Laurent's half shade polarimeter: determination of the specific rotation</p>	12
IV	<p><b>A) Aberrations: (Problem)</b></p> <p>Monochromatic aberrations - Spherical aberration, Methods of minimizing spherical aberration, Coma &amp; Astigmatism -</p>	12

	<p>minimization methods, Chromatic aberration-the achromatic doublet; Achromatism for two lenses (i) in contact and (ii) separated by a distance.</p> <p><b>B) Fibre Optics: (No Problem)</b></p> <p>Fibre optics: Introduction to Fibers, different types of fibers, rays and modes in an optical fiber, Principles of fiber communication (qualitative treatment only), Advantages of fiber optic communication.</p>	
V	<p><b>Lasers and Holography (No Problem)</b></p> <p><b>A) Lasers:</b> Introduction, Spontaneous emission, stimulated emission, Population Inversion, Laser principle, Einstein coefficients, Types of lasers-He-Ne laser, Ruby laser, Applications of lasers;</p> <p><b>B) Holography:</b> Basic principle of holography, Applications of holography</p>	12

#### **Text BOOKS:**

- BSc Physics, Vol.2, Telugu Akademy, Hyderabad
- Unified Physics Vol.II Optics, Jai PrakashNath & Co.Ltd., Meerut., Meerut

#### **REFERENCE BOOKS:**

1. A Text Book of Optics-N Subramanyam, L Brijlal, S.Chand &Co.
2. Optics-Murugesan, S. Chand & Co.
3. Optics, F.A. Jenkins and H.G. White, McGraw-Hill
4. Optics, Ajoy Ghatak, Tata McGraw-Hill.
5. Introduction of Lasers – Avadhanulu, S. Chand &Co.
6. Principles of Optics- BK Mathur, Gopala Printing Press,1995

#### **STUDENT ACTIVITY**

1. Seminars
2. Assignments.

#### **LIBRARY ACTIVITY**

Students visit the library to refer and gather information regarding seminar topics and assignments.



## **RECOMMENDED CO-CURRICULAR ACTIVITIES:**

### MEASURABLE

- Assignments (in writing and doing forms on the aspects of syllabus content and outside the syllabus content. Shall be individual and challenging)
- Student seminars (on topics of the syllabus and related aspects (individual activity))
- Quiz (on topics where the content can be compiled by smaller aspects and data (Individuals or groups as teams))
- Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual participation and contribution of students shall be ensured (team activity))

### GENERAL

- Group Discussion
- Visit to Research Stations/laboratories and related industries

## **RECOMMENDED ASSESSMENT METHODS**

Some of the following suggested assessment methodologies could be adopted;

- The oral and written examinations (Scheduled and surprise tests),
- Practical assignments and laboratory reports,
- Efficient delivery using seminar presentations,
- Viva voce interviews.

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**PARVATHANENI BRAHMAYYA SIDDHARTHA COLLEGE OF ARTS & SCIENCE**

**VIJAYAWADA – 520 010**

(An Autonomous College in the jurisdiction of Krishna University)

Accredited at the 'A<sup>+</sup>' level by NAAC

Model Question Paper

Title of the Paper: **Wave Optics**

Course Code: PHYT21C

**Section-A**

Answer the following:

5X10=50M

1. a) Describe the experimental arrangement for observation of Lloyd's mirror fringes. (CO2, L2)

(OR)

b) Describe Newton's rings method for measuring the wave length of monochromatic light with necessary theory. (CO1, L2)

2. a) What is diffraction? Explain the Fraunhofer diffraction due to single slit with intensity distribution. (CO2, L3)

(OR)

b) Describe the construction and working of zone plate. Derive the equation for its focal length. (CO2, L3)

3. a) Describe the construction and working of Nicol prism. Explain how it can be used as polarizer and analyzer. (CO3, L1)

(OR)

b) What is specific rotation? Describe how specific rotation of sugar solution can be determined experimentally. (CO3, L2)

4. a) Define chromatic aberration, Derive the condition for Achromatism for when two lenses are in contact. (CO4, L1)

(OR)

b) Define fibre optics and explain the types of fibres. (CO1, L2)

5. a) What is LASER? Explain the construction and working of Ruby laser with neat diagram. (CO5, L2)

(OR)

b) Explain the basic principle of holography and write the applications of holography. (CO5, L2)

### Section-B

Answer the following:

5X4=20M

6. a) Explain the formation of Colours in thin films. (CO1, L2)  
(OR)  
b) Derive an expression for resolving power of plane transmission grating. (CO2, L3)
7. a) State and prove Malus law. (CO3, L3)  
(OR)  
b) Write a note on coma. (CO4, L1)
8. a) Write any four applications of Optical fiber. (CO5, L2)  
(OR)  
b) Write any four applications of LASER. (CO4, L2)
9. a) Find the focal lengths of the two lenses made of crown and flint glasses with dispersive powers 0.015 and 0.025 respectively in order to make an achromatic converging lens of focal length 25cm. (CO1, L3)  
(OR)  
b) In a Newton's ring experiment, the diameter of the 10th dark ring is 0.433 cm. Find the wavelength of the incident light, if the radius of curvature of the lens is 80 cm. (CO1, L3)
10. a) A diffraction grating has 15 cm of the surface ruled with 6000 lines per cm. Evaluate the resolving power of grating in the first order. (CO1, L3)  
(OR)  
b) A half wave plate is constructed for a wavelength of  $6000\text{\AA}$ . Find the value of wavelength of light for which this plate works as a quarter wave plate. (CO1, L3)

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## Practical Course II: Wave Optics

Work load:30hrs

Course Code: PHY P21C

2 hrs/week

### Course outcomes (Practicals):

On successful completion of this practical course the student will be able to,

1. Gain hands-on experience of using various optical instruments like spectrometer, polarimeter and making finer measurements of wavelength of light using Newton Ring experiment, diffraction grating etc.
2. Understand the principle of working of polarimeter and the measurement of specific rotatory power of sugar solution
3. Know the techniques involved in measuring the resolving power of telescope and dispersive power of the material of the prism.
4. Be familiar with the determination of refractive index of liquid by Boy's method and the determination of thickness of a thin wire by wedge method.

### Minimum of 6 experiments to be done and recorded

1. Determination of radius of curvature of a given convex lens-Newton's rings.
2. Resolving power of grating.
3. Study of optical rotation –polarimeter.
4. Dispersive power of a prism.
5. Determination of wavelength of light using diffraction grating-minimum deviation method.
6. Determination of wavelength of light using diffraction grating-normal incidence method.
7. Resolving power of a telescope.
8. Refractive index of a liquid-hallow prism
9. Determination of thickness of a thin wire by wedge method
10. Determination of refractive index of liquid-Boy's method.

Note :

1. 8 (Eight) experiments are to be done and recorded in the lab. These experiments will be evaluated in CIA.
2. For certification minimum of 7 (Seven) experiments must be done and recorded by student who had put in 75 % of attendance in the lab.
3. **Best 6 experiments are to be considered for CIA.**
4. 15 marks for CIA. 5 marks for Record
5. 35 marks for practical exam.

**The marks distribution for the Semester End practical examination is as follows:**

Formula/ Principle / Statement with explanation of symbols	05
Diagram/Circuit Diagram / Tabular Columns	05
Setting up of the experiment and taking readings/Observations	10
Calculations (explicitly shown) + Graph + Result with Units	05
Procedure and precautions	05
Viva-voce	05
<b>Total Marks:</b>	<b>35</b>

# P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

Siddhartha Nagar, Vijayawada – 520 010

*Autonomous -ISO 9001 - 2015 Certified*

## Title of the Paper: ELECTRIC APPLIANCES

**Offered to:** B.Sc. (MPC & MPCs)

**Course Type:** Core (L) SDCPHYP01

**Year of Introduction:** 2020-21

**Semester:** II (MPC& MPCs)

**Credits:** 02

**Hours Taught:** 2 hr /week

**Max.Time:** 2 Hours

Learning Outcomes:

By successful completion of the course, students will be able to:

- CO1: Acquire necessary skills/hand on experience/ working knowledge on single phase and three phase connections, basics of electrical wiring with electrical protection devices.
- CO2: Understand the working principles of different household domestic appliances.
- CO3: Check the electrical connections at house-hold but will also learn the skill to repair the electrical appliances for the general troubleshoot and wiring faults.

### List of Experiments

1. To control one lamp by one switch
2. Two lamps controlled by single switch in series connection
3. Two lamps controlled by single switch in parallel connection
4. Stair case wiring
5. Verification of Kirchoff's laws
6. Verification of Ohm's law
7. Preparation of LED/Fluorescent lamp

Note :

1. 7 (Seven) experiments are to be done and recorded in the lab. These experiments will be evaluated in CIA.
2. For certification minimum of 6 (Six) experiments must be done and recorded by student who had put in 75 % of attendance in the lab.
3. **Best 6 experiments are to be considered for CIA.**
4. 15 marks for CIA. 5 marks for Record
5. 35 marks for practical exam.

**The marks distribution for the Semester End practical examination is as follows:**

Formula/ Principle / Statement with explanation of symbols	05
Diagram/Circuit Diagram / Tabular Columns	05
Setting up of the experiment and taking readings/Observations	10
Calculations (explicitly shown) + Graph + Result with Units	05
Procedure and precautions	05
Viva-voce	05
<b>Total Marks:</b>	<b>35</b>

## DEPARTMENT OF STATISTICS

A meeting of the Board of Studies in **Statistics** will be held on **11-3-2023 at 11.00 a.m.** in the Department of Statistics, P.B.Siddhartha College of Arts & Science, Vijayawada-10.

### AGENDA

1. To discuss changes in the model papers of Statistics for B.A(EMS)/ B.Sc.(M.S.Cs, Ca.M.S, M.S.Ds, AI&ML & CSCS)/B.B.A.(General, RM & BA) in semester II w.e.f. the admitted batch of the academic year 2022-23.
2. To discuss syllabus with COs and model paper mapped with COs which is developed in line with OBE of **Statistics** to B.Sc.( M.S.Cs, Ca.M.S, M.S.Ds, AI&ML & CSCS)/B.B.A.(General, RM & BA) and BA(EMS) in semester II & IV w.e.f. the admitted batch of the academic year 2022-23 & 2021-2022.
3. Any other item with the permission of the Chairman.

### Members present

1	Sri G. Chakravarthi, HOD, Statistics	Chairman	Sd/-
2	Dr.Nunna SrinivasaRao, HOD, Andhra Loyola, Vijayawada	University Nominee	Sd/-
3	Prof . A. VasudevaRao Department of Statistics Acharya Nagarjuna University	Subject Expert	Sd/-
4	Dr K Rajyalakshmi, Assistant Professor Department of Mathematics, Koneru Lakshmaiah Education Foundation,	Subject Expert	Sd/-
5	M. Chenchu. Ramaiah Inductive Quotient Analytics India Pvt Ltd	Industrialist	Sd/-
6	Sri E. Murali Krishna, Lecturer in Statistics	Member	Sd/-
7	Sri A. Balaji, Lecturer in Statistics	Member	Sd/-
8	Sri K. Sivanagaraju, Lecturer in Statistics	Member	Sd/-
9	Sri N. Rakesh, Lecturer in Statistics	Member	Sd/-
10	Smt N. Sri Lekha, Lecturer in Statistics	Member	Sd/-
11	Kumari K.Divya, Lecturer in Statistics	Member	Sd/-
12	Smt M. Siva Paravathi, Lecturer in Statistics	Member	Sd/-
13	Smt G. Bhargavi, Lecturer in Statistics	Member	Sd/-



