NAAC - SSR IV CYCLE

Criterion I - Curricular Aspects

1.3. Curriculum Enrichment

1.3.1: Institution integrates cross-cutting issues relevant to Professional Ethics, Gender, Human Values, Environment and Sustainability and other value framework enshrined in Sustainable Development Goals and National Education Policy – 2020 into the Curriculum.

Total Number of

Courses Related to 1.3.1 :145

1.3.1 INDEX PAGE

NAAC - SSR IV CYCLE

Criterion I - Curricular Aspects **1.3 Curriculum Enrichment**

1.3.1: Institution integrates cross-cutting issues relevant to Professional Ethics, Gender, Human Values, Environment and Sustainability and other value framework enshrined in Sustainable Development Goals and National Education Policy – 2020 into the Curriculum

NAME OF THE PROGRAM : B.Sc. ARTFICIAL INTELLIGENCE & MACHINE LEARNING

NAME OF THE PROGRAM : B.Sc. AIML REGULATION 20						
NAME OF THE COURSE	**Couse Code**	**Professional Ethics**	**Gender**	**Human values**	**Environmental and Sustainability**	**other value framework enshrined**
COMPUTER NETWORKS	AIMLSET2	Focuses on ethical data handling, secure networking practices, and responsible programming with an emphasis on transparency, data privacy, and integrity across all layers of networking and applications.	Promotes inclusivity, fairness, and unbiased access to technology and data representation, ensuring diverse user needs are met without discrimination.	Emphasizes values like honesty, fairness, and transparency in data analysis, network design, and resource sharing, fostering a culture of respect and integrity.	Encourages sustainable practices in network design, energy-efficient technologies, and environmentally responsible data transmission methods.	Aligns with social responsibility, transparency, and ethical practices in all aspects of technology, supporting the Sustainable Development Goals and NEP-2020's focus on holistic, value-based education.

Problem solving using Structured Programming	AIMLT11	Emphasizes ethical considerations in programming and problem-solving, ensuring responsible use of algorithms and data structures.	Promote gender inclusivity in computer science education by encouraging diverse participation in programming exercises and algorithm design discussions.	Foster respect and integrity in collaborative programming environments, ensuring that all contributions are valued and ethical considerations are included in problem-solving processes.	Encourage efficient coding practices that minimize resource usage in algorithm design and implementation, promoting sustainability in programming.	Align with the Sustainable Development Goals by incorporating ethical programming practices and responsible data handling as outlined in NEP-2020.
Problem Solving Techniques	AIMLT12	Emphasizes ethical considerations in algorithm development and problem-solving, ensuring responsible programming practices and data integrity.	Promote gender inclusivity in programming tasks, encouraging diverse participation and collaboration in problem-solving exercises and algorithm	Foster respect and integrity in collaborative coding environments, valuing contributions from all team members and addressing biases in algorithm design.	Encourage efficient coding practices that reduce resource usage in algorithm execution and data processing, promoting sustainability in technology	Align with the Sustainable Development Goals by integrating ethical programming practices and responsible data handling, as outlined in NEP-2020.

INTRODUCTION TO PYTHON PROGRAMMING	AIMLT21	Emphasizes ethical data handling and responsible programming practices when working with files and data in Python, ensuring integrity and privacy.	Promote gender inclusivity in programming exercises, encouraging diverse perspectives in file handling and data processing discussions.	Foster a culture of respect and integrity while working with data, emphasizing the importance of ethical considerations in reading and writing various file types.	Encourage efficient file handling practices that minimize resource usage, promoting sustainability in data processing and storage.	Align with the Sustainable Development Goals by integrating ethical practices in data management and file handling as outlined in NEP-2020.
INTRODUCTION TO MACHINE LEARNING	AIMLT41	Emphasizes ethical considerations in machine learning practices, ensuring responsible use of data and algorithms while addressing biases in model training and evaluation.	Promote gender inclusivity in machine learning projects by encouraging diverse teams to collaborate on model development and evaluation	Foster a culture of respect and integrity while working with data, emphasizing ethical considerations in data collection, processing, and model evaluation.	Encourage efficient data processing practices in machine learning workflows to minimize environmental impact and promote sustainability in technology use.	Align with the Sustainable Development Goals by integrating ethical machine learning practices and responsible data handling as outlined in NEP-2020.

TITLE: COMPUTER NETWORKS

Department	Semester	Introduced in A. Y	Programme	Course Code
Computer Science	V	2023 - 2024	B. Sc. (AIML)	AIMLSET02

Teaching Prds: 45 **No. of Credits: 3**

Course Objectives:

1. To educate students on fundamental concepts of data communication and the design of computer networks.
2. To educate student on basic aspects of data link layer.
3. To educate student on datagram routing algorithm and shortest path routing algorithm.
4. To educate student on elements of transport layer protocol.
5. To educate student on fundamental concepts of application layer.

Course Outcomes:	At the end of this course, students should be able to	Programme Outcomes
CO1	Gain knowledge in the need of OSI reference model and various types of transmission media, switching techniques.	PO1, PO2
CO2	To build an understanding of the fundamental concepts of computer networking	PO2, PO3
CO3	To identify the basic taxonomy and terminology of computer networking	**PO4**
CO4	To introduce the advanced networking concepts	**PO5**
CO5	Learn how signals are used to transfer data between nodes	**PO3**

UNIT I: Introduction to Networking **9 Prds**

Uses of computer networks, Uses – Network Hardware: LAN-MAN-WAN, Internet works – Network Software: Protocol hierarchies – Design issues for the layers – Connection –

Oriented and Connectionless Services – Service Primitives Reference Models : OSI – TCP/IP.

Physical Layer Guided Transmission Media – Wireless Transmission – Communication Satellites – Digital Modulation and Multiplexing – Mobile Telephone system

UNIT II: Data Link Layer 9 Prds

Design issues of data link layer, Data link protocols - unrestricted simplex protocol, simplex stop and wait protocol, one bit sliding window protocol; Bluetooth, Error detection and correction . Wireless Technologies – WiFi Features – How to connect.

UNIT III: Network Layer9 Prds Introduction, Design issues of network layer, Virtual vs Datagram routing algorithms, Shortest path routing algorithm, Flooding, Distance vector routing algorithm, Congestion control algorithms.

UNIT IV: Transport Layer 9 Prds Introduction, Design issues of Transport Layer, Elements of Transport Protocols, Addressing - Connection Establishment, Connection Release, Flow control and Buffering, Multiplexing, Crash Recovery; Remote Procedure Call, User Datagram Protocol, Transmission Control Protocol

UNIT V: Application Layer 9 Prds Domain Name system, Email architecture and services, User agent sending and receiving Email, WWW Architectural Overview, Client side Server side URL, Cookies, Cryptography, FTP.

Text book:

1. Computer Networks-Andrew.S.Tanenbaum, Pearson Edu Asia Fourth edition. 2. Introduction to Data Communications and Networking-Behrouz Forouzan,Tata McGraw Hill Edition **Course Delivery method:** Face-to-face / Blended

Course has focus on: Employability

Websites of Interest:

1. https://www.javatpoint.com/java-tutorial

2. https://www.w3schools.com/java/

3. https://www.tutorialspoint.com/jdbc/index.htm

Co-curricular Activities: Programming Contests, Assignments & Quiz.

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TITLE: COMPUTER NETWORKS

COURSE CODE: AIMLSET02 **SECTION: B. Sc. (AIML)**

SEMESTER: V

TIME: 3 Hrs. **MAX: 75M**

SECTION A

ANSWER ANY 5 OF FOLLOWING QUESTIONS **5 X 5 = 25 Marks**

1. Explain LAN, WAN, MAN and Internet. (CO1, L2)
2. Explain message switching.. (CO1, L2)
3. Explain about simplex stop and wait protocol. (CO2, L1)
4. Explain the frame structure of the Bluetooth. (CO2, L1)
5. Compare and contrast virtual circuits and datagram subnets. (CO3, L2)
6. What are the differences between Adaptive and Non-Adaptive Routing algorithms?. (CO3, L2)
7. Explain Remote Procedure Call. (CO4, L2)
8. Explain buffering. (CO4, L2)

SECTION B

ANSWER THE FOLLOWING QUESTIONS . 5 X 10 = 50 Marks

6. A) Explain OSI Reference Model with a neat diagram.(CO1, L1)

(OR)

B) Explain various types of guided media. (CO1, L2)

7. A) Explain the design issues of the Data link layer.(CO2, L1)

(OR)

B) Explain the functionality of one bit sliding window protocol.(CO2, L1)

8. A) Illustrate shortest path routing algorithm with example.(CO3, L1)

(OR)

B) List out and explain different congestion control algorithms. (CO3, L1)

9. A) Write briefly about connection establishment and connection release mechanism. (CO4,L1)

(OR)

B) Write briefly about TCP Service Model and TCP segment Header. (CO4, L1)

10. A) Write a short note on DNS, DNS name space and Name servers. (CO5, L1)

(OR)

B) Explain the architectural overview of WWW and client side, server side URL. CO5, L1).

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TITLE: COMPUTER NETWORKS LAB

Department	Semester	Introduced in A. Y	Programme	Course Code
Computer Science	V	2023- 2024	B. Sc. (AIML)	AIMLSEP02

Teaching Prds: 30 **No. of Credits: 1**

Course Prerequisites (if any): Knowledge in Java and computer network protocols.

Course Objective:

To enable students to implement various computer network protocols using the Java programming language.

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

CO1: Implement various protocols like stop and wait, sliding window and ARP protocols. (PO5, PO7)

CO2: Implement PING, TRACE OUT commands and create HTTP sockets. (PO5, PO7)

CO3: Implement TCP and UDP sockets. (PO5, PO7)

Lab List

1. Implementation of Stop and Wait Protocol

2. Implementation of Sliding Window Protocol

3. Study of Socket Programming and Client – Server model

4. Write a code simulating ARP /RARP protocols.

5. Write a code simulating PING and TRACEROUTE commands

6. Create a socket for HTTP for web page upload and download.

7. Write a program to implement RPC (Remote Procedure Call).

8. Implementation of Subnetting.

9. Applications using TCP and UDP Sockets like DNS, SNMP and File Transfer

10. Applications using TCP Sockets like
A)Echo client and echo server B) Chat C) File Transfer

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COMPUTER NETWORKS LAB

Course Code: AIMLSEP02 **Offered to: B.SC (AIML)**
Semester: V
Max. Marks : 50 (CCIA: 10 + SEE: 40) **Hrs/Week: 3**

Model Paper : Practicals

Time: 3 Hrs **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 : E-COMMERCE

Department	Semester	Introduced in A. Y	Programme	Course Code
Computer Science	**V**	**2023 - 2024**	**B. Sc. (AIML)**	**AIMLSET03**

Total Periods: 45 **Credits: 3**

I. Course Objectives

To educate students in ecommerce and ecommerce applications.

COURSE OUTCOMES:

CO1	To apply in an integrative and summative fashion the students' knowledge in all fields of business studies by drafting a website presence plan.	PO1, PO2
CO2	To understand the factors needed in order to be a successful in ecommerce	(PO2)
CO3	To gain the skills to bring together knowledge gathered about the different components of building a web presence	PO3, PO4
CO4	To critically think about problems and issues that might pop up during the establishment of the web presence	(PO5)
CO5	To apply Word Press as a content management system (CMS), Plan their website by choosing colour schemes, fonts, layouts, and more .	PO6, PO7

Unit-1: (9h)

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: (9h)

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, Cashless payments UPI – features of UPI and Applications.

Unit-3: (9h)

Electronic data Interchange , EDI Technology ,EDl- Communications , EDI Agreements , E– Commerce payment system. Digital Economy , Digital infrastructure for Organisations IndiaStack – Features and Applications

Unit -4: (9h)

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

Unit-5: (9h)

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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SEMESTER END MODEL QUESTION PAPER

TITLE: e-Commerce **COURSE CODE: AIMLSET03**

SECTION: B. Sc. (AIML) **SEMESTER: V**
TIME: 3 Hrs. **MAX: 75M**

Section-A

Answer ANY FIVE the following questions. 5 X 5=25M

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 Lab

Department	Semester	Introduced in A. Y	Programme	Course Code
Computer Science	**V**	**2023-2024**	**B. Sc. (AIML)**	**AIMLSEP03**

Credits:2 **Total: 30 Periods**

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	PO1
CO2	Able to perform validation using PHP	PO2,PO3
CO3	Able to design catalogue	PO3
CO4	Able to implement access control mechanisms in web applications	PO4
CO5	Able to design application for any given e-commerce scenario	PO5

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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E - Commerce LAB

Course Code: AIMLSEP03 **Offered to: B.SC (AIML)**
Semester: V
Max. Marks : 50 (CCIA: 10 + SEE: 40) **Hrs/Week: 3**

Model Paper : Practicals

Time: 3 Hrs **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 : Software Testing Methodologies

Department	Semester	Introduced in A. Y	Programme	Course Code
Computer Science	**V**	**2023-2024**	**B.Sc(AIML)**	**AIMLSET04**

Total: 45 Periods **Credits: 3**

I. Course Objectives

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 nd graph matrices.

Course Outcomes

CO	After completion of the course the student is able to	Programme Outcomes
CO1	Understand the basic concepts of software testing, flow graphs and path testing	PO1
CO2	Understand transaction and data flow testing techniques	PO2, PO3
CO3	Implement various types of domain testing.	PO3, PO4
CO4	Evaluation of Paths, Path products and Regular Expressions and logic based testing	PO5
CO5	Select the appropriate tests to regression test your software after changes have been made.	PO2, PO4

UNIT-I 9hours

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 9 hours

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 9 hours

Domain Testing: domains and paths, Nice & ugly domains, domain testing, domain and interface testing, domains and testability.

UNIT-IV 9 hours

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 9 hours

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.)

II. Text Book:

1. Software Testing techniques –Baris Beizerm Dreamtech, Second edition. Reference Books

1. Software Testing Tools – Dr. K.V.K.K. Prasad, Dream tech.
2. Software Testing Principles and Practices by Naresh Chauhan, Oxford University Press
3. The craft of software testing – Brain Matrick, Pearson Education.
4. Software Testing Techniques – SPD (Oreille) Software Testing in the Real World- Edward Kit, Pearson.

III. 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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SEMESTER END MODEL QUESTION PAPER

TITLE: Software Testing Methodologies **COURSE CODE: AIMLSET04**

SECTION: B. Sc. (AIML) **SEMESTER: V**

TIME: 3 Hrs. **MAX: 75M**

Section-A

Answer any five of the following questions. 5 X 5=25M

1. What is testing? Explain Purpose of testing.(CO1, L1) or
2. Explain about Paths predicates and Achievable paths**.**(CO1, L1)
3. Explain Basics of dataflow testing.(CO2, L1) or
4. Write in detail about ordering the strategies in data flow.(CO2, L6)
5. Describe about domain testing. (CO3,L1)or
6. Explain restrictions to domain testing**.**(CO3, L1)
7. Write short note on decision tables. (CO4, L6) or
8. Explain about State Graphs with example**.(**CO5**,** L1)

Section-B

ANSWER THE FOLLOWING QUESTIONS **5x10M=50M**

9. (A) Explain Dichotomies in software testing in detail.(CO1, L1)

OR

(B) Explain about path sensitizing and path instrumentation with example.(CO1, L1)

10. (A) Explain about Transaction flow testing in detail.(CO2, L1)

OR

(B) Explain about Dataflow testing strategies in detail. (CO2, L1)

11.(A) What is Nice Domain? Summarize different types of Nice domains in detail.(CO3, L2)

OR

(B**)** Write in detail about Domain and Interface Testing**.**(CO3, L6)

12. (A). Explain regular expressions and flow anomaly detection in detail.(CO4, L1)

OR

(B) Explain about Logic Based Testing in detail. (CO4, L1)

13 (A) Explain about State Testing in detail.(CO5, L1)

OR

(B) Explain about Node Reduction Algorithm

Title: Software Testing Methodologies Lab

Department	Semester	Introduced in A. Y	Programme	Course Code
Computer Science	V	2023-24	B. Sc. (AIML)	AIMLSEP04

Total Periods: 30 Credits:2

Course objectives:

- To learn what is a bug and how to test.
- To learn the flow of graphs and apply path testing.
- To learn transaction and data flow techniques.
- To learn various types of domains.
- To learn how to apply different testing techniques.

Course outcomes:

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: (30 Periods)

- Introduction to win runner testing tool
- Recording test in context sensitive &analog mode
- Synchronizing test.
- Checking gui objects
- Checking bitmap objects.
- Programming test with tsl
- Creating data driven test
- Maintaining test script
- Batch test
- Project (creating test report)

Software Testing Methodologies LAB

Course Code: AIMLSEP04 **Offered to: B.SC (AIML)** **Semester: V**
Max. Marks : 50 (CCIA: 10 + SEE: 40) **Hrs/Week: 3**

Model Paper : Practicals

Time: 3 Hrs **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 : Software Project Management

Department	Semester	Introduced in A. Y	Programme	Course Code
Computer Science	V	2023-24	B. Sc. (AIML)	AIMLSET05

Total: 45 Periods **Credits: 3**

Course Objectives:

- To understand the fundamental principles of software project management.
- To have a good knowledge of responsibilities of project manager.
- To be familiar with the different methods and techniques used for project management.

COURSE OUTCOMES:

CO1	**Evaluate** and decide the software project management.	**P01**
CO2	**Determine and classify** the project life cycle and estimate the effort of Agile methods	**PO2**
CO3	**Formulate** the project activity plan and project risk management	**PO3,PO4**
CO4	**Organize** and **manage** the project contracts	**PO4**
CO5	**Establishing** the staffing pattern and Document the organizational behavior	**PO5**

UNIT – I 9 Hours

PROJECT EVALUATION AND PROJECT PLANNING

Importance of Software Project Management – Activities Methodologies – Categorization of Software Projects – Setting objectives – Management Principles – Management Control – Project portfolio Management – Cost-benefit evaluation technology – Risk evaluation – Strategic program Management – Stepwise Project Planning.

UNIT - II 9 Hours

PROJECT LIFE CYCLE AND EFFORT ESTIMATION:

Software process and Process Models – Choice of Process models - mental delivery – Rapid Application development – Agile methods – Extreme Programming – SCRUM – Managing interactive processes – Scrum meetings, Scrum master, roles and responsibilities of various members in Scrum meetings, sprint, etc - Basics of Software estimation – Effort and Cost estimation techniques –COSMIC.

UNIT - III 9 Hours

ACTIVITY PLANNING AND RISK MANAGEMENT:

Objectives of Activity planning – Project schedules – Activities – Sequencing and scheduling – Network Planning models – Forward Pass & Backward Pass techniques – Critical path (CRM) method– Risk identification – Assessment – Monitoring – PERT technique – Monte Carlo simulation –Resource Allocation – Creation of critical patterns – Cost schedules.

UNIT - IV 9Hours

PROJECT MANAGEMENT AND CONTROL:

Framework for Management and control – Collection of data Project termination – Visualizing progress – Cost monitoring – Earned Value Analysis- Project tracking – Change control, Software Configuration Management – Managing contracts – Contract Management.

UNIT - V 9 Hours

STAFFING IN SOFTWARE PROJECTS:

Managing people – Organizational behaviour – Best methods of staff selection – Motivation – The Oldham-Hackman job characteristic model – Ethical and Programmed concerns – Working in teams – Decision making – Team structures – Virtual teams – Communications genres – Communication plans

TEXT BOOK:

1. Bob Hughes, Mike Cotterell and Rajib Mall: Software Project Management – Fifth Edition, Tata McGraw Hill, New Delhi, 2012.

REFERENCES:

1. Robert K. Wysocki "Effective Software Project Management" – Wiley Publication,2011. 2. Walker Royce: "Software Project Management"- Addison-Wesley, 1998.
3. Gopalaswamy Ramesh, "Managing Global Software Projects" – McGraw Hill Education (India), Fourteenth Reprint 2013.

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SEMESTER END MODEL QUESTION PAPER

TITLE: SOFTWARE PROJECT MANAGEMENT **COURSE CODE: AIMLSET05**

SECTION: B. Sc. (AIML) **SEMESTER: V**

TIME: 3 Hrs. **MAX: 75M**

Section-A

Answer any five of the following questions. 5 X 5=25M

1. What are the activities in Stepwise Project Planning? (CO1, L2)
2. Explain Risk Evaluation?(CO1, L2)
3. Explain about Rapid Application Development?(CO2, L2)
4. Explain the concept of process models? (CO2, L2)
5. What is the significance of a critical path method? (CO3, L1)
6. Explain about objectives of Activity Planning? (CO3, L2)
7. Explain Frame work for Project Management and control? (CO4, L1)
8. Explain about Managing Contracts? (CO4 , L1)

Section-B

Answer the following questions. 10 X 5 = 50M.

5. (a) Explain various activities covered by Software Project Management? (CO1, L1)

(OR)

(b) Describe how cost benefits evaluation techniques and its methods with examples? (CO1, L1)

7. (a) Explain in detail about the COCOMO II Model? (CO2, L1)

(OR)

(b) Explain in detail about Agile Methods? (CO2, L1)

8. (a) Explain the two important approaches for identifying Risks? (CO3, L1)

(OR)

(b) Explain Network planning model. Explain with an example how critical path can be identified in precedence networks? (CO3, L1)

9. (a) Explain Software Configuration Management in detail? (CO4, L1)

(OR)

(b) Explain in detail about Change control procedures? (CO4, L1)

10. (a) Explain how new staff can be selected and inducted into a project? (CO5, L1)

(OR)

(b) Explain the importance of working together as a team and the various aspects of team development? (CO5, L1)

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Title: Software Project Management Lab

Department	Semester	Introduced in A. Y	Programme	Course Code
Computer Science	**V**	**2023-24**	**B. Sc. (AIML)**	**AIMLSEP05**

Credits:2 **Total: 30 Periods**

Course Objective:

The objective of this course is to enable students to practically implement various methods and techniques for software project management using python.

Course Outcome:

Course Outcome	By the end of the course, students will be able to	Programme Outcome
CO1	implement function point analysis and models like flexi and SEL.	PO2
CO2	implement basic, intermediate and detailed COCOMO.	PO3

LAB LIST

1. Demonstrate function point analysis.
2. Demonstrate flexi model.
3. Demonstrate SEL model.
4. Demonstrate basic COCOMO.
5. Demonstrate intermediate COCOMO.
6. Demonstrate detailed COCOMO.
7. Demonstrate early design model and calculate effort for development of project.

Ref: Software Project Management -Lab file - LABORATORY FILE Software Project Management (SE-405) 2021 - Studocu

Software Project Management LAB

Course Code: AIMLSEP05 **Offered to: B.SC (AIML) Semester: V**
Max. Marks : 50 (CCIA: 10 + SEE: 40) **Hrs/Week: 3**

Model Paper : Practicals

Time: 3 Hrs **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 : MULTIMEDIA TOOLS AND APPLICATIONS

Department	Semester	Introduced in A. Y	Programme	Course Code
Computer Science	V	2023-24	B. Sc. (AIML)	AIMLSET06

Teaching Prds: 45 **No. of Credits: 3**

I. Course Outcomes: Students at the successful completion of the course will be able to:

CO. NO.	Upon successful completion of this course, students should have the knowledge and skills to	PO. No.
CO1	Gain knowledge on the concepts related to Multimedia	PO1
CO2	Understand the concepts like image data representation and color modes	PO2, PO3
CO3	Understand the different types of video signals and digital audio	PO3
CO4	Know about multimedia data compression types and audio compression standards	PO4
CO5	Know about basic video compression techniques	PO5

II. Syllabus: **(Total Theory Periods: 45)**

UNIT-I :Introduction to multimedia **(9 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 **(12periods)**

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(9 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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Autonomous
Siddhartha Nagar, Vijayawada–520010
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SEMESTER END MODEL QUESTION PAPER

TITLE: MULTIMEDIA TOOLS AND APPLICATIONS COURSE CODE: AIMLSET06

SECTION: B. Sc. (AIML) SEMESTER: V

TIME: 3 Hrs. MAX: 75M

SECTION – A 5X5M=25M

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.

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)**

Title: MULTIMEDIA TOOLS AND APPLICATIONS LAB

Department	Semester	Introduced in A. Y	Programme	Course Code
Computer Science	V	2023-24	B. Sc. (AIML)	AIMLSEP06

Teaching Prds: 30 **No. of Credits: 2**

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

Multimedia Tools and Applications LAB

Course Code: AIMLSEP06 **Offered to: B.SC (AIML)** **Semester: V**
Max. Marks : 50 (CCIA: 10 + SEE: 40) **Hrs/Week: 3**

Model Paper : Practicals

Time: 3 Hrs **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: Security Analysis

Department	Semester	Introduced in A. Y	Programme	Course Code
Computer Science	**V**	**2023 - 2024**	**B. Sc. (AIML)**	**AIMLSET07**

Teaching Prds: 45 **No. of Credits: 3**

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.

To introduce handling network security incidents and malicious code incidents

Course out comes

COURSE OUTCOME NO	Upon successful completion of this course, students should have the knowledge and skills to:	PROGRAM OUTCOME NO
CO1	Configuring network devices, identifying unauthorized devices, etc	PO1
CO2	Troubleshooting of network communication, devices and can handle network slowdowns.	PO2
CO3	Handling responses, understand incident response role and responsibilities, handling data backup	PO4
CO4	Configuring and Analysing Logs, Log management and time synchronization	PO5
CO5	Network attacks and security incidents, preventing incident and handling malicious code	PO3

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 &Analyzing 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^{th} 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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SEMESTER END MODEL QUESTION PAPER

TITLE: SECURITY ANALYSIS **COURSE CODE: AIMLSET07**

SECTION: B. Sc (AIML) **SEMESTER: V**

TIME: 3 Hrs **MAX: 75M**

SECTION - A

Answer ALL of the following: **5 X 5= 20 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: SECURITY ANALYSIS LAB

Department	Semester	Introduced in A. Y	Programme	Course Code
Computer Science	V	2023- 2024	B. Sc. (AIML)	AIMLSEP7

Teaching Prds: 30 **No. of Credits: 2**

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, tcpdumpetc
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:

1. https://www.wireshark.org/docs/wsug_html_chunked/
2. https://whois.domaintools.com/
3. https://whois.domaintools.com/
4. https://binaryplant.com/arp-monitor/
5. https://www.snort.org/

Security Analysis LAB

Course Code: AIMLSEP07 **Offered to: B.SC (AIML)** **Semester: V**
Max. Marks : 50 (CCIA: 10 + SEE: 40) **Hrs/Week: 3**

Model Paper : Practicals

Time: 3 Hrs **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: INTERNET OF THINGS

Department	Semester	Introduced in A. Y	Programme	Course Code
Computer Science	V	2023 – 2024	B. Sc. (AIML)	AIMLSET08

Teaching Prds: 45 **No. of Credits: 3**

I. Course Outcomes: Students at the successful completion of the course will be able to:

CO		PO
CO1	Understand architecture and applications of IoT systems	**PO1**
CO2	Gain knowledge of various development boards used for IoT	**PO2**
CO3	Understand various Wireless Technologies used in IoT	**PO3,PO4**
CO4	Learn how to use various sensors and actuators for design of IoT	**PO5**
CO5	Learn how to connect various things to Internet and develop simple IOT Devices	**PO6**

UNIT-I **(9 Periods)**

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 **(9 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: IEEE802.15.4,Zigbee,HART,NFC,Z-Wave,BLE,BacnetAndModbus.IPBasedProtocolsforIoTIPv6,6LowPAN,LoRA,RPL,REST,AMPQ ,CoAP,MQTT.Edgeconnectivityandprotocols.

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,InterfacingLED,pushbuttonandbuzzerwithArduino,InterfacingArduino 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 inIoT.

III Text Book/References

1. Internet of Things - A Hands-on Approach, ArshdeepBahga and Vijay Madisetti,UniversitiesPress, 2015, ISBN: 9788173719547
2. Vijay Madisetti and ArshdeepBahga, "Internet of Things (A Hands-onApproach)", 1stEdition, VPT, 2014
3. DanielMinoli,—"BuildingtheInternetofThingswithIPv6andMIPv6:TheEvolvingWorldofM2MCommunications",ISBN:978-1-118-47347-4,WillyPublications
4. PethuruRajandAnupamaC.Raman,"TheInternetofThings:EnablingTechnologies,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
b. Contiki (Open source IoT operating system)
c. Ardudroid (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/iottoolkithttps://www.arduino.cc/
3. https://onlinecourses.nptel.ac.in/noc17_cs22/course
4. 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

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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SEMESTER END MODEL QUESTION PAPER

TITLE: INTERNET OF THINGS **COURSE CODE: AIMLSET08**

SECTION: B.SC (AIML) **SEMESTER: V**

TIME: 3 Hrs. **MAX: 75M**

SECTION A

ANSWER ANY FIVE OF THE FOLLOWING QUESTIONS. 5 X 5 = 25 Marks

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.

9 (a) Explain IOT architecture with neat diagram.(CO1,L2)

OR

(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

(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

(b) Compare and Contrast MQTT and CoAP protocols.(CO3,L4)

12(a) Explain Arduino Uno Architecture.(CO4,L2)

OR

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

(b) Write code to Design any App of your choice using Thingspeak.(CO5,L6)

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TITLE: INTERNET OF THINGS LAB

Department	Semester	Introduced in A. Y	Programme	Course Code
Computer Science	V	2023-24	B. Sc. (AIML)	AIMLSEP08

Teaching Prds: 30 **No. of Credits: 2**

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. Simulationof4-WayTrafficLightwithArduino
5. Using Pulse Width Modulation
6. LED Fade Sketch and Button Sketch
7. Analog Input Sketch(Bar Graph with LEDs and Potentiometre)
8. Digital Read Serial Sketch (Working with DHT/IR/Gas or Any other Sensor)
9. Working with Ada fruit Libraries in Arduino
10. Spinning a DC Motor and Motor Speed Control Sketch
11. Working with Shields
12. Design APP using Blink App or ThingspeakAPI and connect it LEDbulb.
13. Design APP Using Blynk App and ConnecttoTemperature, 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)", 1stEdition, VPT, 2014
3. DanielMinoli,—"BuildingtheInternetofThingswithIPv6andMIPv6:TheEvolvingWorldofM2MCommunications",ISBN:978-1-118-47347-4,WillyPublications

Reference Materials on the Web/web-links:

1. https://github.com/connectIOT/iottoolkithttps://www.arduino.cc/
2. https://onlinecourses.nptel.ac.in/noc17_cs22/course
3. https://blynk.io(Mobileapp)

INTERENT OF THINGS LAB

Course Code: AIMLSEP08 **Offered to: B.SC (AIML)** **Semester: V**
Max. Marks : 50 (CCIA: 10 + SEE: 40) **Hrs/Week: 3**

Model Paper : Practicals

Time: 3 Hrs **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 : CYBER SECURITY ESSENTIALS

Department	Semester	Introduced in A. Y	Programme	Course Code
Computer Science	V	2023-24	B. Sc. (AIML)	AIMLSET09

Total Prds: 45 **No.of credits : 3**

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	PO1,PO2
CO2	Learn about NIST Cyber Security Framework	PO3
CO3	Understand the OWASP Vulnerabilities	PO4
CO4	Implement various Malware analysis tools	PO5,P06
CO5	Understand about Information Technologyact2000	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 (9periods)

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. Personal Data Privacy bill of the government of India - A case study.

III References/ Text Book/ e-books/websites

TEXTBOOKS:

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 SecuritybySunitBelapure,NinaGodbole|WileyPublications
4. TCP/IP Protocol Suite |Mcgraw-hill| Forouzan| FourthEdition

WEBSITEREFERENCES:

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 of the Course: CYBER SECURITY ESSENTIALS

COURSE CODE: AIMLSET09

SECTION: B.SC (AIML) **SEMESTER: V**

SECTION – A **5 X 5 M = 25M**

Answer any Five questions.

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.

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

Department	Semester	Introduced in A. Y	Programme	Course Code
Computer Science	V	2023-24	B. Sc. (AIML)	AIMLSEP9

Teaching Prds: 30 **No. of Credits: 2**

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 SQLInjection 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 | KuroseJamesF. 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/

CYBER SECURITY ESSENTIALS LAB

Course Code: AIMLSEP09 **Offered to: B.SC (AIML)**
Semester: V
Max. Marks : 50 (CCIA: 10 + SEE: 40) **Hrs/Week: 3**

Model Paper : Practicals

Time: 3 Hrs **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

Department	Semester	Introduced in A. Y	Programme	Course Code
Computer Science	V	2023-24	B. Sc. (AIML)	AIMLSET10

Teaching Prds: 45 **No. of Credits: 3**

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	PO1
CO2	Know What is an Array concept related programs, What is an Object, various objects, Formatting strings,Date and time and related programs	PO2
CO3	Learn importance of Forms, Combining HTML with PHP code. Importance of Cookies and Sessions related programs of forms cookies and sessions	PO3
CO4	Knowimportance 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	PO4
CO5	Knowabout Database concept of MySQL, Connection, Creation of Database, Table adding Record into it related programs	PO6

UNIT-I **(9 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 **(9Periods)**

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 **(9 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 **(9 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-CurricularActivities:

a) **Mandatory:***(Trainingofstudents byteacherin fieldrelatedskills:(lab: 10+field: 05):*

1. **For Teacher**: Field related training of students by the teacher in laboratory/field for notless than 15 hours on demonstrating various **interactive and dynamic websites** availableonline, addressing the students on identifying the case study to build an interactive anddatabase driven website, forms to be used in website, database to be maintained, reports to beproduced,etc.
2. **For Student**: Students shall (individually) search online and visit any of the agencies likemalls, hotels, super bazaars, etc. where there is a need for an interactive and database drivenwebsiteandsubmitahand-writtenFieldwork/Projectwork/Projectwork/Projectwork/Project work Report not exceeding 10 pages. Example: Choosing a firm or business todevelop a website, identifying forms to be placed in the websites, back end databases to bemaintainedand reports to begenerated and placedin thewebsites.
3. Max marks for Fieldwork/Project work/Project work/Project work/Project work/ProjectworkReport: 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 thewebsiteand acknowledgements*.
5. Unittests(IE).

b) SuggestedCo-CurricularActivities

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.

Title of the Course: Web Applications Development using PHP & MYSQL

Department	Semester	Introduced in A. Y	Programme	Course Code
Computer Science	V	2023-24	B. Sc. (AIML)	AIMLSET10

Model paper

SECTION – A

Short Answer Questions **(5 x 5M= 25 M)**

Answer ALL questions.

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 on Mysqli.(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.

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)

Title : Web Applications Development using PHP & MYSQL LAB

Department	Semester	Introduced in A. Y	Programme	Course Code
Computer Science	V	2023-24	B. Sc. (AIML)	AIMLSEP10

Total prds: 30 **Credits: 2**

PRACTICALSYLLABUS

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, Formattingstrings, 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 Filesconcept 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. JulieC.Meloni,SAMSTeachyourselfPHPMySQLandApache,PearsonEducation(2007).
2. StevenHolzner,PHP: TheCompleteReference,McGraw-Hill
3. RobinNixon,LearningPHP,MySQL,JavaScript,CSS&HTML5,ThirdEditionO'reilly,2014
4. XueBaiMichaelEkedahl,ThewebwarriorguidetoWebProgramming,Thomson(2006).
5. Webresources:

e. http://www.codecademy.com/tracks/php
f. http://www.w3schools.com/PHP
g. http://www.tutorialpoint.com

WEB APPLICATIONS DEVELOPMENT USING PHP & MySQL LAB

Course Code: AIMLSEP10 **Offered to: B.SC (AIML)**
Semester: V
Max. Marks : 50 (CCIA: 10 + SEE: 40) **Hrs/Week: 3**

Model Paper: Practicals

Time: 3 Hrs **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: DESIGN THINKING

Department	Semester	Introduced in A. Y	Programme	Course Code
Computer Science	V	2023-24	B. Sc. (AIML)	AIMLSET11

Teaching Prds: 45 **No. of Credits: 3**

Course Objectives

To solve problems using Design Thinking and to radically increase likelihood of success by using Design Thinking.

Course Outcomes:

Course Outcome No	Upon successful completion of the course, student will be able to:	Program Outcome No
CO1	Learn what is design thinking and when to use it.	PO1
CO2	Understand principles of Design Thinking.	PO2
CO3	Understand process of Design thinking.	PO3
CO4	Develop application using design thinking .	PO4,PO5
CO5	Apply Design thinking to real world scenarios.	PO6,PO7

UNIT – I: 12 Periods

Introduction to Design thinking: History of design thinking, where design thinking is used, why design thinking is effective, how it works, What is design thinking ?, thinking vs doing, how design thinking supports delivering products?, the roots of design thinking, myth busting design thinking.

UNIT – II: 12 Periods

Core Principles of Design Thinking: Principle1-users over stake holders-user research basics-observations, interviews, co-creation, concept reviews, existing research, known problems, how might we statements, acceptance criteria.Principle 2-practical creativity-getting people to be impractical,getting from impractical to practical.Principle 3-making through learning.

UNIT – III: 12Periods

Design thinking process: Think about content to be Included,state the need being solved, the process that led to defining the problem, the ideation phase,getting feed back from

your coworkers, presenting the prototype and testing results.Empathize, define, ideate, prototype , Test.

UNIT – IV: 12 Periods

Applying design thinking process:

ACNE breakfast center use case:who are users, what are their pain points, developing how might we solve statements, developing acceptance criteria.putting users in context-busy professionals,picky and particulars, frenetic families.Identifying user needs, key behavior , their problems and framing new solutions or ideas.Ideas evaluation, ranking of ideas, identifying best idea to solve the problem.

UNIT – V:

Application of Design Thinking to real world scnearios: 12 Periods

Case 1:Developers creating a banking app with an easier to navigate UI than current competitors,case 2:teachers releasing new online course based on previous student experiences.

BOOKS:

- What is Design Thinking? By Julie Stanford, Ellen Siminoff & Mia Silverman, O'Reilly
- Design thinking 101 by Gretchen Anderson ,O'Reilly(course)
- Web references: https://slidemodel.com/how-to-present-design-thinking-process/#header-4

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: DESIGN THINKING **COURSE CODE: AIMLSET11**
SECTION: B.SC (AIML) **SEMESTER: V**
TIME: 3 Hrs. **MAX: 75M**

SECTION A

Answer any five of the following questions 5 x 5= 25 Marks

1. Write history of Design Thinking.(CO1, L1)
2. Write where design thinking is used.(CO1, L1)
3. Write 3 principles of Design Thinking.(CO2, L1)
4. Write user research basics and what information we get from them?.(CO2,L1)
5. Explain prototyping phase of design thinking process.(CO3, L2)
6. Explain testing phase of design thinking process.(CO3, L2)
7. Take your own example and identify users and user pain points and solving statements for it. (CO4, L3)
8. Develop acceptance criteria for ACNE breakfast center example.(CO4,L3)

SECTION - B

Answer the following questions 5 x 10 = 50 Marks

9. A) Explain why design thinking is effective and also how it works?(CO1, L2)

OR

B) Explain how design thinking supports delivering products and also discuss about roots of design thinking.(CO1, L2)

10. A) Explain in detail core principles of design thinking.(CO2, L2)

OR

B) Apply 3 principles of design thinking to any real life example. (CO2, L3)

11. A) Explain Design thinking process.(CO3, L2)

OR

B) Discuss about empathize,define and ideate phases with example.(CO3, L2)

12. A) Explain how to improve business of acne breakfast center using design thinking. (CO4, L2)

OR

B) Explain about different types of customers in acne break fast center and different ideas or solutions generated to satisfy them and the come out with the best solution.(CO4, L2)

13. A) Develop solution using design thinking for Creating banking app with easier to navigate UI than competitors. (CO5, L3)

OR

B)Apply design thinking for the application teachers releasing new online course based on previous student experiences.(CO5, L3)

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TITLE: DESIGN THINKING LAB

Department	Semester	Introduced in A. Y	Programme	Course Code
Computer Science	V	2023 - 2024	B. Sc. (AIML)	AIMLSEP11

Teaching Prds: 30 **No. of Credits: 2**

COURSE OUTCOME NO	Upon successful completion of this course, students should have the knowledge and skills to:	PROGRAM OUTCOME NO
CO1	Understand process of Design thinking.	PO1
CO2	Develop application using design thinking 2	PO3,PO4
CO3	Apply Design thinking to real world scenarios.	PO5,PO6

Lab Experiments List

1. Developers creating a banking app with an easier-to-navigate UI than current competitors 2. Teachers releasing a new online course based on previous student experiences
3. To improve business of start up company Air bed and breakfast.
4. Redesigning the Customer Contact Center at Toyota
5. GE Adventure MRI

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DESING THINKING LAB

Course Code: AIMLSEP11 **Offered to: B.SC (AIML)** **Semester: V**
Max. Marks : 50 (CCIA: 10 + SEE: 40) **Hrs/Week: 3**

Model Paper : Practicals

Time: 3 Hrs **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

Department	Semester	Introduced in A. Y	Programme	Course Code
Computer Science	V	2023-24	B. Sc. (AIML)	AIMLSET12

Teaching Prds: 45 **No. of Credits: 3**

Course Outcomes	Students at the successful completion of the course will be able t	Programme Outcomes
CO1	Gain knowledge about Types of Graphics, Types of Objects, Types of video editing tools	**PO3**
CO2	Show their skills in editing and altering photographs for through a basic understanding of the tool box	**PO1**
CO3	Gain knowledge in using the layers	**PO4**
CO4	Gain knowledge in using the selection tools, repair tools	**PO2,PO5**
CO5	Gain knowledge in using selection tools, applying filters and can show their skills	**PO5**

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 **(9 Periods)**

What is GIMP? , GIMP tool box window, Layers Dialog , Tool Options Dialog , Image window ,. Image window menus

UNIT-III (9Periods)

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(9Periods)

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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SEMESTER END MODEL QUESTION PAPER

TITLE: DIGITAL IMAGING **COURSE CODE: AIMLSET12**
SECTION: B.SC(AIML) **SEMESTER: V**
TIME: 3 Hrs. **MAX: 75M**

SECTION A

Answer THE FOLLOWING questions. 5 X 5=25M

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. **W**rite 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)**

TITLE: DIGITAL IMAGING LAB

Department	Semester	Introduced in A. Y	Programme	Course Code
Computer Science	V	2023-24	B. Sc. (AIML)	AIMLSEP11

Teaching Prds: 30 **No. of Credits: 2**

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

DESING IMAGING LAB

Course Code: AIMLSEP11 **Offered to: B.SC (AIML)** **Semester: V**
Max. Marks : 50 (CCIA: 10 + SEE: 40) **Hrs/Week: 3**

Model Paper : Practicals

Time: 3 Hrs **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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GROUP-C

TITLE: DEEP LEARNING

Department	Semester	Introduced in A. Y	Programme	Course Code
Computer Science	**V**	**2023-24**	**B. Sc. (AIML)**	**AIMLSET13**

Teaching Prds: 45 **No. of Credits: 3**

OBJECTIVES:

- To understand the basic ideas and principles of Neural Networks
- To understand the basic concepts of Big Data and Statistical Data Analysis
- To familiarize the student with The Image Processing facilities like Tensorflow and Keras
- To appreciate the use of Deep Learning Applications
- To understand and implement Deep Learning Architectures

Course Outcomes :

CO. NO.	Upon successful completion of this course, students should have the knowledge and skills to	PO. No.
1	Understand the role of Deep learning in Machine Learning Applications.	PO1
2	To get familiar with the use of TensorFlow/Keras in Deep Learning Applications.	PO2
3	To design and implement Deep Learning Applications.	PO3
4	Critically Analyse Different Deep Learning Models in Image Related Projects.	PO4
5	To design and implement Convolutional Neural Networks.	PO6

UNIT I BASICS OF TENSOR FLOW 9 Hr

Tensors – Computational Graph and Session – Creating Tensors – Working on Matrices- Activation Functions – Tangent Hyperbolic and Sigmoid – RELU and ELU – RELU6- Loss Functions – Common Loss Functions – Optimizers – Metrics – Common Metrics – Understanding and working with Keras.

UNIT II BASICS OF ARTIFICIAL NEURAL NETWORKS (ANN) 9hr

From Biological to Artificial Neurons – Single Layer Perceptron– Multi Layer Perceptron - Logistic Regression Model - Linear Regression, Multilayer Perceptron in Tensorflow – Log-Linear Model – Keras NN for Linear Regression. MLP on IRIS – MNIST (Digit Classification) – Randomly Generated Data.

UNIT III CONVOLUTIONAL NEURAL NETWORKS (CNN) 9hr

Introduction to CNN - CNN Architectures – TensofFlow for CNN Models – Image Classifienr for MNIST Data – Using a High-Level API for Building CNN Models – Define Network Structure – Define Model Architecture – Building an Image Classifier with CIFAR-10 Data – Pretrained Models.

UNIT IV RNN AND LSTM 9hr

Concept of RNN – LSTM – Models of LSTM – Sequence Prediction – Time Series forecasting with the LSTM Model. Speech to Text – Speech as Data – Speech Features – Spectrograms - Classifier for Speech Recognition Through MFCC Features – Spectrogram – Open Source Approaches – Text to speech Conversion – Cognitive Service Providers – Speech Analytics.

UNIT V APPLICATIONS OF DEEP LEARNING 9hr

Developing Chatbots – Face Detection – Face Recognition and Face Analysis – OpenCV – Eigenfaces – LBPH – Fisherfacers – Detecting a face – Tracking the face – Face Recognition – Deep Learning Based Face Recognition – Transfer Learning.

TEXT BOOK:

1. Navin Kumar Manaswi, “Deep Learning with Applications Using Python”, Apress, 2018.
2. Francois Chollet, “Deep Learning with Python”, Manning Publications, 2018.

REFERENCES:

1. Ian Good Fellow, Yoshua Bengio, Aaron Courville, “Deep Learning”, MIT Press, 2017.
2. Phil Kim, “Matlab Deep Learning: With Machine Learning, Neural Networks and Artificial Intelligence”, Apress , 2017.

3. Ragav Venkatesan, Baoxin Li, “Convolutional Neural Networks in Visual Computing”, CRC Press, 2018.
4. Joshua F. Wiley, “R Deep Learning Essentials”, Packt Publications, 2016.

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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 asteams))
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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PARVATHANENI BRAHMAYYA
SIDDHARTHA COLLEGE OF ARTS & SCIENCE
Autonomous
Siddhartha Nagar, Vijayawada–520010
Re-accredited at 'A+' by the NAAC

SEMESTER END MODEL QUESTION PAPER

TITLE: DEEP LEARNING **COURSE CODE: AIMLSET13**
SECTION: B. Sc. (AIML) **SEMESTER: V**
TIME: 3 Hrs. **MAX: 75M**

SECTION A

ANSWER THE FOLLOWING QUESTIONS . 5 X 5= 25 Marks

1. Explain Neural Networks ? (CO1, L2)
2. Why use Artificial Neural Networks? What are its advantages? (CO1, L2)
3. What is the Multi Layer Perceptron (CO2, L1)
4. Describe Gradient problem. (CO2, L1)
5. Explain CNN Architecture (CO3, L2)
6. Explain concept of Pooling Layers. (CO3, L2)
7. Explain Variational Auto encoders. (CO4, L2)
8. Summarise Adversarial Generative Networks (CO4, L2)

SECTION B

ANSWER THE FOLLOWING QUESTIONS . 5 X 10 = 50 Marks

9(a) Summarise concept of Neurons and Explain Perceptron Algorithm. (CO1, L2)

OR

(b) Explain the Terms RELU and ELU with example (CO1, L2)

10. (a). Explain Log- Linear Regression Algorithm (CO2, L2)

OR

(b) Explain RelU Heuristics for Avoiding Bad Local Minima.(CO2, L2)

11. (a) Explain CNN ArchitecturesLayers. (CO3, L2)

OR

(b) Explain Image Classification with CIFAR. (CO3, L2)

12. (a) Illustrate LSTM Architectures.(CO4, L2)

OR

(b) Illustrate Speech Features with an example.(CO4, L2)

13. (a) Explain Face detection with example. (CO5, L2)

OR

(b) Explain Transfer Learning in Deep Learning.(CO5, L2)

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TITLE: DEEP LEARNING LAB

Department	Semester	Introduced in A. Y	Programme	Course Code
Computer Science	**V**	**2023-24**	**B. Sc. (AIML)**	**AIMLSEP13**

Teaching Prds: 30 **No. of Credits: 2**

OBJECTIVES:

- To understand the basic ideas and principles of Neural Networks
- To understand the basic concepts of Big Data and Statistical Data Analysis ● To familiarize the student with The Image Processing facilities like Tensorflow and Keras
- To appreciate the use of Deep Learning Applications
- To understand and implement Deep Learning Architectures

Course Outcomes :

CO. NO.	Upon successful completion of this course, students should have the knowledge and skills to	PO. No.
1	Understand the role of Deep learning in Machine Learning Applications.	PO1
2	To get familiar with the use of TensorFlow/Keras in Deep Learning Applications.	PO2
3	To design and implement Deep Learning Applications.	PO3
4	Critically Analyse Different Deep Learning Models in Image Related Projects.	PO4
5	To design and implement Convolutional Neural Networks.	PO6

Experiments List

Week 1. Installing Tensorflow 2
Week 2. Working on placeholders, constants and variables with tensorflow.
Week 3. Creating Tensors – from image to tensor

Week 4 : Fixed Tensors , sequence Tensors, Random Tensors

Week 5: - Activation function and Loss Functions

Week 6: Working on Optimizers

Week 7: Working on eight steps to the deep learning process in Keras:

Week 8: Linear Regression in Tensorflow - IRIS

Week 9 : Logistic Regression in Tensorflow – IRIS

Week 10: Log-Linear Model

Week 11: Keras Neural Network in Linear Regression

Week 12: MLP on IRIS Data

Week 13: MLP on MNIST Data (Digit Classification)

Week 14 : MLP on Randomly Generated Data

Week 15: Building an Image Classifier for MNIST Data in Kears

Week 16: Time Series Forecasting with LSTM

Week 17: Develop a Chatbot

Week 18: Spectrogram of Speech

Week 19: Text to Speech and Vice Versa

Week 20: OpenCV Face Detection and Face Recognition

DEEP LEARNING LAB

Course Code: AIMLSEP13 **Offered to: B.SC (AIML)** **Semester: V**
Max. Marks : 50 (CCIA: 10 + SEE: 40) **Hrs/Week: 3**

Model Paper : Practicals

Time: 3 Hrs **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: REINFORCEMENT LEARNING

Department	Semester	Introduced in A. Y	Programme	Course Code
Computer Science	V	2023-24	B. Sc. (AIML)	AIMLSET14

Teaching Prds: 45 **No. of Credits: 3**

OBJECTIVE:

This course enables students to gain comprehensive understanding of the principles and foundations of reinforcement learning.

Course Outcomes :

CO. NO.	Upon successful completion of this course, students should have the knowledge and skills to	PO. No.
1	Learn the basic concepts, terminology, and mathematical foundations of reinforcement learning	PO1
2	Implement reinforcement learning algorithms	PO2
3	Explain the basic concepts, terminology, and mathematical foundations of reinforcement learning advanced algorithms.	PO3 PO4
4	Understand exploration strategies in RL	PO5, PO6
5	Understand applications and gain basic knowledge in advanced concepts in RL.	PO3, PO4

Unit 1: Introduction to Reinforcement Learning **9 Prds**

Overview of reinforcement learning (RL) and its applications, Basic components of an RL system: agent, environment, actions, states, rewards, Markov Decision Processes (MDPs) as a framework for RL, Exploration and exploitation trade-off Value functions and policies, Dynamic programming and Bellman equations

Unit 2: Basics of Reinforcement Learning Algorithms 9 Prds

Monte Carlo methods for RL, Temporal Difference (TD) learning: TD(0), TD(λ), eligibility traces, Q-learning: off-policy TD control, Policy Gradient methods: REINFORCE, Actor-Critic, Function approximation and deep RL, Experience replay and target networks.

Unit 3: Advanced Reinforcement Learning Algorithms 9 Prds

Model-based RL: model learning and planning, Monte Carlo Tree Search (MCTS), Proximal Policy Optimization (PPO), Trust Region Policy Optimization (TRPO), Asynchronous Advantage Actor-Critic (A3C), Deep Deterministic Policy Gradient (DDPG), Twin Delayed DDPG (TD3), Soft Actor-Critic (SAC).

Unit 4: Exploration and Exploitation in RL 9 Prds

Exploration strategies: ε-greedy, Boltzmann exploration, Upper Confidence Bound (UCB), Multi-armed bandits: ε-greedy bandits, UCB bandits, Thompson sampling, Contextual bandits and contextual RL, Exploration in deep RL: ϵ-greedy, noisy networks, bootstrapped DQN, count-based exploration

Unit 5: Applications and Advanced Topics in Reinforcement Learning 9 Prds

Deep RL for robotics and control, RL for game playing: AlphaGo, AlphaZero, RL in multi-agent systems, Hierarchical RL and options, Imitation learning and inverse reinforcement learning, Transfer learning and meta-learning in RL, Ethical and safety considerations in RL

Textbooks:

1. "Reinforcement Learning: An Introduction" by Richard S. Sutton and Andrew G. Barto
2. "Deep Reinforcement Learning" by Pieter Abbeel and John Schulman
3. "Reinforcement Learning: State-of-the-Art" edited by Marco Wiering and Martijn van Otterlo

Reference Books:

1. "Reinforcement Learning and Optimal Control" by Dimitri P. Bertsekas
2. "Approximate Dynamic Programming: Solving the Curses of Dimensionality" by Warren B. Powell
3. "Deep Learning" by Ian Goodfellow, Yoshua Bengio, and Aaron Courville
4. "The Hundred-Page Machine Learning Book" by Andriy Burkov
5. "Pattern Recognition and Machine Learning" by Christopher M. Bishop

Recommended Co – Curricular Activities:

P. B. SIDDHARTHA COLLEGE OF ARTS &SCIENCE :: VIJAYAWADA – 10

(An Autonomous college in the jurisdiction of Krishna University, Machilipatnam)

COMPUTER SCIENCE	AIMLT11	2021 – 2022	B.Sc. (AI &ML)

SEMESTER – I **Credits – 4**

Problem solving using Structured Programming

Total: 60Prds.

Course Objective:

To provide exposure to problem solving techniques through structured programming, introduce the concept of algorithms and basic concepts of C programming language.

Course Outcomes:

COURSE OUTCOME NO	Upon successful completion of this course, students should have the knowledge and skills to:	PROGRAM OUTCOME NO
CO1	Understand the concept of problem-solving and develop an algorithm to given problem.	PO5, PO7
CO_2	Understand the concept of structured programming and develop a simple c program	PO5,PO7
CO_3	Understand control structures and right way of using functions in c.	PO5,PO7
CO_4	Understand the right way of using arrays and pointers	PO5,PO7
CO_5	Understand the right way of using structures in c and handling file structures using C.	PO5,PO7

Unit – I: Problem Solving & Algorithms **10 Periods.**

Introduction to problem solving: introduction – steps involved in problem solving

Introduction to Algorithms: key features, flowcharts, different approaches to design algorithms, complexity.

Unit – II: Structured Programming **10 Periods.**

Introduction to structured programming: structured programming language, design

and implement efficient programs.
C programming: features, structure of c program, data types, keywords, identifiers, I/O statements operators, expressions.

Unit – III: Flow controls & Functions **14 Periods.**
Control structures: conditional and unconditional branching, loops and nested loops.
Functions: introduction, creating functions, passing parameters to functions, recursion.

Unit – IV: Arrays & Pointers **14 Periods.**
Arrays: introduction, one dimensional array – creation, accessing elements, searching, sorting in ascending order; Two dimensional array - creating and accessing elements, Addition, subtraction and multiplication of two 2d arrays.
Pointers: introduction, pointer arithmetic, passing arguments to functions using pointers, dynamic memory allocation, drawbacks of pointers.

Unit – V: Structures & Files **12Periods.**
Structures: introduction, creating structures and accessing structure elements, nested structures.
File Handling: introduction, reading and writing data to/from files.

Textbooks:

1. Computer fundamentals and programming in C by reemathareja, second edition, Oxford University Press 2016
2. Computer basics and C programming by V.Rajaraman, first edition, PHI Learning Pvt. Ltd, 2007

Reference Books:

1. Dromey R G, "How to Solve it by Computer", Prentice Hall of India, 1997
2. Programming with C by Byron s gotfried, fourth edition, McGraw Hill Education,2018

Web Resources:

1. https://ncert.nic.in/textbook/pdf/kecs104.pdf
2. https://www.mcemotihari.ac.in/wp-content/uploads/2019/11/file_5dc2a6c80c260.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 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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P. B. SIDDHARTHA COLLEGE OF ARTS &SCIENCE :: VIJAYAWADA – 10

(An Autonomous college in the jurisdiction of Krishna University, Machilipatnam)

COMPUTER SCIENCE	AIMLT12	2021 – 2022	B.Sc. (AI &ML)

SEMESTER – I **Credits – 4**

Problem Solving Techniques

Total: 60Periods.

Course Objective:

To provide fundamental knowledge to student in various programming techniques and algorithms to help them in solving various logical problems.

Course Outcomes:

COURSE OUTCOME NO	Upon successful completion of this course, students should have the knowledge and skills to:	**PROGRAM OUTCOME NO**
CO1	Student can have knowledge on programming techniques	PO5,PO7
CO_2	Writing algorithms for various logical problems	PO5,PO7
CO_3	Writing algorithms using factoring methods	PO5,PO7
CO_4	Accessing array elements	PO5,PO7
CO_5	Implement various searching and sorting techniques	PO5,PO7

Unit – I: PROGRAMMING TECHNIQUES **12 Prds.**

Steps Involved in Computer Programming –Problem Definition –Outlining The Solution – Flow Chart – Developing Algorithms –Efficiency of Algorithms - Analysis of Algorithms.

Unit – II: FUNDAMENTAL ALGORITHMS **12 Prds.**

Exchanging the Values –Counting – Summation of Set of Number - Factorial Computation – Sine Computation –Fibonacci Sequence – Reversing the Digits of an Integer –Base Conversion –Character to Number Conversion.

Unit –III: FACTORING METHODS **12 Prds.**

Finding the Square Root of a Number –Smallest Divisor of an Integer – GCD of Two Integers –Generating Prime Numbers –Computing the Prime Factors of an Integer –Generation of Pseudo-Random Numbers – Raising a Number to a Large Power –Computing the Nth Fibonacci Number.

Unit – IV: ARRAY TECHNIQUES 12 Prds.

Array Order Reversal – Array Counting or Histogramming – Finding the Maximum Number in a Set – Removal of Duplicates from an Ordered Array – Partitioning an Array – Finding the kth Smallest Element – Longest Monotone Subsequence.

Unit –V: MERGING, SORTING AND SEARCHING 12 Prds.

Two way merge – sorting by selection, exchange, insertion and partitioning – binary search – Linear Search - hash searching.

TEXTBOOK

Dromey R G, "How to Solve it by Computer", Prentice Hall of India, 1997

REFERENCE

1. Michael Schneider, Steven W. Weingart, David M. Perlman, "An Introduction to Programming and Problem Solving with Pascal", Wiley Eastern Limited, New Delhi, 1982.
2. Harold Abelson and Gerald Sussman with Julie Sussman, "Structure and Interpretation of Computer Programs", MIT Press, 1985.

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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P. B. SIDDHARTHA COLLEGE OF ARTS &SCIENCE :: VIJAYAWADA – 10

(An Autonomous college in the jurisdiction of Krishna University, Machilipatnam)

COMPUTER SCIENCE	AIMLT21	2021 – 2022	B.Sc. (AI &ML)

SEMESTER – II **Credits –4**

DATA STRUCUTURES

Total : 60 Prds.

Course Objective:

To introduce the fundamental concept of data structures and to emphasize the importance of data structures in developing and implementing efficient algorithms.

Course Outcomes

COURSE OUTCOME NO	Upon successful completion of this course, students should have the knowledge and skills to:	PROGRAM OUTCOME NO
CO1	Select data Structure that suits their application.	PO5, PO7
CO_2	Implement Stacks, Queues and their applications	PO5, PO7
CO_3	Implement trees, binary trees and traverse them.	PO5, PO7
CO_4	Traverse graphs and find minimal spanning trees of a graph	PO5, PO7
CO_5	Able to implement different sorting techniques and search methods.	PO5, PO7

UNIT – I: Concept of Abstract Data Types (ADTs) 8 **Prds.**

1.1 Data Types
1.2 Data Structures, Storage Structures, and File Structures
1.3 Primitive and Non-primitive Data Structures
1.4 Linear and Non-linear Structures.
1.5 **Linear Lists**
  1.5.1 ADT
  1.5.2 Array and Linked representations (Single and Double Linked lists)
  1.5.3 Pointers.

UNIT- II: Stacks and Queues **15 Prds.**

2.1 Stacks
  2.1.1 Definition

2.1.2 ADT
2.1.3 Array and Linked representations
2.1.4 Implementations and Applications.

2.2 Queues

2.2.1 Definition
2.2.2 ADT
2.2.3 Array and Linked representations
2.2.4 Circular Queues
2.2.5 Dequeues
2.2.6 Priority Queues and Applications.

UNIT III Trees 15 Prds.

3.1 Trees

3.1.1 Binary Tree, Definition
3.1.2 Properties
3.1.3 ADT
3.1.4 Array and Linked representations
3.1.5 Implementations and Applications
3.1.6 Heaps Trees and Applications,

3.2 Binary Search Trees (BST)

3.2.1 Definition
3.2.2 ADT
3.2.3 Operations and Implementations
3.2.4 BST and Applications.

UNIT IV Graphs 10 Prds.

4.1 Graphs

4.1.1 Graph and its Representation
4.1.2 Graph Traversals
4.1.3 Connected Components
4.1.4 Basic Searching Techniques
4.1.5 Minimal Spanning Trees.

UNIT- V Sorting and Searching 12 Prds.

5.1 Sorting

5.1.1 Selection
5.1.2 Insertion
5.1.3 Bubble
5.1.4 Merge
5.1.5 Quick

5.2 searching

5.2.1 Sequential Searching.
5.2.2 Binary Searching

TEXT BOOKS:

1. Samantha D, Classic Data Structures, Prentice-Hall of India, 2001

REFERENCE BOOKS

1. Data Structures – A pseudocode approach with C, Richard F. Gilberg, Behrouz A. Forouzan, 2003, Thomson Learning Publications.

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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Computer Science	Course Code: AIMLT41	Introduced from : 2022 - 2023 A. Y	Programme: B.Sc., (AI & ML)
Semester-IV	Credits:4	Introduction to Machine Learning	Total: 60Hrs

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:

COURSE OUTCOME NO	Upon successful completion of this course, students should have the knowledge and skills to:	PROGRAM OUTCOME NO
CO_1	Identify the characteristics of machine learning	PO2,PO7
CO_2	Summarize the Model building and evaluation approaches	PO3, PO6
CO_3	Apply Bayesian learningand regression algorithms for real-world Problems	PO4, PSO2
CO_4	Apply supervised learning algorithms to solve the real-world Problems	PO1, PO5
CO5	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 ,1st 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, 1st 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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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

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MODEL PAPER

TITLE: Introduction to Machine Learning

COURSE CODE: AIMLT41

CLASS: B.Sc. (AI & ML) **Semester IV**

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, 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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1.3.1: Institution integrates cross-cutting issues relevant to Professional Ethics, Gender, Human Values, Environment and Sustainability and other value framework enshrined in Sustainable Development Goals and National Education Policy – 2020 into the Curriculum

NAME OF THE PROGRAM : Bachelor of Business Administration (BBA – Genernal)

NAME OF THE PROGRAM : B.B.A (Genernal) REGULATION 15 & 20						
NAME OF THE COURSE	**Couse Code**	**Professional Ethics**	**Gender**	**Human values**	**Environmental and Sustainability**	**other value framework enshrined**
TAXATION	MGT T52A	• Tax Compliance and Ethical Practices • Computation of Salary Income and Allowances • Profits and Gains of Business • Role of Tax Professionals	• Tax Benefits and Deductions • Exemptions and Rebates • Pension and Gratuity • Residential Status and Scope of Income	• Fairness and Equity • Social Responsibility • Accountability and Transparency	• Exemptions and Deductions for Sustainable Practices • Tax Benefits for Green Investments / Green Housing • Depreciation on Sustainable Assets & Eco-Friendly Equipment • Corporate Social Responsibility (CSR) and Environmental Projects	• Public Finance Value • Social Security and Employee Welfare • Social Value & Justice
INDUSTRIAL RELATIONS	MGTTEL52	• Fair Labor Practices • Social Justice and Equity • Interdisciplinary Learning • Holistic Education	• Gender Equality • Decent Work and Economic Growth • Skill Development	• Peace, Justice, and Strong Institutions • Holistic Education • Community Engagement	• Responsible Consumption and Production • Industry, Innovation, and Infrastructure • Focus on Values and Ethics	• Partnerships for the Goals • Inclusivity and Equity • Ethical Leadership and Responsibility
STORES MANAGEMENT	22MGTSET01	• Accountability • Confidentiality • Ethical Sourcing	• Equal Opportunity • Non-Discrimination • Flexible Work Arrangements	• Honesty and transparency • Respect to all stakeholders • Empathize with Consumer's concerns	• Strategies to minimize waste • Energy Efficiency in operations • Sustainable Packaging materials	• Safety in Operations • High standards of Quality • Continuous imrovement
PROJECT EVALUATION AND MANAGEMENT	22MGTT41	• Avoid Conflict of interests • Respect IPRs • Ensure Data Privacy	• Avoid Gender Bias • Provide level playing field for all • Flexible Work schedules	• Ethical Leadership • Valuing diversity • Collaborative team environment	• Need to utilize Renewable Energy based technologies • Strategies to minimize carbon emission • Sustainable Project designs	• Social impact of Project • Quality Management • Risk Management
BUSINESS RESEARCH METHODS	22MGTT45	• Obtain informed consent from participants • Ensure Accuracy and reliability of data • Avoid plagiarism	• Ensure inclusive research • Non-Discriminatory data analysis	• Avoid cultural bias • Treat participants with respect and dignity • Ensure Synergistic environment	• Reduce paper usage and promote digital data collection • Strategies to recycle materials used in research such as paper • Prioritize Sustainable research	• Promote open access to research publications • Continuous learning of latest research methodologies

P.B.Siddhartha College of Arts & Science
Bachelor of Business Administration
(Under CBCS) w.e.f. 2015-16

TAXATION

Semester – V **Max. Marks: 100**
No. of Hours per week: 5 **External: 75M**
No. of Credits: 4 **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.

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 only)
5.1 Income of other persons included in Assesse's total income
5.2 Deductions from gross total income
5.4 Rebates and reliefs
5.5 Tax liability of an individual and firm
5.6 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. BhagwatiPrasad : 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.

P.B. Siddhartha College of Arts & Science

Bachelor of Business Administration

INDUSTRIAL RELATIONS

(Human Resource Management Elective)

Semester – V **Max. Marks: 100**
No. of Hours per week: 5 **External: 75M**
No. of Credits: 4 **Internal: 25M**

Course 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 this course, the student will be able to –

CO1 Gain an overview of industrial relations, its contents, scope and programs

CO2 Understand various industrial disputes and procedures followed for their settlement

CO3 Appreciate the concept and functions of trade unions, various types of trade unions and trade union movement in changing business context.

CO4 Gain knowledge about the Concept of workers participation in management at various levels and forms of participation

CO5 Understand the concept of collective bargaining, its necessity, importance, principles and process of negotiations

CO-PO MATRIX								
MGTTEL52	CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
	CO1					H	H	H
	CO2					H	H	H
	CO3					H	H	H
	CO4					H	H	H
	CO5					H	H	H

UNIT I An Overview on Industrial Relations **12 Hours**

1.1 Meaning, Importance and scope of Industrial Relations
1.2 Contents of Industrial Relations
1.3 Industrial Relations programs
1.4 Functional Requirements of successful Industrial Relations

UNIT II Industrial Disputes **15 Hours**

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

UNIT III Trade Unions **12 Hours**

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

UNIT IV Participative Management **14 Hours**

4.1 Forms of participation
4.2 Objectives of workers participations in management
4.3 Levels of participation
4.4 Forms of participation in India
4.5 Causes of failure of joint management council

UNIT V Collective Bargaining **15 Hours**

5.1 Meaning and Features of collective bargaining
5.2 Necessity and importance of collective bargaining
5.3 Principles of Collective Bargaining
5.4 Process of negotiations
5.5 Contract administration

References:

1. P. Subba Rao, Industrial Relationship, Himalaya Publishers.
2. Labour and Industrial Laws – Central Law Publications, Allahabad.
3. Industrial Relations – Arun Monappa
4. Management of Industrial Relations – Pramod Verma

PARVATHANENI BRAHMAYYA SIDDHARTHA COLLEGE OF ARTS & SCIENCE

MODEL QUESTION PAPER

MGT TEL52 Industrial Relations (BBA programme)

Semester: IV

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

Section – A

Answer any FIVE of the following: 5x5=25M

1. Scope of Industrial relations (L2)
2. Outline Industrial relations programmes (L2)
3. Summarise the procedure for settlement of Industrial Disputes (L2)
4. Explain Organs of Industrial Peace (L1)
5. Explain types of trade unions in India. (L1)
6. Illustrate Causes of failure of joint management council (L2)
7. Appraise Process of negotiation (L2)
8. Discuss about the Contract administration (L2)

Section – B

Answer the following questions: 5x10=50M

Unit – I

9. (a) Define Industrial Relations and explain contents & actors in Industrial relations (L2)

OR

(b) Describe Industrial Disputes Act (L2)

Unit – II

10. (a) Classify Industrial Disputes and explain causes for Industrial Disputes. (L3)

OR

(b) Distinguish between Grievance & Dispute redressal procedures. (L3)

Unit – III

11. (a) Describe features, objectives and functions of Trade Unions. (L2)

OR

(b)Describe the role of Trade Union movement in current business scenario (L2)

Unit – IV

12. (a) Illustrate the objectives of workers participation in India. (L2)

OR

(b)Express the levels of workers participation in management. (L2)

Unit – V

13. (a) Discuss Meaning, features & importance of Collective Bargaining. (L2)

OR

(b) Analyse principles of Collective Bargaining. (L2)

Professional Ethics and Sustainable Development Goals (SDGs) and NEP 2020

- Fair Labor Practices
- Social Justice and Equity
- Peaceful and Inclusive Societies
- Interdisciplinary Learning,
- Skill Development
- Holistic Education
- Community Engagement

Mapping to Gender in Sustainable Development Goals (SDGs) and NEP 2020

- Gender Equality
- Decent Work and Economic Growth
- Reduced Inequalities
- Peace, Justice, and Strong Institutions
- Interdisciplinary Approach
- Skill Development
- Holistic Education
- Community Engagement

Mapping to Human Values in Sustainable Development Goals (SDGs) and NEP 2020

- Decent Work and Economic Growth
- Reduced Inequalities
- Peace, Justice, and Strong Institutions
- Gender Equality
- Holistic Education
- Interdisciplinary Learning
- Community Engagement

Mapping to Environmental and Sustainability Goals in Sustainable Development Goals (SDGs) and NEP 2020

- Responsible Consumption and Production
- Climate Action
- Decent Work and Economic Growth
- Industry, Innovation, and Infrastructure
- Interdisciplinary Approach
- Skill Development for Sustainability
- Community Engagement and Social Responsibility
- Focus on Values and Ethics

Mapping to Other Value Frameworks in Sustainable Development Goals (SDGs) and NEP 2020

- No Poverty
- Quality Education
- Peace, Justice, and Strong Institutions
- Partnerships for the Goals
- Inclusivity and Equity
- Critical Thinking and Innovation
- Ethical Leadership and Responsibility
- Civic Engagement and Social Responsibility

P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE
Bachelor of Business Administration
STORES MANAGEMENT – 22MGTSET01
(Retailing Elective)

Semester – V **Max. Marks: 100**
No. of Hours per week: 5 **External: 70M**
No. of Credits: 4 **Internal: 30M**

Course 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 this course, the student will be able to –
CO1 Understand the concept of stores, its responsibilities, relationships with other departments
CO2 Identify various methods of material receipts and Maintenance of various records.
CO3 Interpret the stock controlling techniques, safety of stock and prevention of deterioration.
CO4 Gain knowledge about stores operations, health and safety directives on store operations and control mechanisms
CO5 Understand the procedure manual contents, preparation of manuals, their distribution and implementations

CO-PO MATRIX								
22MGTSET01	CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
	CO1					H	H	H
	CO2					H	H	H
	CO3					H	H	H
	CO4					H	H	H
	CO5					H	H	H

UNIT I Stores Function **14 Hours**
1.1 Types of stores
1.2 Stores Responsibilities
1.3 Relationships with Other Departments
1.4 Logistics - Supply Chain
1.5 Coding of materials
1.6 Methods of Coding

UNIT II Material Receipt and Issue **14 Hours**
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 **14 Hours**

3.1 Approaches to 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 **14 Hours**

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 Regulations
4.7 Storage Equipment.

UNIT V Procedure Manuals **12 Hours**

5.1 Need for Manuals
5.2 Preparation of the Manual
5.3 Contents of the Manual
5.4 Publication and Distribution
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.

P.B. Siddhartha College of Arts & Science
Bachelor of Business Administration
STORES MANAGEMENT (22MGTSET01)
Model Question Paper

Max. Marks: 70 **Semester – V**
Time: 3 Hrs.