## Department of Statistics

### List of the courses Revised/Introduced in II & IV Semesters 2022-23

S.No.	Title of the Course	Course Code	Offered in SEM	Type of the Paper	Year of Introduction	Revision/Introduce	OBE with BTL	Offered to
1	Probability Distributions and Statistical Methods	STAT21C	II	CORE	2021-22	QUESTION PAPER	YES	BA(EMS) & B.SC (MSCs, Ca.MS & MSDS)
2	Probability Distributions and Statistical Methods	STAP21C	II	CORE LAB	2021-22	QUESTION PAPER	YES	BA(EMS) & B.SC (MSCs, Ca.MS & MSDS)
3	Statistical Methods and Applications of Probability	STAT28	II	CORE	2021-22	QUESTION PAPER	YES	B.Sc(AI & ML)
4	Statistical Methods and Applications of Probability	STAP28	II	CORE LAB	2021-22	QUESTION PAPER	YES	B.Sc(AI & ML)
5	Quantitative Methods for Managers	STAT22	II	CORE	2021-22	QUESTION PAPER	YES	BBA (G & RM)
6	Probability distributions and Inferential Statistics	STAT25A	II	CORE	2021-22	QUESTION PAPER	YES	BBA (BA)
7	Statistical Methods for Cognitive Systems	STAT26	II	CORE	2021-22	QUESTION PAPER	YES	B.Sc(CSCS)
8	Statistical Methods for Cognitive Systems	STAP22	II	CORE LAB	2021-22	QUESTION PAPER	YES	B.Sc(CSCS)
9	Applied Operations Research	STAT45A	IV	CORE	2017-18	2022-23 (20%)	YES	BBA (BA)

#### Resolutions:

1. It is resolved and recommend the revision of model question paper of Probability Distributions and Statistical Methods with course code STAT21C in II semester of BA(EMS)/ B.Sc.( M.S.Cs, M.S.Ca, M.S.Ds) for the batch of students admitted in 2022-23and onwards. For the revised model question paper vide page numbers from 4 to 8
2. It is resolved and recommend the revision of model question paper of Probability Distributions and Statistical Methods with course code STAP21C in II semester of BA(EMS)/ B.Sc.( M.S.Cs, M.S.Ca, M.S.Ds) for the batch of students admitted in 2022-23and onwards. For the revised model question paper vide page numbers from 9 to 10.
3. It is resolved and recommend the revision of model question paper of Quantitative Methods for Managers with course code STAT22 in II semester of BBA(General ) for the batch of students admitted in 2022-23and onwards. For the revised model question paper vide page numbers from 11 to 14.

4. It is resolved and recommend to introduce Quantitative Methods for Managers with course code STAT22 II semester of BBA (RM) for the batch of students admitted in 2022-23 and onwards. For the syllabus and model question paper vide Page number from 11 to 14.
5. It is resolved and recommend the revision of model question paper of Probability distributions and Inferential Statistics for Business Analytics with course code STAT25A in II semester of BBA(Business Analytics) for the batch of students admitted in 2022-23and onwards. For the revised model question paper vide page numbers from 15 to 18.
6. It is resolved and recommend the revision of model question paper of Statistical Methods for Cognitive Systems with course code STAT26 in II semester of B.Sc.(CSCS) from the batch of students admitted in 2022-23 and onwards. For the revised syllabus and model question paper vide Page number from 19 to 22.
7. It is resolved and recommend the revision of model question paper of Statistical Methods for Cognitive Systems with course code STAP22 in II semester of B.Sc.(CSCS) from the batch of students admitted in 2022-23 and onwards. For the revised syllabus and model question paper vide Page number from 23 To 23.
8. It is resolved and recommend the revision of model question paper of Statistical Methods and Applications of Probability with course code STAT28 in II semester of B.Sc.(AI & ML) for the batch of students admitted in 2022-23 and onwards. For the revised model question paper vide page numbers from 24 To 27.
9. It is resolved and recommend the revision of model question paper of Statistical Methods and Applications of Probability with course code STAP28 in II semester of B.Sc.(AI & ML) for the batch of students admitted in 2022-23 and onwards. For the revised model question paper vide page numbers from 28 to 28.
10. To recommend the revision of syllabus & model question paper of Applied Operations Research with revised course code STAT45 in IV semester of BBA (Business Analytics) for the batch of students admitted in 2021-22 and onwards. For the revised syllabus and model question paper vide Page number from 29 to 33.

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# P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

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## Title of the Course: Probability Distributions and Statistical Methods

Offered to: BA (EMS) & B.SC (MSCs, M.S.Ca &M.S.Ds) Course Code : STAT21C

Course Type: Core (Theory)

Year of Introduction:2019-20

Year of Revision: 2021-22

Percentage of Revision: 60%

Semester: II

Credits: 4

Hours Taught: 60periods

Max.Time: 3 Hours

**Course Prerequisites:** Students required basic knowledge in Calculus, Algebra and Probability.

**Course Description:** This course helps the students to familiarize students with the ways in which we talk about uncertainty and look at everyday situations in which probability arises. Also this course aims at providing basic knowledge about theoretical distribution models that can suit different phenomena of interest measured as variables in a continuum.

### Course Objectives:

- 1) To enable the students to develop basic knowledge in theoreticalProbability distributions
- 2) To provide understanding and applying standard continuous probability distribution to different situations.
- 3) To get the knowledge regarding qualitative factors
- 4) To understand the relation between quantitative factors
- 5) To make the estimated values using regression

**Learning Out comes:**At the end of the course, the student will

- 1) Acumen to apply standard discrete probability distribution to different situations.
- 2) ability to handle transformed random variables and derive associated distributions.
- 3) The parameters describe an underlying physical setting in such a way that their value affects the distribution of the measured data.

S. No	Programme Outcomes
PO1.	<b>Effective Communication:</b> Speak, read, write and listen clearly in person and through electronic media in English and in one Indian language, and make meaning of the world by connecting people, ideas, books, media and technology
PO2.	<b>Effective Citizenship:</b> Demonstrate empathetic social concern and equity centred national development, and the ability to act with an informed awareness of issues and participate in civic life through volunteering.
PO3.	<b>Ethics:</b> Recognize different value systems including your own, understand the moral dimensions of your decisions, and accept responsibility for them.
PO4.	<b>Environment and Sustainability:</b> Understand the issues of environmental contexts and sustainable development

PO5.	<b>Critical Thinking:</b> Take informed actions after identifying the assumptions that frame our thinking and actions, checking out the degree to which these assumptions are accurate and valid, and looking at our ideas and decisions (intellectual, organizational, and personal) from different perspectives.
PO6:	<b>Specialized Skills / Transferable Skills:</b> Acquisition of communication and soft, analytical and technological skills that aid in enhancing
PO7.	<b>Self-directed and Life-long Learning:</b> Acquire the ability to engage in independent and life-long learning in the broadest context socio-technological changes

<b>Course Outcomes:</b>		
<b>Course Outcome</b>	Upon successful completion of this course, students should have the knowledge and skills to:	<b>Programme Outcomes Mapping</b>
CO 1	Develop the basic knowledge in Probability distribution and uncertainty conditions we apply standard discrete probability distributions to identify the probability values.	PO - 5
CO 2	Obtained the knowledge of applications on standard continuous distributions. Also get the knowledge in respect of usage in day-to-day life.	PO - 5
CO3	Analyse the qualitative data	PO - 6
CO 4	Statistically analyze the strengths of relationship between variables.	PO - 7
CO 5	To outline the vital area of regression models applicable in a wide variety of real time situations	PO - 7

### Syllabus

<b>Unit</b>	<b>Learning Units</b>	<b>Lecture Hours</b>
<b>I</b>	<b>Theoretical Probability Discrete Distributions</b> Rectangular, Binomial, Poisson, Negative Binomial, Geometric, Hyper Geometric distributions: Definitions, Means, Variances, M.G.F, C.G.F, P.G.F, additive property, limiting cases, memory less property if exists . Simple problems.	<b>12</b>
<b>II</b>	<b>Theoretical Probability Continuous Distributions</b> Rectangular, Normal, Exponential, Gamma, Beta Distributions: Definitions, Means, Variances, M.G.F, C.G.F, P.G.F, additive property, limiting cases, memory less property if exists . Simple problems.	<b>12</b>
<b>III</b>	<b>Theory of Attributes:</b> Notations, Dichotomy classification, class and class frequencies, order of classes and class frequencies. Ultimate class frequencies, relation between class frequencies. Consistency of data - Conditions for consistency of data for 2 and 3 attributes only. Independence of attributes- criterion of independence of two attributes. Association of attributes-Yule's coefficient of association and coefficient of colligation. Relationship between coefficient of association and colligation and simple problems.	<b>12</b>
<b>IV</b>	<b>Correlation:</b> Meaning, Types of Correlation, Measures of Correlation- Scatter diagram, Karl Pearson's Coefficient of Correlation, Rank Correlation coefficient (with and without ties), Bi-variate frequency distribution, correlation	<b>12</b>

	coefficient for bi-variate data and simple problems. <b>Multiple and Partial Correlation-</b> Coefficients of multiple and partial correlations, properties of multiple and multiple correlation coefficients, coefficient of multiple determination. simple problems	
V	<b>Curve fitting</b> Principle of least squares, fitting of straight line, fitting of second degree polynomial or parabola. Fitting of power curve and exponential curves. <b>Regression Analysis:</b> Introduction, Linear Regression- Regression coefficients, properties of regression coefficients, angle between two lines of regression. Standard error of estimate (residual variance), Explained and unexplained variation, coefficient of determination and simple problems	12

**Text Book:**

Fundamentals of Mathematical Statistics, 12th Edition, Sep 2020, S. C. Gupta and V. K. Kapoor, Sultan Chand & Sons, New Delhi

**Reference Books:**

1. B.A/B.Sc. Second Year Statistics(2010) , Telugu Akademi, Hyderabad.
2. Mathematical Statistics with Applications, 2009, K.M.Ramachandran and Chris P.Tsokos Academic Press(Elsevier), Haryana .
3. Probability and Statistics, Volume I & II, D. Biswas, New central book Agency (P) Ltd, NewDelhi.
4. An outline of Statistical theory, Volume II,3rd Edition,2010(with corrections) A.M.Goon,M.K. Gupta, B.Dasgupta ,The World Press Pvt.Ltd., Kolakota.
5. Sanjay Arora and Bansilal: New Mathematical Statistics, Satya Prakashan , New Delhi.

**Websites of Interest:**

<http://onlinestatbook.com/rvls/index.html>

**Co-Curricular Activities in the class:**

1. Pictionary
2. Case Studies on topics in field of statistics
3. Snap test and Open Book test
4. Architectural – To be build the procedures
5. Extempore – Random concept to students
6. Interactive Sessions
7. Teaching through real world examples

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**Model Question Paper Structure for SEE  
STAT21C**

**Max.: 70Marks  
Min.Pass:28 Marks**

**Model Paper  
Section – A**

**Answer the following**

**5 x 4M = 20M**

1. a) In Binomial distribution mean and variance are 4 and 3 respectively.  
Find mode of the distribution. (CO-1,L-2)  
(OR)
- b) Show that in Poisson distribution mean and variance are equal. (CO-1,L-2)
2. a) Write the properties of normal distribution. (CO-2,L-2)  
(OR)
- b) Obtain the mean and variance of Beta distribution of 2<sup>nd</sup> kind . (CO-2,L-2)
3. a) Explain the types of correlation (CO-3,L-2)  
(OR)
- b) Define class and class frequency of an attribute with examples. (CO-3,L-2)
4. a) Write the properties of regression coefficients. (CO-4,L-2)  
(OR)
- b) Explain the concept of rank correlation. (CO-4,L-2)
5. a) Write the properties of multiple correlation coefficient. (CO-5,L-2)  
(OR)
- b) Write the properties of Regression coefficient. (CO-5,L-2)

**Section – B**

**Answer the following**

**5 x 10M = 50M**

6. a) Define Binomial distribution and derive the recurrence relation for central moments (CO-1,L-2)  
(OR)
- b) (i) A book contain 43 mistakes in 585 pages. Find the probability that there will be no mistake in randomly selected 10pages of the book.  
(ii) If a Poisson distribution such that  $3P(x=1) = 2P(x=3)$ . Find  $P(2 \leq X \leq 5)$  (CO-1,L-2)
7. a) Show that mean, median and mode are equal in Normal distribution. (CO-2,L-2)  
(OR)
- b) In a distribution exactly normal, 7% of the items are under 35and 89% are under 63. What are the mean and standard deviation of the distribution. (CO-2,L-2)
8. a) Write the criteria for independence of three attributes. Find all the remaining class frequencies for the following set of frequencies.  $N= 23713$ ,  $(A) = 1618$ ,  $(B) = 2015$ ,  $(C) = 770$ ,  $(AB) = 587$ ,  $(AC) = 335$ ,  $(BC) = 428$ ,  $(ABC) = 158$  (CO-3,L-3)  
(OR)
- b) The male population of a particular state is 250lakhs. The number of literate males is 20 lakhs and total number of male criminals is 26000. The number of literate male criminals is 2000. Do you find any association between literacy ad criminality. (CO-3,L-3)