Section A

Answer the following: **5 x 4 = 20M**

Unit I

1. a) Explain logistics supply chain management. (L2)

(OR)

b) Explain stores department relationships with other departments. (L2)

Unit II

2. a) Describe various methods of issue (L2)

(OR)

b) Explain the procedure involved in authorization of issues (L2)

Unit III

3. a) Explain ABC analysis with an example. (L2)

(OR)

b) Explain the concept of stock checking. (L2)

Unit IV

4. a) Describe various equipment used in Stores Management (L2)

(OR)

b) How do you measure the efficiency of a Store? (L2)

Unit V

5. a) Contents of the Manual (L3)

(OR)

b) Explain the need for Manuals (L3)

Section B

Answer the following: **5 x 10 = 50M**

Unit I

6. a) Explain the responsibilities of a Stores Manager (L2)

(OR)

b) Explain coding of materials. What are the methods of coding? (L2)

Unit II

7. a) Explain computerized system of Stores records and receipts with examples. (L2)

(OR)

b) What is inspection? Explain various Methods of Inspection with suitable examples (L2)

Unit III

8. a) Explain different approaches to stock control. (L2)

(OR)

b) Explain factors responsible for damage to materials in store. How to minimize it? (L2)

Unit IV

9. a) Explain different types of store houses in detail. (L2)

(OR)

b) Explain health and safety measures to stores operation with suitable examples. (L2)

Unit V

10. a) Explain the procedure involved in preparation of a manual. (L3)

(OR)

b) Explain publication and distribution. How to implement a manual? (L3)

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

PROJECT EVALUATION AND MANAGEMENT

Semester – IV **COURSE CODE: 22MGTT41**
No. of Hours Per week: 5 **No. of Credits: 4**

Course Objective:
The main objective of this course is to impart the students with understanding on the concepts of Project Management right from planning to execution of projects including Project closure.

Course Outcomes: At the end of this course, the student will be able to –
CO1: Classify various Projects and describe the scope & functions of Project Management
CO2: Understand the important elements to be analysed with respect to a project proposal
CO3: Identify different evaluation techniques for selecting projects and post-Project review
CO4: Recognize the importance of human aspects of Project Management
CO5: Gain knowledge on various methods of project termination and the procedure involved

CO-PO MATRIX								
	CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
22MGTT41	CO1		M	M	M	H	H	H
	CO2		M	M	M	H	H	H
	CO3					H	H	H
	CO4					H	H	H
	CO5					H	H	H

UNIT I Introduction to Project Evaluation and Management **16 Hours**
1.1 Meaning of Project Evaluation and Management
1.2 Scope of Project Evaluation and Management
1.3 Objectives of Project Evaluation and Management
1.4 Types of Projects
1.5 Generation of Ideas
1.6 Screening of Ideas
1.7 Monitoring the Environment
1.8 Corporate Appraisal
1.9 Preliminary Screening
1.10 Problems of Project Management

UNIT II Analysis of Project Proposal **16 Hours**
2.1Markets Analysis
2.2 Demand Analysis
2.3 Technical Analysis
2.4 Material Input
2.5 Manufacturing Process
2.6 Technology – Product Mix
2.7 Estimation of Sales and Production
2.8 Machinery and Equipment Selection

UNIT III Project Evaluation for selection **14 Hours**

3.1 Methods of Evaluation - Payback Period, Average Rate of Return, Net Present Value
3.2 Project Evaluation Review Technique (PERT)
3.3 Critical Path Method (CPM)
3.4 Time Estimations - Slack Time, Critical Path Time
3.5 Post Project Review

UNIT IV Human aspects of project management **12 Hours**

4.1 Manpower planning
4.2 Human Ergonomics
4.3 Estimation
4.4 Pre-requisites for successful project implementation

UNIT V Closing of the Project **10 Hours**

5.1 Types of Project Termination
5.2 Termination Procedure
5.3 Evaluation of Termination Possibilities

REFERENCES:

1. Prasanna Chandra, Project: Planning, Analysis, Selection, Implementation and Review, 'Tata McGraw Hill Publishing Co.
2. V.A. Avadhani, Indian Capital Market, Himalaya Publishing House.
3. James P Lewis, Fundamentals of Project Management, 2006.
4. Pinto, Jeffrey K., Project Management, Achieving Competitive Advantage, Prentice Hall,
5. Project Management Institute, A Project Management Body of Knowledge.

P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

MODEL PAPER

PROJECT EVALUATION AND MANAGEMENT

Course Code: 22MGTT41

Time: 3 HOURS **Max. Marks: 70 Marks**

SECTION - A

Answer the following Questions: **5X4=20 Marks**

Unit I

1. A) Explain Corporate Appraisal. (L2)

(OR)

B) What are the sources for generation of Project ideas? (L2)

Unit II

2. A) Explain market analysis related to project proposal. (L2)

(OR)

B) Discuss the elements of Product Mix analysis (L2)

Unit III

3. A) Briefly explain the differences in between CPM and PERT. (L2)

(OR)

B) Discuss about various aspects that constitute Post Project Review. (L2)

Unit IV

4. A) Discuss about various stages in Manpower planning for a project. (L2)

(OR)

B) State the pre-requisites for successful implementation of a project (L2)

Unit V

5. A) Explain the stages in Termination Procedure. (L2)

(OR)

B) Describe different reasons for a project termination. (L2)

SECTION - B

Answer the following: **5X10=50 Marks**

Unit I

6. a) Explain various types of projects and state the problems of project management. (L2)

OR

b) Briefly explain about scope of Project evaluation and Management. (L2)

Unit II

7. a) Explain the manufacturing process in project proposal. (L2)

OR

b) Discuss a detailed account of machinery and equipment selection in analysis of project Proposal. (L2)

Unit III

8. a) Explain PERT technique with an example of a Project (L3)

OR

b) A company considers two projects, X and Y with a life of 4 years having the following stream of cash flows:

PARTICULARS	PROJECT X	PROJECT Y
Investment outlay	1,10,000	1,10,000
Year 1	31,000	71,000
Year 2	40,000	40,000
Year 3	50,000	40,000
Year 4	70,000	20,000

- Find out NPV
- If the two projects are mutually exclusive and the cost of capital is 15%, in which project the company should invest. (L3)

Unit IV

9. a) Summarize the scope of Human Ergonomics in project management? (L2)

OR

b) Summarize various Manpower plans envisaged during a project implementation. (L2)

Unit V

10. a) Discuss various types of project termination. (L3)

OR

b) Discuss about evaluation of termination possibilities in the closing of the project? (L3)

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P.B. Siddhartha College of Arts & Science

Bachelor of Business Administration

BUSINESS RESEARCH METHODS

Semester – IV **Max. Marks: 100**
No. of Hours per week: 5 **External: 70M**
No. of Credits: 4 **Internal: 30M**

Course Objective: 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, the student should be able to –

CO1: Describe the process of Business Research, its scope and importance.

CO2: Identify the dimensions of Research methodology and the types of Research design.

CO3: Interpret Primary and Secondary data, their methods of collection, merits and limitations.

CO4: Appreciate the importance of sampling design in research and the methods of Sampling.

CO5: Describe how research data is analyzed along with research report preparation.

CO-PO MATRIX								
22MGTT45	CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
	CO1			L		H	H	H
	CO2			L		H	H	H
	CO3					H	H	H
	CO4					H	H	H
	CO5					H	H	H

UNIT I Introduction to Business Research **12 Hours**

1.1 Definition & Meaning of Business Research
1.2 Importance of Business Research
1.3 Steps in Business Research process
1.4 Scope of Business Research
1.5 Ethics in Business Research

UNIT II Research Design **15 Hours**

2.1 Elements of Research methodology
2.2 Types of Research design – Exploratory Research design, Descriptive Research design and Experimental Research design
2.3 Features of a good research design

UNIT III Data Collection **15 Hours**

3.1 Primary Data: Meaning and Types
3.2 Primary data collection methods and instruments
3.3 Process of designing a Questionnaire
3.4 Questionnaire vs. Schedule
3.5 Merits and limitations of Primary data
3.6 Secondary Data: Meaning and Sources
3.7 Merits and limitations of Secondary data

UNIT IV Sampling Design **14 Hours**

4.1 Meaning of Sampling
4.2 Steps in Sampling Process
4.3 Probability Sampling Methods (An Overview)
4.4 Non-Probability Sampling Methods (An Overview)
4.5 Characteristics of a good Sample design

UNIT V Data Analysis & Preparation of Research Report **12 Hours**

5.1 Steps in Data Preparation
5.2 Data Analytical techniques in Business Research – Univariate Analysis, Bivariate Analysis and Multivariate Analysis (An Overview)
5.3 Structure of a Business Research Report

References:

1. D.R. Cooper & P.S. Schindler: Business Research Methods: 9th Ed. Tata McGraw Hill.
2. Naval Bajpai: Business Research Methods: Pearson Education India.
3. Shashi. K. Gupta & Praneet Rangi: Research Methodology: Kalyani Publishers.

PARVATHANENI BRAHMAYYA SIDDHARTHA COLLEGE OF ARTS AND SCIENCE

MODEL QUESTION PAPER
BUSINESS RESEARCH METHODS

Semester: IV **Time: 3 Hrs.**
Course Code: 22MGTT45 **Max. Marks: 70**

Section – A

Answer the following questions: 5x4=20M

Unit – I

1. A) Importance of Business Research (L2)
   (OR)
   B) Role of ethics in Business Research (L2)

Unit – II

2. A) Features of a good research design (L2)
   (OR)
   B) Describe Exploratory Research design (L2)

Unit – III

3. A) Types of Primary data (L2)
   (OR)
   B) Sources of Secondary data (L2)

Unit – IV

4. A) Explain the steps in Sampling process (L2)
   (OR)
   B) Characteristics of a good sample design (L2)

Unit – V

5. A) Steps in Data preparation (L2)
   (OR)
   B) Structure of a Business Research report (L2)

Section – B

Answer the following questions: 5x10=50M

Unit – I

6. (a) Explain the steps in Business Research process. (L2)
   (OR)
   (b) What is the Scope of Business Research? Explain with suitable examples. (L2)

Unit – II

7. (a) Describe the Descriptive research design's applications and Techniques. (L3)
   (OR)
   (b) Describe the Experimental research design's applications and Techniques. (L3)

Unit – III

8. (a) Discuss various methods of obtaining Primary data. (L2)
   (OR)
   (b) Explain the process of designing a questionnaire with examples. (L2)

Unit – IV

9. (a) Explain the steps involved in Sampling process. (L2)

(OR)

(b)What are various Probability sampling methods used in Business Research? (L2)

Unit – V

10. (a) Describe various data analytical techniques employed in Business Research. (L2)

(OR)

(b) Mention various elements that constitute the structure of a Business Research Report. (L2)

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1.3.1: Institution integrates cross-cutting issues relevant to Professional Ethics, Gender, Human Values, Environment and Sustainability and other value framework enshrined in Sustainable Development Goals and National Education Policy – 2020 into the Curriculum

NAME OF THE PROGRAM : Bachelor of Commerce (B.Com)

NAME OF THE PROGRAM : B.Com REGULATION 15 & 20						
NAME OF THE COURSE	**Couse Code**	**Professional Ethics**	**Gender**	**Human values**	**Environmental and Sustainability**	**other value framework enshrined**
Fundamentals of Accounting	COHT11	**Ethics in Accounting:** Understanding ethical considerations and the importance of integrity in financial reporting.	NIL	**Integrity:** Emphasizing the importance of honesty and accuracy in all financial reporting and decision-making processes.	NIL	**Accountability:** Highlighting the necessity of being responsible for financial actions and their impact on sustainable development.
Direct Taxes	COHT36	Fostering a sense of fairness in taxation and resource distribution.	NIL	Encouraging individuals and businesses to act responsibly in their financial dealings.	NIL	**Inclusivity:** Highlighting the importance of supporting diverse communities through equitable financial practices.
Auditing	COHT66	Understanding the ethical responsibilities of auditors in ensuring accurate and honest reporting.	NIL	The importance of integrity and honesty in all auditing practices.	NIL	Fostering respect and fairness in auditor-client relationships.
SALES PROMOTION AND PRACTICE	COMSET03	The necessity of integrity and honesty in sales promotions and personal selling.	The importance of fostering a supportive and equitable environment for all sales personnel.	NIL	Understanding the role of sales promotion in promoting sustainable products and practices.	NIL
Management Accounting	COHSET02	Encouraging honest and transparent financial reporting practices.	NIL	Promoting understanding of how financial decisions affect individuals and communities, emphasizing the human aspect of business.	NIL	Highlighting the broader impact of financial decisions on stakeholders and communities.

(An Autonomous college in the jurisdiction of Krishna University, Machilipatnam)

Commerce	COHT11	2017-18	B.Com(Honours) A&F/TPP

SEMESTER:I **No of Credits: 4**

FUNDAMENTLS OF ACCOUNTING

CO 1: Student acquire conceptual knowledge in financial accounting and to impart skills to develop a working vocabulary of accounting terminology and organize the complex data in preparing final accounts (PO 1&2) **PSO-1**

CO 2: Students will acquire the reason for differences and their emergence in bank statements of any Organisation. (PO 1&3) **PSO-1**

CO 3: Students will get the knowledge of indirect expenses (i.e., Depreciation and Valuation of Assets) of the business and provisions available to meet them. (PO 1) **PSO-1**

CO 4: Students gain ability in competition of final accounts for Organisation use and public understanding. (PO 2, 3&4) **PSO-1**

CO 5: Students get equipped with the classification of errors effecting and not effecting the preparation of final accounts. (PO 3) **PSO-1**

Unit 1: ACCOUTNING PROCESS. **24hrs**

1.1 – Need, Definition and Scope Of Accounting
1.2 –Book Keeping and Accounting,Advantages and Limitations
1.3 –Accounting Concepts And Conventions,Accounting Standards And Accounting Process
1.4 –Journalizing
1.5 –Ledger Accounts
1.6 –Trail Balance
1.7 –Subsidiary Books
1.8 –Cash Book-Single Column, Two Column,Three Column And Petty Cash Book

UNIT 2: BANK RECONSILIATION STATEMENT **15hrs**

2.1—Introduction and Reasons for Difference between Cash Book Balance and Pass Book Balances
2.2—Problems with Favourable and Un-Favourable Balances
2.3—Problems with Extracts of Cash Book and Pass Book and Attainment of Correct Cash Book Balance

UNIT 3: DEPRECIATIONS AND PROVISIONS **21hrs**

3.1—Meaning,Causes, Objects and Factors for Providing Depreciation
3.2—Accounting Treatment and Provision for Depreciation
3.3—Methods of Providing Depreciation – S L M, W D V,Annuity and Depreciation Fund (Problems), Remaining Methods (Theory)

PROVISIONS AND RESERVE

3.4—Meaning and Different Types of Reserve
3.-5—RBD,Provision for Discount and debtors, Provision for discount On Creditors (Problems)
3.6—Provision for Repairs and Renewals (Problems

UNIT 4: FINAL ACCOUNTS OF SOLE TRADER **15hrs**

4.1—Trail Balance, Accounting Concepts and Conventions Relating To Final Accounts
4.2—Trading, Manufacturing and Profit And Loss Account
4.3—Balance Sheet
4.4—Adjustments and Closing entries

UNIT 5: ERRORS AND THEIR RECTIFICATION **15hrs**

5.1—Types of Errors
5.2—Rectification Before and After Preparation of Final Accounts
5.3—Suspense Accounts
5.4—Effect of Errors and Their Rectification On Profit

REFERNECE BOOKS: 1. ADAVNCED ACCOUNTANCY BY S.P JAIN AND K.L NARANG. KALYANI PUBLISHERS
2. ADVANCED ACCOUNTING BY M. RADHA SWAMY AND R.L GUPTA. SULTAN CHAND AND SONS.

P.B.SIDDHARTHA COLLEGE OF ARTS &SCIENCE :: VIJAYAWADA-10.

(An Autonomous college in the jurisdiction of Krishna University, Machilipatnam)

Commerce	**COHT36**	**2018-19**	**B.Com (Honours) A&F**

SEMESTER:III **No of Credits :4**

DIRECT TAX

CO1:Acquire knowledge about tax rate schedule and residential status of an individual **PO4**
CO2: Enlist the ability of provisions of income from salary and its taxability **PO4**
CO3: The student can build on idea about income from house property and its taxability **PO4**
CO4: The student can acquire knowledge in calculation of business income and professional income **PO06**
CO5: Impart knowledge on deductions u/s 80 and build an idea about compute gross total income.

UNIT - I: Residential status **15 Hours**

1.1 Important definitions, Assessment year, previous year, Assessee, person
1.2 Determination of residential status of an Assessee
1.3 Relationship between residential status and incidence of tax (Problems)
1.4 Income Tax Authorities

UNIT - II: Salaries **20 Hours**

2.1 Basis of charge of salary income
2.2 Forms of salary
2.3 Allowances
2.4 Perquisites and their valuation
2.5 Deductions from Salary. (Problems)

U-NIT - III: Income from house property: **15 Hours**

3.1Basis of charge
3.2 Computation of income taxable under the head
3.3 Deductions allowed. (Problems).

UNIT - IV: Income under the head "profits and gains of business or profession"': 10 Hours

4.1 Basis of charge - Basic principles for arriving at Business income
4.2 Specific deductions and allowances
4.3 Allowable depreciation.
4.4Computation of Income under "Profits and gains from business". (Problems)
4.5 Computation of Income from profession "(Problems).

UNIT - V: Deductions from gross total income under section 80: **10 Hours**

5.1. 80C: Deduction for savings
5.2. 80D: Health insurance.
5.3. 80E: Interest on Education loan
5.4. 80G: Donations
5.5. 80U: Medically handicapped or mentally retorted assesse

Text Books:

1. Income tax - Law & Accounts By: Gaur&NarangKalyani Publishers, New Delhi
2.Students" Guide to Income Tax By: Vinod.K.SinghaniaTaxmann publications (P) Ltd.,New Delhi

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(An Autonomous college in the jurisdiction of Krishna University, Machilipatnam)

Commerce	COHT66	2019-20	B.Com(Honours) A&F/TPP

SEMESTER:V **No of Credits:4**

Auditing

CO1 Students will develop the knowledge & importance of accounting and auditing and adoption of audit types of any Organisation (PO 1) **PSO1**

CO2 – Students will have knowledge in planning the effectiveness of auditing and importance of documentary evidence for the completion of effective audit (PO 1,2 3) **PSO1**

CO3 - Students will have the knowledge of the competency of person, his rights and duties regarding auditing and audit report (PO 6,7) **PSO1**

CO4-. Students will understanding critically verification and valuation of assets and liabilities and their impact on accuracy of accounting (PO1) **PSO1**

CO5-. Students will critically understand profits and dividend and legal decisions relating declaring of dividends. (PO 1,3,6) **PSO1**

Unit-I: Origin of auditing **20 Hours**

1.1. Auditing meaning.
1.2. Distinction between auditing and accounting.
1.3. Auditing objects.
1.4. Advantages of audit.
1.5. Audit programme.
1.6. Preliminaries at the commencement of a new audit.
1.7. General audit and statutory audit.
1.8. Methods of audit.
1.9. Continuous and periodical audit, Interim audit.

Unit-II: Internal Control **15 Hours**

2.1. Internal check meaning.
2.2. Internal Audit.
2.3. Vouching meaning, Advantages and disadvantages.
2.4. Vouching of trading transitions.
2.5. Vouching of cash transitions. .

Unit-III: Company Auditor **10 Hours**

3.1. Qualifications, disqualifications of auditor.
3.2. Appointment of auditor.
3.3. Removal and remuneration.
3.4. Duties, rights of auditor.
3.5. Liabilities of auditors.
3.6. Audit of companies.

Unit-IV: Verification and valuation of assets and liabilities **15 Hours**

4.1. Meaning of Verification and valuation.
4.2. Distinction between Verification and valuation and vouching.
4.3. Verification and valuation of assets and liabilities of a company.
(Freehold property, leasehold property, Plant & machinery, goodwill, patent rights, stock and book debts).

Unit-V: Divisible profits and Audit report **15 Hours**

5.1. Divisible profits meaning.

5.2. Important legal decisions in relation thereto.
5.3. Reserves and its types.
5.4. Reserve funds auditor's duties.
5.5. Audit report and its types.

Text Books:

1.Auditing Theory and practice By: Prdeepkumar ,BaldevSachdevaJagwantsinghKalyani publications

Ref.Books

1. Principles of Practice of Auditing. By: Jagadish Prakash Kalyani Publishers, New Delhi.
2. Practical Auditing By Kumar Sachdeva& Singh Kalyani Publishers, New Delhi.

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(An Autonomous college in the jurisdiction of Krishna University, Machilipatnam)
SALES PROMOTION AND PRACTICE

Semester:	V/VI	Credits :	4
Offered to	B.Com(General, Computers)	Course Code	**COMSET03**
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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(An Autonomous college in the jurisdiction of Krishna University, Machilipatnam)

Management Accounting

Semester:	V	**Credits :**	**4**
Offered to	**B.Com(Honours) A&F/TPP/BPM**	**Course Code**	**COHSET02**
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 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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Commerce	III B.Com (Hons) A&F/TPP/BPM	Semester-V	2021-22	Max. Marks : 75	Course Code: COHSET002

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			Less: returns	11,588	13,903
expenses	91,823	1,15,632		7,09,868	8,20,347
To Selling expenses	46,531	54,137	By Other Income:		
To Interest paid	4,275	3,500	Interest &Dividend	3,795	2,620
To Loss on sale of			Discount	4,250	3,792
plant	1,254	350	By Profit on sale		
To Income Tax	43,038	80,390	of land	3,000	---
To Net Profit	70,742	88,851			
	7,20,913	8,26,759		7,20,913	8,26,759

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
	20,00,000	24,00,000		20,00,000	24,00,000

Additional information: Machinary & 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
	2,70,000	3,85,000		2,70,000	3,85,000

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
	3,00,000		3,00,000

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
	4,95,000	5,55,000		4,95,000	5,55,000

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.

1.3.1: Institution integrates cross-cutting issues relevant to Professional Ethics, Gender, Human Values, Environment and Sustainability and other value framework enshrined in Sustainable Development Goals and National Education Policy – 2020 into the Curriculum

NAME OF THE PROGRAM : B.Sc. BZC (BOTANY)

NAME OF THE PROGRAM : B.Sc. BZC (Botany) REGULATION 15 & 20						
NAME OF THE COURSE	**Couse Code**	**Professional Ethics**	**Gender**	**Human values**	**Environmental and Sustainability**	**other value framework enshrined**
INTRODUCTION TO MICROBES AND THALLOPHYTA	BOTT11	Ethical Research Practices, Public Health and Safety, Environmental Stewardship, Biosecurity and Biosafety, Respect for Biodiversity, Intellectual Property and Fair Access, Informed Consent and Use of Genetic Material, Transparency in Public Communication, Responsible Use of Biotechnology, Addressing Antimicrobial Resistance	Gender Equality in Scientific Research, Gender-Specific Health Impacts of Microorganisms, Women's Role in Traditional and Sustainable Agriculture, Gender-Sensitive Approaches in Disease Control and Prevention, Gender in Industrial Microbiology and Biotechnology, Traditional Knowledge and Gender Roles in Microbial Practices, Empowering Women in Biotechnology Innovations, Impact of Microbial Research on Women's Work	Ethical Responsibility, Empathy and Public Health, Respect for Life, Social Responsibility, Knowledge and Education, Sustainability and Environmental Stewardship, Collaboration and Community Engagement, Addressing Inequities, Innovation for the Greater Good, Holistic Perspectives	Ecosystem Functioning, Bioremediation, Sustainable Agriculture, Climate Change Mitigation, Renewable Energy Production, Water Quality and Treatment, Biodiversity Conservation, Sustainable Food Systems, Environmental Monitoring, Education and Awareness	Zero Hunger, Good Health and Well-being, Clean Water and Sanitation, Responsible Consumption and Production, Climate Action, Life Below Water, Life on Land, Partnerships for the Goals, Value Framework of Equity and Inclusivity, Value Framework of Innovation and Resilience.
ETHNOBOTANY AND MEDICINAL BOTANY	BOTTCL62A	Respect for Cultural Heritage and Indigenous Knowledge, Integrity and Transparency, Fairness, Equity, and Non-Exploitation, Sustainability and Environmental Stewardship, Accountability and Responsibility, Intellectual Property Rights and Protection Against Biopiracy, Social Responsibility and Community Engagement, Professional Conduct in Research and Education	Traditional Gender Roles in Ethnobotany, Women's Role in Plant Knowledge and Healthcare, Empowerment and Women's Knowledge, Gender Equity in Knowledge Systems, Gender and Conservation Practices, Access and Benefit Sharing (ABS) from a Gender Perspective, Gender Dynamics in Bioprospecting and Research Ethics, Gender-Responsive Conservation and Sustainable Development	Respect for Cultural Diversity and Traditional Knowledge, Empathy and Understanding, Equity and Fairness, Responsibility and Stewardship, Community and Collective Well-being, Sustainability and Harmony with Nature, Integrity and Honesty in Research, Compassion and Care for the Environment, Social Justice and Advocacy, Wisdom and Knowledge Preservation	Biodiversity Conservation, Sustainable Use of Natural Resources, Preservation of Traditional Ecological Knowledge, Climate Change Adaptation and Mitigation,Conservation of Ecosystems and Natural Habitats, Agroecology and Sustainable Agriculture, Ethical Bioprospecting and Benefit-Sharing, Education and Raising Environmental Awareness, Sustainable Development Goals (SDGs) and Ethnobotany, Environmental Justice and Empowerment of Indigenous	Cultural Values, Ethical Values, Economic Values, Scientific Values, Health and Well-being Values, Social and Community Values, Intellectual and Educational Values, Innovation and Creativity Values, Spiritual and Ethical Relationship with Nature, Global Values and Cross-Cultural Understanding

ANATOMY AND EMBRYOLOGY OF ANGIOSPERMS, PLANT ECOLOGY AND BIODIVERSITY	22BOTT31	Environmental Stewardship, Responsible Research Practices, Biodiversity Conservation, Social Responsibility, Interdisciplinary Collaboration, Sustainability and Ethics, Equity and Inclusivity, Professional Accountability, Education and Advocacy, Ethical Decision-Making	Environmental Stewardship, Responsible Research Practices, Biodiversity Conservation, Social Responsibility,Interdisciplinary Collaboration, Sustainability and Ethics, Equity and Inclusivity, Professional Accountability, Education and Advocacy, Ethical Decision-Making	Respect for Nature, Responsibility and Stewardship, Empathy and Compassion, Justice and Equity, Interconnectedness, Sustainability and Future Generations, Knowledge and Education, Collaboration and Community, Innovation and Creativity, Holistic Perspective	Understanding Ecosystems, Biodiversity Conservation, Sustainable Resource Management, Climate Change Mitigation, Restoration Ecology, Ethical Environmental Stewardship, Community and Local Knowledge, Interdisciplinary Approaches, Policy Development, Education and Advocacy	Zero Hunger, Good Health and Well-Being, Quality Education, Climate Action,Life on Land, Responsible Consumption and Production, Sustainable Cities and Communities, Clean Water and Sanitation, Peace, Justice, and Strong Institutions, Interconnectedness of SDGs
PLANT PHYSIOLOGY AND METABOLISM	22BOTT01	Integrity in Research and Data Collection, Respect for Biodiversity and Natural Resources, Commitment to Sustainability and Environmental Stewardship, Accountability in Agricultural and Biotechnological Practices, Accountability in Agricultural and Biotechnological Practices, Ethical Treatment of Intellectual Property,Honesty in Teaching and Knowledge Dissemination, Safety and Responsibility in Laboratory Practices, Respect for Traditional and Indigenous Knowledge, Promotion of Social and Environmental Justice, Avoidance of Conflicts of Interest, Continuous Learning and Professional Development	Gender Equality in Scientific Research, Empowerment through Agricultural Knowledge, Recognition of Traditional Knowledge Held by Women, Gender-Sensitive Approaches in Agricultural Interventions, Health and Nutrition Implications for Gender, Educational Inclusion and Representation, Access to Resources and Land Ownership, Addressing Bias in Scientific Research, Gender-Specific Impact of Environmental Changes, Involvement in Policy-Making	Respect for Nature and Biodiversity, Responsibility in Environmental Stewardship, Integrity in Scientific Research, Empathy and Care for Community Well-being, Wisdom in Resource Use and Conservation,Commitment to Sustainability and Future Generations, Equity and Access to Knowledge, Cultural Respect and Preservation of Traditional Knowledge, Curiosity and the Pursuit of Knowledge, Justice and Fairness in Resource Distribution, Harmony with Nature, Humility in Understanding the Natural World	Understanding and Managing Water Resources, Soil Health and Sustainable Agriculture, Enhancing Crop Productivity and Resilience, Carbon Sequestration and Climate Change Mitigation, Conservation of Biodiversity and Ecosystem Services, Development of Sustainable Bioenergy Sources, Adaptation to Climate Change, Sustainable Use of Plant-Based Resources, Ecosystem Restoration and Land Rehabilitation, Promoting Circular Economy and Resource Efficiency, Pollution Reduction and Phytoremediation, Promotion of Agroecology and Organic Farming, Food Security and Sustainable Nutrition, Ethical Conservation and Resource Management	Curiosity and Lifelong Learning, Patience and Perseverance, Collaboration and Teamwork, Creativity and Innovation, Cultural Awareness and Respect, Ethical Awareness and Responsibility, Innovation in Problem-Solving, Empathy and Compassion for Living Beings,Justice and Fairness in Access to Resources, Integrity and Transparency in Research, Mindfulness and Observational Skills, Ecological Awareness and Connectivity, Resilience and Adaptability, Stewardship and Care for Future Generations,Interdisciplinary Thinking and Holistic Perspective

P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE, VIJAYAWADA-10
An autonomous college in the jurisdiction of Krishna University, Machilipatnam. A.P.

I-BZC	BOTANY-I	SEM-I	BOTT11	2019-20	No. of Credits:3	No. of Hrs /Week:4

INTRODUCTION TO MICROBES AND THALLOPHYTA

Course objective To acquaint the students about the morphology, biology and importance of prokaryotes, eukaryotes, algal organisms, fungal organisms and lichens.

Course outcomes: At the completion of this course a student will be able to

CO1: Studied some plant diseases with special reference to the causative agents, symptoms, etiology and control measures.
CO2: Learn about classification, characteristics, ultra structure of a cellular, Prokaryotic and Eukaryotic microbes
CO3: Learn about the structure, pigmentation, food reserves and methods of reproduction of Algae
CO4: Learn about the structure, mode of nutrition, food reserves and methods of reproduction of Fungi
CO5: Know about the Economic importance of algae, Fungi and lichen

CO-PO MATRIX							
CO-PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**
CO1						M	
CO2						L	
CO3						L	
CO4						L	
CO5						H	

INTRODUCTION TO MICROBES AND THALLOPHYTA

UNIT-I : VIRUSES **10 hrs**

1.1 Introduction to microorganisms.
1.2 **Viruses-** Introduction,
1.2.1 Structure (TMV and T_4 phage)
1.2.2 Replication of viruses
1.2.3 Transmission of viruses
1.2.4 Plant diseases caused by viruses and their control

UNIT-II: BACTERIA **10hrs**

2.1 **Bacteria:** Introduction
2.1.1 Structure and Nutrition in Bacteria
2.1.2Reproduction in bacteria
2.1.3 Economic importance of bacteria
2.2 Special groups of bacteria - Actinomycetes, Mycoplasma & Cyanobacteria

UNIT-III: PHYCOLOGY **15 hrs**

3.1 Thallus organization
3.2 Reproduction in algae
3.3 Fritsch Classification (outlines only)

3.4 Economic importance of algae

3.5 Structure, Reproduction, life history and systematic position of -

3.5.1 ***Oedogonium***

3.5.2 ***Chara***

3.5.3 ***Ectocarpus***

3.5.4 ***Polysiphonia***

UNIT-IV : ***MYCOLOGY*** **15hrs**

4.1 General characters of fungi

4.2 **Ainsworth** Classification (outlines only)

4.3 Economic importance of fungi.

4.4 Structure, reproduction, life history and systematic position of-

4.4.1 ***Phytophthora***

4.4.2.*Albugo*

4.4.2 ***Penicillium***

4.4.3 ***Puccinia***

UNIT-V: LICHENOLOGY **10 hrs**

5.1 Lichens**:** Structure of lichens

5.1.1 Reproduction in lichens

5.1.2 Economic importance of lichens

Text books:

1. Vasista, B.R.(2018).Botany for degree students - Algae - S. Chand and company Ltd., New Delhi.
2. Dubey, H.C. (2018). A text book of Fungi, bacteria and Viruses. Vikas publishing house, New Delhi.
3. Smith, G.M (1955).Cryptogamic Botany(Vol. I Algae, Fungi, & Lichens) McGraw-Hill Book Co., New York .

Reference Books:

1. Presscott, L. Harley, J. and Klein, D. (2005). Microbiology, 6th edition, Tata Mc Graw- Hill Co. New Delhi.
2. Alexopoulos,C.J., Mims, C.W. & Blackwell, M. (1996): Introductory Mycology John Wiley& Sons., Inc., N.Y., Chicester, Berisbane, Toronto, Singapore.
3. Fritsch F.E. (1935). The Structure & Reproduction of Algae. Cambridge University Press Cambridge, U.K. Vol. I, Vol. II.

P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE, VIJAYAWADA-10
Model paper, November-2019

Title of the paper: **Introduction to Microbes and Thallophyta**

Course Code: BOT T11
Time:3hrs
Max.Marks:75

SECTION-A

Answer any Five of the following **5X5=25M**

1. TMV CO1, L1
2. Bacteria cell structure CO2, L1,L2
3. Economic importance of algae CO5, L1
4. *Penicillium* conidia CO4, L2
5. Types of Lichens CO5, L4
6. *Ectocarpus* sporangia CO3, L1,L2
7. Symptoms of white rust CO1, L2, L4
8. Transmission of plant viruses CO1, L1, L2

SECTION-B

Answer the following
5X10=50M

9 (a) Explain the structure and replication of T_4 phage virus. CO1, L1

OR

b) Discuss the plant diseases caused by viruses and their control measures. CO1, L4

10. a) Write an essay on economic importance of bacteria. CO2, L2

OR

b) Explain various methods of reproduction in bacteria. CO2, L1

11. a) Write an essay on Thallus organization in algae. CO3, L2

OR

b) Describe the structure and reproduction in *Polysiphonia.* CO3, L2

12. a) Elaborate the general characters of fungi. CO4, L1

OR

b) Describe the life cycle of *Puccinia* on primary host. CO4, L1

13. a) Explain the reproduction in Lichens. CO5, L1

OR

b) Give an account of ecological and economic significance of Lichens. CO5, L4

P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE, VIJAYAWADA-520010

An autonomous college in the jurisdiction of Krishna University, Machilipatnam, A.P., India.

III-BZC	BOTANY-VIII	SEM-VI	BOTTCL62	2020-202	No. of Credits:	No. of hrs/week:4

Title of the Course**: ETHNOBOTANY AND MEDICINAL BOTANY**

Course Outcomes:

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

- CO1: Gain knowledge in ethnobotany.
- CO2: Understand the role of ethnobotany in moder
- medicine.
- CO3: Illustrate interests of ethnic groups.
- CO4: Understand the indigenous medicinal sciences.
- CO5: Analyze the endangered and endemic medicinal plants.
-

CO-PO MATRIX							
CO-PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**
CO1					H		
CO2						L	
CO3						M	
CO4						M	
CO5						H	

UNIT –I: **ETHNOBOTANY**: **(12HRS)**

1.1.1 Introduction, concept, scope and objectives

1.1.2 Ethnobotany as interdisciplinary science.

1.1.3 The relevance of Ethnobotany in the present context

1.2 Major and minor ethnic groups or Tribals of India and their life styles.

1.3 Plants used by the tribal populations:

a) Food plants b) Intoxicants and beverages c) Resins and oils

UNIT -II: **ROLE OF ETHNOBOTANY IN MODERN MEDICINE**: **(12HRS)**

2.1 Role of ethnobotany in modern medicine with special examples

2.1.1 *Rauwolfiaserpentina*2.1.2 *Trichopuszeylanicus* 2.1.3*Withaniasomnifera*

2.2 Medico-ethnobotanical sources in India

2.3 Significance of the following plants in ethno botanical practices (along with their habitat and morphology)

2.3.1 *Vitexnegundo* 2.3.2 *Gloriosasuperba* 2.3.3 *Tribulusterrestris*

UNIT-III: ETHNOBOTANY AS A TOOL TO PROTECT INTERESTS OF ETHNIC GROUPS

(12HRS)

3.1 Sharing of wealth concept with few examples from India.

3.2 Biopiracy, Patent, Intellectual Property Rights and Traditional Knowledge.

UNIT -IV: HISTORY, SCOPE AND IMPORTANCE OF MEDICINAL PLANTS IN INDIGENOUS MEDICINAL SCIENCES **(12HRS)**

4.1 ***Ayurveda****: History, origin, panchamahabhutas, saptadhatu and tridosha concepts, plants used in*
ayurvedic treatments.
4.2 ***Siddha****: Origin of Siddha medicinal systems, Basis of Siddhasystem, plants used in Siddha medicine.*
4.3 ***Unani****: History, concept: Umoor-e- tabiya, polyherbal formulations (in brief).*

UNIT -V: CONSERVATION OF ENDANGERED AND ENDEMIC MEDICINAL PLANTS:

(12HRS)

5.1 Definition: Endemic and endangered medicinal plants
5.2 Red list criteria
5.3 *In situ* conservation: Biosphere reserves, sacred groves,National Parks
5.4 *Ex situ* conservation: Botanical Gardens

Reference Books:

1. S.K. Jain, Manual of Ethnobotany, Scientific Publishers, Jodhpur, 1995.
2. Glimpses of Indian. Ethnobotany, Oxford and I B H, New Delhi – 1981.
3. S.K. Jain (ed.) 1989. Methods and approaches in Ethnobotany. Society of ethnobotanists, Lucknow, India.
4. S.K. Jain, 1990. Contributions of Indian ethnobotny.Scientific publishers, Jodhpur.
5. Rama Ro, N and A.N. Henry (1996). The Ethnobotany of Eastern Ghats in Andhra Pradesh, India.Botanical Survey of India. Howrah
6. Trivedi P C, 2006. Medicinal Plants: Ethnobotanical Approach, Agrobios, India.
7.Purohit and Vyas, 2008. Medicinal Plant Cultivation: A Scientific Approach, 2nd edn.Agrobios, India.
8. Pal, D.C. & Jain, S.K., 1998. Tribal Medicine.NayaPrakash Publishers, Calcutta

PARVATHANENI BRAHMAIAH SIDDHARTHA COLLEGE OF ARTS AND SCIENCE,

VIJAYAWADA.

TITLE OF THE PAPER: ETHNOBOTANY AND MEDICINAL BOTANY
MODEL QUESTION PAPER
Semester-VI Course Code: BOTTCL62A **Time: 3 Hrs**
Max. Marks: 75M

SECTIONA
Answer any FIVE of the following 5x5=25m
1. Scope and concept of ethnobotany.
2.Relevance of ethnobotany in the present context.
3.Tribulusterrestres.
4.Medicoethnobotanical sources in India.
5.Sharing of wealth concept in India.
6.Plants used in Siddha medicine.
7. Diagnosis and treatment in Siddha medicine.
8.Reddatabook.

SECTIONB
Answer the following 5x10=50M
9. a)Explain ethnobotany as an interdisciplinary science.
OR

b) Write an essay on plants used by tribal populations.

10. a) Explain ethnobotany of Rauwolfia and state its role in modern medicine.

OR

b) Describe morphology and ethnobotanical significance of the following.

i) Gloriosasuperba

ii) Vitexnegundo

11. a)Write an essay on biopiracy in India.

OR

b) Write an essay on traditional knowledge.

12. a)Write an essay on basic concepts of Ayurvedam.

OR

b) Write about Unani medicinal system.

13. a) Explain endemic and endangered medicinal plants.

OR

b) Write an essay on botanical gardens.

P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

Siddhartha Nagar, Vijayawada – 520 010

Autonomous - ISO 9001 – 2015 Certified

Title of the Paper (Anatomy and Embryology of Angiosperms, Plant Ecology and Biodiversity)

Offered to: BSc. BZC with Programme code

Course Type: Core (TH)

Year of Introduction: 2021-2022 **Year of Revision: 2021**

Percentage of Revision: 100%

Semester: III **Credits:** 04

Hours Taught: 60 hrs. per Semester **Max. Time**: 3 Hours

Course Prerequisites: Knowledge of Anatomy and Embryology of angiosperms, Plant Ecology and Biodiversity at +2 level.

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:
On successful completion of this course, the students will be able to:

1. To understand the Anatomy of Angiosperms.
2. To understand the Embryology of Angiosperms.
3. To understand the Basics of Ecology.
4. To understand the Population Community and Production Ecology.
5. To understand the Basics of Biodiversity.

Course Outcomes: At the end of this course, students should be able to:
CO1: Understand the organization of tissues and tissue systems in plants.
CO2: Illustrate and interpret various aspects of embryology.
CO3: Discuss the basic concepts of plant ecology, and evaluate the effects of environmental and biotic factors on plant communities.
CO4: Appraise various qualitative and quantitative parameters to study the population and community ecology.
CO5: Correlate the importance of biodiversity and consequences due to its loss and enlist the endemic/endangered flora and fauna from two biodiversity hot spots in India and assess strategies for their conservation.

CO-PO MATRIX							
CO-PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**
CO1						L	
CO2						L	
CO3				H			
CO4				H			
CO5				H			

Syllabus

Course Details

Unit	Learning Units	Lecture Hours
I	**Anatomy of Angiosperms** 1.Organization of apical meristems: Tunica-carpus theory and Histogen theory. 2.Tissue systems–Epidermal, ground and vascular. 3.Anomalous secondary growth in *Boerhavia* and *Dracaena*. 4.Study of timbers of economic importance - Teak, Red sanders and Rosewood.	12
II	**Embryology of Angiosperms** 1.History of embryology, Structure of anther, types of tapetum. Microsporogenesis and development of male gametophyte. 2.Structure of ovule, megasporogenesis; monosporic (*Polygonum*), bi sporic (*Allium*) nd tetra sporic (*Peperomia*) types of embryo sacs. 3.Outlines of pollination, pollen – pistil interaction and fertilization. 4.Endosperm - Types and biological importance - Free nuclear, cellular, helobial and ruminate. 5.Development of Dicot (*Capsella bursa-pastoris*) embryo.	12
III	**Basics of Ecology** 1.Ecology: definition, branches and significance of ecology. 2.Ecosystem: Concept and components, energy flow, food chain, food web, ecological pyramids. 3.Plants and environment: Climatic (light and temperature), edaphic and biotic factors. 4.Ecological succession: Hydrosere and Xerosere.	12
IV	**Population, Community and Production Ecology** 1.Population ecology: Natality, mortality, growth curves, ecotypes, ecads. 2.Community ecology: Frequency, density, cover, life forms, biological spectrum. 3.Concepts of productivity: GPP, NPP and Community Respiration. 4.Secondary production, P/R ratio.	12
V	**Basics of Biodiversity** 1.Biodiversity: Basic concepts, Convention on Biodiversity - Earth Summit. 2.Value of Biodiversity; types and levels of biodiversity and Threats to biodiversity. 3.Biodiversity Hot spots in India. Biodiversity in Eastern Ghats and Western Ghats. 4.Principles of conservation: IUCN threat-categories, RED data book. 5.Role of NBPGR and NBA in the conservation of Biodiversity.	12

Textbook:

- Botany – III (Vrukshasastram-I) : Telugu Akademi, Hyderabad
- Botany – IV (Vrukshasastram-II) : Telugu Akademi, Hyderabad
- Pandey, B.P. (2013) *College Botany, Volume-II,* S. Chand Publishing, New Delhi

- Pandey, B.P. (2013) *College Botany, Volume-III,* S. Chand Publishing, New Delhi

Recommended Reference book:

- Esau, K. (1971) *Anatomy of Seed Plants*. John Wiley and Son, USA.
- Fahn, A. (1990) *Plant Anatomy*, Pergamon Press, Oxford.
- Cutler, D.F., T. Botha & D. Wm. Stevenson (2008) *Plant Anatomy: An Applied Approach,* Wiley, USA.
- Paula Rudall (1987) *Anatomy of Flowering Plants: An Introduction to Structure and Development*. Cambridge University Press, London.

Course Delivery method: Face-to-face / Blended.
Course has focus on: Foundation
Websites of Interest:
https://byjus.com/biology/tissues-anatomy-of-angiosperms/
https://onlinecourses.swayam2.ac.in/cec21_bt22/preview
https://explorenaturalcommunities.org/ecology-basics#:~:text=Ecology%20is%20the%20science%20of,and%20with%20their%20physical%20environment.
https://en.wikipedia.org/wiki/Community_(ecology)
https://ec.europa.eu/environment/basics/natural-capital/biodiversity/index_en.htm#:~:text=%22Biodiversity%22%20is%20a%20word%20we,their%20habitats%20and%20their%20genes.&text=Much%20food%20production%20is%20only,that%20pollinate%20plants%20and%20trees.

Co-curricular Activities:
Question and answer session at the end of class.
Observing animations.
Written assignments.
Preparation of models.
Making charts of
Group Discussion (GD)/ Quiz.
Power Point Presentations.

Model Question Paper Structure for SEE

Max.: 75 Marks **Min. Pass: 30 Marks**

Section-A

Answer Any Five (5 x 5M = 25Marks) atleast one from each unit

1. Tunica corpus theory.CO1L1
2. Rose wood. CO1L2
3. Nemec phenomenon. CO2L2
4. Ruminate endosperm. CO2L2
5. Food chain & Food web. CO3L1
6. Ecads. CO4L2
7. Earth summit. CO5L1
8. Identify Biodiversity hot spots of India CO5L3.

Section-B

Answer the following questions (5 x 10M = 50Marks)

9. (a) Describe the epidermal tissue system. CO1L1
   or **Unit I**
   (b) What is anomalous secondary growth? Describe the anomalous secondary growth in *Boerhavia* stem. CO1L1
10. (a) What is embryosac? How many types are there? Explain the development of embryosac studied by you. CO2L2
   or **Unit II**
   (b) Explain the development of embryo CO2L2
11. (a) What is an ecosystem? Give an account of structure of an ecosystem studied by you.CO3L1
   or **Unit III**
   (b) What is succession? Give account of xerosere. CO3L1
12. (a) What is population ecology? Explain characters of a population studied by you. CO4L2
   or **Unit IV**
   (b) List out the quantitative and qualitative characters of community. Explain qualitative characters of a plant community. CO4L2
13. (a) Classify and analyse main values of biodiversity. CO5L4
   or **Unit V**
   (b) Analyse the major threats to biodiversity. CO5L4

D. Sravani
Signature of the Course In-charge

D. Sravani
Signature of the Programme In-charge

Ch. Venkateswarlu
Signature of the HOD

Note: Kindly see that total document is in A4 paper size - Font – Times new roman – size 12

P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

Siddhartha Nagar, Vijayawada – 520 010

Autonomous - ISO 9001 – 2015 Certified

Title of the Paper (Plant Physiology and Metabolism)

Offered to: BSc. BZC with Programme code **US03**

Course Type: Core (TH)

Year of Introduction: 2021-2022 **Year of Revision:**

Percentage of Revision:

Semester: III/IV **Credits: 04**

Hours Taught: 60 hrs. per Semester **Max. Time**: 3 Hours

Course Prerequisites: Knowledge of Plant Physiology and Metabolism at +2 level.

Course Description:

This course will provide one with a basic and comprehensive understanding of plant water relations. Enable the student with depth of topics and helps them to gain appreciation of the mineral nutrition, enzymes and respiration. On the other hand, importance of understanding photosynthesis and photorespiration are also learnt. A part from these the student will be enhanced with the knowledge of nitrogen and lipid metabolism. The course provides a vast knowledge in plant growth development and stress physiology.

Course Objectives

On successful completion of this course, the students will be able to:

1. To understand the plant water relations.
2. To understand the mineral nutrition, enzymes and respiration.
3. To understand the photosynthesis and photorespiration.
4. To understand the nitrogen and lipid metabolism.
5. To understand the plant growth-development and stress physiology.

Course Outcomes:

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

CO1: Comprehend the importance of water in plant life and mechanisms for transport of water and solutes in plants.

CO2: Evaluate the role of minerals in plant nutrition and their deficiency symptoms, Interpret the role of enzymes in plant metabolism.

CO3: Critically understand the light reactions and carbon assimilation processes responsible for synthesis of food in plants.

CO4: Analyze the biochemical reactions in relation to Nitrogen and lipid metabolisms.

CO5: Evaluate the phytohormones that regulate growth and development in plants, examine the role of light on flowering and explain physiology of plants under stress conditions.

CO-PO MATRIX							
CO-PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**
CO1					L		
CO2						M	
CO3						H	
CO4						H	
CO5						M	

Syllabus

Course Details

Unit	Learning Units	Lecture Hours

I	**Plant-Water relations** 1. Importance of water to plant life, physical properties of water, diffusion, imbibition, osmosis. water potential, osmotic potential, pressure potential. 2. Absorption and lateral transport of water; Ascent of sap 3. Transpiration: stomata structure and mechanism of stomatal movements (K^+ ion flux). 4. Mechanism of phloem transport; source-sink relationships.	12
II	**Mineral nutrition, Enzymes and Respiration** 1. Essential macro and micro mineral nutrients and their role in plants; symptoms of mineral deficiency 2. Absorption of mineral ions; passive and active processes. 3. Characteristics, nomenclature and classification of Enzymes. Mechanism of enzyme action, enzyme kinetics. 4. Respiration: Aerobic and Anaerobic; Glycolysis, Krebs cycle; electron transport system, Mechanism of oxidative phosphorylation, Pentose Phosphate Pathway (HMP shunt).	12
III	**Photosynthesis and Photorespiration** 1. Photosynthesis: Photosynthetic pigments, absorption and action spectra; Red drop and Emerson enhancement effect 2. Concept of two photosystems; mechanism of photosynthetic electron transport and evolution of oxygen; photophosphorylation 3. Carbon assimilation pathways (C3, C4 and CAM); 4. Photorespiration - C2 pathway	12
IV	**Nitrogen and lipid metabolism** 1. Nitrogen metabolism: Biological nitrogen fixation – asymbiotic and symbiotic nitrogen fixing organisms. Nitrogenase enzyme system. 2. Lipid metabolism: Classification of Plant lipids, saturated and unsaturated fatty acids. 3. Anabolism of triglycerides, β-oxidation of fatty acids, Glyoxylate cycle.	12
V	**Plant growth - development and stress physiology** 1. Growth and Development: Definition, phases and kinetics of growth. 2. Physiological effects of Plant Growth Regulators (PGRs) - Auxins, Gibberellins, Cytokinins, ABA, Ethylene and Brassino steroids. 3. Physiology of flowering: Photoperiodism, role of phytochrome in flowering. 4. Seed germination and senescence; physiological changes.	12

Textbook:

- Botany – IV (Vrukshasastram-II): Telugu Academy, Hyderabad
- Pandey, B.P. (2013) *College Botany, Volume-III,* S. Chand Publishing, New Delhi

Recommended Reference book:

- Aravind Kumar & S.S. Purohit (1998) *Plant Physiology – Fundamentals and Applications,* Agro Botanica, Bikaner
- Datta, S.C. (2007) *Plant Physiology,* New Age International (P) Ltd., Publishers, New Delhi

Course Delivery method: Face-to-face / Blended.
Course has focus on: Foundation
Websites of Interest:
https://youtu.be/4to_4guDx50
https://youtu.be/j0BN8RfeqD0
https://youtu.be/Uc4lDTd1JXs
https://youtu.be/LVxdoH9MLU4
https://youtu.be/MSsVrzYibI8
https://youtu.be/YoNgSOIsk0A

Co-curricular Activities:
Question and answer session at the end of class.
Observing animations.
Written assignments.
Group Discussion (GD)/ Quiz.
Power Point Presentations.

Model Question Paper Structure for SEE

Max.: 75 Marks **Min. Pass: 30 Marks**

Section-A

Answer Any Five (5 x 5M = 25Marks) atleast one from each unit

1.Identify role of Water potential in plants **CO1L2**
2.Carrier concept **CO2L1**
3.Oxidative phosphorylation **CO2L1**
4.CAM plants **CO3L1**
5.Emerson enhancement effect **CO3L1**
6.Classification of plant lipids **CO4L4**
7.Brassino steroids. **CO5L1**
8.Phytochrome **CO5L1**

Section-B

Answer the following questions (5 x 10M = 50Marks)

9. (a) Explain osmosis, diffusion and imbibition with the help of experiments. **CO1L2**
or **Unit I**
(b) Explain the various theories on mechanism of stomatal movements.**CO1L2**

10. (a) Define enzymes. Illustrate the properties and structure. Mention the mechanism of enzyme action. **CO2L1**

or **Unit II**

(b) Explain the bio chemical reactions that occur in kreb's cycle. **CO2L1**

11. (a) Explain carbon assimilation how many methods of carbon assimilation are shown by plants explain carbon assimilation in C3 plants. **CO3L1**

or **Unit III**

(b) What is photorespiration? Differentiate photorespiration and respiration in plants? Explain photorespiration. **CO3L1**

12. (a) what is biological nitrogen fixation? Explain types of biological nitrogen fixation. **CO4L2**

or **Unit IV**

(b) what are lipids? Give an account of classification of plant lipids. **CO4L2**

13. (a) What are phyto harmones? Analyse the physiological effects of cytokinines.in plant growth. **CO5L4**

or **Unit V**

(b) What is photo periodism? Distinguish the role of phytochrome in physiology of flowering. **CO5L4**

D. Sravani
Signature of the Course In-charge

D. Sravani
Signature of the Programme In-charge

Ch. Venkateswarlu
Signature of the HOD

Note: Kindly see that total document is in A4 paper size - Font – Times new roman – size 12

1.3.1: Institution integrates cross-cutting issues relevant to Professional Ethics, Gender, Human Values, Environment and Sustainability and other value framework enshrined in Sustainable Development Goals and National Education Policy – 2020 into the Curriculum

NAME OF THE PROGRAM : B.Sc. MPC (CHEMISTRY)

NAME OF THE PROGRAM : B.Sc. MPC (Chemistry) REGULATION 15 & 20						
NAME OF THE COURSE	**Couse Code**	**Professional Ethics**	**Gender**	**Human values**	**Environmental and Sustainability**	**other value framework enshrined**
SPECTROSCOPY & PHYSICAL CHEMISTRY	**CHE T41**	The study and application of chemistry come with significant ethical responsibilities. Professionals in the field must prioritize integrity, accuracy, and transparency in their work. This involves not only adherence to scientific standards but also consideration of the broader impacts of their research and applications on society and the environment. Promoting ethical practices in chemistry fosters trust and safety, aligning with the core values of the scientific community.	Addressing gender considerations in chemistry fosters inclusivity, ensuring that diverse voices and experiences shape research and applications. This approach can lead to more ethical and comprehensive scientific practices, ultimately enhancing the quality and relevance of chemical research in addressing societal needs. Promoting gender equity in education and the workplace can enrich the field of chemistry, leading to better products and solutions that cater to all.	Integrating human values into the practice of chemistry fosters a more ethical approach to scientific inquiry and application. By emphasizing safety, integrity, sustainability, and social responsibility, chemists can contribute to a better quality of life and a more equitable society. Promoting awareness of these values in education and professional practice helps create a culture that respects both science and the community it serves.	Integrating chemical principles with sustainability efforts highlights the critical role of analytical chemistry in environmental protection. By employing accurate measurement techniques and understanding molecular interactions, chemists can contribute to monitoring pollution, optimizing resource management, and developing sustainable practices. This connection emphasizes the importance of chemistry in fostering a more sustainable future for the planet.	The ability to analyze phase diagrams can help optimize resource use in manufacturing and waste management. Understanding phase equilibria in natural systems aids in managing natural resources and restoring ecosystems.These chemistry concepts are fundamental to advancing various Sustainable Development Goals. By integrating scientific understanding with sustainable practices, we can address global challenges more effectively. Educating future generations in these areas will empower them to contribute to sustainable development initiatives, ensuring a healthier planet for all.
INORGANIC, PHYSICAL & ORGANIC CHEMISTRY	**CHET51**	Accurate reporting of data related to bonding theories or thermodynamic principles is crucial. When handling chemicals, particularly in reactions involving amines or nitro compounds, adherence to safety protocols protects both researchers and the environment.The applications of coordination compounds or organic reactions (like drug synthesis) should consider societal implications and the potential for misuse.This comprehensive understanding not only enhances scientific knowledge but also instills a sense of responsibility toward ethical practice in the scientific community.	Gender representation in science, technology, engineering, and mathematics (STEM) fields has historically been imbalanced.Encouraging young women and underrepresented genders to pursue careers in chemistry can lead to diverse perspectives and innovative approaches to scientific problems.Gender biases can influence research topics, funding opportunities, and professional advancement. Diverse teams often yield more comprehensive and creative research outcomes.Gendered differences in communication styles can affect collaboration and team dynamics in research settings.Representation of women and non-binary individuals in chemistry as role models can inspire future generations to enter the field. Effective mentorship programs can help retain individuals from underrepresented groups in STEM.By integrating gender perspectives into the discussion of scientific disciplines, including chemistry, we can create a more inclusive environment that benefits everyone.	Emphasizing accuracy and transparency in scientific work. This is crucial when reporting findings related to coordination chemistry or thermodynamic properties, where misrepresentation can lead to misunderstandings or unsafe practices.Chemical research, especially involving reactive compounds like nitro compounds and amines, requires a strong commitment to safety. Ethical considerations dictate that scientists prioritize the well-being of individuals and the environment.Promoting diversity within scientific communities leads to a broader range of ideas and perspectives, fostering innovative solutions. This aligns with human values that advocate for equity and collaboration.	The principles of green chemistry emphasize reducing hazardous substances in chemical processes. Understanding coordination chemistry and reactivity of compounds can lead to the development of safer, more sustainable methods in industry.Coordination complexes can be used to recover valuable metals from waste streams, contributing to a circular economy. This includes using chelating agents to extract metals from electronic waste or industrial byproducts.Educating future chemists about the environmental impact of their work encourages responsible practices. Awareness of how chemical processes affect ecosystems can foster a culture of sustainability.	Chemistry plays a crucial role in developing pharmaceuticals and healthcare products that are essential for improving health outcomes.Innovations in chemical processes and materials can enhance industrial efficiency, reducing environmental impact.Chemical research can contribute to developing methods to capture and utilize greenhouse gases, mitigating climate change impacts.Understanding chemical reactivity and stability allows for the design of safer products and processes, reducing hazardous waste and promoting sustainability.

ORGANIC CHEMISTRY & SPECTROSCOPY	**CHET31A**	The study of organic chemistry, from nucleophilic substitutions to molecular spectroscopy, not only equips students with technical skills but also fosters an ethical framework essential for responsible scientific practice. As future chemists engage in research and application, these ethical principles will guide their contributions to society, ensuring that chemistry advances in a manner that is safe, sustainable, and equitable.	The topics in organic chemistry provide a foundation for understanding the molecular basis of materials, reactions, and biological processes. When paired with a focus on gender equity in education and research, they contribute to a more inclusive scientific community, ultimately enhancing the development of innovative solutions for societal challenges. Encouraging diverse voices in science not only enriches research but also helps create a more equitable and just society.	The study of organic chemistry and spectroscopy not only equips individuals with essential scientific knowledge and skills but also aligns with and promotes human values by contributing to societal well-being, sustainability, and ethical practices.Understanding the chemistry of organic compounds and their interactions aids in developing sustainable practices, such as the creation of biodegradable materials and the reduction of harmful pollutants.The study of organic compounds directly impacts drug discovery and development. Knowledge of alcohols, carboxylic acids, and other functional groups facilitates the	The principles and applications of organic chemistry, particularly regarding alkyl halides, alcohols, phenols, carbonyl compounds, carboxylic acids, and molecular spectroscopy, are intrinsically linked to environmental issues and sustainability efforts. By understanding these compounds' properties and reactivities, chemists can develop safer, more sustainable practices that contribute to environmental protection and resource conservation.The emphasis on efficient, sustainable reactions in organic chemistry aligns with the tenets of green chemistry, which seeks to minimize waste, reduce the	The study of organic chemistry and molecular spectroscopy not only enhances scientific understanding but also fosters innovative solutions that align with the Sustainable Development Goals. By focusing on sustainable practices, the chemical industry can significantly contribute to environmental protection, human health, and economic development.
ANALYTICAL METHODS IN CHEMISTRY-1	**CHESET01**	In analytical chemistry, professional ethics involve integrity in data reporting, adherence to safety standards, and responsibility in environmental impacts. Ethical practices ensure the reliability of results and contribute to public trust in scientific research and industry practices. Upholding these values is critical for advancing the field and ensuring the safety and well-being of society.	Gender can impact various aspects of analytical chemistry, from educational opportunities to workplace dynamics. Historically, gender biases may have limited women's access to education and careers in STEM fields, including analytical chemistry. Initiatives to encourage women in science aim to bridge this gap.Diverse teams bring varied perspectives, leading to innovative solutions and approaches in research. Gender diversity can enhance creativity and problem-solving in analytical chemistry.Upholding professional ethics ensures inclusivity and fairness in scientific inquiry.Female scientists can serve as role models, inspiring the next generation and contributing to a more balanced representation in the field.	Analytical chemistry is inherently tied to human values. Accurate analysis is vital for public safety, especially in pharmaceuticals and environmental testing. Adhering to ethical practices ensures reliable results and fosters trust in scientific research. Analytical chemistry plays a crucial role in addressing societal issues, such as pollution monitoring and food safety. Chemists are responsible for ensuring that their work contributes positively to society. Through education and outreach, analytical chemists can enhance public understanding of scientific issues, fostering informed decision-making and encouraging responsible behavior toward health and the environment.By integrating human values into analytical chemistry practices, professionals can ensure their work not only advances scientific knowledge	Analytical methods are vital for detecting and quantifying pollutants in air, water, and soil. Monitoring these contaminants helps assess environmental health and regulatory compliance.Accurate analysis of natural resources, such as minerals and water, supports sustainable management practices. This ensures that these resources are used efficiently and responsibly. Analytical chemistry contributes to understanding climate change by measuring greenhouse gas emissions and analyzing their effects on the environment. Emphasizing sustainable practices, analytical chemistry supports the development of greener processes and materials, reducing environmental impact.Incorporating these analytical methods into environmental and sustainability frameworks helps create a	Analytical methods in chemistry aid SDGs by: Environmental Monitoring: Tracking pollutants in water, soil, and air.Healthcare: Assessing blood glucose and monitoring toxic metal levels.Industrial Processes: Ensuring product purity and minimizing waste through efficient chemical analysis.These methods and principles collectively support sustainable practices, health, and environmental stewardship.

ANALYTICAL METHODS IN CHEMISTRY-2	**CHESET02**	In the context of professional ethics, chromatographic methods embody values like accuracy, transparency, and honesty in scientific analysis. They ensure that results are reproducible, dependable, and transparent, all essential in fields where data integrity and quality are paramount, such as pharmacology, food safety, and environmental monitoring. This reinforces ethical responsibility toward producing reliable and truthful scientific findings.	Chromatographic techniques indirectly support gender-related health research by analyzing compounds in biological and pharmaceutical contexts. For instance, gas chromatography and HPLC are instrumental in hormone analysis, where understanding estrogen and androgen levels aids in studies of gender physiology and treatment of hormone-related conditions. These methods thus support the nuanced analysis of biochemical markers relevant to both gender and personalized medicine.	Chromatographic techniques support human values by ensuring the purity and quality of pharmaceuticals, detecting contaminants in food and water, and analyzing biological samples in healthcare. By providing precise and accurate data, chromatography helps protect public health, environmental safety, and food integrity, ultimately reinforcing trust and safety in products essential to human life.	Chromatography plays a crucial role in environmental monitoring and sustainability:Pollutant Analysis: It helps in identifying and quantifying pollutants in air, water, and soil.Quality Control used in assessing the purity of products, ensuring safety in food and pharmaceuticals.Waste Management assists in analyzing hazardous waste components, aiding in effective disposal and treatment strategies.Research and Development supports the development of green chemistry initiatives by facilitating the analysis of environmentally friendly compounds and processes.Through these applications,	Chromatography plays a crucial role in pharmaceuticals and clinical diagnostics, ensuring quality control and safety of medications and health products.Chromatographic techniques help in the analysis of waste products and the quality of materials, promoting sustainable production processes and environmental safety.Analytical methods, including chromatography, are essential for detecting pollutants and contaminants in water, helping to ensure safe drinking water.Analysis of greenhouse gases and pollutants in the atmosphere can be effectively performed using

SEMESTER- IV **PAPER-IV** **No of Credits:3**

(SPECTROSCOPY & PHYSICAL CHEMISTRY)
60 hrs (4 h / w)

SPECTROSCOPY **30 hrs (2h / w)**

UNIT-I **6h**

General features of absorption - Beer-Lambert's law and its limitations, transmittance, Absorbance, and molar absorptivity. Single and double beam spectrophotometers. Application of Beer-Lambert law for quantitative analysis of 1. Chromium in $K_2Cr_2O_7$
2. Manganese in Manganous sulphate

Electronic spectroscopy: **8h**

Interaction of electromagnetic radiation with molecules and types of molecular spectra. Energy levels of molecular orbitals (σ, π, n). Selection rules for electronic spectra. Types of electronic transitions in molecules effect of conjugation. Concept of chromophore and auxochrome.

UNIT-II

Infra red spectroscopy **8h**

Different Regions in Infrared radiations. Modes of vibrations in diatomic and polyatomic molecules. Characteristic absorption bands of various functional groups. Interpretation of spectra-Alkanes, Aromatic, Alcohols carbonyls, and amines with one example to each.

Proton magnetic resonance spectroscopy (^{1}H-NMR) **8h**

Principles of nuclear magnetic resonance, equivalent and non-equivalent protons, position of signals. Chemical shift, NMR splitting of signals - spin-spin coupling, coupling constants. Applications of NMR with suitable examples - ethyl bromide, ethanol, acetaldehyde, 1,1,2-tribromo ethane, ethyl acetate, toluene and acetophenone.

PHYSICAL CHEMISTRY **30 hrs (2h / w)**

UNIT-III

Dilute solutions **10h**

Colligative properties. Raoult's law, relative lowering of vapour pressure, its relation to molecular weight of non-volatile solute. Elevation of boiling point and depression of freezing point. Derivation of relation between molecular weight and elevation in boiling point and depression in freezing point. Experimental methods of determination. Osmosis, osmotic pressure, experimental determination. Theory of dilute solutions. Determination of molecular weight of non-volatile solute from osmotic pressure. Abnormal Colligative properties- Van't Hoff factor.

UNIT-IV

Electrochemistry-I **10h**

Specific conductance, equivalent conductance. Variation of equivalent conductance with dilution. Migration of ions, Kohlrausch's law. Arrhenius theory of electrolyte dissociation and its limitations. Ostwald's dilution law. Debye-Huckel-Onsagar's equation for strong electrolytes (elementary treatment only). Definition of transport number, determination by Hittorfs method. Application of conductivity measurements- conductometric titrations.

UNIT-V

1. Electrochemistry-II **4h**

Single electrode potential, sign convention, Reversible and irreversible cells Nernst Equation-Reference electrode, Standard Hydrogen electrode, calomel electrode, Indicator electrode, metal – metal ion electrode, Inert electrode, Determination of EMF of cell, Applications of EMF measurements - Potentiometric titrations.

2.Phase rule **6h**

Concept of phase, components, degrees of freedom. Thermodynamic Derivation of Gibbs phase rule. Phase equilibrium of one component system - water system. Phase equilibrium of two-component system, solid-liquid equilibrium. Simple eutectic diagram of Pb-Ag system, simple eutectic diagram, desilverisation of lead., NaCl-Water system, Freezing mixtures.

P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE :: VIJAYAWADA-10
(An Autonomous college in the jurisdiction of Krishna University, Machilipatnam)

CHEMISTRY	CHE T51	B. Sc. MPC, BZC	AY:2017-18

Paper - V (INORGANIC, ORGANIC & PHYSICAL CHEMISTRY-I)
45 hrs (3 h/w)

INORGANIC CHEMISTRY

UNIT – I

Coordination Chemistry: 8h

IUPAC nomenclature - bonding theories - Review of Werner's theory and Sidgwick's concept of coordination - Valence bond theory - geometries of coordination numbers 4-tetrahedral and square planar and 6-octahedral and its limitations, crystal filed theory - splitting of d-orbitals in octahedral, tetrahedral and square-planar complexes - low spin and high spin complexes - factors affecting crystal-field splitting energy, merits and demerits of crystal-field theory. Isomerism in coordination compounds - structural isomerism and stereo isomerism, stereochemistry of complexes with 4 and 6 coordination numbers.

UNIT-II

1. Spectral and magnetic properties of metal complexes: 4h

Types of magnetic behavior, spin-only formula, calculation of magnetic moments, experimental determination of magnetic susceptibility-Gouymethod.

2. Stability of metal complexes: 3h

Thermodynamic stability and kinetic stability, factors affecting the stability of metal complexes, chelate effect, determination of composition of complex by Job's method and mole ratio method.

ORGANIC CHEMISTRY

UNIT- III

Nitro hydrocarbons: **3h**

Nomenclature and classification-nitro hydrocarbons, structure -Tautomerism of nitroalkanes leading to aci and keto form, Preparation of Nitroalkanes, reactivity - halogenation, reaction with HONO (Nitrous acid),Nef reaction and Mannich reaction leading to Micheal addition and reduction.

UNIT – IV

Nitrogen compounds : 12h

Amines (Aliphatic and Aromatic): Nomenclature, Classification into 1°, 2°, 3° Amines and Quarternary ammonium compounds. Preparative methods –

1. Ammonolysis of alkyl halides 2. Gabriel synthesis 3. Hoffman's bromamide reaction (mechanism).

Reduction of Amides and Schmidt reaction. Physical properties and basic character -

Comparative basic strength of Ammonia, methyl amine, dimethyl amine, trimethyl amine and aniline - comparative basic strength of aniline, N-methylaniline and N,N-dimethyl aniline (in

aqueous and non-aqueous medium), steric effects and substituent effects.
Chemical properties: a) Alkylation b) Acylation c) Carbylamine reaction d) Hinsberg separation e) Reaction with Nitrous acid of 1°, 2°, 3° (Aliphatic and aromatic amines). Electrophillic substitution of Aromatic amines – Bromination and Nitration. Oxidation of aryl and Tertiary amines, Diazotization.

PHYSICAL CHEMISTRY

UNIT- V

Thermodynamics **15h**

The first law of thermodynamics-statement, definition of internal energy and enthalpy. Heat capacities and their relationship. Joule-Thomson effect- coefficient. Calculation of w, for the expansion of perfect gas under isothermal and adiabatic conditions for reversible processes. State function. Temperature dependence of enthalpy of formation-Kirchoff s equation. Second law of thermodynamics. Different Statements of the law. Carnot cycle and its efficiency. Carnot theorem. Concept of entropy, entropy as a state function, entropy changes in reversible and irreversible processes. Entropy changes in spontaneous and equilibrium processes.

P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE :: VIJAYAWADA-10
(An Autonomous college in the jurisdiction of Krishna University, Machilipatnam)

Title of the Paper (ORGANIC CHEMISTRY & SPECTROSCOPY)

Course Code: CHET31A

Offered to: II B.Sc MPC & BZC (TH) **Course Type :** Core

Year of offering: 2021

Semester: III **Credits: 4**

Hours Taught: 60 hrs. Per Semester **Max.Time**: 4Hour

Syllabus

Course Details

UNIT-1

Chemistry of Halogenated Hydrocarbons 6H

Alkyl halides: Methods of preparation and properties, nucleophilic substitution reactions– SN1, SN2 and SNi mechanisms with stereo chemical aspects and effect of solvent etc.; nucleophilic substitution vs. elimination, Williamson's synthesis. Arylhalides: Preparation (including preparation from diazonium salts) and properties, nucleophilic aromatic substitution; SNAr, Benzyne mechanism. Relative reactivity of alkyl, allyl, benzyl,vinyl and aryl halides towards nucleophilic substitution reactions.

Alcohols & Phenols 6H

Alcohols: preparation, properties and relative reactivity of 1°, 2°, 3° alcohols, Bouvaelt Blanc Reduction; Oxidation of diols by periodic acid and lead tetra acetate,Pinacol- Pinacolone rearrangement; **Lucas Reagent**Phenols: Preparation and properties; Acidity and factors effecting it, Ring substitution reactions, Reimer–Tiemannand Kolbe's–Schmidt Reactions, Fries and Claisen rearrangements with mechanism;

UNIT-2

Carbonyl Compounds

Structure, reactivity, preparation and properties; Nucleophilic additions, **with $NaHSO_3$, Formation of alcohols, HCN , Grignard's Reagent(Rmgx), hemi acetol's, Fehling's, Tollen's, 2 4 Di Nitro Phenyl hydrazine (2 4 DNPH) and formation of oximes** Nucleophilic addition-elimination reactions with ammonia derivatives Mechanisms of Aldol and Benzoin condensation, Claisan-Schmidt, Perkin, Cannizzaro and Wittig reaction, Beckmann halo form reaction and Baeyer Villiger oxidation, α- substitution reactions,oxidations and reductions (Clemmensen, wolf – kishner, with LiAlH4 & NaBH4). Addition reactions of α,β-unsaturated

carbonyl compounds: Michael addition. Active methylene compounds: Keto- Enolt automerism. Preparation and synthetic applications of diethyl malonate and ethyl aceto acetate.

UNIT-3
Carboxylic Acids and their Derivatives

General methods of preparation, physical properties and reactions of mono carboxylic acids, effect of Substituents on acidic strength.Typical reactions of dicarboxylic acids, hydroxyl acids and unsaturated acids. Preparation and reactions of acid chlorides, anhydrides,esters and amides; Comparative study of nucleophilic substitution at acyl group-Mechanism of acidic and alkaline hydrolysis of esters, Claisen condensation, Reform at sky reactions and Curtius rearrangement Reactions involving H, OH and COOH groups- salt formation, anhydride formation, acid chloride formation, amide formation and esterification (mechanism). Degradation of carboxylic acids by Huns-Diecker reaction, de carboxylation by Schimdt reaction, Arndt- Eistert synthesis, halogenation by Hell- Volhard- Zelinsky reaction.