9. a) State the Karl Pearson's correlation coefficient and prove that it has between -1 and +1 (CO-4,L-2)

(OR)

- b) Obtain the rank correlation coefficient of marks of 12 students in statistics and computer science given below (CO-4,L-3)

X	58	64	65	55	44	80	65	75	40	55	64	55
Y	52	48	45	62	45	68	62	82	44	45	74	62

10. a) Derive the regression equation of y on x (CO-5,L-2) (OR)  
b) Fit the power curve of the type  $y = ax^b$  to the following data (CO-5,L-3)

X	3	5	8	10	12	13
Y	17	41	94	139	191	220

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## Title of the Course: Probability Distributions and Statistical Methods Lab

Offered to: BA (E.M. S) & B.SC (M.S. Cs, M.S. Ca&M.S.Ds.) Course Code: STAP21C

Course Type: Core (P)

Year of Introduction: 2019-2020

Year of Revision: 2021-22

Percentage of Revision: 60%

Semester: II

Credits: 1

Hours Taught: 30periods

Max.Time: 2 Hours

Course Prerequisites (if any): Nil

S. No	Programme Outcomes
PO1.	<b>Effective Communication:</b> Speak, read, write and listen clearly in person and through electronic media in English and in one Indian language, and make meaning of the world by connecting people, ideas, books, media and technology
PO2.	<b>Effective Citizenship:</b> Demonstrate empathetic social concern and equity centred national development, and the ability to act with an informed awareness of issues and participate in civic life through volunteering.
PO3.	<b>Ethics:</b> Recognize different value systems including your own, understand the moral dimensions of your decisions, and accept responsibility for them.
PO4.	<b>Environment and Sustainability:</b> Understand the issues of environmental contexts and sustainable development
PO5.	<b>Critical Thinking:</b> Take informed actions after identifying the assumptions that frame our thinking and actions, checking out the degree to which these assumptions are accurate and valid, and looking at our ideas and decisions (intellectual, organizational, and personal) from different perspectives.
PO6:	<b>Specialized Skills / Transferable Skills:</b> Acquisition of communication and soft, analytical and technological skills that aid in enhancing
PO7.	<b>Self-directed and Life-long Learning:</b> Acquire the ability to engage in independent and life-long learning in the broadest context socio-technological changes

Course Outcomes:		
Course Outcome	Upon successful completion of this course, students should have the knowledge and skills to:	Programme Outcomes Mapping
CO 1	To fit a data into various theoretical probability distributions.	PO – 5
CO 2	Apply and Analyze the qualitative data	PO – 6
CO3	Identify the relations between the variables and estimate.	PO - 7



## List of Practicals

1. (a) Fitting of Binomial distribution (Direct Method). (CO – 1)  
(b) Fitting of Binomial distribution (Recurrence Method).(CO – 1)
2. (a) Fitting of Poisson distribution (Direct Method).(CO – 1)  
(b) Fitting of Poisson distribution (Recurrence Method). (CO – 1)
3. (a) Fitting of Normal distribution (Areas Method). (CO – 1)  
(b) Fitting of Normal distribution (Ordinates Method). (CO – 1)
4. Computation of Yule’s coefficient of association. (CO – 2)
5. Computation of Pearson’s and Tcherprows coefficient of contingency(CO – 2)
6. (a) Computation of correlation coefficient for ungrouped data. (CO – 3)  
(b) Computation of correlation coefficient for grouped data. (CO – 3)
7. (a) Fitting of a straight line by the method of least squares. (CO – 3)  
(b) Fitting of a parabola by the method of least squares. (CO – 3)  
(c) Fitting of power curve  $y = ax^b$  by the method of least squares. (CO – 3)  
(d) Fitting of exponential curves  $y = ae^{bx}$  &  $y = ab^x$  by the method of least squares.(CO-3)
8. (a) Construction of regression lines for the ungrouped data. (CO – 3)  
(b) Construction of regression lines for the grouped data.(CO – 3)

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## Structure of Practical Paper

**Total Marks: 50 Marks**

<b>(i) For Continuous Evaluation</b>	<b>:</b>	<b>15 marks (Internal Evaluation)</b>
<b>(ii) For semester end Practical Examination</b>	<b>:</b>	<b>35 marks (External Evaluation)</b>



STATISTICS	STAT22	2022-23 Onwards	BBA (General & RM)
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SEMESTER- II

No of Credits: 5

### Quantitative Methods for Managers

S. No	PROGRAMME OUTCOMES
PO1	Remember the basic concepts of statistics at different levels and to understand them for gaining of knowledge.
PO2	Apply the statistical techniques in the analysis of data and also acquire knowledge in optimization techniques.
PO3	Facilitate students to acquire flair knowledge to estimate the values in real life problems.

#### Title of the course : Quantitative Methods for Managers

Course Outcome	Course: BBA (Business Analytics) Upon successful completion of this course, students should have the knowledge and skills to:	P.O Mapping
CO 1	acumen to apply standard discrete probability distribution to different situations.	PO - 1
CO 2	knowledge of important continuous distributions such as Uniform, Normal, Exponential and Gamma and relations with some other distributions	PO - 1
CO3	Demonstrate the computation skills to estimate the parameters in point and interval forms and also getting the knowledge of formulating different hypothesis	PO - 1
CO 4	Testing the Qualitative and Quantitative factors in case of one and two samples using standard normal variate, student's t, F-statistic and chi square test statistic	PO - 2
CO 5	Testing the Qualitative and Quantitative factors which are not follows any distribution, with the help of some standard test procedures namely run test, median test, sign test etc.	PO - 2

#### Unit I : Statistical Description of data and Measures of Central Tendency

Classification of Data, Tabular & Diagrammatic representation of data. Frequency Distribution. Graphical representation of frequency distribution - Histogram, Frequency Polygon, Ogive curves.

Mathematical averages- arithmetic mean, geometric mean and harmonic mean. Properties and applications.

Positional Averages: Mode, Median and partition values- quartiles, deciles, and percentiles- properties and problems.

15 Lectures

#### Unit II : Measures of Dispersion

Absolute and Relative measures of Dispersion-Range, quartile deviation, mean deviation, standard deviation, and co-efficient of variation - Properties and applications.

Moments: Importance of moments, central and non-central moments and their inter-relationships

(excluding derivations), Sheppard's corrections for central moments for grouped data.

Measures of Skewness and Kurtosis with simple problems

15 Lectures

### **Unit III : Simple Correlation and Regression Analysis**

Correlation Analysis. Meaning of Correlation, Scatter Diagram, Simple linear correlation, Pearson's co-efficient of correlation, properties and simple problems Probable and standard errors of simple linear correlation. Rank Correlation, Concurrent deviation and coefficient of determination  
Regression Analysis, Principle of least squares and regression lines. Regression equations.

Properties of Regression Coefficients (proofs are not required) and problems

15 Lectures

### **Unit IV : Probability and its Distributions**

15 Lectures

Theory of Probability. Approaches to the calculation of probability, Calculation of event probabilities. Addition and multiplication laws of probability (proofs not required). Conditional probability and Baye's Theorem (proofs not required) and problems

Normal Distribution: Probability density function, mean, variance, properties and applications (proofs not required)

Exact Sampling Distributions: t, F and  $\chi^2$  - distributions properties and its applications

### **Unit V: Sampling Theory**

Basic Principles of sampling theory, Comparison between sample survey and complete enumeration, Errors in sample survey, Types of sampling- Non - Probabilistic- Purposive, Quota and Sequential methods

Probabilistic - Simple random, Stratified random and Systematic sampling methods. (only concepts)

Determination of sample size based on sample mean and sample proportion. Confidence Intervals for single mean and single proportion

15 Lectures

**Note: Proofs and derivations of statements are excluded.**

#### **Text Book:**

Gupta, S.C. Fundamentals of Statistics, Sixth Revised & Enlarged Edition Himalaya Publishing House.

#### **Reference Books**

1. Gupta, S.P., and Archana Gupta. Statistical Methods. Sultan Chand and Sons, New Delhi.
2. Levin, Richard and David S. Rubin. Statistics for Management. 7th Edition. Prentice Hall of India.
3. Siegel, Andrew F. Practical Business Statistics. International Edition. (4th Ed.). Irwin McGraw Hill.
4. Berenson and Levine. Basic Business Statistics: Concepts and Applications. Prentice Hall.
5. Spiegel M.D. Theory and Problems of Statistics. Schaums Outlines Series. McGraw Hill Publishing Co.

#### **Co-Curricular Activities in the class:**

1. Pictionary
2. Case Studies on topics in field of statistics
3. Snap test and Open Book test
4. Architectural – To be build the procedures
5. Extempore – Random concept to students
6. Interactive Sessions
7. Teaching through real world examples



STATISTICS	STAT22	2022-2023	B.B.A. (General) B.B.A. (RM)
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**Model Paper**

**Max. Marks: 70**  
**Min. Pass Mark:28**

**Section – A**

**Answer the following**

**5 x 4M = 20M**

1. (a) Calculate the Harmonic mean of the following data 10, 34, 24, 18, 29.

OR

- (b) Calculate the Geometric mean of the following data 10, 22, 4, 18, 29.

2. (a) Calculate Mean Deviation about mean and coefficient of Mean Deviation  
80, 82, 79, 78, 85, 80, 83.

OR

- (b) Define skewness explain its types

3. (a) Explain types of correlation with examples.

OR

- (b) write properties of regression coefficient

4. (a) Define conditional probability.

OR

- (b) Define t- distribution and write its properties.

5. (a) Explain sampling and non-sampling errors in sampling.

OR

- (b) Explain simple random sampling

**Section – B**

**Answer the following**

**5 x 10M = 50M**

6. (a) The following table gives the frequency distribution of the weekly Wages (in '00) of 100 workers in a factory

Weekly wages	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
No. of workers	4	5	12	23	31	10	8	5	2

Draw the histogram and frequency polygon of the distribution

OR

- (b) Calculate mean and median from the following series

Income(Rs)	0-5	5-10	10-15	15-20	20-25	25-30
Frequency	5	7	10	8	6	4

7. (a) Below is given the frequency distribution of weights of a group of 60 students of a class in a school. Calculate the coefficient of quartile deviation

weight(kg)	30-34	35-39	40-44	45-49	50-54	55-59	60-64
No. of students	3	5	12	18	14	6	5

.OR

(b) Calculate the standard deviation from the following data

Class	90-99	80-89	70-79	60-69	50-59	40-49	30-39
Frequency	2	12	22	20	14	4	1

8. (a) Calculate Karl Pearson's correlation coefficient from the following data

X	26	28	43	51	34	48	52	57	63	34
Y	110	117	128	118	128	110	116	128	134	141

OR

(b) Find the means, correlation coefficient and SD of  $y$  when SD of  $x$  is 3 from the regression equations  $2x + 5y = 12$  and  $7x + 3y = 19$

9. (a) Assume the mean height of soldiers to be 68.22 inches with a variance of 10.8 inches<sup>2</sup>. How many soldiers in a regiment of 1000 would you expect to be (i) over 6 feet tall (ii) below 5.5 feet. Assume heights to be normally distributed.

OR

(b) (i) Give the mathematical and statistical definitions of probability (ii) A speaks truth in 60% cases and B speaks truth in 70% cases. In what percentage of cases are they likely to contradict each other in stating the same fact.

10 (a) Explain basic principles of sampling theory

OR

b) (i) A sample of size 36 from a normal population gave mean as 15.8 and variance as 10.3. Find a 99% interval for a population mean. (ii) In a random sample of 400 oranges from a large consignment, 40 were considered as bad. Find the 95% confidence interval for the population proportion.

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STATISTICS	STAT25A	2020-21 Onwards	BBA (Business Analytics)
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**SEMESTER- II**

**PAPER - II**

**No of Credits:5**

**Probability Distributions and Inferential Statistics for Business Analytics**

S. No	PROGRAMME OUTCOMES
<b>PO1</b>	Remember the basic concepts of statistics at different levels and to understand them for gaining of knowledge.
<b>PO2</b>	Apply the statistical techniques in the analysis of data and also acquire knowledge in optimization techniques.
<b>PO3</b>	Facilitate students to acquire flair knowledge to estimate the values in real life problems.

Title of the course : <b>Probability Distributions and Inferential Statistics for Business Analytics</b> Course Code : STAT25A		
Course Outcome	Course: BBA (Business Analytics)	ProgrammeOutcomesMapping
	Upon successful completion of this course, students should have the knowledge and skills to:	
CO 1	acumen to apply standard discrete probability distribution to different situations.	PO - 1
CO 2	knowledge of important continuous distributions such as Uniform, Normal, Exponential and Gamma and relations with some other distributions	PO - 1
CO3	Demonstrate the computation skills to estimate the parameters in point and interval forms and also getting the knowledge of formulating different hypothesis	PO - 1
CO 4	Testing the Qualitative and Quantitative factors in case of one and two samples using standard normal variate, student's t ,F-statistic and chi square test statistic	PO - 2
CO 5	Testing the Qualitative and Quantitative factors which are not follows any distribution, with the help of some standard test procedures namely run test, median test, sign test etc.	PO - 2

**Unit-I:**

**15L**

Discrete Probability Distributions-Binomial distribution- Probability mass function, properties and applications, Poisson distributions- Probability mass function, properties, and applications. Geometric Distribution- Probability mass function, properties and applications and simple problems.

**Unit II****15L**

Continuous Probability Distributions –Uniform distribution (rectangular), Exponential, Gamma, and normal distributions- Probability density function, distribution function properties and applications and simple problems

**Unit III:****15L**

Types of sampling - Simple random sampling, stratified sampling, systematic sampling, and cluster sampling. Parameter, Statistic, Standard Error of the statistic- mean and proportion, point estimation of a parameter, concept of bias and mean square error of an estimate. Criteria of good estimator- unbiasedness, consistency, efficiency, and sufficiency with examples. Concepts of statistical hypotheses- Simple, Composite, Null and alternative hypothesis, Critical region, two types of errors, level of significance, power of a test and p-value. One and two tailed tests. Procedure for testing of hypothesis, Tests of significance for Large samples- Single proportion and difference of proportions, single mean and difference of means and simple problems.

**Unit IV****15L**

Exact Sampling distributions- Chi-square distribution- definition, properties and applications- Test for goodness of fit and independence of attributes. t- distribution – definition, properties and applications- test for single mean, difference of means and paired t-test for difference of means. F-distribution – definition, properties and applications – F-test for equality of two population variances and equality of several means- ANOVA one way and two-way classification and simple problems.

**UNIT V****15L**

Non-parametric methods- definition, advantages and disadvantages, Measurement of scale- nominal, ordinal, interval and ratio. One sample test- Sign test, Run test, Wilcoxon-signed rank test. Two independent sample tests: Median test, Wilcoxon- Mann Whitney U - test, Kruskal Wallis test.

**Note: Proofs and derivations of statements are excluded.**

**TEXT BOOK:**

S.C. Gupta, (2019), Seventh Edition, Fundamentals of Statistics, Mumbai: Himalaya Publishing House.

**REFERENCE BOOKS**

1. Sharma, J. K. (2013), *Business statistics*, New Delhi: Pearson Education
2. Levine, D.M., Berenson, M. L. & Stephan, D. (2012), *Statistics for managers using Microsoft Excel*, New Delhi: Prentice Hall India Pvt.
3. Aczel, A. D. & Sounderpandian, J. (2011), *Complete Business Statistics*, New Delhi: Tata McGraw Hill.
4. Anderson, D., Sweeney, D., Williams, T., Camm, J., & Cochran, J. (2013), *Statistics for Business and Economics*, New Delhi: Cengage Learning.
5. Davis, G., & Pecar, B. (2014), *Business Statistics using Excel*, New Delhi: Oxford University Press.

**Websites of Interest:**

<http://onlinestatbook.com/rvls/index.html>

**Co-Curricular Activities in the class:**

1. Pictionary
2. Case Studies on topics in field of statistics
3. Snap test and Open Book test
4. Architectural – To be build the procedures
5. Extempore – Random concept to students
6. Interactive Sessions
7. Teaching through real world examples



PARVATHANENI BRAHMAYYA SIDDHARTHA COLLEGE OF ARTS & SCIENCE::VIJAYAWADA-10.

(An Autonomous College in the jurisdiction of Krishna University, Machilipatnam)

STATISTICS	STAT25A	2020-2021	B.B.A. (Business Analytics)
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### Model Paper

**Max. Marks: 70**  
**Min. Pass Mark: 28**

#### Section – A

**Answer the following**

**5 x 4M = 20M**

1. a) Define Binomial Distribution. State its properties. (Co-1, L-2)  
(OR)  
b) Define Geometric distribution and write its properties. (Co-1, L-2)
2. a) Define Normal distribution. State its properties. (Co-2, L-2)  
(OR)  
b) Explain the exponential distribution with their limitations. (CO-2,L-2)
3. a) Define critical region. Explain the types of errors. (CO-3,L-2)  
(OR)  
b) Define the statistical hypothesis and explain its types. (CO-3,L-2)
4. a) Define Chi-square distribution and write its applications. (Co-4, L-2)  
(OR)  
b) Define F-distribution and write its properties. (Co-4, L-2)
5. a) Define nominal, ordinal, interval and ratio data. (Co-5, L-2)  
(OR)  
b) Write the advantages and disadvantages of non-parametric methods. (CO-5,L-2)

#### Section – B

**Answer the following**

**5 x 10M = 50M**

6. a) A coffee connoisseur claims that he can distinguish between a cup of instant coffee and a cup of percolator coffee 75% of the time. It is agreed that his claim will be accepted if he correctly identifies at least 5 of the 6 cups. Find his chances of having the claim (i) accepted, (ii) rejected, when he does have the ability he claims. (Co-1, L-3)  
(OR)  
b) A manufacturer, who produces medicine bottles, finds that 0.1% of the bottles are defective. The bottles are packed in boxes containing 500 bottles. A drug manufacturer buys 100 boxes from the producer of bottles. Using Poisson distribution, find how many boxes will contain (i) no defective, and (ii) at least two defectives. (Co-1, L-3)
7. a) If X is uniformly distributed with mean 1 and variance  $\frac{4}{3}$ . Find the (i)  $P(X > 0)$ , (ii)  $P(0.5 < X < 1.5)$ , and (iii)  $P(X > 1.5)$ . (Co-2, L-3)  
(OR)  
b) The mean yield for one-acre plot is 662 kilos with standard deviation 32 kilos. Assuming normal distribution, how many one-acre plots in a batch of 1,000 plots would you expect to



have yield (i) over 700 kilos, (ii) below 650 kilos, and (iii) what is the lowest yield of the best 100 plots? (Co-2, L-3)

8. a) Intelligence tests were given to two groups of boys and girls of the same age group chosen from the same college and the following results were obtained.

	Size	Mean	S.D.
Boys	100	73	10
Girls	60	75	8

Examine whether the difference between the means is significance or not. (Co-3, L-3)  
(OR)

- b) In a sample of 1000 people in Maharashtra, 540 are rice eaters and the rest are wheat eaters. Can we assume that both rice and wheat are equally popular in Maharashtra at 1% level of significance. (CO-3, L-3)
9. a) Out of 8,000 graduates in a town 800 are females, out of 1,600 graduate employees 120 are females. Use  $\chi^2$  to determine if any distinction is made in appointment the basis of sex. (Co-4, L-3)

(OR)

- b) Airline companies change their airface several times a day depending on many extraneous factors that range from customer demand to change in oil price. The following table gives the airfaces (in US\$) between two cities obtained from three different airlines for travelling on December 31, 2003. The airfaces were observed at random time points within one week prior to departure. (Co-4, L-3)

Airline-1	Airline-2	Airline-3
273	471	593
374	573	297
219	293	399
699	199	379
413	819	409
303	771	399

Are the airfaces for the three airlines more or less same?

10. a) The number of defective items produced from two machines are observed as follows.

(Co-5, L-3)

Machine 1	26, 27, 31, 26, 19, 21, 20, 25, 30
Machine 2	23, 28, 26, 24, 22, 19

Test whether these two samples are drawn from the same population by using median test.

(OR)

- b) From a company trainers are selected randomly and divided into 3 groups and each group containing 10 members and there are given a course in the management skills by three different methods. At the end of the training period scores are as follows.

Method A	99	64	101	85	79	88	97	95	90	100
Method B	83	102	125	61	91	96	94	89	93	75
Method C	89	98	56	105	87	90	87	101	76	89

By using Kruskal wallis test to determine if the three methods are equally effective (or) not at 5% level. (Co-5, L-3)

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STATISTICS	STAT26	2020-21 Onwards	CSCS (Computer Science with Cognitive Systems)
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SEMESTER- II

PAPER - I

No of Credits:4

### Statistical Methods for Cognitive Systems

#### Course Description

This course is an introduction to statistics for computer science with cognitive systems. The objective of the course will be to learn to use statistical techniques to evaluate, interpret and quantify uncertainty. This will provide a basis for analysing and interpreting data from designing and conducting formal studies to reading magazine, journal and newspaper articles.

#### OBJECTIVES

- 1) To enable the students to develop basic knowledge in Statistics
- 2) To provide understanding in some basic statistical techniques which are used for Solving data science related problems.

**LEARNING OUTCOMES** At the end of the course, the student will

- 1) Understand the measurement systems variability
- 2) Find relationship between two quantitative variables
- 3) Measure relative changes in price, production or any such quantities of economic interest

<b>Title of the course :Statistical Methods for Cognitive systems</b>			
<b>Course Code : STAT26</b>			
<b>Course Outcome</b>	<b>Course: CSCS(Computer Science with Cognitive Systems)</b>	<b>P</b>	<b>O</b>
	Upon successful completion of this course, students should have the knowledge and skills to:	<b>Mapping</b>	
CO 1	Develop the basic knowledge in Statistics and describe the central tendency value measurement	PO - 1	
CO 2	Knowing the concept of variations and the significance of measuring it by Range, Quartile deviation, mean deviation variance and Standard deviation	PO - 1	
CO3	Knowledge of various types of data, their organization and evaluation of summary measures such as non- central and central moments, measures of skewness and kurtosis.	PO - 1	
CO 4	know about correlation and regression techniques, the two very powerful tools in statistics,	PO - 2	
CO 5	Get the knowledge in respect of usage in day-to-day life in decision making in the face of uncertainty and also obtained the knowledge of probability applications	PO - 2	

#### Unit-I:

12L

**Introduction, Data collection and Presentation of Data:** Statistics for Managers, Basic vocabulary of statistics, data collection, Types of Variables, Tables and diagrams and graphs for categorical and numerical data.

**Measures of Central Tendency:** Objectives of averages, characteristics of a good average. Arithmetic mean, Geometric mean, Harmonic mean, Median and Mode-merits, demerits, properties and applications.

**Unit II:** **12L**

**Measures of Dispersion:** Significance of measures of dispersion, characteristics of an ideal measure of dispersion. Absolute and relative measures of dispersion-range, quartile deviation, mean deviation, variance and standard deviation- merits, demerits, properties and applications.

**Unit III** **12L**

**Moments-** about mean, about arbitrary point, relation between moments about mean and about arbitrary point vice-versa. **Skewness** - Karl Persons' coefficient of skewness, Bowley's coefficient of skewness and coefficient of skewness based on moments. **Kurtosis-** concept, measures of kurtosis based on moments and simple problems.

**Unit IV:** **12L**

**Correlation Analysis** - Introduction- Types of correlation, methods of studying correlation - scatter diagram, Karl Pearson's coefficient of correlation, and Spearman's rank correlation coefficient- merits, demerits properties and applications.