UNIT-4
Molecular Spectroscopy:

Interaction of electromagnetic radiation with molecules and various types of spectra;

Rotation spectroscopy: Selection rules, intensities of spectral lines, determination of bond lengths of diatomic and linear triatomic molecules, isotopic substitution.
Vibrational spectroscopy: Classical equation of vibration, computation of force constant, Harmonic and an harmonic oscillator, Morse potential curve,vibrational degrees of freedom molecules, modes of vibration. Selection rules for vibrational transitions, Fundamental frequencies, overtones and hotbands.
Electronic spectroscopy: Energy levels of molecular orbitals (σ, π, n). Selection rules for electronic spectra. Types of electronic transitions in molecules, effect of conjugation. Concept of chromophore. Bathochromic and hypsochromic shifts.Beer-Lambert's law and its limitations.

Nuclear Magnetic Resonance (NMR) spectroscopy: Principles of nuclear magnetic resonance, equivalent and non-equivalent protons, position of signals. Chemical shift, NMR splitting of signals - spin-spin coupling, coupling constants. Applications of NMR with suitable examples - ethyl bromide, ethanol, acetaldehyde, 1,1,2-tribromo ethane, ethyl acetate, toluene and acetophenone.

UNIT-5

Application of Spectroscopy to Simple Organic MoleculesApplication of visible, ultraviolet and Infrared spectroscopy in organic molecules.

Application of electronic spectroscopy and Woodward rules for calculating λ_{max} of conjugated dienes and α,β – unsaturated compounds. Infrared radiation and types of molecular vibrations, functional group and fingerprint region. IR spectra of alkanes, alkenes and simple alcohols (inter and intramolecular hydrogen bonding), aldehydes, ketones, carboxylic acids and their derivatives (effect of substitution on >C=O stretching absorptions).

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)**
Domain Subject: CHEMISTRY **Semester**: V
II Syllabus: *(*Total Hours: 45 including Unit tests etc.)

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 **12hours**

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, co precipitation, post precipitation, digestion, filtration, and washing of precipitate, drying and ignition.

Unit-3: Treatment of analytical data **8hours**

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 counter current 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 Fe^{+2}, $Mn^{+2}$and Pb^{+2}. Determination of PK value of indicator, determination of Glucose in blood.

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: **CHESET02** **Offered to B.Sc (MPC)**
Domain Subject: CHEMISTRY **Semester**: V

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, Rfvalues, factors affecting Rfvalues.

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, applicationsand advantages.
2. Paper Chromatography: Principle, Experimental procedure, choice of paper and solvents, various modes of development- ascending, descending, radial and twodimensional, 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 Flurocene 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, Rf 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.

1.3.1: Institution integrates cross-cutting issues relevant to Professional Ethics, Gender, Human Values, Environment and Sustainability and other value framework enshrined in Sustainable Development Goals and National Education Policy – 2020 into the Curriculum

NAME OF THE PROGRAM : Bachelor of Computer Applications (BCA)

NAME OF THE PROGRAM : BCA REGULATION 15 & 20						
NAME OF THE COURSE	**Couse Code**	**Professional Ethics**	**Gender**	**Human values**	**Environmental and Sustainability**	**other value framework enshrined**
Information Security Management (Security Analyst -I)	AEC017	The course content in information security encompasses crucial aspects that promote professional ethics, responsible data management, and effective risk mitigation. By addressing security threats, promoting accountability, and emphasizing the implementation of robust security policies, the course aligns well with the goals of the Sustainable Development Goals and the National Education Policy 2020. These elements collectively prepare students to engage in ethical practices and contribute positively to the digital landscape.	NIL	The course content in information security strongly reflects the principles of human values, ethical practices, and social responsibility as outlined in the Sustainable Development Goals and NEP 2020. By focusing on understanding threats, promoting data integrity, implementing security policies, and fostering accountability, the course prepares students to engage in responsible practices and contribute positively to society. This alignment not only enhances their professional competence but also instills a sense of ethical responsibility that is crucial in today's digital landscape.	NIL	The course content on information security aligns well with the values framework of the Sustainable Development Goals and the National Education Policy 2020. By emphasizing the importance of ethical practices, responsible data management, accountability, and transparency, the course prepares students to contribute positively to society and fosters a culture of security awareness and ethical conduct. This alignment not only enhances students' professional capabilities but also instills core human values essential for sustainable development and responsible citizenship in an increasingly digital world.

Information Security Assessment and Audits (Security Analyst – II)	AEC018	The course content not only enhances technical competency but also promotes a culture of ethical responsibility, inclusivity, and proactive risk management, aligning well with SDGs and NEP 2020. It equips students with practical cybersecurity skills, fosters a sense of professional ethics, and contributes to a more secure and resilient digital environment.	NIL	This curriculum supports human values by prioritizing secure, ethical, and inclusive digital practices, aligning with both SDGs and NEP 2020. It fosters a sense of responsibility and prepares students to engage with cybersecurity and information management in a way that protects users, promotes transparency, and contributes to a more resilient digital infrastructure.	NIL	This course integrates with SDGs and NEP 2020 by fostering ethical digital practices, professional skill development, and sustainable management of IT resources. It prepares students for the complexities of digital security while instilling values of responsibility, inclusivity, and resilience, which are central to creating a secure digital society.
Information Security Incident Response and Management (Secrity Analyst – III)	CSCT57A	This curriculum aligns with SDGs and NEP 2020 by promoting secure, ethical, and resilient digital practices. It emphasizes the professional ethics needed in cybersecurity, focusing on skills that support transparency, security, and accountability in the digital landscape while preparing students to become responsible stewards of secure, sustainable technology systems.	NIL	The course content aligns with the human values framework embedded in the SDGs and NEP 2020 by emphasizing ethical responsibility, sustainable infrastructure management, and inclusivity in digital security practices. It prepares students not only with essential skills but with a strong foundation in values, promoting a responsible, secure, and resilient digital future.	NIL	The course content reflects values critical to the SDGs and NEP 2020, focusing on ethics, inclusivity, sustainability, accountability, and the efficient management of security resources. It emphasizes not only technical skills but also the responsible and ethical use of these skills in supporting sustainable development and secure digital infrastructure.

Data Mining and Warehousing	CSCT46A	This course content aligns well with the ethical principles promoted by the SDGs and NEP 2020, particularly in areas of responsible data handling, transparency, accountability, and inclusivity. Through this curriculum, students gain both technical skills and a foundational understanding of ethical data practices, preparing them to contribute to sustainable and fair digital infrastructures in their professional roles.	NIL	NIL	NIL	This course fosters ethical data practices, data-driven decision-making, and analytical skills that are crucial to supporting sustainable development and aligned with NEP 2020's emphasis on technical literacy, ethical behavior, and research innovation. The inclusion of responsible data handling, efficiency in data management, and applications across societal contexts supports both SDGs and NEP's goals of fostering resilient, informed, and accountable future professionals.
Operating Systems	CSCT35	NIL	NIL	NIL	NIL	This operating systems course provides a strong foundation in both technical and ethical considerations, preparing students to design and manage systems that prioritize resource efficiency, fairness, and inclusivity. By developing skills that promote innovation and responsible technology management, the course content aligns with the goals of the SDGs and NEP 2020, emphasizing both practical skills and professional ethics essential for sustainable digital futures.

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COMPUTER SCIENCE	AEC017	2019 - 2020	B. C. A

Semester : III **Credits: 3**

Information Security Management (Security Analyst – I) **Total : 60 Hrs**

Course Objectives:

1. To introduce the information security management: threats, attacks and their counter measures.
2. To introduce fundamentals of information security.
3. To enable student to know about data leaks - threats and database security.
4. To educate students regarding various information security policies.
5. To educate students regarding roles and responsibilities of information security management.

Course Outcomes:

By the end of the course students will have knowledge :

1. in various types of security attacks and their counter measures. (**PO1,PO7**)
2. regarding key and logical elements of Network. (**PO1,PO7**)
3. in data leakage threats , reducing risks of data loss and database security. (**PO1,PO7**)
4. in various information security policies, security procedures and audits. (**PO1,PO7**)
5. Roles and responsibilities in information security management, responding in emergency situation, etc. (**PO1,PO7**)

UNIT – I Information Security Management **12hrs**

Information Security Overview, threats and attacks vectors, types of attacks, Common Vulnerabilities and Exposures, Security Attacks, Fundamentals of Information Security, Computer Security Concerns, Information Security Measures etc.

UNIT – II Fundamentals of Information Security **12hrs**

Key Elements of Networks, Logical Elements of Network, Critical Information Characteristics, Information States, etc.

UNIT – III Data Leakage **12hrs**

What is Data Leakage and Statistics, Data Leakage Threats, Reducing the Risk of Data Loss, Ley Performance Indicators(KPI), Data Security.

UNIT – IV Information Security Policies, Procedures and Audits **12hrs**

Information Security Policies – necessity – key elements & characteristics, Security Policy Implementation, Configuration, Security Standards – Guidelines & Frameworks, etc.

UNIT – V Information Security Management – Roles and Responsibilities 12hrs

Security Roles & Responsibilities, Accountability, Roles and Responsibilities of Information Security Management, team – responding to emergency situation – risk analysis process etc.

Text Books:

1. Management of Information Security by Michael E. Whitman and Herbert J. Mattord.

References:-

1. http://www.iso.org/iso/home/standards/management-standards/iso27001.htm
2. http://csrc.nist.gov/publications/nistpubs/800-55Rev1/SP800-55-rev1.pdf

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COMPUTER SCIENCE		2020 - 2021	B. C. A

Semester : V **Credits: 4**

Information Security Incident Response and Management (Secrity Analyst – III)

Total :75 Hrs.

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(PO1, PO7)
2. Troubleshooting of network communication, devices and can handle network slowdowns.(PO1, PO7)
3. Handling responses, understand incident response role and responsibilities, handling data backup.(PO1, PO7)
4. Configuring and Analysing Logs, Log management and time synchronization.(PO1, PO7)
5. Network attacks and security incidents, preventing incident and handling malicious code.(PO1, 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 &Analyzing 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.

Text Books

1. Managing Information Security Risks, The Octave Approach by Christopher Alberts and Audrey Dorofee

2. "Cryptography and Network Security (4^{th} edition) by William Stallings

References:

1. https://www.sans.org/reading-room/whitepapers/incident/security-incident-handling-small-organizations-38979

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COMPUTER SCIENCE	AEC018	2019 - 2020	B. C. A

Semester : IV **Credits: 3**

INFORMATION & COMMUNICATION TECHNOLOGY – II
Information Security Assessment and Audits (Security Analyst – II)

Total : 60 Hrs.

Course Objectives:

1. To introduce various information security performance metrics and audit.
2. To enable students to understand audit tasks, prepare reports.
3. To introduce vulnerability management.
4. To introduce various assessments in information security.
5. To introduce configuration management.

Course Outcomes:

By the end of the course students will have knowledge :

1. in security metrics, various information security methodologies.(**PO1,PO7)**
2. in pre-audit checklist and gathering information, auditing web application security, etc. (**PO1,PO7)**
3. in various types of threats and vulnerabilities along with vulnerability management. (**PO1,PO7)**
4. Classifications of vulnerabilities and phases of vulnerabilities and information security risk assessment. (**PO1,PO7)**
5. Configuration management, requirements and testing configuration management. (**PO1,PO7)**

UNIT I: Information Security Performance Metrics and Audit 12hrs

Security Metrics and Reporting, Common Issues and Variances of Performance Metrics, Introduction to Security Audit, Serves and Storage Devices, Infrastructure and Networks, Communication Routes, Information Security Methodologies(Black Box, White Box, Grey Box), Phases of Information Security Audit and Strategies, Ethics of an Information Security Auditor.

UNIT II: Information Security Audit Tasks, Reports and Post Auditing Actions 12hrs

Pre-Audit checklist, Information Gathering, Vulnerability Analysis, External Security Audit, Internal Network Security Audit, Firewall Security Audit, IDS Security Auditing, Social Engineering Security

Auditing, Web Application Security Auditing, Information Security Audit Deliverables & Writing Report, Result Analysis, Post Auditing Actions, Report Retention.

UNIT III: Vulnerability Management **12hrs**

Information Security Vulnerabilities – Threats and Vulnerabilities, Human – based social Engineering, Computer – based Social Engineering, Social Media Countermeasures, Vulnerability Management – Vulnerability Scanning, Testing, Threat Management, Remediation.

UNIT IV: Information Security Assessments **12hrs**

Vulnerability Assessment, Classification, Types of Vulnerability Assessment, Vulnerability Assessment Phases, Vulnerability Analysis Stages, Characteristics of a Good Vulnerability Assessment Solutions & Considerations, Vulnerability Assessment Reports – Tools and Choosing a right Tool, Information Security Risk Assessment, Risk Treatment, Residual Risk, Risk Acceptance, Risk Management Feedback Loops.

UNIT V: Configuration Reviews **12hrs**

Introduction to Configuration Management, Configuration Management Requirements – Plan Control, Development of Configuration Control Policies, Testing Configuration Management.

Text Books:

1. Assessing Information Security (Strategies, tactics, logic and framework) by A Vladimirov, K. Gavrilenko and A. Michajiowski.

2. The Art of Computer Virus Research and Defence by Peter Szor.

References:-

1. https://www.sans.org/reading-room/whitepapers/threats/implementing -vulnerability-management-process-34180

2. http://csrc.nist.gov/publications/nistpubs/800-40-ver2/SP800-40v2.pdf

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DATA MINING AND WAREHOUSING

Offered To:	BCA	**Course Code:**	CSCT46A
Course Type:	Core (Theory)	**Course:**	Data Mining and Warehousing
Year of Introduction:	2021 – 2022	**Year of offering:**	2021 – 2022
Year of Revision:	-	**Percentage of Revision:**	-
Semester:	IV	**Credits:**	4
Hours Taught:	60 hrs. per semester	**Max. Time:**	3 Hrs

Course Prerequisites (if any): Programming / Statistics Language

Course Description: It's is an introductory course on Data mining and Data Warehousing. Its introduces the Basic concepts Data warehouse Architecture OLAP Technologies, Principles, methods Implementation techniques, Applications and Query Languages of Data mining . The major methods focused were Data pre-processing Techniques, Association Rule mining, Classification and prediction and Cluster Analysis Techniques.

Course Objectives: In this course students will learn about

1. Data mining primitives, Architecture.
2. OLAP operations.
3. Mining association rules on large databases.
4. Classification and prediction.
5. Cluster analysis.

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

CO1: Understands knowledge discovery in databases(PO5,PO7)

CO2: Understands OLAP operations and types of OLAP(PO5,PO7)

CO3: Apply Apriori and FP-Growth algorithms to generate frequent itemsets in a dataset. (PO5,PO7)

CO4: Apply Decision tree induction and Bayesian algorithm to classify the unknown sample. (PO5,PO7)

CO5: Describes preparing data for clustering, clustering methods. (PO5,PO7)

Syllabus		
Unit	**Learning Units**	**Lecture Hours**
I	**Introduction** Fundamentals of Data mining, Data mining functionalities, Classification of data mining systems, Data mining task primitives, Data mining applications, Data Warehouse and OLAP technology: What is Data Warehouse+, Multidimensional data model, Data warehouse architecture.	12
II	**Data preprocessing** Data cleaning, Data integration and Transformation, Data reduction, Discretization and Concept hierarchy generation, Data generalization and summerization, Mining descriptive statistical measures,Data Mining Query Languages.	12
III	**Associaion Rule Mining** Market basket analysis, Efficient and scalable frequent itemset mining methods(Apriori and FP-Growth), Mining various kinds of association rules.	12
IV	**Classification and Prediction** Introduction to classification, Classification by Decision tree induction, Bayesian classification, Prediction: Linear regression, Non-Linear regression.	12
V	**Cluster analysis** Types of data in cluster analysis, Categorization of clustering methods, Partioning methods, Outlier analysis, DB Scan method.	12

Prescribed Text Books			
	Author	**Title**	**Publisher**
1	Jiawei Han University of Illinois at Urbana–Champaign, Micheline Kamber Jian Pei Simon Fraser University.	Data Mining Concepts and Techniques	

Prescribed Text Books			
	Author	**Title**	**Publisher**
1	Pang-Ning Tan, Vipin Kumar, Michael Steinbach	Introduction To Data Mining	Pearson Education

Course Delivery method : Face-to-face / Blended

Course has focus on : Skill Development

Websites of Interest:

1. https://www.upgrad.com/blog/classification-in-data-mining/
2. https://towardsdatascience.com/bayes-theorem-with-example-for-data-science-professionals-55b4d52f8967
3. https://www.upgrad.com/blog/association-rule-mining-an-overview-and-its-applications/

Co-curricular Activities: Certification Courses, Quiz, Seminars.

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DATA MINING AND WAREHOUSING

SEMESTER END MODEL QUESTON PAPER

Programme: BCA, B.Sc (CSCS) **Course Code: CSCT46A (BCA), CGST45(CSCS)** **Semester: IV** **Time: 3 Hrs.** **Max.: 75 Marks**

Min. Pass: 30 Marks

SECTION - A

Answer any *five* of the following: **5 X 5= 25 MARKS**

1. Illustrate essential steps in the process of knowledge discovery in databases. (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 the kinds of patterns they can discover. (CO1,L2)

OR

(b) Draw the 3-tier Data Warehouse Architecture. Explain each tier in detail. (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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COMPUTER SCIENCE	CSCT35	2017-18	B.C.A

SEMESTER – II **Credits: 4**

OPERATING SYSTEMS

Total : 60 Hrs

Course Objectives:

1. To understand the services provided by and the design of an operating system.
2. To understand the structure and organization of the file system.
3. To understand what a process is and how processes are synchronized and scheduled.
4. To understand different approaches to memory management.
5. Students should be able to use system calls for managing processes, memory and the file system.

COURSE OUTCOME NO	COURSE OUTCOME – BSC Upon successful completion of this course, students should have the knowledge and skills to:	PROGRAM OUTCOME NO
CO_1	1. Analyze the services and functions of operating systems.	PO1
CO_2	2. Analyze the concepts of processes in operating system and illustration of the scheduling of processor for a given problem instance.	PO1,PO7
CO_3	3. Analyze memory management techniques, concepts of virtual memory and disk scheduling.	PO1,PO7
CO_4	4. Understand the implementation of file systems and directories along with the interfacing of IO devices with the operating system.	PO1,PO7
CO_5	5. Identify the dead lock situation and provide appropriate solution so that protection and security of the operating system is also maintained.	PO1,PO7

1. **UNIT – I** **Operating System Introduction** **8 Hrs**

1.1. Operating Systems Objectives and functions
1.2. Computer System Architecture
1.3. OS Structure, OS Operations
1.4. Evolution of Operating Systems - Simple Batch
1.5. Multi programmed
1.6. time shared
1.7. Parallel
1.8. Distributed Systems
1.9. Real-Time Systems
1.10. Operating System services.

2. **UNIT – II** **CPU Scheduling** **15 Hrs**

2.1. Process and CPU Scheduling - Process concepts - The Process
2.2. Process State
2.3. Process Control Block

2.4. Threads, Process Scheduling - Scheduling Queues
2.5. Schedulers
2.6. Context Switch
2.7. Preemptive Scheduling
2.8. Dispatcher
2.9. Scheduling Criteria
2.10. Scheduling algorithms
2.11. Case studies: Linux, Windows.
2.12. Process Coordination - Process Synchronization
2.13. The Critical section Problem
2.14. Synchronization Hardware
2.15. Semaphores, and Classic Problems of Synchronization
2.16. Monitors
2.17. Case Studies: Linux, Windows.

3. **UNIT – III** **Memory Management** **12 Hrs**

3.1. Memory Management and Virtual Memory - Logical & physical Address Space
3.2. Swapping
3.3. Contiguous Allocation
3.4. Paging
3.5. Structure of Page Table.
3.6. Segmentation
3.7. Segmentation with Paging
3.8. Virtual Memory
3.9. Demand Paging
3.10. Performance of Demanding Paging
3.11. Page Replacement Page Replacement Algorithms
3.12. Allocation of Frames.

4. **UNIT – IV** **File Systems** **15 Hrs**

4.1. File System Interface - The Concept of a File
4.2. Access methods
4.3. Directory Structure
4.4. File System Mounting
4.5. File Sharing, Protection
4.6. File System Structure
4.7. Mass Storage Structure - Overview of Mass Storage Structure
4.8. Disk Structure
4.9. Disk Attachment
4.10. Disk Scheduling

5. **UNIT – V** **Deadlocks** **10 Hrs**

5.1. Deadlocks - System Model
5.2. Deadlock Characterization
5.3. Methods for Handling Deadlocks
5.4. Deadlock Prevention
5.5. Deadlock Avoidance

5.6. Deadlock Detection
5.7. Recovery from Deadlock.

TEXT BOOKS:

1. Operating System Principles, Abraham Silberchatz, Peter B. Galvin, Greg Gagne 8th Edition, Wiley Student Edition.

REFERENCES BOOKS:

1. Principles of Operating Systems by NareshChauhan, OXFORD University Press
2. Operating systems - Internals and Design Principles, W. Stallings, 6th Edition, Pearson.
3. Modern Operating Systems, Andrew S Tanenbaum 3rd Edition PHI.
4. Operating Systems A concept - based Approach, 2nd Edition, D. M. Dhamdhere, TMH.
5. Principles of Operating Systems, B. L. Stuart, Cengage learning, India Edition.
6. Operating Systems, A. S. Godbole, 2nd Edition, TMH

1.3.1: Institution integrates cross-cutting issues relevant to Professional Ethics, Gender, Human Values, Environment and Sustainability and other value framework enshrined in Sustainable Development Goals and National Education Policy – 2020 into the Curriculum

NAME OF THE PROGRAM : B.Sc. (CSCS & MSCS) – COMPUTER SCIENCE

NAME OF THE PROGRAM : B.Sc. CSCS & MSCS (Computer Science) REGULATION 15 & 20						
NAME OF THE COURSE	**Couse Code**	**Professional Ethics**	**Gender**	**Human values**	**Environmental and Sustainability**	**other value framework enshrined**
Enterprise Resource Planning	CABT22	ERP (Enterprise Resource Planning), and related technologies, integrating practical concerns for implementation, operation, and ongoing maintenance. When we consider these elements within the frameworks of professional ethics, sustainable development goals (SDGs), and India's NEP 2020, a significant alignment appears, particularly in areas of responsible technology use, skill development, and sustainability. Emphasizing responsible technology use, skill-building, ethical data practices, and continuous improvement can drive alignment with these frameworks, making ERP systems not only business-enabling tools but also contributors to a more ethical, inclusive, and sustainable global economy.	Gender equality within the context of enterprise systems, ERP, and related technologies can be integrated into areas such as equitable access, inclusivity in ERP implementation, skill development, and fair representation in ERP-enabled workflows.Content can be strategically mapped to gender equality, with special attention to inclusion, equitable access, and sensitivity in data and implementation practices.	Focusing on responsible and ethical ERP implementation, secure data management, and user-centered system design supports values such as trust, respect, inclusivity, and integrity. This approach fosters an environment where technology serves not just as a business tool but as a means to enhance well-being, collaboration, and fairness within organizations.	Through efficient data handling, vendor selection based on environmental credentials, and continuous improvement of ERP functions to reduce environmental impact, these elements directly contribute to SDG 12 (Responsible Consumption and Production) and SDG 13 (Climate Action). Furthermore, the NEP 2020's emphasis on integrating sustainability into education and professional practices aligns well with a responsible ERP approach, emphasizing sustainable development as a key organizational value.	Through ethical governance, accountability, adaptability, efficiency, transparency, and lifelong learning, ERP systems contribute to building resilient, adaptable, and responsible organizations. This approach supports not only business goals but also the larger social and ethical values promoted by the SDGs and NEP 2020, making ERP an instrument that can drive positive societal and economic change.

Object Oriented Programming using Java	CGST33	NIL	NIL	NIL	NIL	The course on Object-Oriented Programming in Java effectively supports the values framework encapsulated in the Sustainable Development Goals and the National Education Policy 2020. By focusing on practical skills, ethical programming, and the principles of OOP, the course not only prepares students for successful careers in technology but also encourages responsible practices, innovation, and collaboration. Integrating these values into the curriculum will help students become not just proficient programmers, but also responsible contributors to society and the economy.
Process Management	CGST42	NIL	NIL	NIL	NIL	Process Management course aligns well with the values frameworks outlined in the Sustainable Development Goals and NEP 2020. By integrating ethical considerations, promoting collaboration, Practical approach to Dev Ops and UX and fostering a culture of empathy and innovation, this course prepares students to become responsible, skilled professionals who can contribute positively to society. This holistic approach will not only benefit individual development but also support broader societal goals, preparing students to navigate and influence the future of technology and software development responsibly.

Problem Solving in C	CSCT11B	NIL	NIL	NIL	NIL	he course content on programming in C not only equips students with essential technical skills but also aligns well with the values framework of the Sustainable Development Goals and the National Education Policy 2020. By integrating these values into the curriculum, students are prepared to contribute positively to society while fostering a sense of responsibility, innovation, and ethical conduct in their professional lives. This approach supports the broader goals of sustainable development and quality education.
Data Structures	CSCT21B	NIL	NIL	NIL	NIL	The course content on data structures, algorithms, and their applications not only equips students with essential technical skills but also aligns well with the values framework of the Sustainable Development Goals and the National Education Policy 2020. By integrating these values into the curriculum, students are prepared to contribute positively to society while fostering a sense of responsibility, innovation, and ethical conduct in their professional lives. This approach supports the broader goals of sustainable development and quality education.

Object Oriented Programming using Java	CSCT31	NIL	NIL	NIL	NIL	The course on Object-Oriented Programming in Java effectively supports the values framework encapsulated in the Sustainable Development Goals and the National Education Policy 2020. By focusing on practical skills, ethical programming, and the principles of OOP, the course not only prepares students for successful careers in technology but also encourages responsible practices, innovation, and collaboration. Integrating these values into the curriculum will help students become not just proficient programmers, but also responsible contributors to society and the economy.
Python	CSCT41B	NIL	NIL	NIL	NIL	The Python programming course effectively supports various values frameworks established in the Sustainable Development Goals and the National Education Policy 2020. By focusing on practical skills, ethical programming, and foundational concepts in computing, the course not only prepares students for careers in technology but also instills a sense of responsibility and innovation. Integrating these values into the curriculum ensures that students become not just proficient programmers but also responsible contributors to society and the economy. This holistic approach aligns with the goals of fostering sustainable development through education and technological competence.

Software Engineering	CSCT51	NIL	NIL	NIL	NIL	The Software Engineering course supports various values frameworks established in the Sustainable Development Goals and the National Education Policy 2020. By focusing on foundational knowledge, practical skills, ethical considerations, and collaboration, the course not only prepares students for successful careers in technology but also fosters a sense of responsibility and innovation. This holistic approach aligns with the goals of fostering sustainable development through education, preparing students to contribute positively to society and the economy while adhering to ethical practices in technology.

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COMPUTER SCIENCE	CABT22	2016- '17	B.COM (CA)

SEMESTER – II **CREDITS: 4**

Enterprise Resource Planning

Course Objectives:

1. To learn basic knowledge about the Overview of enterprise systems.
2. To learn about the ERP Solutions and Functional Modules.
3. To learn about the ERP Implementation.
4. To learn about Post Implementation.
5. To learn about Emerging Trends on ERP

Course Outcomes:

1. Able to know about the Overview of enterprise systems. .(PO1,PO2)
2. Able to know ERP Solutions and Functional Modules. (PO1,PO2,PO3,PO5)
3. Able to know about the ERP Implementation. (PO1,PO2,PO3,PO5,PO6,PO7)
4. Able to know about Post Implementation. (PO1,PO2,PO3,PO5,PO6,PO7)
5. Able to know about Emerging Trends on ERP(PO1,PO2,PO3,PO5,PO6,PO7)

Unit-I: Introduction: Overview of enterprise systems – Evolution - Risks - Issues to be consider in people, implementation, operation and maintenance of cross functional integrated ERP systems- benefits.

Unit- II: ERP Solutions and Functional Modules: Overview of ERP software solutions- Small, medium and large enterprise vendor solutions, BPR and best business practices- Business process Management, Functional modules.

Unit-III: ERP Implementation: Planning Evaluation and selection of ERP systems - Implementation life cycle - ERP implementation Strategies– Data Migration.

Unit-IV: Post Implementation: Measuring the performance of the ERP system; Success and Failure factors of ERP Implementation.

Unit-V: Emerging Trends on ERP: ERP and Related technologies, Data Warehousing, Data Mining. Business Analytics: Business Analytics Life Cycle – Business Analytics Process – Data concepts – Data exploration & visualization – Business Analytics as solution for business challenges.

Text Books:

1. Alexis Leon, ERP demystified, second Edition Tata McGraw-Hill, 2008.
   - Unit I: Chapter: 1, 2, 5, 6
   - Unit II: Chapter: 18, 10, 40
   - Unit III: Chapter: 25, 21, 20, 32
   - Unit IV: Chapter: 38, 35
   - Unit V: Chapter: 7, 11, 12
2. R. N. Prasad and Seema Acharya, "Fundamentals of Business Analytics", Wiley India Publication.

References:

1. Sinha P. Magal and Jeffery Word, Essentials of Business Process and Information System, Wiley India, 2012
2. Jagan Nathan Vaman, ERP in Practice, Tata McGraw-Hill, 2008
3. Alexis Leon, Enterprise Resource Planning, second edition, Tata McGraw-Hill, 2008.
4. Mahadeo Jaiswal and Ganesh Vanapalli, ERP Macmillan India, 2009
5. Vinod Kumar Grag and N.K. Venkitakrishnan, ERP- Concepts and Practice, PHI, 2006.
6. Summer, ERP, Pearson Education, 2008.

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OBJECT ORIENTED PROGRAMMING USING JAVA

Offered to: B.Sc. (CSCS) **Course Code**: CGST33

Course Type: Core (Theory) **Course:** OBJECT ORIENTED PROGRAMMING USING JAVA

Year of Introduction: 2021 **Year of offering: 2021**

Year of Revision: - **Percentage of Revision: -**

Semester: III **Credits: 4**

Hours Taught: 60 hrs. Per Semester **Max.Time**: 3 Hours

Course Prerequisites (if any): Knowledge in C Programme

Course Description: As the business environment becomes more sophisticated, the software development (software engineering is about managing complexity) is becoming increasingly complex. As of the best programming paradigm which helps to eliminate complexity of large projects, Object Oriented Programming (OOP) has become the predominant technique for writing software in the past decade. Many other important software development techniques are based upon the fundamental ideas captured by object-oriented programming.

Course Objectives:

The Objective of the course is to assist the student in understanding the concepts of Object Oriented Programming using Java language.

Course Outcomes: At the end of this course the student is able to

CO1: Overview of java programming, history and its features**.(PO5,PO7)**

CO2: Understand fundamentals of programming such as variables, conditional and iterative execution, statements, etc**.(PO5,PO6,PO7)**

CO3: Understand the principles of arrays, inheritance, packages and multi-threading**.(PO5,PO6,PO7)**

CO4: Understand the Fundamental features of Managing Errors, Exceptions and Applet Programming**.(PO5,PO6,PO7)**

CO5: Understand the Files concept in java**.(PO5,PO6,PO7)**

Syllabus		
Unit	**Learning Units**	**Lecture Hours**
I	JAVA Evolution: History - Features - Java differs from C and C++ - Java and Internet - Java and WWW - Web Browsers. Overview of Java Language: Introduction - Simple Java program - Structure - Java tokens - Statements - Java virtual Machine.	12
II	Constants - Variables - Data types - Operators and expressions - Decision making and Branching: Simple If Statement, the IF…Else statement, The Else... If ladder, The Switch Statement, The? : Operator, Decision making	14

	and looping: The While statement, The do Statement - The for Statement - Jumps in loops - labeled loops - Classes, Objects and Methods.	
III	Arrays, Strings and Vectors – Interfaces- Multiple Inheritance – Packages: Putting classes together – Multi Threaded Programming.	12
IV	Managing Errors and Exceptions – I/O Exceptions – Applet Programming – Graphics programming: The Graphics class-Lines and rectangles-Circles and ellipses-Drawing arcs-Drawing polygons-Line graphs-Using Control loops in applets-Drawing Bar charts.	12
V	Files: Introduction – concept of streams – Stream classes – Using stream – I/O classes – File class – creation of files – Reading / Writing characters/ Bytes– Random Access Files.	10

Text Books:

	Author	Title	Publisher
1	E. Balaguruswamy,	Programming with JAVA - A Primer, 2015	McGraw Hill Professional

Reference Text Books:

	Author	Title	Publisher
1	Sachin Malhotra	Programming in Java	OXFORD University Press
2	John R. Hubbard	Programming with Java, Second Edition	Schaum's outline Series, TATA McGraw-Hill Company.
3	Deitel &Deitel.	Java TM: How to Program 2007	PHI
4	D.S Mallik	Java Programming: From Problem Analysis to Program Design	
5	P. Radha Krishna	Object Oriented Programming Through Java, 2008	Universities Press

Course Delivery method: Face-to-face / Blended

Course has focus on: Skill Development.

Websites of Interest:
https://www.tutorialspoint.com/java/index.htm

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OBJECT ORIENTED PROGRAMMING USING JAVA
MODEL QUESTION PAPER FOR SEM END EXAMINATION

TITLE : Object Oriented Programming using Java COURSE CODE: CGST33
SECTIONS : B.SC CSCS SEMESTER: III
TIME: 3 Hrs MAX: 75M

SECTION –A

ANSWER ANY FIVE QUESTIONS 5 X 5 =25 M.

1. Explain the History of Java.(CO1,L5)
2. Explain about JVM.(CO1, L5)
3. Write a java program to implement final keyword.(CO2,L1)
4. Write java programs to implement while and do while.(CO2, L1)
5. Write a java program on Single Dimensional Array.(CO3, L1)
6. Explain the concept of interface with an example. (CO3, L5)
7. Explain about Runtime error caused by divisible by zero with an example.(CO4, L5)
8. Write a java program to read data from a file(CO5, L1)

SECTION – B

ANSWER ALL THE QUESTIONS 5 X 10 =50 M.

9.(a) Explain various Java Features.(CO1, L5)

OR

(b) Explain various Java tokens.(CO1, L5)

10.(a) Write a java program on data types.(CO2, L1)

OR

(b) Write a java program on Decision Making Statements.(CO2, L1)

11.(a) Explain different types of Inheritance.(CO3, L5)

OR

(b) Write a java program to implement Multi-Threaded Programming.(CO3, L1)

12.(a) Explain about Unchecked Exceptions with suitable examples.(CO4, L5)

OR

(b) Write a program to control loops in applets.(CO4, L1)

13.(a) Explain about OutputStream and InputStream Classes.(CO5, L5)

OR

(b) Write a java program to create a file and to write data to a file.(CO5, L1)

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PROCESS MANAGEMENT

Offered To:	**B.Sc CSCS**	**Course Code:**	CGST42
Course Type:	Core (Theory)	**Course:**	Process Management
Year of Introduction:	2021 – 2022	**Year of offering:**	2021 – 2022
Year of Revision:	-	**Percentage of Revision:**	-
Semester:	IV	**Credits:**	4
Hours Taught:	60 hrs. per semester	**Max. Time:**	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 and Scrum. (PO5, P07)

CO3: Learn to Manage DevOps Tools. (PO5, P07)

CO4: Know about Lean UX and Agile Anti-Patterns. (PO5, P07)

CO5: Understand Design Thinking is about. (PO5,PO6, PO7)

Syllabus		
Unit	**Learning Units**	**Lecture Hours**
I	**Software and software Engineering:** 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.	12

II	**Agile:** Agile Methodology-Manifesto-Principles of Agile-Agile Methodologies-Challenges with Agile. Scrum: Overview of Scrum-Scrum Roles-Scrum Ceremonies-Scrum Artifacts-Extreme programming vs Scrum.	12
III	**Devops:** Introduction to Devops-Principles-Automation-Performance Measurement through KPIS and Metrics-Agile and Devops-Agile Infrastructure-Velocity-Lean Startup UPS.	12
IV	**Lean UX and Agile Anti-Patterns** : Sprint -Staggered sprints -Sprint zero and design sprints- Dual-track Agile- Listening to Scrum's rhythms- Participation- Design is a team sport- Coordinating multiple Lean UX teams- Managing up and out – Agile anti-patterns.	12
V	**Design Thinking:** 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			
	Author	**Title**	**Publisher**
1	Roger S Pressman,	"Software Engineering A Practioners Approach"	7th Edition 2010
2	KalloriVikraman,	"Introduction to Devops"	1st Edition, 2016.
3	Stephen Haunts	Essential of Scrum" Addison-Wesley Professional	1st 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.javatpoint.com/agile
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: CGST42 **Max.Marks:75M**

CLASS: B.Sc. (CSCS) **Semester IV**

Section-A

Answer any five questions. **5*5=25M**

1. Explain the nature of Software.(CO1, L2)
2. Define the unique nature of WebApps.(CO1,L6)
3. What are the principals of Agile?(CO2, L3)
4. Explain Scrum Roles.(CO2, L2)
5. What is Devops?(CO3, L3)
6. Define Velocity in Agile.(CO3, L6)
7. What is Sprint? (CO4, L3)
8. Explain the Actionable Strategy for Design Thinking.(CO5, L3)

Section-B

ANSWER THE FOLLOWING QUESTIONS **5x10M=50M**

9. (A)What are Software Myths?(CO1, L3)

OR

(B)Explain Software Process Models. (CO1, L2)

10. (A)Explain Agile Methodologies.(CO2, L2)

OR

(B)What are Scrum Artifacts?(CO2, L3)

11. (A)How to measure Performance through KPIS and its Metrics?(CO3, L3)

OR

(B) Explain about Lean Startup UPS.(CO3, L2)

12. (A) Explain how to staggering a sprint. (CO4, L2)

OR

(B) How to Coordinate multiple Lean UX teams?(CO4, L2)

13. (A) What is Lean Thinking and its Principles?(CO5, L3)

OR

(B)Explain the vision and Strategy of Design Thinking.(CO5, L2)

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Semester I	Course Code	Course Title	Credits	Hours
B.Sc. (CAMS / CAME / MSCS / MPCS / MECS)	CSCT11B	Problem Solving In C	4	60

Course Objectives:

This course aims to provide exposure to problem-solving through programming and introduce the concepts of the C Programming language.