**Linear Regression Analysis** – Introduction, Lines of regression, coefficients of regression – properties and applications.

**Unit V:** **12L**

**Probability:** Definitions of various terms, classical, statistical and axiomatic probability definitions, addition theorem of probability. Conditional probability-definition, multiplication theorem of probability and Bayes' theorem – applications.

**Note: Proofs and derivations of theorems are excluded.**

**TEXT BOOK:**

S.C. Gupta, (2016), Seventh Edition, Fundamentals of Statistics, Mumbai: Himalaya Publishing House.

**REFERENCE BOOKS**

1. Sharma, J. K. (2013), *Business statistics*, New Delhi: Pearson Education
2. Levine, D.M., Berenson, M. L. & Stephan, D. (2012), *Statistics for managers using Microsoft Excel*, New Delhi: Prentice Hall India Pvt.
3. Aczel, A. D. & Sounderpandian, J. (2011), *Complete Business Statistics*, New Delhi: Tata McGraw Hill.
4. Anderson, D., Sweeney, D., Williams, T., Camm, J., & Cochran, J. (2013), *Statistics for Business and Economics*, New Delhi: Cengage Learning.
5. Davis, G., & Pecar, B. (2014), *Business Statistics using Excel*, New Delhi: Oxford University Press.

**Websites of Interest:** <http://onlinestatbook.com/rvls/index.html>

**Co-Curricular Activities in the class:**

1. Pictionary
2. Case Studies on topics in field of statistics
3. Snap test and Open Book test
4. Architectural – To be build the procedures
5. Extempore – Random concept to students
6. Interactive Sessions
7. Teaching through real world examples



STATISTICS	STAT26	2020-2021	CSCS(Computer Science with Cognitive Systems)
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**Model Paper**

**Max. Marks : 70**  
**Min. Pass Mark :28**

**Section – A**

**Answer the following**

**5 x 4M = 20M**

- (a) Explain briefly the various methods that are used for graphical representation of Frequency distribution. (CO- 1, L – 2)  
(OR)  
(b) Explain the principles of classification. (CO- 1, L –2)
- (a) Write the characteristics of an ideal measure of dispersion. (CO – 2, L – 2)  
(OR)  
(b) Write the Advantages and disadvantages of Standard deviation. (CO – 2, L – 2)
- (a) Define Skewness. Write the measures of Skewness? (CO – 3, L – 2)  
(OR)  
(b) Define Kurtosis and explain its types. (CO – 3, L – 2)
- (a) Write the properties of regression coefficients. (CO –4, L – 2)  
OR  
(b) Write a short notes on correlation (CO-4, L-2)
- (a) Define (i) Mathematical definition and (ii) Statistical definition of probability. (CO –5, L –2)  
(OR)  
(b) State the addition and multiplication theorems of probability. (CO –5, L –2)

**Section – B**

**Answer the following**

**5 x 10M = 50M**

- (a) Calculate Mean, Median and Mode to the following data (CO- 1, L – 3)

Class intervals	10-20	20-30	30-40	40-50	50-60	60-70	70-80
Frequency	15	20	34	40	50	30	10

(OR)

- (b) Draw Ogive curve to the following data and also obtain median through Ogives

(CO- 1, L –3)

Wages (in Rs.)	50-60	60-70	70-80	80-90	90-100	100-110	110-120	120-130
No. Of workers	15	20	34	50	70	45	26	10

- (a) Calculate mean deviation and standard deviation from the following data (CO–2,L–3)

Class interval	0-9	10-19	20-39	39-39	40-49	50-59	60-69
Frequency	5	7	10	12	18	10	6

(OR)

- (b) Two groups of students revealed the following results in the semester end examinations as follows. (CO – 2, L – 3)

Groups	Number of students	Mean	S.D
A	25	73.2	2.6

B	28	71.8	3.1
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Calculate the combined standard deviation and examine the consistency of groups.

8. (a) The first four moments of a distribution about the value 5 are -4, 22, -117 and 560. Find the corresponding moments about the mean, about zero and also find  $\beta_1$  and  $\beta_2$ . (10M)  
(CO – 3, L – 3)

(OR)

- (b) The standard deviation of a symmetrical distribution is 5. What must be the value of The Fourth moment about the mean in order that the distribution be (i) leptokurtic, (ii) mesokurtic and (iii) Platykurtic? (CO – 3, L – 3)

9. (a) Calculate the correlation coefficient from the following data (CO – 4, L – 3)

X	23	28	36	41	10	20	35	24	21	18	50
Y	19	21	24	16	15	18	22	16	12	30	25

(OR)

- (b) The following table shows the marks of two subjects X and Y. Calculate Rank Correlation coefficient between X and Y. (CO – 4, L – 3)

X	68	64	75	50	64	80	75	40	55	64
Y	62	58	68	45	81	60	68	48	50	70

10. (a) The content of urns I, II and III are as follows (CO – 5, L – 3)  
 1 white, 2 black and 3 red balls  
 2 white, 1 black and 1 red balls and  
 4 white, 5 black and 3 red balls

One urn is chosen at random and two balls are drawn. They happen to be white and red. What is the probability that they come from the urns I, II and III?

(OR)

- (b) The probability that a student passes a Physics test is  $\frac{2}{3}$  and the probability that he passes both a Physics test and an English test is  $\frac{14}{45}$ . The probability that he passes at least one test is  $\frac{4}{5}$ . What is the probability that he passes the English test? (CO – 5, L – 3)

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PARVATHANENI BRAHMAYYA SIDDHARTHA COLLEGE OF ARTS & SCIENCE:: VIJAYAWADA-10.  
(An Autonomous College in the jurisdiction of Krishna University, Machilipatnam)

STATISTICS	STAP22	2020-21 Onwards	CSCS (Computer Science with Cognitive Systems)
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**SEMESTER-II Practical – I: Statistical Methods for Cognitive Systems**  
**No.of Credits: 1**

CO.NO	Upon successful completion of this course, students should have the knowledge and skills to:	Mapping
CO1	draw the suitable diagram and graphs of the given sample data	PO2
CO2	Analyze the uni-variate data using statistical techniques.	PO2

**List of Practicals**

1. Diagrams & Graphs- Bar, Pie , Histogram, frequency polygon, and Ogive curves
2. Computation of measures of central tendency- Arithmetic Mean, Geometric mean and Harmonic Mean – Grouped Data.
3. Computation of measures of central tendency- Median, Mode and Partition Values - Grouped Data.
4. Computation of measures of Dispersion – Quartile Deviation, Mean Deviation, Standard Deviation, Variance and Coefficient of Variation – Grouped Data.
5. Computation of non-central, central moments,  $\beta_1$  and  $\beta_2$  and Sheppard's corrections for grouped data.
6. Computation of Karl Pearson's coefficients, Bowley's coefficients of Skewness and coefficients of skewness based on moments – Grouped Data
7. Computation of correlation coefficient and regression lines for (i) ungrouped data (ii) grouped bivariate data
8. Construction regression line equations for (i) ungrouped data (ii) grouped bi-variate data.

**Note: Training shall be on establishing formulae in Excel cells and derive the results. The excel output shall be exported to MS word for writing inference.**

**Reference Books**

1. Practical Manual -Prepared by the Department Faculty Members
2. K.V.S. Sarma: Statistics Made Simple: Do it yourself on PC. PHI

**Websites of Interest:** <http://www.statsci.org/datasets.html>

**Structure of Practical Paper**

**Total Marks: 50 Marks**

- (i) For Continuous Evaluation : 15 marks (Internal Evaluation)  
(ii) For semester end Practical Examination : 35 marks (External Evaluation)

**PARVATHANENI BRAHMAYYA SIDDHARTHA COLLEGE OF ARTS & SCIENCE**  
**VIJAYAWADA-10.**  
*(An Autonomous College in the jurisdiction of Krishna University, Machilipatnam)*

**Title of the Course : Statistical Methods and Applications of Probability**

**Offered to:** B.SC (AI &ML)

**Course Code :** STAT28

**Course Type:** Core (Theory)

**Year of Introduction:** 2021-22

**Semester:** II

**Credits:** 4

**Hours Taught:** 60 periods

**Max. Time:** 3 Hours

**Course Objective:** The purpose is to familiarize the students about the basic concepts required for artificial intelligence and Machine learning.

**Course Outcomes:** After successfully completing this course, the students will acquire:

- CO1: know about correlation and regression techniques, the two very powerful tools in statistics,
- CO2: study concept of coefficient of determination and inference on partial and multiple correlation and regression coefficients.
- CO3: knowledge of important discrete distributions such as Binomial, Poisson, Geometric, Negative Binomial and Hyper geometric and their interrelations if any,
- CO4: knowledge of important continuous distributions such as Uniform, Normal, Exponential and Gamma and relations with some other distributions,
- CO5: basic knowledge of complete enumeration and sample, sampling frame, sampling distribution, sampling and non-sampling errors, principal steps in sample surveys, limitations of sampling etc.,

**Unit I**

**12 L**

**Correlation Analysis**

Meaning Measures of Correlation- Scatter diagram, Karl Pearson's and Spearman's rank correlation. Calculation of the correlation coefficient for bi-variate frequency distribution Multiple and Partial correlation( 3 variables only)

**Unit II**

**12L**

**Curve fitting and Regression Analysis:**

Principle of least squares, fitting of straight line, second degree polynomial or parabola, power and exponential curves. **Regression:** Introduction, Linear Regression- Regression coefficients and its properties, Angle between two lines of regression. Standard error of estimate (residual variance), Explained and Unexplained variation, coefficient of determination. Multiple Linear Regression(3 variables only) and Logistic Regression.

**Unit III Discrete Probability Distributions:**

**12L**

Uniform, Bernoulli, Binomial, Poisson, Geometric, Negative Binomial and Hyper-geometric distributions along with their characteristic properties, applications and limiting/approximation cases.

## Unit IV

14L

**Continuous Probability distributions:** Normal, Exponential, Uniform, Beta, Gamma, distributions along with their characteristic properties, applications and limiting/approximation cases.

## Unit V

10L

Basic concepts: population and sample, census and sample survey, sampling frame, sampling distribution, standard error, sampling design, sampling and non-sampling errors, sample surveys, principles of sample survey, principal steps in sample survey, limitations of sampling, Sample survey versus complete enumeration survey. Types of sampling - Simple random sampling, stratified sampling, systematic sampling, and cluster sampling (only concept)

**Note: without proofs of named theorems and more importance to applications**

**Text Book( Unit I to IV):** Fundamentals of Mathematical Statistics, 12<sup>th</sup> Edition, 10<sup>th</sup> September 2020, S. C. Gupta and V. K. Kapoor, Sultan Chand & Sons, New Delhi.

**Text Book( Unit V) :** Fundamentals of Applied Statistics, 4<sup>th</sup> Edition, 1<sup>st</sup> January 2014, (ISBN-10 : 8180547051) S. C. Gupta and V. K. Kapoor, Sultan Chand & Sons, New Delhi.

### Recommended References books:

1. Mathematical Statistics with Applications, 2009, K.M.Ramachandran and Chris P.Tsokos Academic Press(Elsevier), Haryana .
2. Probability and Statistics, Volume I, D.Biswas, New central book Agency (P) Ltd, New Delhi.
3. An outline of Statistical theory, Volume Two, 3<sup>rd</sup> Edition, 2010 (with corrections) A.M.Goon, M.K. Gupta, B.Dasgupta, The World Press Pvt.Ltd., Kolakota.
4. Sanjay Arora and Bansilal: New Mathematical Statistics, SatyaPrakashan, New Delhi.

### Websites of Interest:

<http://onlinestatbook.com/rvls/index.html>

### Co-Curricular Activities in the class:

1. Pictionary
2. Case Studies on topics in field of statistics
3. Snap test and Open Book test
4. Architectural – To be build the procedures
5. Extempore – Random concept to students
6. Interactive Sessions
7. Teaching through real world examples



**Model Question Paper Structure for SEE  
STAT28**

**Max.: 70 Marks  
Min.: 28 Marks**

**Model Paper  
Section – A**

**5 x 4M = 20M**

**Answer the following**

1. a) Define correlation coefficient and state its properties. (CO-1, L-2)  
(OR)  
b) Define multiple correlation and write its properties (CO-1, L-2)
2. a) Explain the principle of least squares method. (CO-2, L-2)  
(OR)  
b) Define Regression Analysis and state its properties. (CO-2, L-2)
3. a) Define Geometric distribution. State its properties. (CO-3, L-2)  
(OR)  
b) Define Poisson distribution, State its properties. (CO-3, L-2)
4. a) Explain the exponential distribution with their limitations. (CO-4, L-2)  
(OR)  
b) Define Normal distribution. State its properties. (CO-4, L-2)
5. a) Explain the advantages of stratified random sampling technique. (CO-5, L-2)  
(OR)  
b) Explain the limitations of sampling. (CO-5, L-2)

**Section – B**

**5 x 10M = 50M**

**Answer the following**

6. a) Sales and advertisement expenditure of a commodity is given below. Obtain the correlation coefficient between them (CO-1, L-3)

Advertisement expenses(In thousands of Rupees)	39	65	62	90	82	75	25	98	36	78	54	48
Sales (In lakhs of Rupees)	47	53	58	84	65	68	60	89	51	84	66	55

(OR)

- b) The following table gives number of blind people per one lakh population in different age groups. Find correlation coefficient between age and blindness. (CO-1, L-3)

Age in years	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80
Number of blind people (Per lakh)	55	67	100	111	150	200	300	500

7. a) Fit an exponential curve  $y = ax^b$  to the following data : (CO-2, L-3)

Year (x)	1901	1911	1921	1931	1941	1951	1961	1971
Production (y) (in tonnes)	3.9	5.3	7.3	9.6	12.9	17.1	23.2	30.5

(OR)

- b) In a partially destroyed laboratory record of in analysis of correlation data the following results only are legible : variance of X = 9, the regression equations are  $8X - 10Y + 66 = 0$  and  $40X - 18Y - 214 = 0$ . Find on the basis of above information (CO-2, L-3)
  - (i) The means of X and Y
  - (ii) Correlation coefficient between X and Y
  - (iii) Standard deviation of Y
8. a) A coffee connoisseur claims that he can distinguish between a cup of instant coffee and a cup of percolator coffee 75% of the time. It is agreed that his claim will be accepted if he correctly identifies at least 5 of the 6 cups. Find his chances of having the claim (i) accepted, (ii) rejected, when he does have the ability he claims. (CO-3, L-3)

(OR)

- b) A manufacturer, who produces medicine bottle, finds that 0.1% of the bottles are defective. The bottles are packed in boxes containing 500 bottles. A drug manufacturer buys 100 boxes from the producer of bottles. Using Poisson distribution, find how many boxes will contain: (i) no defective, and (ii) at least two defective (CO-3, L-3)
9. a) If  $X$  is uniformly distributed with mean 1 and variance  $4/3$ . (CO-4, L-3)  
Find (i)  $P(X < 0)$ , (ii)  $P(-1 \leq X \leq 2)$
- (OR)
- b) The mean yield for one-acre plot is 662 kilos with standard deviation 32 kilos. Assuming normal distribution, how many one-acre plots in a batch of 1,000 plots would you expect to have yield (i) over 700 kilos, (ii) below 650 kilos, and (iii) what is the lowest yield of the best 100 plots? (CO-4, L-3)
10. a) Explain the principle steps in sample survey. (CO-5, L-2)
- (OR)
- b) Explain the principles of sampling. (CO-5, L-2)

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PARVATHANENI BRAHMAYYA SIDDHARTHA COLLEGE OF ARTS & SCIENCE:: VIJAYAWADA-10.

(An Autonomous College in the jurisdiction of Krishna University, Machilipatnam)

## Title of the Course: Statistical Methods and Applications of Probability

Offered to: B.Sc. (AI & ML)

Course Code : STAP28

Course Type: Core (P)

Year of Introduction: 2021-22

Semester: II

Credits: 1

Hours Taught: 30 periods

Max.Time: 2 Hours

Course Outcomes:		
Course Outcome	Upon successful completion of this course, students should have the knowledge and skills to:	Programme Outcomes Mapping
CO 1	To fit a data into various theoretical probability distributions.	PO – 5
CO 2	Apply and Analyze the qualitative data	PO – 6
CO3	Identify the relations between the variables and estimate.	PO - 7

### List of Practicals

- Fitting of Binomial distribution (Direct Method). (CO – 1)
  - Fitting of Binomial distribution (Recurrence Method). (CO – 1)
- Fitting of Poisson distribution (Direct Method). (CO – 1)
  - Fitting of Poisson distribution (Recurrence Method). (CO – 1)
- Fitting of Normal distribution (Areas Method). (CO – 1)
  - Fitting of Normal distribution (Ordinates Method). (CO – 1)
- Computation of correlation coefficient for ungrouped data. (CO – 3)
  - Computation of correlation coefficient for grouped data. (CO – 3)
- Fitting of a straight line by the method of least squares. (CO – 3)
  - Fitting of a parabola by the method of least squares. (CO – 3)
- Fitting of power curve  $y = ax^b$  by the method of least squares. (CO – 3)
  - Fitting of exponential curves  $y = ae^{bx}$  &  $y = ab^x$  by the method of least squares. (CO – 3)
- Construction of regression lines for the ungrouped data. (CO – 3)
  - Construction of regression lines for the grouped data. (CO – 3)

**Reference Manual:** Practical Manual -Prepared by the Department Faculty Members

**Websites of Interest:** <http://www.statsci.org/datasets.html>

### Structure of Practical Paper

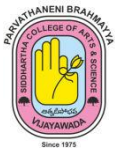
**Total Marks: 50 Marks**

**(i) For Continuous Evaluation**

**: 15 marks (Internal Evaluation)**

**(ii) For semester end Practical Examination**

**: 35 marks (External Evaluation)**



# P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

Siddhartha Nagar, Vijayawada – 520 010

Autonomous -ISO 9001 – 2015 Certified

## Applied Operations Research

**Offered to:** BBA (Business Analytics) / STAT45A

**Course Type:** Core (Theory)

**Year of Revision:** 2021

**Semester:** I V **Paper No.** IV

**Hours Taught:** 75 periods per Semester

**Percentage of Revision:** 20%

**Credits:** 5

**Max. Time:** 3 Hours

**Course Prerequisites:** Students required knowledge in basic mathematics and statistics techniques

**Course Description:** The Objectives of the course is to acquaint the student with the applications of Operations Research to business and industry and help them to grasp the significance of analytical techniques in decision making. Students will be tested on the application of Operations Research to business related problems.

### Course Objective:

- 1) To enrich the knowledge of students with advanced techniques of linear programming problem along with real life applications.
- 2) To provide understanding in solving industrial problems using linear programming techniques

**Learning Out Comes:** At the end of the course, the student will

- 1) Ability to understand and analyze managerial problems in industry so that they are able to use resources (capitals, materials, staffing, and machines) more effectively.
- 2) Skills in the use of Operations Research approaches and computer tools in solving real problems in industry
- 3) Mathematical models for analysis of real problems in Operations Research.

### Course Outcomes:

The students shall get exposed to

- CO1: Develop the basic knowledge in Operation research (O.R.,) and describe the nature, scientific methods and Decision making (O.R.,)
- CO2: Frame the Linear Programming Problem (LPP), graphical and simplex method of solving linear programming problem (LPP) for finding , unbounded, alternate and infeasible solutions,
- CO3: obtaining solution of a transportation problem by North West corner method, Matrix Minima method, Vogel's method and Hungarian Method for solving assignment problems,
- CO4: game theory for graphical solution of  $m \times 2$  or  $2 \times n$  rectangular game and mixed strategy,
- CO5: networking problem using PERT & CPM techniques.

## Syllabus

Unit	Learning Units	Lecture Hours
I	Nature and Features of O.R., Models in O.R., Applications, Opportunities and short comings of O.R. Linear programming – Mathematical formulation – Graphical & Simplex Methods.	15
II	<b>Transportation Model</b> Introduction – Solution of Transportation Problem - Initial basic feasible Solution : NW Corner Rule, Least Cost Method, Vogel’s Approximation method and Test for optimality : MODI method. Unbalanced, Prohibited, Maximization problems.	15
III	<b>Assignment Problem</b> Introduction-solution of Assignment Problem- Hungarian method, Special cases in Assignment problem - Unbalanced, Prohibited, Maximization problems.	15
IV	<b>Inventory Control</b> Basic concepts of inventory problems, Types of inventories and Cost associated with inventories. The concept of EOQ (Economic Order Quantity).Deterministic inventory problems (Static Demand Model) The EOQ model without shortage - The economic lot size system with uniform demand- production rate is finite and infinite. Price Breaks (Quantity Discounts): Problems of EOQ with One price break and two price breaks. Simple problems.	15
V	<b>Network Scheduling by PERT /CPM</b> Basic components, Logical Sequencing , Rules for Network construction, Critical path Analysis, Determination of Floats and slack times. Probability considerations in PERT( Project Evaluation and Review Technique). Distinction between PERT and CPM, Applications of network techniques.	15

Note: **No proof and derivations.** Maximum two sub questions in a main question.

**Text Book:**

**Operations Research**, Improved and Enlarged Edition, S. D. Sharma, Kedar Nath Ram Nath & Co., Meerut.

**List of Reference Books:**

1. Operations Research, 15<sup>th</sup> Edition, 2010, Kanti Swarup, P.K.Gupta , Man Mohan, Sultan Chand & Sons, New Delhi.
2. Operations Research, 2<sup>nd</sup> edition, R. Panneerselvam, PHI Learning, Private Limited, New Delhi.
3. Kirshna's Operations Research, Dr. R. K. Gupta, 27 th Edition , 2010, Krishna Prakashan Media (P) Ltd., Meerut.
4. Operations Research:Theory and Applications, J.K.Sharma, 5<sup>th</sup> Edition, Macmillan Publishers 2013,

**Model Question Paper Structure for SEE**

**Max.: 75 Marks**

**Min.Pass : 30 Marks**

**Applied Operations Research**  
**Course Code: STAT45A**

**Answer all the questions. Each Question Carries 15 marks.**

- 1 (a) Use the graphical method to solve the following L.P.P (L3,CO2)

$$\begin{aligned} \text{Min } Z &= 1.5x_1 + 2.5x_2 \\ \text{Subject to conditions} \\ x_1 + 3x_2 &\geq 3 \\ x_1 + x_2 &\geq 2 \\ \text{and } x_1, x_2 &\geq 0. \end{aligned}$$

- (b) What are the characteristics of a good model for O.R? (L1,CO1)

(OR)

- (c) What are the applications of O.R. (L1,CO1)

- (d) Using simplex method solve to

$$\begin{aligned} \text{Minimum } z &= x_2 - 3x_3 + 2x_5 \\ \text{subject to the constraints:} \end{aligned}$$

$$\begin{aligned} 3x_2 - x_3 + 2x_5 &\leq 7, \\ -2x_2 + 4x_3 &\leq 12, \\ -4x_2 + 3x_3 + 8x_5 &\leq 10, \\ x_2, x_3, x_5 &\geq 0 \end{aligned}$$

(L3,CO2)

- 2 (a) Solve the following transportation problem. (L3,CO3)

TO

From	A	B	C	Available
I	50	30	220	1
II	90	45	170	3
III	250	200	50	4
Requirements	4	2	2	

(OR)

- (b) Use MODI method to obtain an optimum basic feasible solution of the transportation problem.

$$\begin{array}{cccccc} D & E & F & G & \text{Available} & \\ A & \left[ \begin{array}{cccc} 11 & 13 & 17 & 14 \end{array} \right] & 250 & & & \\ B & \left[ \begin{array}{cccc} 16 & 18 & 14 & 10 \end{array} \right] & 300 & & & \\ C & \left[ \begin{array}{cccc} 21 & 24 & 13 & 10 \end{array} \right] & 400 & & & \\ \text{Demand} & 200 & 225 & 275 & 250 & \end{array}$$

(L3,CO3)

3. (a) A car hire company has one car at each of the five depots 1, 2, 3, 4 and 5. A customer in each of the five towns A, B, C, D and E requires a car. The distance (in miles) between the depots (origins) and the towns (destinations) where the customers are given the following distance-matrix: (L3,CO3)

Depots \ Towns	1	2	3	4	5
A	160	130	175	190	200
B	135	120	130	160	175
C	140	110	155	170	185
D	50	50	80	80	110
E	55	35	70	80	105

How should the cars be assigned to the customers so as to minimize the distance travelled?