Course Learning Outcomes:

Course Outcome No	Upon successful completion of the course, a student will be able to:	Program Outcome No.
CO1	Understand the evolution & functionality of Digital Computers and develop an algorithm for solving a given problem.	PO1, PO7, PSO1, PSO4
CO2	Understand tokens and control structures in C.	PO1, PO7, PSO1, PSO4
CO3	Understand arrays and strings and implement them.	PO1, PO7, PSO1, PSO4
CO4	Understand the right way of using functions, pointers, structures and unions in C	PO1, PO7, PSO1, PSO4
CO5	Develop and test programs written in C files	PO1, PO7, PSO1, PSO4

UNIT I **12 periods**

General Fundamentals: Introduction to computers: Block diagram of a computer, characteristics and limitations of computers, applications of computers, types of computers, computer generations.

Introduction to Algorithms and Programming Languages: Algorithm – Key features of Algorithms, Flow Charts, Programming Languages – Generations of Programming Languages – Structured Programming Language- Design and Implementation of Correct, Efficient and Maintainable Programs.

UNIT II **12 periods**

Introduction to C: Introduction – Structure of C Program – Writing the first C Program –File used in C Program – Compiling and Executing C Programs – Using Comments –

Keywords – Identifiers – Basic Data Types in C – Variables – Constants – I/O Statements in C- Operators in C- Programming Examples.

Decision Control and Looping Statements: Introduction to Decision Control Statements– Conditional Branching Statements – Iterative Statements – Nested Loops – Break and Continue Statement – goto Statement.

UNIT III **10 periods**

Arrays: Introduction – Declaration of Arrays – Accessing elements of the Array – Storing Values in Array– Operations on Arrays – one dimensional, two dimensional and multi-dimensional arrays, character handling and strings.

UNIT IV **14 periods**

Functions: Introduction – using functions – Function declaration/ prototype – Function definition – function call – return statement – Passing parameters – Scope of variables – Storage Classes – Recursive functions.

Structure, Union, and Enumerated Data Types: Introduction – Nested Structures – Arrays of Structures – Structures and Functions– Union – Arrays of Unions Variables – Unions inside Structures – Enumerated Data Types.

UNIT V **12 periods**

Pointers: Understanding Computer Memory – Introduction to Pointers – declaring Pointer Variables – Pointer Expressions and Pointer Arithmetic – Null Pointers - Passing Arguments to Functions using Pointer – Pointer and Arrays – Memory Allocation in C Programs – Memory Usage – Dynamic Memory Allocation – Drawbacks of Pointers

Files: Introduction to Files – Using Files in C – Reading Data from Files – Writing Data to Files – Detecting the End-of-file – Error Handling during File Operations – Accepting Command Line Arguments.

BOOKS

1. E Balagurusamy – Programming in ANSIC – Tata McGraw-Hill publications.

2. Brain W Kernighan and Dennis M Ritchie - The 'C' Programming language" - Pearson publications.

3. Ashok N Kamthane: Programming with ANSI and Turbo C, Pearson Edition Publications.

4. Yashavant Kanetkar - Let Us 'C' – BPB Publications.

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

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. Problem-solving exercises,

4. Practical assignments and laboratory reports,

5. Observation of practical skills,

6. Individual and group project reports like "Creating Text Editor in C".

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 Question Paper: 2020-2021

TITLE: Problem solving in C **COURSE CODE: CSCT11B/CGST11**

SECTIONS: B.Sc. (CAMS / CAME / MSCS / CSCS / MPCS / MECS) **SEMESTER: I**

TIME: 3 Hrs. **MAX: 75M**

SECTION –A

ANSWER ANY FIVE QUESTIONS **5 X 5 =25 M.**

1. What is a flowchart? Utilize flowchart symbols and draw a flowchart to find biggest of two numbers. **(CO1, L3)**
2. Write a short note on block diagram of computers. **(CO1, L2)**
3. Explain do…while loop with an example program. **(CO2 , L2)**
4. Develop a C program to find largest number in a given integer list. **(CO3 ,L3)**
5. Classify data types in C. Write a short note on any two data types. **(CO2 , L2)**
6. How to declare and initialize 1D arrays. **(CO3, L1)**
7. Construct a student structure to accept student details and write a C program to calculate grade of a student. **(CO4 , L3)**
8. Illustrate command line arguments with an example program. **(CO5, L2)**

SECTION – B

ANSWER ALL THE QUESTIONS **5 X 10 =50 M.**

9 A) Define Algorithm. Demonstrate Key features of algorithm with examples. **(CO1, L2)**

(or)

B) List out the characteristics and limitations of computers. **(CO1, L1)**

10 A) Give Classification of Control statements in C. Explain multi-way decision making statements in C with examples. **(CO2, L2)**

(or)

B) Write a program to check whether the given number is Armstrong or not. **(CO2, L3)**

11 A) Develop a program in C for matrix multiplication. **(CO3, L3)**

(or)

B) Demonstrate various String handling functions in C with examples. **(CO3, L2)**

12 A) Compare and contrast structures with unions. **(CO4, L4)**

(or)

B) Explain the types of functions in C. **(CO4, L2)**

13 A) List different file handling functions in C. Explain with examples. **(CO5, L2)**

(or)

B) Explain call by value and call by reference with example. **(CO4, L2)**

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TITLE : Problem solving in C **COURSE CODE : CSCT11B/CGST11**

SECTIONS: B.Sc. (CAMS / CAME / MSCS / CSCS / MPCS / MECS) **SEMESTER: I**

TIME: 3 Hrs. **MAX: 75M**

SECTION-A

ANSWER ANY FIVE QUESTIONS **5X5=25M**

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

SECTION – B

ANSWER ALL THE QUESTIONS **5 X 10 =50 M.**

9 A) Unit 1.

(or)

B) Unit 1.

10 A) Unit 2.

(or)

B) Unit 2.

11 A) Unit 3.

(or)

B) Unit 3.

12 A) Unit 4.

(or)

B) Unit 4.

13 A) Unit 5.

(or)

B) Unit 5.

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Semester-II	Course Code	Course Title	Hours	Credits
B.Sc. (CAMS / CAME / MSCS / MPCS / MECS)	CSCT21B	Data Structures	60	4

Course Objectives

To introduce the fundamental concept of data structures and to emphasize the importance of various data structures in developing and implementing efficient algorithms.

Course Outcomes:

Course Outcome No	Upon successful completion of the course, student will be able to:	Program Outcome No
CO1	Learn the concepts of ADT and understand analysis of algorithms	PO1, PSO1, PSO2, PSO4
CO2	Understand available Data Structures for data storage and processing.	PO1, PSO1, PSO2, PSO4
CO3	Learn stacks, queues and their applications	PO1, PSO1, PSO2, PSO4
CO4	Understand trees, graphs and implement their operations	PO1, PO7, PSO1, PSO2, PSO4
CO5	Develop ability to implement different Sorting and Search methods	PO1, PO7, PSO1, PSO2, PSO4

UNIT – I: **11Periods**

Introduction to Data Structures: Introduction to the Theory of Data Structures, Data Representation, Abstract Data Types, Data Types, Primitive Data Types, Data Structure and Structured Type, Atomic Type, Difference between Abstract Data Types, Data Types, and Data Structures, Refinement Stages.

Principles of Programming and Analysis of Algorithms: Software Engineering, Program Design, Algorithms, Different Approaches to Designing an Algorithm, Complexity, Big 'O' Notation, Algorithm Analysis, Recursion.

UNIT – II: **11Periods**

Linked Lists: Introduction to Lists and Linked Lists, Basic Linked List Operations, Doubly Linked List, Circular Linked List, Atomic Linked List, Linked List in Arrays, Linked List versus Arrays

UNIT – III: **14Periods**

Stacks: Introduction to Stacks, Stack as an Abstract Data Type, Representation of Stacks through Arrays, Representation of Stacks through Linked Lists, Applications of Stacks, Stacks and Recursion

Queues: Introduction, Queue as an Abstract data Type, Representation of Queues, Circular Queues, Double Ended Queues- Deques, Priority Queues, Application of Queues

UNIT – IV: **10Periods**

Binary Trees: Introduction to Non- Linear Data Structures, Introduction Binary Trees, Types of Trees, Basic Definition of Binary Trees, Properties of Binary Trees, Representation of Binary Trees, Operations on a Binary Search Tree, Binary Tree Traversal, Counting Number of nodes in Binary Trees, Applications of Binary Tree

UNIT – V: **14Periods**

Searching and sorting: Sorting – An Introduction, Bubble Sort, Insertion Sort, Merge Sort, searching – An Introduction, Linear or Sequential Search, Binary Search, Indexed Sequential Search

Graphs: Introduction to Graphs, Terms Associated with Graphs, Sequential Representation of Graphs, Linked Representation of Graphs, Traversal of Graphs, Spanning Trees, Shortest Path, Application of Graphs.

BOOKS:

- "Data Structures using C", ISRD group Second Edition,TMH
- Data Structures through C", YashavantKanetkar, BPBPublications
- "Data Structures Using C" Balagurusamy E.TMH

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 asteams))
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 Question Paper: 2020-2021

TITLE: DATA STRUCTURES **COURSE CODE:CSCT21B**

SECTIONS: B.Sc. (CAMS / CAME / MSCS / CSCS / MPCS / MECS /BCA) **SEMESTER: II**

TIME: 3 Hrs. **MAX: 75M**

SECTION –A

ANSWER ANY FIVE QUESTIONS **5 X 5 =25 M.**

1. What is an ADT? Explain with an example. **{CO_1, L2}**
2. Explain about algorithm analysis. **{CO1, L2}**
3. Distinguish between linked lists and arrays. **{CO2, L2}**
4. Evaluate the postfix expression **2 3 1 * + 9 -. {CO3, L5}**
5. Explain about min and max priority queues**. {CO3, L2}**
6. Construct binary tree from the following in order and pre order traversals
   In order: D B E A F C

   Pre order: A B D E C F {**CO4, L3}**
7. Explain various representations of graphs with your own example. **{CO5, L2}**
8. Develop a C program for linear search. **{CO5, L3}**

SECTION – B

ANSWER ALL THE QUESTIONS **5 X 10 =50 M.**

9 A) Explain about Data structure, structured type and atomic type. **{CO1, L2}**

(Or)

B) Explain about Time Complexity and Space Complexity. **{CO1, L2}**

10 A) Explain about inserting and deleting a node in double linked list.**{CO2, L2}**

(Or)

B) Explain about insertion in atomic node linked list. **{CO2, L2}**

11A) Develop a C program for stack's using arrays. **{CO3, L3}**

(Or)

B) Develop a C program for circular queues. **{CO3, L3}**

12 A) Explain about binary tree traversals with an example. **{CO4, L2}**

(Or)

B) Demonstrate with an example deleting a node in a binary search tree. **{CO4, L2}**

13 A) Illustrate Merge sort with an example and write code for it. **{CO5, L2}**

(Or)

B) Illustrate Depth First search with an example. **{CO5, L2}**

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TITLE : DATA STRUCTURES **COURSE CODE:CSCT21B**

SECTIONS: B.Sc. (CAMS / CAME / MSCS / CSCS / MPCS / MECS /BCA) **SEMESTER: II**

TIME: 3 Hrs. **MAX: 75M**

SECTION-A

ANSWER ANY FIVE QUESTIONS **5X5=25M**

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

SECTION – B

ANSWER ALL THE QUESTIONS **5 X 10 =50 M.**

9 A)Unit 1.

(or)

B) Unit 1.

10 A) Unit 2.

(or)

B) Unit 2.

11 A)Unit 3.

(or)

B) Unit 3.

12 A) Unit 4.

(or)

B) Unit 4.

13 A) Unit 5.

(or)

B) Unit 5.

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PARVATHANENI BRAHMAYYA SIDDHARTHA COLLEGE OF ARTS & SCIENCE
VIJAYAWADA - 520 010
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COMPUTER SCIENCE	CSCT31	2017-2018	B.Sc. (MECS, MPCS, MSCS, MSCA,CAME)

SEMESTER – III **CREDITS: 3**

Object Oriented Programming Using JAVA

Total: 60 Hrs

Course Objectives: At the end of this course the student is able to

1. Understand the features of Object Oriented Programming.
2. Understand features of Java programming language.
3. Know how to write and execute java programs in text editors.
4. Apply polymorphism, inheritance, multithreading, exception handling mechanism and packages in real life applications.
5. Write and read data from the files using streams and file handling methods.

COURSE OUTCOMES:

COURSE OUTCOME NO	Upon successful completion of this course, students should have the knowledge and skills to:	PROGRAM OUTCOME NO
CO1	Understand the concept and underlying principles of Object-Oriented Programming, Understand how object-oriented concepts are incorporated into the Java programming language.	PO1,PO7
CO2	Implement Object Oriented Programming Concepts (class, constructor, overloading, inheritance, overriding) in java.	PO1,PO7
CO3	create inheritance and interfaces in a Java program	PO1,PO7
CO4	Implement Multithreading, exception handling in Java.	PO1,PO7
CO5	Use and create packages and interfaces in a Java program,Use graphical user interface in Java programs, Use of Input/output Streams in java.	PO1,PO7

Syllabus:

UNIT-1 **10 hours**

1.1 FUNDAMENTALS OF OBJECT – ORIENTED PROGRAMMING

- 1.1.1 Introduction
- 1.1.2 Object Oriented paradigm
- 1.1.3 Basic Concepts of OOP
- 1.1.4 Benefits of OOP
- 1.1.5 Applications of OOP
- 1.1.6 Java features

1.2 **OVERVIEW OF JAVA LANGUAGE**

1.2.1 Introduction
1.2.2 Simple Java program structure
1.2.3 Java tokens
1.2.4 Java Statements
1.2.5 Implementing a Java Program
1.2.6 Java Virtual Machine
1.2.7 Command line arguments

1.3 **CONSTANTS, VARIABLES & DATATYPES**

1.3.1 Introduction
1.3.2 Constants
1.3.3 Variables
1.3.4 Data Types
1.3.5 Declaration of Variables
1.3.6 Giving Value to Variables
1.3.7 Scope of variables
1.3.8 Symbolic Constants
1.3.9 Type casting
1.3.10 Getting Value of Variables
1.3.11 Standard Default values

1.4 **OPERATORS & EXPRESSIONS**.

UNIT-II **12 hours**

1.1 DECISION MAKING & BRANCHING

1.1.1 Introduction
1.1.2 Decision making with if statement
1.1.3 Simple if statement
1.1.4 If - Else statement
1.1.5 Nesting of if- else statements
1.1.6 The else if ladder
1.1.7 The switch statement
1.1.8 The conditional operator.

1.2 LOOPING

1.2.1 Introduction
1.2.2 The While statement
1.2.3 The do-while statement,
1.2.4 The for statement
1.2.5 Jumps in loops.

1.3 CLASSES, OBJECTS & METHODS

1.3.1 Introduction
1.3.2 Defining a class
1.3.3 Adding variables
1.3.4 Adding methods
1.3.5 Creating objects
1.3.6 Accessing class members
1.3.7 Constructors
1.3.8 Method overloading
1.3.9 Static members
1.3.10 Nesting of methods

UNIT-III **12 hours**

3.1 INHERITANCE

3.1.1 Extending a class
3.1.2 Overloading methods
3.1.3 Final variables and methods
3.1.4 Final classes
3.1.5 Abstract methods and classes

3.2 ARRAYS, STRINGS

3.2.1 Arrays
3.2.2 One-dimensional arrays
3.2.3 Creating an array
3.2.4 Two – dimensional arrays
3.2.5 Strings
3.2.6 Wrapper classes

3.3 INTERFACES
3.3.1 MULTIPLE INHERITANCE : Introduction
3.3.2 Defining interfaces
3.3.3 Extending interfaces
3.3.4 Implementing interfaces
3.3.5 Assessing interface variables

UNIT-IV **10 hours**

1.1 **MULTITHREADED PROGRAMMING**
1.1.1 Introduction
1.1.2 Creating Threads
1.1.3 Extending the Threads
1.1.4 Stopping and Blocking a Thread
1.1.5 Lifecycle of a Thread
1.1.6 Using Thread Methods
1.1.7 Thread Exceptions
1.1.8 Thread Priority
1.1.9 Synchronization
1.1.10 Implementing the 'Runnable' Interface.

1.2 **MANAGING ERRORS AND EXCEPTIONS**
1.2.1 Types of errors
1.2.2 Compile-time errors
1.2.3 Run-time errors
1.2.4 Exceptions
1.2.5 Exception handling
1.2.6 Multiple Catch Statements
1.2.7 Using finally statement

UNIT – V **16 hours**

1.1 **APPLET PROGRAMMING**
1.1.1 Local and remote applets
1.1.2 Applets and Applications
1.1.3 Building Applet code
1.1.4 Applet Life cycle: Initialization state, Running state, Idle or stopped state, Dead state, Display state.

1.2 **PACKAGES**
1.2.1 Introduction
1.2.2 Java API Packages
1.2.3 Creating Packages
1.2.4 Accessing a Package
1.2.5 Using a Package.

1.3 **MANAGING INPUT/OUTPUT FILES IN JAVA**
1.3.1 Introduction
1.3.2 Concept of Streams
1.3.3 Stream classes
1.3.4 Byte Stream Classes
1.3.5 Character Stream classes: Reader stream classes, Writer Stream classes
1.3.6 Reading and writing files.

Text Books:

1. E.Balaguruswamy, Programming with JAVA, A primer, 3e, TATA McGraw-Hill Company.

Reference Books:

1. Programming in Java by Sachin Malhotra, OXFORD University Press
2. John R. Hubbard, Programming with Java, Second Edition, Schaum's outline Series, TATA McGraw-Hill Company.
3. Deitel &Deitel. Java TM: How to Program, PHI (2007)
4. Java Programming: From Problem Analysis to Program Design- D.S Mallik
5. Object Oriented Programming Through Java by P. Radha Krishna, Universities Press (2008)

PARVATHANENI BRAHMAYYA SIDDHARTHA COLLEGE OF ARTS & SCIENCE
VIJAYAWADA - 520 010
An autonomous college in the jurisdiction of Krishna University, A.P., India

COMPUTER SCIENCE	CSCT41B	2019-2020	B.Sc(MECS,CAME,MSCS,CAMS,MPCS)

SEMESTER – IV **Credits: 3**

Python **Total: 60 Hrs**

Course Objectives:

1. To understand why Python is a useful scripting language for developers.
2. To learn how to write loops and decision statements in Python.
3. To learn how to write functions and pass arguments in Python.
4. To learn how to use exception handling in Python applications for error handling
5. To learn how to design object-oriented programs with Python classes.

COURSE OUTCOME NO	Upon successful completion of this course, students should have the knowledge and skills to:	PROGRAM OUTCOME NO
CO_1	Implement a given algorithm as a computer program (in Python)	PO1, PO7; PSO1, PSO2, PSO4
CO_2	Adapt and combine standard algorithms to solve a given problem	PO1, PO7; PSO1, PSO2, PSO4
CO_3	Adequately use standard programming constructs: repetition, selection, functions, composition, modules, aggregated data (arrays, lists, etc.)	PO1, PO7; PSO1, PSO2, PSO4
CO_4	Identify and repair coding errors in a program	PO1, PO7; PSO1, PSO2, PSO4
CO_5	Understand the concepts of object-oriented programming as used in Python: classes, subclasses, properties, inheritance	PO1, PO7; PSO1, PSO2, PSO4

UNIT-1: **12 Hrs**

1.1 Introduction:

1.1.1 History
1.1.2 Features,
1.1.3 Setting up path
1.1.4 Working with Python
1.1.5 Basic Syntax
1.1.6 Variable and Data Types
1.1.7 Operators.

1.2 Conditional Statements :
1.2.1 If
1.2.2 If- else
1.2.3 Nested if-else

1.3 Looping
1.3.1 For
1.3.2 While
1.3.3 Nested loops
1.3.4 Break
1.3.5 Continue
1.3.6 Pass.

UNIT-2: **12 hrs**

2.1 Strings:
2.1.1 string Manipulation
2.2.2 Accessing Strings
2.1.3 Basic Operations
2.1.4 String slices
2.1.5 Function and Methods.

2.2 Lists
2.2.1 Introduction
2.2.2 Accessing list
2.2.3 Operations
2.2.4 Working with lists
2.2.5 Function and Methods.

2.3 Tuple:
2.3.1 Introduction
2.3.2 Accessing tuples
2.3.3 Operations

UNIT-3
12hrs

3.1 Dictionaries:
3.1.1 Introduction,
3.1.2 Accessing values in dictionaries
3.1.3 working with dictionaries
3.1.4 Properties

3.2 Functions:
3.2.1 Defining a function
3.2.2 calling a function
3.2.3 Types of functions

3.2.4 Function Arguments
3.2.5 Anonymous functions
3.2.6 Global and local variables.

3.3 Modules:

3.3.1 Importing module
3.3.2 Math module
3.3.3 Random module
3.3.4 Packages
3.3.5 Composition.

UNIT-4: **12 hrs**

4.1 Input-Output:

4.1.1 Printing on screen
4.1.2 Reading data from keyboard
4.1.3 Opening and closing file
4.1.4 Reading and writing files
4.1.5 Functions

4.2 Exception Handling :

4.2.1 Exception
4.2.2 Exception Handling
4.2.3 Except clause
4.2.4 Try ? finally clause
4.2.5 User Defined Exceptions .

UNIT-5: **12 hrs**

5.1 OOPs concept:

5.1.1 Classes
5.1.2 Objects,
5.1.3 Attributes and methods
5.1.4 Design with classes
5.1.5 Data modelling
5.1.6 Persistent storage of objects
5.1.7 Inheritance,Polymorphism
5.1.8 Overloading
5.1.9 Overriding
5.1.10 Data hiding
5.1.11 Abstract Class.

Reference Text Books:

1.Learn to program with Python by Richard L.Halterman
2.Learning Python 5th Edision by mark Lutz , published by O'relly media.
3. Learning with Python by Jeffrey Elkner,Chris Meyers,Allen Downey ,Dream Tech Press
4.Introduction to Computation and programming with Python by John V.Guttag,PHI

COMPUTER SCIENCE	CSCT51	2017 – '18	B.SC(MPCS, MECS, MSCA,MSCS,CAME)

SEMESTER – V **PAPER – V** **Credits: 3**
TOTAL HRS: 60

SOFTWARE ENGINEERING

Course Objectives:

1. The Objective of the course is to assist the student in understanding the basic theory of software engineering.
2. To apply these basic theoretical principles to a group software development project.

COURSE OUTCOME NO	Upon successful completion of this course, students should have the knowledge and skills to:	PROGRAM OUTCOME NO
CO_1	Ability to gather and specify requirements of the software projects.	PO1,PSO1,PSO2,PSO4
CO_2	Ability to use perfect models according to the requirements of the software projects.	PO1, PSO1,PSO2,PSO4
CO_3	Ability to analyze software requirements with existing tools.	PO1, PSO1,PSO2,PSO4
CO_4	Able to use different class diagrams, user interface designs, chart diagrams.	PO1,PO7, PSO1,PSO2,PSO4
CO5	Able to differentiate different testing methodologies.	PO1,PO7, PSO1,PSO2,PSO4

UNIT–I: **15 Hrs**

Introduction: The Software Engineering – Evolution and impact, Software Development Projects,Software Process and Project Metrics,Emergence of Software Engineering, Computer Systems Engineering,

Software Life cycle models: Need for life Cycle model, classical waterfall model, Iterative waterfall model,V-model, Prototyping model, Evolutionary model, Spiral model, Comparison of different life cycle models.

UNIT–II: **10 Hrs**

Software Project Management: Responsibilities of a Software Project Manager, Project planning, Metrics for Project size estimation and scheduling.

Requirement Analysis: Requirements gathering and analysis, Software Requirements Specification ___ contents of the SRS document, Functional requirements, Traceability, Characteristics of good SRS DOCUMENT, Organization of the SRS document.

UNIT-III: **13 Hrs**

Software Design: Desirable characteristics of a good software design, Cohesion and coupling, Layer Arrangement of Modules, Function-oriented design and Object-oriented design.
Function-oriented software Design: Overview of SA/SD methodology, structured analysis, Data Flow Diagrams, Structured Design and Detailed Design.

UNIT-IV: **12 Hrs**

Unified Modeling Language: Overview of Object-oriented concepts, Unified Modeling Language, UML diagrams, use case model class diagrams, Interaction diagrams, Activity diagrams, state chart diagrams

User Interface Design: Characteristics of good user interface design, Basic concepts, Types of user interfaces, component-based GUI development, A user interface Design Methodology

UNIT-V: **10 Hrs**

Coding and Testing: Coding standards & guidelines, code review, testing, unit testing, Black-box testing, White-box testing, Debugging, Integration testing, System testing.

Software Reliability and Quality Management: Software Reliability, Statistical Testing, Software Quality.

Text Book: Fundamentals of Software Engineering **-**By RAJABMALL –PHI Third Edition

REFERENCE BOOKS:

1. Roger Pressman S., "Software Engineering: A Practitioner's Approach", 7th Edition, McGraw Hill, 2010.
2. Sommerville, "Software Engineering", Eighth Edition, Pearson Education, 2007.

1.3.1: Institution integrates cross-cutting issues relevant to Professional Ethics, Gender, Human Values, Environment and Sustainability and other value framework enshrined in Sustainable Development Goals and National Education Policy – 2020 into the Curriculum

NAME OF THE PROGRAM : B.A. (EMS) - ECONOMICS

NAME OF THE PROGRAM : B.A. (EMS)-ECONOMICS REGULATION 15 & 20						
NAME OF THE COURSE	**Couse Code**	**Professional Ethics**	**Gender**	**Human values**	**Environmental and Sustainability**	**other value framework enshrined**
Economic Analysis	ECOT18	Resoures allocation and there distubution , framing economic policys addressing economic inequalities promoting social welfare conderations demand management , ensuring fair labour stands, enrismental respond repect privice transparentcy etc..	Economics analysis and gender are deeply related , as gender influences economic outcomes and vice versa. Gender perspectives enrich economic analysis difference in bargaining power addressing wage gap , improving training skill for women work force equality support work life balance etc.	Inherently involves human values , decisions affect people well- being quality of life equity and fairness, social welfare and poverty reduction, human rights and labour standards, health and education , social cohesion	Economics decision resource management Environmental externalities , growth and its impacts climate change reusing , recycling, biodiversity , green industries, clean technology etc.	Holistic understanding long term economic resilience prosperous economic
Managerial Economics	ECOT19	Maximising the utilisation of resource,optimisation of company financial outcomes,adherimg to principles like honesty,fairness,integrity	Economics analysis and gender are deeply related , as gender influences economic outcomes and vice versa. Gender perspectives enrich economic analysis difference in bargaining power addressing wage gap , improving training skill for women work force equal	equal Economic decision making,shaping gender dynamics in work places,risk assement,diverse view points,varied perspectives,adressing disparities,motivation	Balance profitability,responsible environmental practices,,minimisatin of cost,maximisation of happiness,cost benefit anaysis,risk management,grees companies,green products,eco conscious consumes	corporate social responsibility,brand reputation,evaluate cst benefit of green technology
Agri Business environment in An	ECOTCL61	Farmer welfare,community trust,fair treatment to farming community,respect,timely payments,reducing exploitation,transperancy,reduce conflicts,safety,	gender dynamics,work force particiation rate,gender inclusivity,wage disparities	increasing farmers incomes,livelyhood,fairness and equity,justice,empowering marginalised section,community welbeing,social responsibility	stewardship,sustainable practices,organic farming,crop rotation,conserve natural soil,maintain soil fertility,efficient use of natural resources	economic viability,creating jobs,enhance community resilience,fair compensation,CSR,health care infra support
Agricultural output marketing	ECOTCL62	fair pricing and compensation,equitable trasactions,resonable return.transparency,honesty,accurate information,quality assurence,consumer protection,sustainable practices	gender dimationances,acess to markets,control over incom,capacity to invest,decision making pawer	societal values,fairness,sustainability,equity,ethical marketing practices,community welfare,trancperany and honesty,respect for labour	encouraging sustainable practices,environmental friendly farming, organic farming,crop rotation,reduce corbon footprints,bio divercity	esilient eco system,water conservation,heirloomvarieties,indigeneoud crops,mixed farming,

P.B. SIDDHARTHA COLLEGE OF ARTS AND SCIENCE:: VIJAYAWADA- 10
(An autonomous college in the jurisdiction of Krishna university, Machilipatnam)
(2018-2019)
ECOT18: ECONOMIC ANALYSIS
(FOR B.COM CA)

I Semester

No. of hours per week: 5
Credits: 4

S.No:1	Course Code: ECOT18	Title of the paper: ECONOMIC ANALYSIS	Remarks
CO 1	To understand Nature and scope of business economics		
CO 2	To understand demand analysis		
CO 3	To understand production analysis		
CO 4	To understand supply cost and revenue analysis		
CO 5	To understand market structures		

CO-PO MATRIX							
CO-PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**
CO1					H		
CO2						M	
CO3						M	
CO4					H		
CO5						M	

UNIT – I
Introduction
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

UNIT – III
Demand Analysis
2.1. Demand
2.1.1. Meaning and definition of demand
2.1.2. Determinants of demand – Demand function

2.1.3. Law of demand and its exceptions
2.2. Elasticity of demand
2.2.1. Types of price elasticity of demand
2.2.2. Methods to measure price elasticity of demand

UNIT – III
Production Analysis
3.1. Production function
3.2. The law of variable propositions
3.3. The law of returns to scale
3.4. Economies of large scale production

UNIT – IV
Supply, Cost and Revenue Analysis
4.1. Supply Analysis
4.1.1. Meaning of supply
4.1.2. Determinants of supply
4.1.3. Law of supply and its limitations
4.2. Cost Analysis
4.2.1. Cost concepts
4.2.2. Short run cost curves
4.2.3. Relationship between AC & MC curves
4.3. Revenue Analysis
4.3.1. Revenue Concepts
4.3.2. Revenue curves under different markets

UNIT – V
Market Structures
5.1. Meaning and classification of market
5.1.1. Perfect Competition
5.1.2. Perfect competition features
5.1.3. Price determination under perfect competition
5.1.4. Equilibrium of the firm in the short run and long run
5.2. Monopoly market
5.2.1. Features
5.2.2. Equilibrium of the firm under monopoly
5.3. Monopolistic competition
5.3.1 Features
5.3.2. Equilibrium of the firm under monopolistic competition
5.4. Oligopoly Market
5.4.1. Features
5.4.2. Kinky demand curve analysis

REFERENCES
1. Joel Dean : Managerial Economics Prentice Hall of India (Latest edition).
2. Varshney R.L.: Managerial Economics S. Chand & Co. Delhi, Maheshwari K.L.N.
3. Dwivedi D.N. : Managerial Economics, Vikab Pub.
4. Paul Mote & Gupta: Managerial Economics, Tata Mc. Graw Hill, New Delhi.
5. P.L. Mehta : Managerial Economics, Sultan Chand & Co.

6. G.S. Gupta : Managerial Economics, TMH Pub.
7. A.R. Aryasri & V.V. Ramana Murthy: Business Economics for B. Com I year; TMH.
8. Salwator: Managerial Economics
9. Peterson: Managerial Economics

P.B. SIDDHARTHA COLLEGE OF ARTS AND SCIENCE:: VIJAYAWADA- 10
(An autonomous college in the jurisdiction of Krishna university, Machilipatnam)
(2020-2021)
MANAGERIAL ECONOMICS
For BBA, BBA (Business Analytics), B.Com(Hon)A&F, B.Com. (Hon)TPP and B.Com. (BPM)
Course Code: ECOT19

I Semester

No. of hours per week: 5
Credits: 4

S.No:1	Course Code: ECOT19	Title of the paper: MANAGERIAL ECONOMICS	Remarks
CO 1	To understand economic activities and utility concepts		
CO 2	To understand demand analysis		
CO 3	To know about production, cost and revenue		
CO 4	To gain knowledge market structure		
CO 5	To understand about Macro Economic concepts		

CO-PO MATRIX							
CO-PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**
CO1					H		
CO2						M	
CO3						M	
CO4					H		
CO5						M	

UNIT – I
Introduction
1.1. Economic & Non-Economic Activities
1.2. Definitions***(Through online)***
1.3. Nature and slope of business economics
1.4. Laws of utility
- 1.4.1. The Law of Diminishing Marginal Utility***(Limitations through online)***
- 1.4.2. The Law of Equi-marginal Utility ***(Limitations through online)***
- 1.4.3. The concept of Consumer's Surplus

UNIT – II

Demand and supply analysis

2.1. Demand Analysis

2.1.1 The law of demand

2.2. Elasticity of Demand

2.2.1. Types of Price Elasticity of Demand

2.2.2. Methods to Measure Price Elasticity of Demand.***(through online)***

2.3. Demand Forecasting-Meaning

2.3.1. Qualitative Techniques

2.3.2. Quantitative Techniques

2.4. Supply Analysis

2.4.1. Meaning and importance of supply ***(through online)***

2.4.2. The Law of supply

UNIT – III

Production, Cost and Revenue Analysis

3.1. Production Analysis

3.1.1. Production function

3.1.2. The law of variable propositions

3.1.3. The law of returns to scale

3.2. Cost Analysis

3.2.1. Concepts of cost***(through online)***

3.2.1. Short run and long run cost curves

3.3. Revenue Analysis

3.3.1. Revenue Concepts***(through online)***

3.3.2. TR, AR& MR curves and their relationships

UNIT – IV

Market Analysis

4.1. Meaning & Classification of Market

4.2. Perfect competition market

4.2.1. Characteristics***(through online)***

4.2.2. Pricing in the perfect competition market

4.2.3. Equilibrium of the firm in the short run & long run

4.3. Monopoly market

4.3.1. Characteristics***(through online)***

4.3.1. Equilibrium of the firm under monopoly

4.4. Monopolistic competition

4.4.1. Characteristics***(through online)***

4.4.2. Equilibrium of the firm

4.5. Oligopoly Market

4.5.1. Features***(through online)***
4.5.2. Kinky demand curves analysis

UNIT – V
National Income and Trade Cycles
5.1. National Income
5.1.1. Meaning and definitions of National Income***(through online)***
5.1.2. Concepts of National Income
5.1.3. Methods toMeasure National Income

5.2. Trade cycles
5.2.1. Definitions of Trade cycles
5.2.2. Phases of Trade cycles
5.2.3. Causes for trade cycles***(through online)***

REFERENCES
1. Joel Dean : Managerial Economics Prentice Hall of India (Latest edition).
2. Varshney R.L.: Managerial Economics S. Chand & Co. Delhi, Maheshwari K.L.N.
3. Dwivedi D.N. : Managerial Economics, Vikab Pub.
4. Paul Mote & Gupta: Managerial Economics, Tata Mc. Graw Hill, New Delhi.
5. P.L. Mehta : Managerial Economics, Sultan Chand & Co.
6. G.S. Gupta : Managerial Economics, TMH Pub.
7. A.R. Aryasri & V.V. Ramana Murthy: Business Economics for B. Com I year; TMH.
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P.B. SIDDHARTHA COLLEGE OF ARTS AND SCIENCE:: VIJAYAWADA- 10
(An autonomous college in the jurisdiction of Krishna university, Machilipatnam)
(2017-2018)
B. A. ECONOMICS
III Year B. A. Programme (UG) Courses – Under CBCS
Semester – VI
Paper – VIII-A; Cluster Elective–A: Agribusiness
Paper VIII-A-1: Agribusiness Environment in Andhra Pradesh
COURSE CODE : ECOTCL61

No. of hours per week: 5
Credits: 4

S.No: 1	Course Code: ECOTCL61	Title of the paper: Agribusiness Environment in Andhra Pradesh	Remarks
CO 1	To understand Agriculture development in Andhra pradesh		
CO 2	To understand agricultural finance in Andhra pradesh		
CO 3	To understand agricultural crops in Andhra pradesh		
CO 4	To get knowledge about growth and perfomence of agriculture commodities in Andhra pradesh		
CO 5	To understand marketing policy in Andhra Pradesh		

CO-PO MATRIX							
CO-PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**
CO1							M
CO2						M	
CO3						M	
CO4							M
CO5						M	

UNIT-1

Role of agriculture in development process in Andhra Pradesh vis-à-vis other developed states. Economy wide effects of agriculture in Andhra pradesh through trickle down effects. Backward and forward linkages of agriculture with rest of economy.