(OR)

- (b) A manufacturing company has four zones A, B, C, D and four sales engineers P, Q, R, S respectively for assignment. Since the zones are not equally rich in sales potential, it is estimated that a particular engineer operating in a particular zone will bring the following sales: Zone A: 4,20,000, Zone B: 3,36,000, Zone C: 2,94,000, Zone D: 4,62,000. The engineers are having different sales ability. Working under the same conditions their yearly sales are proportional to 14, 9, 11 and 8 respectively. The criteria of maximum expected total sales is to be met by assigning the best engineer to the richest zone, the next best to the second richest zone and so on. Find the optimum assignment and the maximum sales.

- 4 (a) A contractor has to supply 10,000 bearings per day to an automobile manufacturer. He finds that, when he starts a production run. He can produce 25,000 bearings per day. The cost of holding a bearing in stock for one year is 20 paise and the set up cost of a production run is Rs 180. How frequently should production run to be made? (L3,CO4)

(OR)

- (b) An oil engine manufacturer purchases lubricants at the rate of Rs.42 per piece per from a vendor. The requirement of these lubricants is 1,800 per year. What should be the order quantity per order, if the cost per placement of an order is Rs.16 and inventory carrying charge per rupee per year is only 20 paise (L3,CO4)

5. (a) Tasks A, B, C, ..., H, I constitute a project. The notations  $X < Y$  means that the tasks X must be finished before Y can begin. With this notation.

<b>A &lt; D</b>	<b>A &lt; E</b>	<b>B &lt; F</b>	<b>D &lt; F</b>	<b>C &lt; G</b>	<b>C &lt; H</b>	<b>F &lt; I</b>	<b>G &lt; I</b>
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Draw a graph to represent the sequence of tasks and find the minimum time of completion of the project, when the time (in days) of completion of each tasks is as follows. (L4,CO5)

<b>TASK</b>	A	B	C	D	E	F	G	H	I
<b>TIME</b>	8	10	8	10	16	17	18	14	9

(OR)

- (b) A small project consists of seven activities, the details of which are given below:

<b>Activity</b>	A	B	C	D	E	F	G
<b>Most likely</b>	3	6	3	10	7	5	4
<b>Optimistic</b>	1	2	3	4	3	2	4
<b>Pesimistic</b>	7	14	3	22	15	14	4
<b>Preceding Activities</b>	-	-	B	C	A, D	D	A, D
<b>Duration</b>	6	5	2	2	2	1	6

- (i) Draw the network, number the nodes, find the critical path, the expected project completion time and the next most critical path.
- (ii) What project duration will have 95% confidence of completion?(L4,C05)

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1.ది10-03-2023న ఉదయం 10.30గం. లకు పర్యవేషిని బ్రహ్మయ్య సిద్ధార్థ స్వయంప్రతిపత్తి కళాశాల తెలుగుశాఖాధ్యక్షులు డా॥ ఎన్. శివకుమార్ అధ్యక్షతన తెలుగు పాఠ్యప్రణాళిక నిర్ణాయక సంఘం సమావేశంలో పరిశీలనాంశములు యమనగా 2022-23 విద్యా సంవత్సరంలో డిగ్రీ యుజి. అన్ని కోర్సుల/గ్రూపుల విద్యార్థులకు IIవ సెమిస్టరు పాఠ్యాంశములు మరియు కోర్సు కోడ్ TELT21Aకు సంబంధించిన సిలబస్‌ను బోధించుటకు నిర్ణయం గురించి మరియు 2022-23 విద్యా సంవత్సరంలో తెలుగుపరీక్షా ప్రశ్నపత్రాల నమూనా మార్పు పరిశీలన గురించి.

2. అధ్యక్షుల అనుమతితో తెలుగుశాఖకు సంబంధించిన ఏవైనా ఇతర అంశాలు.

### హాజరైన సభ్యులు:

1. డా.ఎన్. శివకుమార్, చైర్మన్, బోర్డు ఆఫ్ స్టడీస్, తెలుగుశాఖాధ్యక్షులు, పి.బి. సిద్ధార్థ స్వయంప్రతిపత్తి కళాశాల, విజయవాడ-10
2. డా. జి.బి.ఆనంద్ కుమార్, నామిని, కృష్ణా విశ్వవిద్యాలయం, మచిలీపట్నం
3. డా. పి.విజయ కుమార్, విషయనిపుణులు, వైస్ ప్రెసిడెంట్, ఎస్.ఎం.ఎల్. ప్రభుత్వ డిగ్రీ కళాశాల, ఎమ్మిగనూరు, కర్నూలు
4. డా.పి.జ్యోతి, పొయిట్ & క్రిటిక్, తెలుగుశాఖాధ్యక్షురాలు, కాకతీయ విశ్వవిద్యాలయం, వరంగల్
5. శ్రీ జి.వెంకటేశ్వరరావు, పూర్వ విద్యార్థి, జర్నలిస్టు, విజయవాడ
6. శ్రీ ఆర్.జితేంద్ర కుమార్, తెలుగు అధ్యాపకులు, పి.బి.సిద్ధార్థ స్వయంప్రతిపత్తి కళాశాల, విజయవాడ-10
7. డా.పి. నీరజ, తెలుగు అధ్యాపకురాలు, పి.బి.సిద్ధార్థ స్వయంప్రతిపత్తి కళాశాల, విజయవాడ-10

### TELUGU DEPARTMENT

#### LIST OF THE COURSES REVISED SYLLABUS / MODEL QUESTION PAPER IN II SEMESTER-2022-2023

S.NO	TITLE OF THE COURSE	COURSE CODE	OFFERD IN SEM	TYPE OT THE PAPER	YEAR OF INTRODUCTION	YEAR OF REVISION	PAGE NUMBERS	OBE WITH BTL	OFFERED TO
1	Telugu-II	TELT21A	II	Second Language	2020-21	No Revision	1-4	YES	ALL UG PROGRAMS (22)

### అమోదించిన తీర్మానాలు:

#### మొదటి తీర్మానము :-

1. 2022-23 విద్యా సంవత్సరంలో డిగ్రీ యుజి. అన్ని కోర్సుల/గ్రూపుల విద్యార్థులకు IIవ సెమిస్టరు పాఠ్యాంశములు మరియు కోర్సు కోడ్ TELT21Aకు సంబంధించిన సిలబస్‌ను బోధించుటకు నిర్ణయం గురించి మరియు 2022-23 విద్యా సంవత్సరాల్లో తెలుగు పాఠ్యగ్రంథాల బోధనానుభవమును సమీక్షించిన అనంతరం 2022-23 విద్యా సంవత్సరం నుండి తెలుగు పరీక్షా ప్రశ్నపత్రాల నమూనా మార్పు పరిశీలనచేసి పరీక్షాప్రశ్నపత్రాల నమూనాను, పాఠ్యప్రణాళికకు అనుగుణంగా ఉన్నాయని, సెమిస్టర్ చివరి పరీక్షలు 70 మార్కులకు, ఇంటర్మీడియట్ పరీక్షలు 30 మార్కులకు నిర్వహించుటకు విద్యార్థులస్థాయికి తగినట్లుగా ఉన్నాయని నిర్ణయించి, తదుపరి విద్యా సంవత్సరాలలో కూడా యిదే కొనసాగించునట్లుగా అనుమతిని అంగీకరిస్తూ ఏకగ్రీవంగా తీర్మానించడమైంది.

PARVATHANENI BRAHMAYYA SIDDHARTHA COLLEGE OF ARTS & SCIENCE  
VIJAYAWADA - 520 010

An autonomous college in the jurisdiction of Krishna University, A.P., India

TELUGU	TELT21 A	2022 – 2023	All UG Courses (22)
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SEMESTER – II

Credits: 3

కోర్స్ కోడ్: TELT21A

TELUGU-II

అంశం: తెలుగు- II

సెమిస్టర్- II

ఆధునికతెలుగు సాహిత్యం

యూనిట్ల సంఖ్య: 5

కోర్స్ అవుట్ కమ్స్ :

ఈ కోర్సు విజయవంతంగా ముగించాక, విద్యార్థులు క్రింది అభ్యసన ఫలితాలను పొందగలరు.

1. ఆంగ్ల భాష ప్రభావం కారణంగా తెలుగులో వచ్చిన ఆధునిక సాహిత్యాన్ని దాని విశిష్టతలను గుర్తిస్తారు.
2. సమకాలీన ఆధునిక సాహిత్య ప్రక్రియలైన 'వచన కవిత్వం, కథ, నవల, నాటకం' విమర్శలపై అవగాహన పొందుతారు.
3. భావకవిత, అభ్యుదయ కవిత్వాల లక్ష్యాలను గూర్చిన జ్ఞానాన్ని పొందుతారు. ఇంకా అస్తిత్వవాదం, ఉద్యమాల పుట్టుకను, ఆవశ్యకతను గుర్తిస్తారు.
4. కథా సాహిత్యం ద్వారా సామాజిక చైతన్యాన్ని పొందుతారు సిద్ధాంతాల ద్వారా కాకుండా, వాస్తవ పరిస్థితులను తెలుసుకోవడం ద్వారా సిద్ధాంతాన్ని సమీక్షించుకొంటారు.
5. ఆధునిక తెలుగు కల్పనా సాహిత్యం ద్వారా సామాజిక, సాంస్కృతిక, రాజకీయ చైతన్యాన్ని పొందుతారు.

అండ్ ఆబ్జెక్టివ్స్

1. ఆధునిక భాషా సాహిత్యము నందలి ప్రక్రియల పట్ల ప్రీతి, మమకారం, ఆసక్తి కల్గుతుంది.
2. ఆధునిక కవిత్వము పట్ల అవగాహన పద్ధతులు, ప్రసిద్ధులైన కవుల, రచయితల రచనాశైలి తెలుస్తాయి.
3. ఆధునిక సాహిత్య ప్రక్రియలైన కథ, నవల, నాటకం, విమర్శ మొదలగు సాహిత్య ప్రక్రియలలో రచనా మెలుకువలు తెలుసుకోవటం జరుగుతుంది.
4. ఆధునిక సాహిత్యంలోని వివిధ కొత్త పదబంధాలు, శబ్ద ప్రయోగవైచిత్రీ, భాషా పరిజ్ఞానాన్ని తెలుసుకుంటారు.
5. కాలానుగుణంగా షామిత్యం తన స్వరూపాన్ని ఏవిధముగా మార్చుకుంటుందో విద్యార్థులు క్షుణ్ణంగా పరిశీలించే అవకాశం కల్గుతుంది.

Course Code: TELT21A  
Time: 3 Hrs.

TELUGU-II

Max. Marks: 70M  
Pass Min : 28M

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SECTION-A/ అ - భాగము

I. క్రింది వానిలో నాల్గింటికి సంగ్రహరూప సమాధానాలు వ్రాయండి.

4 x 5 = 20 మా.

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|---|----|
| 1. ఆధునిక కవిత్వ లక్షణాలను తెలపండి.<br>(లేదా)<br>గురజాడ అప్పారావు                                       | L1 |
| 2. కొండవీడు<br>(లేదా)<br>అనిశెట్టి సుబ్బారావు   | L1 |
| 3. తెలుగు నవల<br>(లేదా)<br>రథచక్రాలు మరియు పాత్ర  | L2 |
| 4. కథానిక లక్షణాలు తెలపండి.<br>(లేదా)<br>భయం కథలో సొమ్ముల గురవడు పాత్రను వివరించండి.                    | L2 |
| 5. యక్షగానం పాఠ్యాంశంలో కేశవపర్వ పాత్రను రాయండి.<br>(లేదా)<br>విమర్శను నిర్వచించి, ప్రయోజనాలను తెలపండి. | L3 |

SECTION-B/ ఆ - భాగము

II. క్రింది వానిలో ఐదింటికి వ్యాసరూప సమాధానాలు వ్రాయండి.

5 x 10 = 50 మా.