UNIT-2

Agricultural finance-importance in modern agriculture- performance of agricultural finance in Andhra Pradesh -problems of agricultural finance – Inter linkages of agricultural credit and other input markets and product markets.

UNIT-3

Dynamics of agriculture-crop (horticulture, field crops), sector-livestock (poultry dairy and fisheries) sector and inter linkages among the sectors. Agribusiness sector in Andhra Pradesh-salient futures, constraints, sub sectors of agribusiness-input sector, production sector, processing sector.

UNIT-4

Growth performance of major agricultural commodities in Andhra Pradesh-production and processing trends in exports and imports of major agricultural commodities.

UNIT-5

Marketing policy- structure of agri markets – regulated markets – need – activities – structure – APMC act – market legislations – Role of Farmer Groups in the marketing of Agricultural Produce.

References:

1. Adhikary M. 1986. Economic Environment of Business. S. Chand & Sons.
2. Aswathappa K. 1997. Essentials of Business Environment. Himalaya Publ.
3. Francis Cherunilam 2003. Business Environment. Himalaya Publ.
4. Agarwal Raj, 2001, Business Environment, Excel Books, New Delhi.

P.B. SIDDHARTHA COLLEGE OF ARTS AND SCIENCE:: VIJAYAWADA- 10
(An autonomous college in the jurisdiction of Krishna university, Machilipatnam)
(2017-2018)
B. A. ECONOMICS
III Year B. A. Programme (UG) Courses – Under CBCS
Semester – VI
Paper – VIII-A; Cluster Elective – A: Agribusiness
Paper VIII-A-2: Agricultural Output Marketing
COURE CODE : ECOTCL62

No. of hours per week: 5
Credits: 4

S.No:1	Course Code: ECOTCL62	Title of the paper: Agricultural Output Marketing	Remarks
CO 1	To understand Agrimarketing organizations		
CO 2	To understand marketing costs , marketing finance and marketing structure of major agricultural crops		
CO 3	To understand the problems and challengs in agricultural marketing		
CO 4	To get knowledge about agriculture marketing agencies		
CO 5	To understand about inter regional international trade in agriculture		

CO-PO MATRIX							
CO-PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**
CO1							H
CO2						M	
CO3						M	
CO4							H
CO5						M	

UNIT-1

Structure and Model of Agri-Marketing Organizations with functions: Functions of intermediaries, Marketing Practices in Primary and secondary and terminal market, Regulated markets, co-operative marketing.

UNIT-2

Marketing costs and margins, Marketing Finance. Marketing Structure of Major agricultural commodities, food grains: Rice, and Maize. Cash Crops; Cotton, Oil Seeds, Vegetables and Fruits, Milk, Meat and Poultry products.

UNIT-3:

Problems and Challenges in Agriculture Marketing - Market Yards - Support prices - Rural Warehousing.

UNIT-4:

State Intervention in Agricultural Marketing, Role of Various agencies (Andhra Pradesh Agro, MARKEED, State Department, and FCI, Tobacco Board, Cotton Corporation) and its impact on market efficiency. Agriculture Price Commission.

UNIT-5:

Inter-regional and international trade in agriculture; emerging scenario of international trade in agricultural commodities; concept of terms of trade and balance of payments,. WTO and Indian agriculture with special reference to Andhra Pradesh .

References:

1. C.S.G.Krishnamacharyulu & Lalitha Ramakrishnan, "Rural Marketing: Text and Cases", Pearson Education, New Delhi.
2. Awadhesh Kumar Singh & Satyaprakash Pandey, Rural Marketing: Indian Perspective, New Age International Publishers, New Delhi.
3. Mamoria, C.B. & Badri Vishal: Agriculture Problems in India
4. Arora, R.C., "Integrated Rural Development", S. Chand Limited, New Delhi.
5. Gopalaswamy, T.P., "Rural Marketing: Environment, Problems and Strategies, Vikas Publishing House Pvt. Ltd., New Delhi.
6. Bedi & Bedi, "Rural Marketing", Himalaya Publishing House, New Delhi.

1.3.1: Institution integrates cross-cutting issues relevant to Professional Ethics, Gender, Human Values, Environment and Sustainability and other value framework enshrined in Sustainable Development Goals and National Education Policy – 2020 into the Curriculum

NAME OF THE PROGRAM : B.Sc. (MECS) – ELECTRONICS

NAME OF THE PROGRAM : B.Sc. MECS (Electronics) REGULATION 15 & 20						
NAME OF THE COURSE	**Couse Code**	**Professional Ethics**	**Gender**	**Human values**	**Environmental and Sustainability**	**other value framework enshrined**
DIGITAL ELECTRONICS	ELET31	NIL	primarily technical and pertains to fields such as computer science, electronics, and engineering.	Ethical Responsibility,Collaboration and Teamwork,Problem-Solving and Innovation,Social Impact,Lifelong Learning	Energy Efficiency: Understanding the design of circuits and systems can lead to the development of more energy-efficient technologies, which is crucial for reducing carbon footprints. Sustainable Materials: Knowledge about integrated circuits and logic families can include discussions on using sustainable materials in electronic manufacturing. E-Waste Management: As technology evolves, awareness of electronic waste (e-waste) becomes critical. Courses can cover the importance of recycling and responsible disposal of electronic components.	Goal 9: Industry, Innovation, and Infrastructure: Understanding microcontrollers and their applications supports the development of innovative technologies and infrastructure. Students can create efficient systems that enhance industrial processes. Goal 11: Sustainable Cities and Communities: Projects involving microcontrollers can contribute to smart city solutions, such as traffic management systems, waste management, and energy-efficient buildings.

ELECTRONIC INSTRUMENTATION	ELETCL62	NIL	NIL	Accuracy and Integrity: Emphasizing the importance of accuracy in measurements fosters integrity and responsibility. Engineers and technicians must ensure their work is reliable and truthful, impacting safety and trust. Safety: Understanding measurement systems directly relates to safety in engineering practices. Instruments must be used correctly to prevent accidents and ensure the well-being of individuals and the environment. Quality Assurance: Adhering to standards and calibration procedures promotes quality and reliability, reflecting a commitment to excellence and public service. Ethical Responsibility: Awareness of systematic and random errors encourages professionals to approach their work ethically, acknowledging limitations and being transparent about uncertainties in measurements. Innovation and Improvement: The study of advanced instruments and techniques can inspire creativity and a desire for	Accurate Measurements for Environmental Monitoring: Instruments like pH meters and spectrophotometers are critical in monitoring water quality, air pollution, and soil health, which are essential for environmental protection. Calibration Standards: Ensuring that measurement instruments are properly calibrated supports accurate data collection, which is vital for assessing environmental impact and compliance with regulations. Energy Efficiency: Understanding and implementing control systems (like PLCs and DDC) can lead to more efficient industrial processes, reducing waste and energy consumption. Sustainable Design: Knowledge of measurement techniques can inform the development of sustainable technologies and processes, such as renewable energy systems and waste management solutions. Climate Change Research: Many analytical instruments play a role in	Affordable and Clean Energy, Industry, Innovation, and Infrastructure, Sustainable Cities and Communities, Responsible Consumption and Production, Climate Action.

MICRO CONTROLLER AND INTERFACING	ELETEL61	Integrity in Programming: Emphasizing the importance of writing clear, reliable, and efficient code reflects ethical standards in software development and engineering practices. Safety and Reliability: When interfacing with devices (like temperature sensors or motors), understanding and ensuring the safety and reliability of these systems is critical, especially in applications that affect health and safety. Impact of Technology: Students should be encouraged to consider the broader implications of their work, such as how microcontroller applications can impact society, privacy, and security.	NIL	Integrity and Responsibility: Emphasizing ethical programming practices and accurate coding fosters integrity. Students should understand the importance of producing reliable and efficient software that can impact real-world applications. Collaboration and Teamwork: Many engineering projects require teamwork. Encouraging collaborative projects in microcontroller programming and interfacing can develop interpersonal skills and promote respect for diverse perspectives. Problem-Solving and Critical Thinking: The practical applications of microcontrollers encourage students to think critically and solve problems, which are essential skills not only in engineering but in everyday life. Innovation and Creativity: The ability to design and implement solutions with microcontrollers encourages creativity and innovation, important values in any technical field.	Energy Efficiency: Understanding how to program and interface microcontrollers can lead to the development of energy-efficient systems. Students can learn to optimize power consumption in embedded applications, which is critical for sustainability. Environmental Monitoring: Microcontrollers can be used in applications for environmental monitoring, such as measuring temperature (e.g., using LM35) or other environmental parameters. This can contribute to efforts in tracking climate change or pollution levels. Automation for Sustainability: Implementing automated systems using microcontrollers can improve resource management in various sectors, such as agriculture (smart irrigation) or waste management, promoting sustainable practices. Renewable Energy Applications: Microcontrollers are often used in solar panels, wind turbines, and other	Yes, in Industry, Innovation, and Infrastructure, Quality Education, Reduced Inequalities, Responsible Consumption and Production, Peace, Justice, and Strong Institutions, Climate Action.

BASIC CIRCUIT THEORY	ELET11A	Professional ethics in engineering typically involve: Integrity: Adhering to ethical standards and honesty in practice. Responsibility: Ensuring public safety and welfare in engineering decisions. Fairness: Treating all stakeholders equitably. Accountability: Being responsible for one's actions and their impact.	NIL	Yes connected to human values in various ways: Integrity and Responsibility, Innovation and creativity, Collaboration and Communication, Community Impact, Accountability and Ethics, Safety and Welfare	Yes, supports environmental and sustainability efforts in various ways: Energy Efficiency, Renewable Energy Systems, Sustainable Technologies, Environmental Impact Assessments, Smart Grids and Energy Management, Education and Awareness, Sustainable Practices in Engineering.	Yes, Quality Education, Affordable and Clean Energy, Industry, Innovation, and Infrastructure, Sustainable Cities and Communities, Responsible Consumption and Production, Climate Action
ANALOG AND DIGITAL COMMUNICATION	ELET51	Professional ethics can be integrated in various ways: Need for Modulation, Signal Processing and Noise Management, Impact of Communication Technology, Environmental Considerations, Professional Conduct.	NIL	Yes, certainly encompass human values: Accessibility and Inclusivity, Privacy and Confidentiality, Integrity and Honesty, Social Responsibility, Environmental Stewardship.	Yes, closely related to environmental concerns: Energy Efficiency, Reduction of Electronic Waste, Impact of Communication on Behavior, Remote Communication Technologies, Smart Grids and IoT.	NIL
INTRODUCTION TO RASPBERRY – PI AND ITS APPLICATIONS	ELET62	Yes, professional ethics can certainly apply to using Raspberry Pi in real-world projects: Data Privacy and Security, Safety and Reliability, ntellectual Property, Environmental Responsibility.	NIL	Yes, Empathy, Responsibility, Integrity, Sustainability, Inclusivity.	Yes, Energy Efficiency, E-Waste Reduction, Eco-friendly Projects, Renewable Energy Integration, Resource Conservation.	NIL

sub: ELECTRONICS	Course code : ELET31	Year : 2019– 20	Group: B.Sc (M.ECs/CA.M.E)	Credits -3

TITLE: DIGITAL ELECTRONICS

Semester – 3 **Max. Marks: 100M**
No. of Hours per week: 4 **External: 75M**
No. of Credits: 3 **Internal: 25M**

DIGITAL ELECTRONICS

OBJECTIVES:

This course is designed to provide a comprehensive introduction to digital logic design to understand number system representations, Boolean algebra, its axioms and theorems and combinational circuits (such as Karnaugh maps), synchronous sequential logic and Asynchronous sequential logic.

Program Outcomes:

PO 1 - Apply knowledge of mathematics, science, and Electronics for solving problems.

PO 2 - Design and conduct experiments as well as to analyze and interpret experimental or collected data, simulate and fabricate electronic circuits and systems and make own projects utilizing latest software tools and techniques.

PO3: The ability to identify, formulate, research literature and analyze complex engineering problems to reach logical conclusions.

PO 4: Design a system, component or process to meet the desired specifications, performance and capabilities; compatible with health, safety, legal, societal and environmental considerations.

COURSE OUTCOMES:

CO_1: To understand the binary number theory of digital circuits. **(PO1, PO2)-L1**

CO_2: To remember the concepts of Boolean algebra and have knowledge to analyze and design combinational systems using standard gates and minimization methods (such as karnaugh maps). **(PO1, PO2)-L2**

CO_3: To design various logical inputs of different IC- logic families. **(PO1, PO2)-L3**

CO_4: To apply and design flip-flops and latches for sequential systems composed of standard sequential modules, such as counters and registers. **(PO2, PO3, PO4)-L3**

CO_5: To analyze design combinational systems composed of standard combinational modules, such as multiplexers and decoders and understand various data manipulation circuits **(PO2, PO3, PO4)-L4**

ELET31	CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
	CO1		M					
	CO2		H					
	CO3	M						
	CO4			M				
	CO5				H			

Unit – I (9hrs)
NUMBER SYSTEM AND CODES:

Decimal, Binary, Hexadecimal, Octal, BCD, Conversions, Complements (1's, 2's, 9's and 10's), Addition, Subtraction, Gray, Excess-3 Code conversion from one to another.

Unit- II (12hrs)
BOOLEAN ALGEBRA AND THEOREMS:

Boolean Theorems, De-Morgan's laws. Digital logic gates, Multi level NAND & NOR gates. Standard representation of logic functions (SOP and POS), Minimization Techniques (Karnaugh Map Method: 4,5 variables),don't care condition.

Unit-III (12hrs)
COMBINATIONAL DIGITAL CIRCUITS:

OFFLINE: (09 hours)
Adders-Half & full adder, Sub-tractor-Half and full sub-tractors, Parallel binary adder, Magnitude Comparator, Multiplexers (2:1,4:1)) and Demultiplexers (1:2,4:1), Encoder (8-line-to-3-line) and Decoder (3-line-to-8-line).

ONLINE: (03 hours)
IC-LOGIC FAMILIES**:** TTL logic, DTL logic, RTL Logic, CMOS Logic families (NAND&NOR Gates), Bi-CMOS inverter

UNIT-IV (10hrs)
SEQUENTIAL DIGITAL CIRCUITS:

OFFLINE: (07 hours)
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.

ONLINE: **(03 hours)** Synchronous-4-bit &Ring counter.

UNIT-V (10hrs)
MEMORY DEVICES:

OFFLINE: **(07 hours)**
General Memory Operations, ROM, RAM (Static and Dynamic), PROM, EPROM, EEPROM, EAROM,

ONLINE: (03 hours)
PLA (Programmable logic Array), PAL (Programmable Array Logic).

TEXT BOOKS:

1. M.Morris Mano, " Digital Design " 3rd Edition, PHI, New Delhi.
2. Ronald J. Tocci. "Digital Systems-Principles and Applications" 6/e. PHI. New Delhi. 1999.(UNITS I to IV)
3. G.K.Kharate-Digital electronics-oxford university press
4. S.Salivahana&S.Arivazhagan-Digital circuits and design
5. Fundamentals of Digital Circuits by Anand Kumar

Reference Books:

1. Herbert Taub and Donald Schilling. "Digital Integrated Electronics" . McGraw Hill. 1985.
2. S.K. Bose. "Digital Systems". 2/e. New Age International. 1992.
3. D.K. Anvekar and B.S. Sonade. "Electronic Data Converters : Fundamentals & Applications". TMH. 1994.
4. Malvino and Leach. " Digital Principles and Applications". TMG Hill Edition.

P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE, VIJAYAWADA – 10

Model Question Paper –NOV-2020

TITLE: DIGITAL ELECTRONICS

Course Code: ELET31 **Maximum Marks: 75M**

Time: 3 Hours **Pass Minimum: 30M**

SECTION – A

Answer any FIVE of the following: **5 x 5 = 25 M**

1. Explain the operation of Shift register**.-(co4)- (L1)**
2. State and explain De-Morgan's laws**.-(co2)-(L2)**
3. Discuss briefly about IC-digital logic families**.(co3)-(L1)**
4. Simplify the Boolean expression if Y=A+AB.-(**$\overline{co2}$**)-(**L3)**
5. Explain about Bi-MOS inverter.- **(co3)-(L1)**
6. Write briefly about Don't care condition**(co2)-(L2)**
7. Perform BCD addition for $(1010)_2$ and $(1111)_{2-}$ **(co1)-(L1)**
8. Explain about Magnitude comparator.(**c03) –(L2)**

Section – B

Answer the following: **5 x 10 = 50 M**

9.(a)Explain about rules of 1's compliment and 2's compliment method.-(**co1)-(L1)**

(or)

(b) Convert the following grey code to binary vice-versssa.(1)11101 (2)100110—(**co1)-(L2)**

10.(a)Explain briefly about canonical and standard form of Boolean algebra. **–(c02)-(L1)**

(or)

(b)Simplify the following functions in sum of products using K-map and draw their implementation.

(i)F (A, B, C, D) =∑ (7, 13, 14, 15)

(ii)F(w,x,y,z)=∑(1,3,7,11,15)+d∑(0,2,5) -(**c02)-(L3)**

11. (a)Define the following terms (i) Half adder (ii) Full adder (iii) Decoder. Explain the design procedure of Full subtractor. (**co3)-(L1)**

(or)

(b)Discuss about the construction and working of TTL NAND gate and Characteristics.(**co3)**(**L2)**

12.(a)Define counter and Explain briefly about ripple counter.**(co4)–(L3)**

(or)

(b)Explain the difference between combinational and sequential logic circuits. & Explain the operation of JK-Flip-flop and draw the timing diagram (**co4)-(L3).**

13.(a) Explain briefly about Semi conductor memories.-(**co5**)-(**L2)**

(or)

(b) Discuss briefly about Programmable logic array(PLA)(**co5**)-(**L3)**

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ELECTRONICS	ELETCL62	2017-18	B.Sc.-MECS	Credits -3

TITLE: ELECTRONIC INSTRUMENTATION

OBJECTIVES:

The student will be introduced to

- To introduce students to monitor, analyze and control any physical system
- To understand students how different types of meters work and their construction
- To Study of absolute is merely confirmed within laboratories
- To Study integrating instruments like ammeter, voltmeter
- To Measurement of impedance using bridges
- To Study of PLL ,ph-meter, PLC

Program Outcomes:

PO 1 - Apply knowledge of mathematics, science, and Electronics for solving problems.

PO 2 - Design and conduct experiments as well as to analyze and interpret experimental or collected data, simulate and fabricate electronic circuits and systems and make own projects utilizing latest software tools and techniques.

PO3: The ability to identify, formulate, research literature and analyze complex engineering problems to reach logical conclusions.

PO 4: Design a system, component or process to meet the desired specifications, performance and capabilities; compatible with health, safety, legal, societal and environmental considerations.

COURSE OUTCOMES:

At the end of course the students are able to:

Co1: To Design a system, component or process to meet desired needs in electrical engineering.
Co2: To Measurement of R,L,C ,Voltage, Current, Power factor , Power, Energy
Co3: Able 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

ELETCL62	CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
	CO1		H					
	CO2			M				
	CO3				H			
	CO4	H						
	CO5		M					

UNIT-I (10hrs)
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 (10hrs)

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 (15hrs)

Lock-in-amplifier: Basic Principles of phase locked loop (PLL), Phase detector (XOR& edge triggered), Voltage Controlled Oscillator (Basics, varactor), lock and capture. Basic idea of PLL IC (565 or 4046). Lock-in-amplifier , Idea of techniques for sum and averaging of signals.

Signal Generators: Function generator, Pulse Generator, (Qualitative only).

UNIT-IV (15hrs)

Analytical instruments

Spectrophotometer, working with block diagram, features of spectrophotometer,

$\mathbf{P_H}$ meter - principle working with block diagram, features of $\mathbf{P_H}$ 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 : (10hrs)

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. Industrial instrumentation –Eckman.P.
4. 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).
4. Alan S. Morris, "Measurement and Instrumentation Principles", Elsevier (Butterworth Heinmann-2008).

P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE, VIJAYAWADA – 10

Model Question Paper

TITLE: ELECTRONIC INSTRUMENTATION

Course Code: ELESET02 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_H meter. (CO4)-(L2)

13.a) Discuss briefly about Direct digital control. (CO5)-(L1)

(or)

b) Explain about the block diagram of PLC and it's operation.(CO5)-(L2)

PARVATHANENI BRAHMAYYA SIDDHARTHA COLLEGE OF ARTS & SCIENCE VIJAYAWADA – 10

An Autonomous college in jurisdiction of Krishna University, A.P., India

ELECTRONICS	**ELETEL61**	**2017 – 18**	**B.Sc.-MECS**	**Credits -3**

TITLE: MICRO CONTROLLER AND INTERFACING

OBJECTIVES:

- To understand the concepts of microcontroller based system.
- To enable design and programming of microcontroller based system.
- To know about the interfacing Circuits.

Program Outcomes:

PO 1 - Apply knowledge of mathematics, science, and Electronics for solving problems.

PO 2 - Design and conduct experiments as well as to analyze and interpret experimental or collected data, simulate and fabricate electronic circuits and systems and make own projects utilizing latest software tools and techniques.

PO3: The ability to identify, formulate, research literature and analyze complex engineering problems to reach logical conclusions.

PO 4: Design a system, component or process to meet the desired specifications, performance and capabilities; compatible with health, safety, legal, societal and environmental considerations.

COURSE OUTCOMES:

At the end of course the students are able to:

C01: The student can gain good knowledge on microcontrollers and implement in practical applications

CO2: To understand the different types of microprocessor and microcontrollers and to know the various development software tools.

CO3: To study the basic architecture of 8051 microcontroller and understand each block of the system.

C04: To gain the knowledge various addressing modes, instructions set and to design a time delay calculations

C05: To write and test various assembly language programming's for moderate complexity

C06: To write and test various assembly language programming's for moderate complexity

ELETEL61	CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
	CO1	H						
	CO2		L					
	CO3		M					
	CO4	L						
	CO5			H				

UNIT-I: (10Hrs)

Introduction, comparison of Microprocessor and micro controller, Evolution of microcontrollers from 4-bit to 32 bit, Development tools for micro controllers, Assembler-Compiler-Simulator/Debugger.

UNIT -II: (10Hrs)

Microcontroller Architecture:

Overview and block diagram of 8051, Architecture of 8051, program counter and memory organization, Data types and directives, PSW register, Register banks and stack, pin diagram of 8051, Port organization, Interrupts and timers.

UNIT-III:(10Hrs)

Addressing modes, instruction set of 8051: Addressing modes and accessing memory using various addressing modes, instruction set: Arithmetic, Logical, Simple bit, jump, loop and call instructions and their usage. Time delay generation and calculation, Timer/Counter Programming,

Unit -IV: (15Hrs)

Assemble language programming Examples: Addition, Multiplication, Subtraction, division, arranging a given set of numbers in largest/smallest order.

UNIT-V : (15Hrs)

Interfacing and Application of Microcontroller:

Interfacing of – PPI 8255, DAC (0804), Temperature measurement (LM35), interfacing seven segment displays, displaying information on a LCD, control of a stepper Motor (Uni-Polar), Interfacing a 4*3 matrix keypad. Generation of different types of waveforms using DAC.

TEXT BOOKS:

1. The 8051 microcontroller and embedded systems using assembly and c-kennet j.Ayalam, Dhananjay V.gadre, cengage publishers

2.The 8051 microcontrollers and Embedded systems - By Muhammad Ali Mazidi and Janice Gillispie Mazidi – Pearson Education Asia, 4th Reprint, 2002.

REFERENCE BOOKS:

1. Microcontrollers Architecture Programming, Interfacing and System Design – **Raj kamal.**
2. The 8051 Microcontroller Architecture, Programming and Application - **Kenneth J.Ajala ,** west publishing company (ST PAUL, NEW YORK, LOS ANGELES, SAN FRANCISCO).
3. Microcontroller theory and application-Ajay V.Deshmukh

P.B .SIDDHARTHA COLLEGE OF ARTS &SCIENCE

Title: Microcontroller and interfacing

MODEL PAPER

SECTION-A

Answer any FIVE of the following: 5x5=25M

1. Write about evolution of microcontrollers.(CO1)-(L1)
2. List and explain some 8051 16-bit registers. (CO2)-(L2)
3. Explain CALL instruction and stack.(CO3)-(L3)
4. Write an ALP program for two 8-bit numbers.(CO4)-(L1)
5. Write a short note on temperature measurement. (CO5)-(L1)
6. Write short notes on microcontroller testing tools.(CO5)-(L3)
7. Explain about stack pointer.(CO2)-(L2)|
8. Draw the pin diagram for DAC.(CO5)-(L1)

SECTION-B

Answer the following: 5x10=50M

1.a) Explain the difference between microprocessor and microcontroller.(CO1)-(L1)

(or)

b) Draw the pin diagram of 8051 and explain each pin in detail. (CO2)-(L1)

2. a)Explain the architecture of 8051 and explain each pin in detail. (CO2)-(L2)

(or)

b) Explain about port organization of 8051. (CO2)-(L3)

3. a) Explain about different types of Addressing modes.(CO3)-(L1)

(or)

b) Explain about (i)single bit instruction (ii)loop instruction(iii)Air thematic instruction with one example each.(CO3)-(L2)

4. a) Write a ALP program on largest number in an array.(CO4)-(L2)

(or)

b) Write an ALP (i) 8-bit addition (ii) multiplication of 8-bit.(CO4)-(L1)

5. a)Briefly explain the architecture of 8255(PPI).(CO5)-(L3)

(or)

b)Explain about interfacing of stepper motor to 8051 microcontroller.(CO5)-(L2)

PARVATHANENI BRAHMAYYA SIDDHARTHA COLLEGE OF ARTS & SCIENCE VIJAYAWADA – 10

An Autonomous college in jurisdiction of Krishna University, A.P., India

Sub: ELECTRONICS	Course code : ELET11A	Year:2019– 20	Group: B.Sc MECs,CAME	Credits -3

TITLE: BASIC CIRCUIT THEORY

Semester – I
No. of Hours per week: 4
No. of Credits: 3

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

Objective: The main objective of this course is to provide the student with a conceptual understanding of passive elements, types of sources and various network reduction techniques, to understand the behavior of RLC networks for sinusoidal excitations, to study the performance of R-L, R-C and R-L-C circuits with variation of one of the parameters and to understand the concept of resonance.

Program Outcomes:

PO 1 - Apply knowledge of mathematics, science, and Electronics for solving problems.

PO 2 - Design and conduct experiments as well as to analyze and interpret experimental or collected data, simulate and fabricate electronic circuits and systems and make own projects utilizing latest software tools and techniques.

PO3: The ability to identify, formulate, research literature and analyze complex engineering problems to reach logical conclusions.

PO4: Design a system, component or process to meet the desired specifications, performance and capabilities; compatible with health, safety, legal, societal and environmental considerations

Course Outcomes:

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

CO1: To remember the concept of current & voltage in circuits. (PO1, PO2, PO4) (L1)

CO2: To understand various Electrical networks by using principles of network theorems. (PO1, PO3, PO4) (L6)

CO3: To understand the behavior of R, C network with DC & sinusoidal excitation. (PO1, PO2, PO4). (L4)

CO4: To understand the behavior of Inductor and it various states. (PO1, PO2) (L2)

CO5: To apply the concept of Resonance & R, L, C network with variation of any one of it (PO1, PO2, PO3, and PO4) (L5)

ELET11A	CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
	CO1		M					
	CO2			L				
	CO3				M			
	CO4	M						
	CO5			H				

UNIT- 1: (12Hrs)

Sinusoidal Alternating Waveforms:

Definition of current & voltage, The sine wave, general format of sine wave for voltage or current, phase relations, average value, effective (R.M.S) values, Differences between A.C and D.C. Basic elements and **Phasors:** Basic Response of R, L & C elements, frequency response of basic elements. (Problems)

UNIT-II: (12hrs)

Passive Networks: (D.C)

Kirchhoff's current and Voltage Law's ,Resistor, Capacitor, and Inductor, series and parallel networks, R-L and R-L-C Circuits with DC inputs. Branch current method, Mesh Analysis, Nodal Analysis, star to delta & delta to star conversions.

UNIT-III: (14hrs)

Networks Theorems: (D.C)

Superposition Theorem, Thevenin's Theorem, Norton's Theorem, Maximum Power, Milliman and Reciprocity theorems (problems)

UNIT-IV: (12hrs)

RC & RL Circuits:

Transient response of RL and RL circuits with step input, Time constants, Frequency response of RC and RL circuits, their action as low pass, high pass and Band pass filters. Passive differentiating and integrating circuits (problems)

UNIT-V: (10hrs)

Series and Parallel Resonance Circuits:

Series resonance and parallel resonance circuits, Q - Factor, Selectivity and band width, Comparison of series and parallel resonance, Tank circuit-LC oscillations.

TEXT BOOKS:

1. Electronic Devices and Circuit Theory --- Robert L. Boylestad & Louis Nashelsky.
2. Electrical Technology (Basic Electrical Engineering) – B.L. Theraja & A.K. Theraja.

REFERENCE BOOKS:

1. Electronic Devices and Circuit Theory --- Robert L. Boylestad & Louis Nashelsky.
2. Circuit Analysis by P.Gnanasivam- Pearson Education
3. Engineering Circuit Analysis By: Hayt & Kemmerly - MG.
4. Networks and Systems – D.Roy Chowdary.

Web Links:

https://www.electronics-tutorial.net/

https://www.clear.rice.edu/elec201/Book/basic_elec.html

https://www.electronics-tutorials.ws/

https://www.electronicshub.org/tutorials/?ref=menu

https://electronicspost.com/basic-electronics-tutorials/

Certificate Course:

https://www.classcentral.com/course/swayam-basic-electronics-7916

https://www.edx.org/course/circuits-and-electronics-1-basic-circuit-analysis-1

https://www.coursera.org/learn/electronics

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, connecting students through zoom for clarification of doubts.
   - Using subject based android app for effective subject inputs.

CO-CURRICULAR ACTIVITIES

Group discussion on subject topics.

Power point presentations.

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Model Question Paper –NOV-2019

TITLE: BASIC CIRCUIT THEORY

Course Code: ELET11A | Maximum Marks: 75M

Time: 3 Hours | Pass Minimum: 30M

SECTION – A

Answer any FIVE of the following: 5 x 5 = 25 M

1. Define the following terms. (Co1)- (L1) 5M

   i. Amplitude ii. Time period iii. Cycle iv. Peak Factor.

2. Explain the concept of nodal analysis. (Co2)--(L3) 5M

3. State and explain Milliman's theorem.(co3)- (L4)

4. Write short notes on basic response of R, L & C elements.(co1) (L2)5M

5. Derive the expression for voltages and current in series resonance circuits. (Co1)-(L5) 5M

6. State and explain Reciprocity Theorem.(co3) (L6) 5M

7. Derive the expression for energy stored in a capacitor.(co1)- (L5) 5M

8. Derive an expression for LC oscillations of a tank circuit. (Co5)-(L6)5M

SECTION – B

Answer any FIVE of the following: 5 x 10 = 50 M

9.(a) Derive RMS value of sinusoidal waveform. (Co1)-(L4) 5M

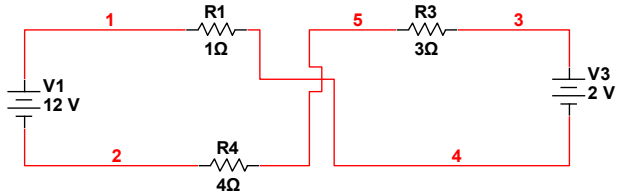
Explain frequency response of resistor and reactor. (Co1)-(L4) 5M

(Or)

(b) What is alternating current? How does it differ from direct current? Derive an expression for average & virtual value of A.C. Define form factor .Give its significance (co1)-(L5) 10M

10. (a) State and prove Kirchhoff's laws.(co2)- (L1) 6M

For the circuit shown in fig (1) find the power absorbed by the each element.(co2)- (L6) 4M



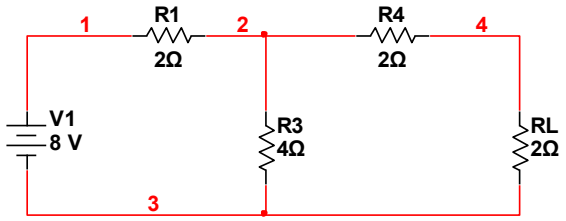
(or)

(b) Explain the format approach of mesh analysis. (Co2)- (L6) 4M

How can you convert star to delta conversion. (co2) (L1) 6M

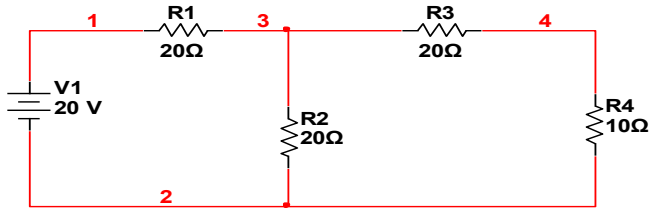
11. (a) State and prove Norton's Theorem (c03)-(L6) 6M

Find the I_L in the given circuit by using Thevenin's theorem (co3) (L6) 4M



(or)

(b) State and Maximum power transfer Theorem. (Co3)- (L6) 5M
Find the current in load in figure with Norton's Theorem. (Co3) 5M



12.(a) Explain transient response RL circuit using DC source. (Co40- (L5) 6M
A charged condenser of capacity 1 micro farads is shunted by a high resistance. If half of the charge leaks in 693 seconds calculate its resistance. (Co4)- (L2) 4M

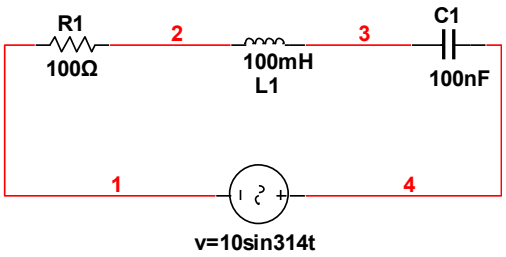
(or)

(b) Explain how RC circuits acts like low pass filter and high pass filter.(co4)- (L6) 10M

13. (a) What is resonance? Derive the expression for frequency response, band width, Q-Factor and selectivity of series RLC resonance circuit.(co5)- (L4) 10M

(or)

(b) Distinguish between series and parallel resonance (co5)- (L1) 4M
For the circuit shown below, determine current at resonance, resonant frequency, Q factor and selectivity.(co5)- (L2) 6M



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Sub: ELECTRONICS	Course code: ELE T51	Year: 2017 – 18	Group: B.Sc. MECS	Credits-3

TITLE: ANALOG AND DIGITAL COMMUNICATIONS

Semester – 5 **Max. Marks: 100M**
No. of Hours per week: 4 **External: 75M**

OBJECTIVES:

- This course provides a thorough introduction to the basic principles and techniques used in analog and digital communications.
- The course will introduce analog and digital modulation techniques.
- Communication receiver and transmitter design, baseband and band pass communication techniques, line coding techniques, noise analysis, and multiplexing techniques.
- The course also introduces analytical techniques to evaluate the performance of communication systems.

Program Outcomes:

PO 1 - Apply knowledge of mathematics, science, and Electronics for solving problems.

PO 2 - Design and conduct experiments as well as to analyze and interpret experimental or collected data, simulate and fabricate electronic circuits and systems and make own projects utilizing latest software tools and techniques.

PO3: The ability to identify, formulate, research literature and analyze complex engineering problems to reach logical conclusions.

PO 4: Design a system, component or process to meet the desired specifications, performance and capabilities; compatible with health, safety, legal, societal and environmental considerations.

Course OUTCOMES:

At the end of course the students will be able to:

CO1: The student can gain good knowledge on analog and digital communication

CO2: To understand basic elements of a communication system

CO3: To analysis of baseband signals in time domain and in frequency domain

CO4: To Demonstrate understanding of various analog and digital modulation and demodulation techniques techniques.

CO5: To Analyse the performance of modulation and demodulation techniques in various transmission environments

ELE T51	CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
	CO1	M						
	CO2		M					
	CO3				H			
	CO4	L						
	CO5			M				

UNIT –I (10Hrs)

AMPLITUDE MODULATION:

Need for modulation, amplitude modulation-frequency spectrum of AM wave, representation of AM, power relations in the AM wave. Generation of AM- Transistor modulators. Suppression of carrier, balanced modulator, suppression of one side band- the filter method, phase shift method.

UNIT –II (10Hrs)

FREQUENCY MODULATION:

Theory of FM, mathematical representation of FM, frequency spectrum of FM wave, narrow band FM, wide band FM, power contents of the carrier and sidebands, Generation of FM signals – Reactance modulator.