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|---|----|
| 6. ఆధునిక కవిత్వం ఆవిర్భావ వికాసాలను వివరించండి.<br>(లేదా)<br>కన్యక ఇతివృత్తాంతాన్ని తెలియజేయండి. | L1 |
| 7. అనిశెట్టి మాతృసంగీతాన్ని వివరించండి.<br>(లేదా)<br>భయం కథను సంగ్రహంగా తెలపండి.                  | L2 |
| 8. రథచక్రాలు నవల సారాంశాన్ని వ్రాయండి.<br>(లేదా)<br>రథచక్రాలు నవలను సమీక్షించండి.                 | L2 |
| 9. యక్షగానం నాటిక ఇతివృత్తాన్ని వ్రాయండి.<br>(లేదా)<br>యక్షగానం నాటికను సమీక్షించండి.             | L1 |
| 10. విమర్శ భేదాలను వివరించండి.<br>(లేదా)<br>ఉత్తమ విమర్శకుని లక్షణాలను తెలపండి.                   | L3 |

PARVATHANENI BRAHMAYYA SIDDHARTHA COLLEGE OF ARTS & SCIENCE:: VIJAYAWADA-520 010.  
(An Autonomous College in the jurisdiction of Krishna University, Machilipatnam)  
SEMESTER-END EXAMINATIONS, MARCH-2023

**నమూనా ప్రశ్నపత్రం**

Course Code: TELT21A  
Time: 3 Hrs.

**TELUGU-II**

Max. Marks: 70M  
Pass Min : 28M

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ఆధునిక భారతి - ప్రథమ సంవత్సరం తెలుగు  
ద్వితీయ అర్ధవర్షము / రెండవ సెమిస్టరు

**ప్రశ్నపత్ర నిర్మాణం నమూనా :**

SECTION-A / ఆ - భాగము

I. క్రింది వానిలో నాల్గింటికి సంగ్రహరూప సమాధానాలు వ్రాయండి.

4 x 5 = 20 చూ.

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|--------------------------|-----|--------------|
| 1. సంగ్రహ రూప ప్రశ్నలు : | 2-1 | 1x05 = 05 చూ |
| 2. సంగ్రహ రూప ప్రశ్నలు : | 2-1 | 1x05 = 05 చూ |
| 3. సంగ్రహ రూప ప్రశ్నలు : | 2-1 | 1x05 = 05 చూ |
| 4. సంగ్రహ రూప ప్రశ్నలు : | 2-1 | 1x05 = 05 చూ |
| 5. సంగ్రహ రూప ప్రశ్నలు : | 2-1 | 1x05 = 05 చూ |

SECTION-B/ ఆ - భాగము

II. క్రింది వానిలో ఐదింటికి వ్యాసరూప సమాధానాలు వ్రాయండి.

5 x 10 = 50 చూ.

- |                         |     |             |
|-------------------------|-----|-------------|
| 6. వ్యాసరూప ప్రశ్నలు :  | 2-1 | 1x10 = 10చూ |
| 7. వ్యాసరూప ప్రశ్నలు :  | 2-1 | 1x10 = 10చూ |
| 8. వ్యాసరూప ప్రశ్నలు :  | 2-1 | 1x10 = 10చూ |
| 9. వ్యాసరూప ప్రశ్నలు :  | 2-1 | 1x10 = 10చూ |
| 10. వ్యాసరూప ప్రశ్నలు : | 2-1 | 1x10 = 10చూ |

**గమనికలు/సూచనలు :**

1. SECTION-A (లేదా) ఆ - భాగంలో ప్రతి యూనిట్ నుండి రెండు సంక్షిప్త ప్రశ్నలు అంతర్గత ఐచ్ఛిక ప్రశ్నలుగా (InternalChoice) ఇవ్వాలి. ఏదైనా నాలుగు సంక్షిప్త ప్రశ్నలకు సమాధానములు వ్రాయవలసి ఉంటుంది. ఒక ప్రశ్నకు 5 మార్కులు చొప్పున 4 ప్రశ్నలకు 20 మార్కులు.

2. SECTION-B (లేదా) ఆ - భాగంలో ప్రతి యూనిట్ నుండి రెండు వ్యాసరూప ప్రశ్నలు అంతర్గత ఐచ్ఛిక ప్రశ్నలుగా (Internal Choice) ఇవ్వాలి. ఏదైనా ఐదు వ్యాస ప్రశ్నలకు సమాధానాలు వ్రాయవలసి ఉంటుంది. ఒక ప్రశ్నకు 10 మార్కులు చొప్పున 5 ప్రశ్నలకు 50 మార్కులు.

**ముఖ్య గమనిక:-**

ప్రశ్నపత్ర నిర్మాణ సూచిక :- ప్రశ్నపత్రములో ఆధునిక భారతి రెండవ సెమిస్టరు తెలుగు వాచకము లోని పాఠ్యాంశాల వెనుక ఇవ్వబడిన సంక్షిప్త / సంగ్రహ ప్రశ్నలు మరియు వ్యాసరూప ప్రశ్నల నుంచి మాత్రమే ప్రశ్నలను అడగవలసి ఉన్నది.

**DEPARTMENT OF ZOOLOGY**  
**BOARD OF STUDIES FOR THE ACADEMIC YEAR 2023-24 (EVEN SEMESTERS)**

**1. Agenda:**

1. To evaluate the syllabus in relation to its socio-economic relevance.
2. To explore the possibilities of introducing any new subjects as additional optional subjects, or new combinations of subjects.
3. To assess the potential of the courses against the employment prospects, necessary certification courses.
4. To make academic flexibilities like honors with extra credits acquired through either advanced study of same courses or with procuring additional credits from additional courses.

Minutes of meeting of Board of studies in zoology held on **13-03-2023** at **9.30am** in the Department of zoology.

**2. List of members in BOS:**

	<b>Name of the BOS members</b>	<b>Designation</b>	<b>Signature</b>
1	Ch. Venkateswarlu	Chairman	Sd
2	Dr.L. Suseela	University Nominee	Sd
3	Prof. K. Veeraiah	Subject expert	Sd
4	Prof. S. Kishore	Subject expert	Sd
5	Dr. M. Lakshmi Prasad	Industrialist	Sd
6	Ch. Sai Krishna	Alumnus	Sd
7	V. Babu Rao	Special invitee	Sd
8	Dr. A. Samba Naik	Internal member	Sd

Department of Zoology								
LIST OF THE COURSES REVISED/ INTRODUCED IN II SEMESTER-2022-23								
S.NO	TITLE OF THE COURSE	Course Code	Offered in SEM	Type of the Paper	Year of Introduction	Year of Revision	OBE with BTL	Offered to
1	“Animal diversity – Biology of chordates”	ZOOT21A	II	CORE	2020-21	QUESTION PAPER	YES	BSc.(B.Z.C)
2	“Animal diversity – Biology of chordates”	ZOOP21A	II	CORE LAB	2020-21	QUESTION PAPER	YES	BSc.(B.Z.C)

Resolutions / Recommendations:

1. It is resolved and recommend the revision of model question paper of “Animal diversity – biology of chordates” with course code ZOOT21A in II semester of B.Sc.(BZC) of for the batch of students admitted in 2022-23 and onwards. For the revised model question paper vide Page Number 1 to 2.
2. It is resolved and recommend the revision of model question paper of “Animal diversity – biology of chordates” with course code ZOOP21A in II semester of B.Sc.(BZC) of for the batch of students admitted in 2022-23 and onwards. For the revised model question paper vide Page Number 3 to 3.

PARVATHANENI BRAHMAIAH SIDDHARTHA COLLEGE OF ARTS AND SCIENCE,  
VIJAYAWADA.

TITLE OF THE PAPER: ANIMAL DIVERSITY - BIOLOGY OF CHORDATES  
MODEL QUESTION PAPER

Semester-II  
Time: 3 Hrs

Course Code: ZOO T21A  
Max. Marks: 70M

Draw neat labeled diagrams wherever necessary.

**SECTION –A (20M)**

**Answer all Questions**

(Restrict to maximum of 2 sub divisions)

1. i. Describe the structure of *Herdmania* – CO1 L2 4M  
(Or)
- ii. Enumerate the general characters of Cephalochordata – CO1 L1 4M
2. i. Explain the different types of Scales in fishes –CO2 L2 4M  
(Or)
- ii. Explain Viviparity in fishes – CO2, L2 4M
3. i. Describe the south indian amphibians – CO3, L2 4M  
(Or)
- ii. Describe the ventricles of brain of frog – CO3, L2 4M
4. i. Distinguish between poisonous and non-poisonous snakes – CO4, L2 4M  
(Or)
- ii. Describe the functions of brain of calotes- CO4, L2 4M
5. i. explains the structure of tooth. CO5, L2 4M  
(Or)
- ii. Describe the structure of quill feather. CO5, L2 4M

**SECTION – B (50M)**

**Answer all Questions**

(Restrict to maximum of 2 sub divisions)

6. I. What is meant by Retrogressive Metamorphosis? Apply the phenomenon with reference to the development of *Herdmania* – CO1, L3 10M  
(Or)
- ii. Enumerate the General characters of Cyclostomes – CO1 L3 10M
7. i. Describe the Respiratory system in *Scoliodon*– CO2, L2 10M  
(Or)

- ii. Explain the significance of Accessory respiratory organs –CO2, L2 10M
8. i. Describe Respiratory system in *Rana*– CO3, L2 10M  
(Or)
- ii. Discuss Parental Care in Amphibians – CO3 L2 10M
9. i. Explain about the South Indian Chelonians – CO4, L2 10M  
(Or)
- ii. Describe the structure and working of heart of *Calotes*- CO4, L2 10M
10. i. Describe the Respiratory system in Pегion – CO5, L2 10M  
(Or)
- ii. Explain about the Aquatic Mammals – CO5, L2 10M



**PARVATHANENI BRAHMAIAH SIDDHARTHA COLLEGE OF ARTS AND SCIENCE,  
VIJAYAWADA.**

**II B.Sc. ZOOLOGY PRACTICAL EXAMINATION**

**PRACTICAL- II**

**COURSE CODE: ZOO P21A**

**TITLE OF THE PAPER: ANIMAL DIVERSITY - BIOLOGY OF CHORDATES**

**Time: 3hrs.**

**Max. Marks 35M**

**SEE MODEL PAPER**

1. List out the general characters of Class Mammalia. CO5, L 5 M
  
2. Identify and draw a neat labelled diagram of digestive system of *Channa*. CO2, L3 10 M  
Identification: 2M  
Diagram: 4 M  
Labelling: 4 M
  
3. Identify, draw a labelled diagram, classify and write notes on A, B, C, D and E CO1, 2,3,4,5  
L2 5 X 2 = 10 M  
A. Protochordata and Cyclostomata  
B. Pisces  
C. Amphibia and Reptilia  
D. Aves and Mammalia  
E. Osteology  
Identification: 1 M  
Diagram:  
Classification:  
Comment 1 M
  
4. Practical Record Book CO1, 2,3,4,5 L3 5 M
  
5. VIVA CO1, 2,3,4,5 L5 5 M

PARVATHANENI BRAHMAIAH SIDDHARTHA COLLEGE OF ARTS AND SCIENCE; VIJAYAWADA  
(An autonomous college in the jurisdiction of Krishna University)

Department of Zoology

TITLE OF THE PAPER: Aquarium Fish keeping and Maintenance

COURSE CODE – SDCZOO01

MAX.MARKS-35M

MODEL QUESTION PAPER

I. Answer the following questions

1. Define the Aquarium. Describe the Equipment's Used in the Maintenance of Aquarium 8M
2. Preparation of Aquarium – Write the procedure and preparation 12M  
    Procedure -5M  
    Preparation – 10M
3. Identify and Comment on 5X2= 10M
4. Viva voce 05M