UNIT –III (10Hrs)

BASIC RECEIVER CIRCUITS:

Noise – Thermal, Shot, Noise figure, Super heterodyne Receiver block diagram, FM receiver, discriminators- slope, balanced slope, phase discriminator & Ratio detector

UNIT –IV (12Hrs)

RADIO WAVE PROPAGATION:

Communication bands, Electromagnetic waves, propagation of waves - ground waves, Ionosphere & Space waves. ***PULSE MODULATION:*** Introduction, Sampling Theorem, TDM, FDM, PAM- Generation & Detection PWM- Generation & Detection, PPM- Generation & Detection

UNIT –V (18Hrs)

DIGITAL COMMUNICATIONS:

PCM – PCM encoders, Quantization noise, S/N ratio of PCM system, relation between S/N ratio & BW, Companding, Advantages of digital over analog communications. Advantages of shift keying over digital communication, Types of shift keying, ASK – Generation & Detection, FSK – Generation & Detection, PSK – Generation & Detection.

TEXT BOOKS:

1. Electronic Communications - George Kennedy
2. Antennas and Wave Propagation – G.S.N.Raju – PHI
3. Principles of communication system –Herbert Taub & D.L.Schilling

REFERENCES:

1. Electronic Communications – Roody & Colen
2. Communication Systems – Hayken --- 4th Edition
3. Advance Electronic communication system ---Tomasi wayne
4. Modern digital and analog communication system –B.P.lathi

P.B. SIDDHARTHA COLLEGE OF ARTS &SCIENCE

Department of Electronics

Title: Anaolg and Digital Communications (Course code:ELET51)

MODEL PAPER

SECTION-A

Answer any **FIVE** of the following: **5x5=25M**

1. Explain about need for modulation.
2. Write short notes on wide band FM.
3. Define the following terms.
   (i)Thermal (ii) shot noise
4. State and prove sampling theorem
5. Write a short note on amplitude shift keying .
6. Write a short notes on communication bands.
7. Explain the generation and detection of FSK.
8. Explain about power relations of AM.

SECTION-B

Answer the following**:** **5x10=50M**

1. a) Define amplitude modulation and explain about frequency spectrum of AM wave.

   (or)

   b) Explain about Suppression of one side band using phase shift method.
2. a)Explain about the generation and de-modulation of FM

   (or)

   b) Explain how FM signals are generated using reactance modulator.
3. a) Explain about the principle and working of super hetro dyne receiver-AM

   (or)

   b)Discuss about the construction and working of Ratio detector.
4. a)Explain the block diagram of PAM and briefly explain each block.

   (or)

   b)Describe the generation and detection of PPM .

5. a)Explain the block diagram of PCM in detail.

   (or)

   b)Discuss briefly about Phase shift keying(PSK) .

Sub: ELECTRONICS	Course code: ELET62	Year: 2020 – 21	Group: B.Sc. CAME	Credits – 3

Semester – 6 **TITLE** **Paper – VI**

Introduction to Raspberry – Pi and its Applications

Objective:

- Familiarize participants with the physical components of the Raspberry Pi, including its ports, connectors, and peripherals.
- Introduce fundamental programming concepts using Python, the primary language for Raspberry Pi projects, and
- Demonstrate how to write simple programs to interact with hardware components.

Program Outcomes:

PO 1 - Apply knowledge of mathematics, science, and Electronics for solving problems.

PO 2 - Design and conduct experiments as well as to analyze and interpret experimental or collected data, simulate and fabricate electronic circuits and systems and make own projects utilizing latest software tools and techniques.

PO3: The ability to identify, formulate, research literature and analyze complex engineering problems to reach logical conclusions.

PO 4: Design a system, component or process to meet the desired specifications, performance and capabilities; compatible with health, safety, legal, societal and environmental considerations

COURSE OUTCOMES:

At the end of the course the students will able to

Co1: To Create a fully functional computer using Raspberry Pi.

Co2: To Use Python based IDEL, trace and debug Python code on the device.

C03: To Measure physical parameters using sensors.

Co4: To Implementation various protocols for wired and wireless communication.

Co5: To Interfaces different motors and create robots.

ELET62	CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
	CO1	L						
	CO2			M				
	CO3				H			
	CO4	H						
	CO5		M					

Unit – I: **14L**

Getting Started with Raspberry – Pi:

R-Pi Hardware – Introduction, the Raspberry-Pi hardware, accessories.
R-Pi Connectivity – Introduction, configuring network manually, directly to a laptop or computer, through Internet via (Wi-Fi, proxy server), through remotely (using VNC and SSH);
R-Pi Software – Controlling R-Pi, Configuring R-Pi, shutdown and reboot.

Unit – II: **12L**

Python to R-Pi:

Python Basics – Introduction, Python environment, Installing python and tools, IDLE, Numbers, Variables and For Loops, IF, While, Strings, Lists, Dictionaries, Tuples, and Exceptions, Modules, Classes and Methods.

Unit – III: **10L**

Interfacing to R-Pi I/O:

GPIO – Introduction, GPIO Digital Output and Input, Internal Pull-up and Pull-down resistors.
Wiring-Pi – Installing, GPIO command, Programming with wiring-Pi.
Interfaces - Toggling an LED, Button press LED response, DC – Motors, Stepper Motors, and Relays.

Unit – IV: **12L**

Interfacing to R-Pi Buses:

I^2C – I^2C Hardware, test circuit using Linux I^2C tools, *SPI* – SPI Hardware, SPI on R-Pi, *UART* – Introduction, the R-Pi UART.
Interfaces – I^2C – MPU6050; SPI – 74HC595 (7-Segment and LCD), Nokia5110 LCD Display; UART – GPS;

Unit – V: **12L**

Basic R-Pi Projects:

1. Intruder Alarm with email notifications using PIR.
2. Gas and Smoke Alert using MQ-2 sensor.
3. ON-OFF home appliances using R-Pi webserver.
4. Wi-Fi remote controlled robot.

To Study:

1. Exploring Raspberry Pi – Interfacing to the real world with Embedded Linux by Derek Molloy and Wiley.
2. Programming the Raspberry Pi – Getting started with Python by Simon Monk.

Suggested Readings:

1. Raspberry Pi Cookbook by Simon Monk.
2. Raspberry Pi 3 Cookbook for Python Programmers by Tim Cox.
3. Python Programming for Raspberry Pi by SAMS.

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MODEL PAPER

TITLE: Introduction to Raspberry – Pi and its Applications
Semester: VI PAPER-VII
Course Code: ELET62 **Maximum Marks:** 75M
Time: 3 Hours **Pass Minimum:** 30M

SECTION-A

Answer any FIVE of the following: 5x5=25M

1. Write about Raspberry-Pi accessories.
2. Explain the commands for controlling Raspberry-Pi.
3. Give an example to control hardware peripheral using **'IF'** statement.
4. Explain strings and lists.
5. Write about Internal Pull-up and Pull-down resistors.
6. Write a program to control a led on button press.
7. Discuss briefly about I2C two wire interface.
8. Write a short note on 7-Segment display.

SECTION-B

Answer the following: 5x10=50M

9. a) Write the steps to configure Raspberry – Pi network manually and direct to laptop or computer.

(or)

b) Explain the evaluation of Raspberry-Pi and its generations with features.

10. a) Write an example program to interface the peripheral of R-Pi using while, lists and strings

(Or)

b) Explain briefly about Exceptions, modules and classes.

11. a) Explain GPIO commands and Write the process of installing the wiring - Pi

(or)

b) Design an interface diagram of Stepper motor and write a program to rotate stepper motor in full drive mode.

12. a) Explain the concept of SPI protocol and write the steps to enable SPI in R-Pi .

(or)

b) Design interface diagram of MPU6050, write a program to display raw values of the sensor

13. a) Design Intruder Alarm with email notifications using PIR with R-Pi

(or)

b) Design Wi-Fi remote controlled robot with R-Pi.

1.3.1: Institution integrates cross-cutting issues relevant to Professional Ethics, Gender, Human Values, Environment and Sustainability and other value framework enshrined in Sustainable Development Goals and National Education Policy – 2020 into the Curriculum

NAME OF THE PROGRAM : ENGLISH

NAME OF THE PROGRAM : ENGLISH REGULATION 15 & 20						
NAME OF THE COURSE	**Couse Code**	**Professional Ethics**	**Gender**	**Human values**	**Environmental and Sustainability**	**other value framework enshrined**
H V P E	**LSC T16**	Furthermore, fostering **professional integrity, respect, and equality** promotes a culture of trust and openness, encouraging positive cooperation among diverse professions.	The focus on **trust (Vishwas)** and **respect (Samman)** as foundational values highlights the importance of healthy relationships	**Understanding the need for value education** emphasizes the integration of personal, social, moral, and spiritual values, which are vital for fostering harmony within families—the basic unit of human interaction—and broader society.	value education becomes a transformative force, visualizing a universal harmonious order from the family unit to a global community (Akhand Samaj), ultimately aligning with the SDGs aimed at achieving peace, equality, and sustainability in society.	value education becomes a transformative force, visualizing a universal harmonious order from the family unit to a global community (Akhand Samaj), ultimately aligning with the SDGs aimed at achieving peace
ENGLISH-I	**ENGT11A**	**A.P.J. Abdul Kalam: The Knowledge Society**: Emphasizes the ethical responsibility of educators and leaders in fostering a knowledge-driven society. The issue here relates to the integrity of information dissemination and the moral obligation to empower future generations through education.	**Ngugi wa Thiong'o: The Language of African Literature**: Explores the intersection of language, identity, and gender, highlighting how linguistic choices impact gender representation and empowerment	**Robert Frost: The Road Not Taken**: Reflects on choices and individual responsibility, paralleling SDG 16 (Peace, Justice, and Strong Institutions). The poem underscores the importance of personal integrity and the ethical implications of our choices in shaping society.	**Nissim Ezekiel: Night of the Scorpion**: While primarily a story of human experience, it indirectly addresses the relationship between human actions and environmental consequences. The values of compassion and community action align with SDG 13 (Climate Action), emphasizing the need for collective responsibility toward sustainability.	each literary piece reflects diverse aspects of professional ethics, gender dynamics, human values, and environmental sustainability, offering critical insights that resonate with the Sustainable Development Goals. By examining these themes, we can better understand the complex interplay between literature and the ethical frameworks necessary for sustainable developmen
English-II	**ENGT21A**	**J.B.S. Haldane's "The Scientific Point of View"** underscores the ethical implications of scientific inquiry, aligning with **SDG 4 (Quality Education)** by advocating for informed decision-making in a complex world.Anton Chekhov's "A Marriage Proposal" provides insights into societal norms and personal ethics, illustrating the complexities of human relationships.	**Kishwar Naheed's "I Am Not That Woman"** addresses gender equality and empowerment, directly connecting with **SDG 5 (Gender Equality)**.	**A.G. Gardiner's "On Shaking Hands"** highlights the human values of connection and trust, reinforcing **SDG 16 (Peace, Justice, and Strong Institutions)** through the importance of interpersonal relationships.	In **John Keats' "Ode to Autumn,"** the beauty of nature serves as a reminder of our responsibility towards environmental sustainability	these works offer a rich tapestry of themes that underscore the interconnectedness of literature, ethics, and sustainable development.
ENGLISH PRAXIS - III	**ENGT01A**	**Jawaharlal Nehru's "Tryst with Destiny"** emphasizes the ethical responsibility of leadership in nation-building, aligning with **SDG 16 (Peace, Justice, and Strong Institutions)**.	**Barack Obama's "Yes, We Can"** promotes inclusivity and empowerment, resonating with **SDG 5 (Gender Equality)** and highlighting the importance of diverse voices in leadership.	**Dr. A.P.J. Abdul Kalam's insights on managing failure** underscore resilience and the value of learning	Skills such as greetings, requests, and giving directions enhance communication and collaboration, fundamental for building relationships in achieving sustainable development.	these elements create a comprehensive framework for understanding the interconnectedness of ethics, values, and sustainability in contemporary discourse.

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(Awarded by UGC)
(2021-22)

Syllabus for B.SC MPC, MPCS, MECS, MSCS-A and MSCS-B COURSES

Course Code: LSCT16 **Max. Marks: 50**
No. of Hours per Week: 2 **External: 40**
No. of Credits: 2 **Internal: 10**

HUMAN VALUES AND PROFESSIONAL ETHICS (HVPE)

(SYLLABUS)

Learning Outcome:

On completion of this course, the UG students will be able to

- ✓ Understand the significance of value inputs in a classroom and start applying them in their life and profession.
- ✓ Distinguish between values and skills, happiness and accumulation of physical facilities, the Self and the Body, Intention and Competence of an individual, etc.
- ✓ Understand the value of harmonious relationship based on trust and respect in their life and profession.
- ✓ Understand the role of a human being in ensuring harmony in society and nature.
- ✓ Distinguish between ethical and unethical practices and start working out the strategy to actualize a harmonious environment wherever they work.

UNIT: 1 Introduction – Definition, Importance, Process & Classifications of Value Education

- ❖ Understanding the need, basic guidelines, content, and process for Value Education
- ❖ Understanding the thought provoking issues; need for Values in our daily life.
- ❖ Choices making – Choosing, Cherishing & Acting
- ❖ Classification of Value Education: understanding Personal Values, Social Values, Moral Values & Spiritual Values.

UNIT: 2 Harmony in the Family – Understanding Values in Human Relationships

- ✓ Understanding harmony in the Family- the basic unit of human interaction
- ✓ Understanding the set of proposals to verify the Harmony in the Family.
- ✓ Trust (*Vishwas*) and Respect (*Samman*) as the foundational values of relationship
- ✓ Present Scenario: Differentiation (Disrespect) in relationships on the basis of body, physical facilities, or beliefs.
- ✓ Understanding the Problems faced due to differentiation in Relationships
- ✓ Understanding the harmony in the society (society being an extension of family): *Samadhan*, *Samridhi*, *Abhay*, *Sah-astitva* as comprehensive Human Goals
- ✓ Visualizing a universal harmonious order in society- Undivided Society (*AkhandSamaj*), Universal Order (*SarvabhaumVyawastha*)- from family to world family.

UNIT: 3Professional Ethics in Education

- ✓ Understanding about Professional Integrity, Respect & Equality, Privacy, Building

Trusting Relationships.

- ✓ Understanding the concepts; Positive co-operation, Respecting the competence of other professions.
- ✓ Understanding about Taking initiative and Promoting the culture of openness.
- ✓ Depicting Loyalty towards Goals and objectives.

Resolutions:

It is resolved to introduce new syllabus HVPE as life skills course to the students of all programmes BA,BSC,BCOM, who are admitted in the academic year 2020-2021 and onwards.

Text Books:

R R Gaur, R Sangal, G P Bagaria, 2009, A Foundation Course in Human Values and Professional Ethics.

Bhatia, R. & Bhatia, A (2015) Role of Ethical Values in Indian Higher Education

References:

- Ivan Illich, 1974, Energy & Equity, The Trinity Press, Worcester, and Harper Collins, U
- E.F. Schumacher, 1973, Small is Beautiful: a study of economics as if people mattered, Blond & Briggs, Britain.
- Sussan George, 1976, How the Other Half Dies, Penguin Press. Reprinted 1986, 1991
- Donella H. Meadows, Dennis L. Meadows, Jorgen Randers, William W. Behrens III, 1972, Limits to Growth – Club of Rome's report, Universe Books.
- A Nagraj, 1998, Jeevan Vidya EkParichay, Divya Path Sansthan, Amarkantak.
- P L Dhar, RR Gaur, 1990, Science and Humanism, Commonwealth Publishers.
- A N Tripathy, 2003, Human Values, New Age International Publishers.

Mode of Evaluation:

Assignment/ Seminar/Continuous Assessment Test/Semester End Exam.

Co curricular Activities:

1. Visit to an Old Age Home and spending with the inmates for a day.
2. Conduct of Group Discussions on the topics related to the syllabus.
3. Participation in community service activities.
4. Working with a NGO like Rotary Club or Lions International, etc.

Course Objectives :

CO 1. Understanding Value Education, its need in modern days, the basic human aspirations of happiness and prosperity. PO1

CO 2. Understanding harmony in the family and society PO6

CO 3. Gaining competence in Professional Ethics. PO4

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MODEL QUESTION PAPER

Title : Human Values and Professional Ethics

COURSE CODE: LSCT16 **Max. Marks: 40**

Time: 2 hours

Section – A

I. Answer any TWO of the following questions 2x5=10 Marks

1. What are the basic guidelines for Value Education? CO1 , L1
2. What are human values? What is their significance? CO2, L2
3. What do you mean by professional ethics? Explain. CO2 L2
4. What are the values in human relationship? CO3 L1

SECTION – B

II. Answer any THREE of the following questions. 3x10=30 Marks

5. What is the need for value education in the present day professional oriented education? CO1 L4
6. What are the basic requirements to fulfill human aspirations of happiness and prosperity? CO1 L2
7. "Family is a natural laboratory to understand human relationships." Explain. CO3 L2
8. What do you mean by understanding values in human relationships? CO3 L3
9. What is the need and importance of professional ethics? CO2 L4
10. "If a country is to be free of corruption and a nation of beautiful minds, I strongly feel there are three key societal members who can make a difference. They are the father, the mother and the teacher"- A. P. J. Abdul Kalam. Discuss. CO4 L3

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GENERAL ENGLISH SYLLABUS FOR B.A/ B.COM/B.SC COURSES UNDER CBCS

SEMESTER-I (2019-20)

COURSE CODE: ENG T11A **Max. Marks: 100**
No. of Hours per Week: 4 **External: 75M**
No. of Credits: 3 **Internal: 25M**

UNIT-I PROSE12 hours

1. A.P.J. Abdul Kalam: The Knowledge Society (from Ignited Minds)
2. NgugiWaThiong'o: The Language of African Literature (from Decolonizing the Mind)

UNIT-II POETRY10 hours

1. Robert Frost: The Road Not Taken
2. Nissim Ezekiel: Night Of The Scorpion

UNIT –III SHORT STORY12 hours

1. Mulk Raj Anand: The Lost Child
2. Henry Lawson: The Loaded Dog

UNIT-IV 10 hours

ONE ACT PLAY- THE STEPMOTHER-ARNOLD BENNETT

UNIT -V LANGUAGE ACTIVITY16 hours

1. Classroom and LABORATORY Activities
   Sound (Pronunciation), Sight (Spelling), Sense (Meaning), Syntax (Usage)
2. Classroom Activity
   i. Exercises in Articles and Prepositions
   ii. Exercises in Tenses, Interrogatives and Question Tags

NOTE: In classroom instruction it may be ensured that the theoretical and practical components of CSS- II complement the language activity in this Semester.

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DEPARTMENT OF ENGLISH
Course Structure and Syllabi under CBCS
(2018-2019)

Sl No.	Semester	Course Code	Name Of The Subject	Teaching Hours	Credits
1	**II Semester**	**ENGT21A**	**English-II**	**4**	**3**

GENERAL ENGLISH SYLLABUS FOR B.A/ B.COM/B.SC COURSES UNDER CBCS

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 OUTCOMES:
At the end of the course, the learners will be able to:
CO 1.Analyze, interpret, appreciate and comprehend the specified text and the contexts in terms of their content, purpose and form. **PO1**

CO 2. Write effectively for a variety of professional and social settings adapting other writers' ideas as they explore and develop their own. **PO3**

CO 3. Speak clearly, effectively and appropriately in a public forum with correct pronunciation, pause and articulation of voice for a variety of audiences and purposes. **PO2**
CO 4.Think critically; convey their own interpretations, perspectives, producing new creative and artistic works following grammatical structures in oral and written assignments. **PO7**
CO 5.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**

CO-PO MATRIX- ENG T21A							
CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	M						
CO2			M				
CO3		H					
CO4							H
CO5							H

P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE
DEPARTMENT OF ENGLISH
(2018-2019)

Course Code: ENGT21A Max. Marks: 100
Title of the Paper: ENGLISH-II External: 75M
No. of Credits: 3 Internal: 25M

SEMESTER-II

UNIT-I PROSE 12 hours

1. J.B.S. Haldane: The Scientific Point of View
2. A.G. Gardiner: On Shaking Hands

UNIT-II POETRY 10 hours

1. John Keats: Ode To Autumn
2. Kishwar Naheed: I Am Not That Woman (from An Anthology of Commonwealth Poetry edited by C.D.Narasimhaiah)

UNIT –III SHORT STORY 12 hours

1. Ruskin Bond: The Boy Who Broke The Bank
2. R.K.Narayan: Half A Rupee Worth

UNIT-IV 10 hours

ONE ACT PLAY- Anton Chekhov-A Marriage Proposal

UNIT -V LANGUAGE ACTIVITY 16 hours

i. Transformation of Sentences(Voice, Speech and Degrees)
ii. Dialogue Practice (Oral and Writing)
iii. Guided composition
iv. Dialogue Writing
v. Reading Comprehension

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(An Autonomous College under the jurisdiction of Krishna University)
Reaccredited at the level 'A+' by the NAAC
College with Potential for Excellence
(Awarded by UGC)
DEPARTMENT OF ENGLISH
GENERAL ENGLISH SYLLABUS FOR B.A/ B.COM/B.SC COURSES UNDER CBCS
SEMESTER-III (2021-22)

Course Code: ENG T01A **Max. Marks: 100**
No. of Hours per Week: 4 **External: 75M**
No. of Credits: 3 **Internal: 25M**

A COURSE IN CONVERSATIONAL SKILLS

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

I. UNIT

Speech Skills: 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

1. **Speech**: 1. You've Got to Find What You Love Steve Jobs
Skills: 2. Debates
3. Descriptions
4. Role Play

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COURSE CODE: ENG T01A **MAX. MARKS: 75M**
TITLE OF THE PAPER: ENGLISH PRAXIS-III **TIME: 3HRS**
CREDITS: 3 **PASS MARKS: 30M**

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?
2. What does Barack Obama say about his victory in the American Presidential election?
3. How did Steve Jobs keep himself going after getting fired from Apple?
4. What was the lesson about leadership that Abdul Kalam learnt from Prof. Satish Dhawan?
5. Why did Nelson Mandela say that prison was not a waste of time?
6. What are the major changes in Indian business that were noticed by J.R.D.Tata?

SECTION-B

II. Answer any FIVE of the following questions. **5X2=10M**

1. What was the message given by Steve Jobs in his speech?
2. What was the achievement of freedom as a faithful movement for India?
3. How does Dr. A.P.J. Abdul Kalam plan for an energy independent India?
4. What are the views expressed by JRD Tata in his interview?
5. What was the message given by Nelson Mandela has seen in the interview with Harry King?
6. What are the challenges ahead of Obama in remarking the nation?

SECTION-C **35 M**

I. Imagine a situation where you have met a popular sport star. Construct a dialogue of greeting each other.
1X5=5M

II. Construct a dialogue between two friends discussing their future studies.
1X5=5M

III. List any five debate points to support the topic given below "plastic covers should be banned by the government".
1X5=5M

IV. With the help of the hints given below, describe a family function you have attended

An important occasion- meeting friends and relatives- great joy- decoration- putting on best clothes- dance.
1X5=5M

V. How do you introduce your best friend to your brother?
1X3=3M

VI. You have some difficulty with English grammar. Make a request to your English teacher asking him/her to help you.
1X3=3M

VII. Seek information from the online help desk about the academic program/ courses offered in your college. Be sure to ask about the fee structure, hostel facility and scholarship. **1X3=3M**

VIII. Agree with your friend, Ashok who is discussing the merits of government colleges.

1X3=3M

IX. Plan a role play between a principal and a parent asking him/her to take care of his/her child's attendance

1X3=3M

1.3.1: Institution integrates cross-cutting issues relevant to Professional Ethics, Gender, Human Values, Environment and Sustainability and other value framework enshrined in Sustainable Development Goals and National Education Policy – 2020 into the Curriculum

NAME OF THE PROGRAM : HINDI

NAME OF THE PROGRAM : HINDI REGULATION 15 & 20						
NAME OF THE COURSE	**Couse Code**	**Professional Ethics**	**Gender**	**Human values**	**Environmental and Sustainability**	**other value framework enshrined**
FUNCTIONAL HINDI -I	**HINT12A -R15**	Understanding , using precise terminology, avoid misunderstandings, inclusivity ,respect for diversity ,transparency, accountability	Communication about gender issues,awareness and promoting respect for all gender identities, empathy, respect,sensitivity,acknowledge diverse gender identities,contributing to a more equitable society	Interactions and decision-making processes,especially in legal and civic matters,Recognizing linguistic diversity, promotes global dialogue	Inclusivity,effective advocacy and community engagement,environmental rights and movements, engaging with local communities ,responsibility, accountability, and integrity,enhance communication about complex sustainability	Identity and diversity,ostering intellectual growth,promoting equity and social justice, representation,constructiv e dialogue
FUNCTIONAL HINDI -II	**HINT22A-R15**	Professionalism,writing clear and respectful letters,ethical communication,Integrity,Fairness,Confident iality,Transparency,Inclusivity,Equity	Gender Sensitivity,Representation,encourages an inclusive workplace culture,ender Policies,Gender Language,Cultural Context,Equitable Representation	Value of treating others with dignity,honesty and transparency promotes trust, individuals take ownership of their actions,honesty,using diverse languages promotes inclusivity	Implementation of Eco-Friendly Policies,Information Dissemination,Sustainability Goals,Updates on Environmental Policies,Clear Communication of Environmental Practices,Access to Environmental Information	Language and Identity,Equitable Access,Knowledge Sharing,arity and Effectiveness
HINDI-I	**HINT11 - R20**	Understanding Context, Integrity and Courage,Professional Relationships,Professional Relationships,Gender and Number Opposites	Representation,Support Networks,Gendered Language, Gender in Language,Effective Communication,Courage in Gender Advocacy Inclusive Language,Courage in Challenging Norms,Inter-gender Relationships	Empathy and Understanding,Courage and Integrity,Trust and Support,Communication and Respect,Expressing Values	Environmental issues,Relationship between humans and nature,Environmental protection,Environmental degradation Promote a sustainable lifestyle,Respecting natural resources,Developing clear policies,Initiatives aimed at reducing environmental impacts Enrich our understanding of literature	Empathy, cultural understanding, and critical thinking .Diverse perspectives Integrity, courage, and social justice Advocating for the marginalized,Aligning with ethical frameworks.Moral responsibility.
HINDI-II	**HINT21-R20**	Understanding cultural and literary contexts,Aware of diverse cultural backgrounds and values Balancing personal beliefs,Encourages introspection about one's values.Moral implications of their actions, Including correct spelling.Reflects professionalism and ethical responsibility Upholding high standards in communication.Formal correspondence demonstrates professionalism	Can highlight gender roles, Challenge stereotypesContemporary gender issuesWomen's rights Advocating for gender equality and justice.Societal expectations tied to gender.Gender norms influence one's identity	Understanding ,Appreciating diversity,Courage, justice,Non-violence,Personal integrity Moral responsibility.Respect,Prof essionalism,Accountability	Ecological issues,Responsibility towards nature.Attention to issues like climate change,Deforestation, and pollution Understanding the language of environmental discourse	Diversity, Inclusivity.Cultural appreciation,Social justice Activism non-violence Personal integrity Responsibility Self-awareness

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SEMESTER- I **PAPER - I**

TITLE OF THE PAPER: FUNCTIONAL HINDI-I

FUNCTIONAL HINDI-I **2018-2019** **COURSE CODE – HINT12A**

COURSE NAME	COURSE OUTCOMES	COURSE OUTCOMES	PO'S
HINT12A	CO1	हिन्दी राजभाषा के रुप में ,संविधान में हिन्दी भाषा की प्राधान्यता विषयों के बारे कहते हैं।	PO1
	CO2	अनौपचारिक लेखों के द्वारा भाषा , लिखने से भावों की प्राधान्यता बढते हैं।	PO6
	CO3	साधारण भाषा से अलग होते हैं, इससे उत्तर स्थानों में होनीवाली भाषा सीखकर , शब्दावली में ज्ञान प्राप्त कर समाज में भाषा की प्राधान्यता बढ हो सकती हैं।	PO1
	CO4	एक भाषा से दूसरे भाषाओं में अनुवाद करने से भाषा में ज्ञान प्राप्त हो जाते हैं।	PO1
	CO5	समाज में हिन्दी भाषा की पुष्टीकरण , भाषा के द्वारा भावों को आसानी से समझ में आ सकते हैं।	PO1

CO-PO MATRIX

CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	L						
CO2						M	
CO3	L						
C04	M						
C05	M						

I. पारिभाषिक शब्दावली : प्रयोग	**- 1-5Pages**	**10M**
II. राजभाषा, राष्ट्रभाषा, संपर्क भाषा	**- 6-11Pages**	**10M**
III. हिन्दी ही संवैदानिकता	**- 343-351Pages**	**10M**
IV. अनुवाद :	**- 12-22Pages**	**10+5+5M**

(1) परिभाषा अनुवाद के प्रकार

(2) सिद्धान्त एवमं स्वरूप

(3) महत्व

(4) अनुवाद के गुण

V. व्याकरण :	**- 23-32Pages**	**25M**

(1) शुद्धिकरण

(2) पर्यायवाची शब्द

(3) विलोम शब्द

(4) संधि विच्छेद

(5) कारक चिन्हों का प्रयोग

Reference Books:

Vikram Publishers Pvt. Ltd., Durga Agraharam, Vijayawada-2

प्रामाणिक आलेखन और टिप्पण

मिलिन्द प्रकाशन

Hyderabad-95. **प्रयोगिक हिन्दी, ओरियंट ब्लैकस्वान प्राइवेट लिमिटेड, आसफ अली शेड, नई दिल्ली**-110002

PARVATHANENI BRAHMAYYA SIDDHARTHA COLLEGE OF ARTS & SCIENCE :: VIJAYAWADA-520 010.
I Semester Model Question Paper

Course Code: HINT12A **Roll No.:** **Max. Marks: 75M**
Time: 3 Hrs. **No. of Questions: 08** **Pass Min. : 30M**

1. ***एक वाक्य में उत्तर दीजिए :-*** **10 X 2 = 20M**

1. राजभाषा किसे करते है?
2. अशोक के समय में राजभाषा क्या थी ?
3. भारतीय संविधन में राजभाषा के रूप में कब मान्यता प्रदान की गई?
4. संविधान के अनुच्छेद 343के अनुसार संध की राजभाषा और लिपि क्या है?
5. राजभाषा आयोग के गठन का आदेश कब हुआ?
6. राजभाषा आयोग की प्रथम बैठक कब हुई?
7. राजभाषा आयोग के प्रथम अध्यक्ष कौन थे?
8. राजभाषा आयोग के लिए गठिन समिति का कर्तव्य क्या है ?
9. अनुवाद 348 में किस विषय का उल्लेख है।
10. संविधान की अष्टम अनुसूची में भारत की कितनी भाषाओं का उल्लेख है ।

2. विहार यात्रा जाने के लिए अनुमति माँगते हुए, पिता जी नाम पर पत्र लिखिए । **10M**

अथवा

चार दिन की छुट्टी माँगते हुए, अपने कालेज के प्राचार्य के नाम छुट्टी पत्र लिखिए ।

3. प्रयोजनमूलक भाषा की विशेषताओं पर प्रकाश डालिए । **10M**

अथवा

प्रयोजनमूलक हिन्दी विभिन्न रूपों को समझायें ।

4. ***हिन्दी में अनुवाद कीजिए ।*** **10 X 1 = 10M**

1. Sita sings a song.
2. What is you name?
3. Raghu is going to school.
4. I will tell you a story.
5. Surdas wrote Sursagar.
6. Rama has eatten bread.
7. Service to man is service to God.
8. The cat is drinking milk.
9. Trees keep the atmosphere cool.
10. He can swim in the river.

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PARVATHANENI BRAHMAIAH SIDDHARTHA COLLEGE OF ARTS AND SCIENCE; VIJAYAWADA-10

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SEMESTER- II **PAPER - II**

TITLE OF THE PAPER:FUNCTIONAL HINDI-II

FUNCTIONAL HINDI-II **2018-2019** **COURSE CODE - HINT22A**

COURSE NAME	COURSE OUTCOMES NO	COURSE OUTCOMES	PO'S
HINT22A	CO1	सरकारी कार्यालयों के पत्राचार की जानकारी।	PO6
	CO2	प्रयोगिक हिंदी के प्रकार एवं प्रयोग का अवगहण।	PO7
	CO3	प्रयोजनमूलक हिंदी की अवधारण जानकारी।	PO6
	CO4	राजभाषा ,राष्ट्रभाषा ,संपर्क भाषा का अंत: संबंध का ज्ञान।	PO6
	CO5	अनुवाद प्रक्रिया का बोध।	PO1

CO-PO MATRIX

CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1						M	
CO2							M
CO3						M	
C04						H	
CO5	H						

I. कार्यालय पत्राचारः

प्रामाणिक आलेखन और टिप्पण

1. **अर्ध - सरकारी पत्र - Pages 8, 9**
2. **कार्यालय आदेश - Pages 10, 11**
3. **परिपत्र - Pages 12, 13**
4. **कार्यालय ज्ञापन - Pages 23 to 28**
5. **अधिसूचना - Pages 40 to 50**

II. प्रायोगिक हिन्दी

1. **आलेखन - Pages 34 to 43**
2. **टिप्पण - Pages 62, 63**
3. **विज्ञापन - Pages 76, 77**

III. प्रयोजन मूलक हिन्दी : अवधारणा और स्वरूप

(संप्रेषणमूलक व्यावसायिक हिन्दी - Chapter Two: Pages 20 to 30)

IV. राजभाषा, राष्ट्रभाषा, संपर्क भाषाः अंतः संबंध

(प्रायोगिक हिन्दी - Pages 4, 5)

V. अनुवाद

Reference Books:

प्रामाणिक आलेखन और टिप्पण

मिलिन्द प्रकाशन, सुल्तान बाजार

Hyderabad-95.

PARVATHANENI BRAHMAYYA SIDDHARTHA COLLEGE OF ARTS & SCIENCE :: VIJAYAWADA-520 010.
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Course Code: HINT22A **Roll No.:** **Max. Marks: 75M**
Time: 3 Hrs. **No. of Questions: VII** **Pass Min. : 30M**

I. (अ) आप सेवारत है और सांध्यकालीन किसी पाठ्यक्रम में प्रवेश लेना चाहते है । इस विषय की अनुमति लेने हेतु आवेदन का प्रारूप तैयार करें । **10M**

अथवा

(आ) अपने महाविद्यालय के वार्षिकोत्सव के लिए एक सभागार की बुलिंग हेतु महाविद्यालय की ओर से भेजे जाने वाले अर्थ शासकीय पत्र का प्रारूप तैयार करें ।

II. (अ) कार्यालय परिसर की स्वच्छता को बनाए रखने के लिए परिपत्र का प्रारूप तैयार करें । **10M**

अथवा

(आ) एक कर्मचारी को छुट्टी यात्रा रियायत (LTC) की अनुमति तथा दस दिन की अर्जित छुट्टी के नगद भुगतान की अनुमति प्रदान करने केलिए एक आदेश का प्रारूप तैयार करें ।

III. (अ) कार्यालय का एक कर्मचारी कभी बिना कोई कारकण बताए छुट्टी पर लचा जाता है । इस विषय में उसे एक ज्ञापन जारी करें । **10M**

अथवा

(आ) शिक्षा निदेशालय द्वारा कुछ विद्यालयों में प्रधानाचार्य की बियुक्ति की अधिसूचना तैयार करें।

IV. (अ) भूतपूर्व सैनिकों के लिए चिकित्सा की सुविधाएँ हेतु अन्तर विभागीय टिप्पणी तैयार कीजिए। **10M**

अथवा

(आ) राज्य चुनाव आयुक्त की नियुक्ति की अधिसूचना तैयार करे ।

V. ***किसी एक प्रश्न का उत्तर दीजिए ।*** **15M**

1. प्रयोजनमूलक हिन्दी से आपका क्या तात्पर्य है और उसकी विशेषताओं को स्पष्ट कीजिए । **2.** प्रयोजनमूलक हिन्दी के विभिन्न रूपों का वर्णन कीजिए ।

VI. राजभाषा और राष्ट्रभाषा किसे कहते हैं तथा इनकी विभिन्नताओं पर प्रकाश डालिए । **10M**

VII. ***अंग्रेजी से हिन्दी में अनुवाद कीजिए*** । **10M**

In order to keep our bodies strong and healthy, we should like regular exercise. Football, Cricket, running, jumping, walkings are all most useful so keeping us in good health. And when we enjoy a game, we get pleasure as well as health from it. So we should all take part in the games that are played at school for it is as such our minds with knowledge. If our bodies are weak and sickly, our minds too are likely to be sickly and unhealthy. A good brain should have healthy body to live in.

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SEMESTER–I **Credits – 3**

TITLE OF THE PAPER: HINDI–I **COURSE CODE:HINT11**

HINDI-I **2020-2021**

COURSE NAME	COURSE OUTCOMES	COURSE OUTCOMES	PO'S
HINT11	CO1	मानव मूल्यों को पहचानकर समाज कल्याण हेतु देने के लिए तैयार रहना।	PO3
	CO2	आधुनिक युग की भावनाओं को पहचानकर सामाजिक समस्याओं का सामना करते हुए , निरंतर आगे बढना।	PO2
	CO3	विषय का विश्लेषण करके,विषयों को अपना अनुकूल बनाकर समाज में आगे बढने के लिए प्रयास करना।	PO4
	CO4	ग्रहण किये गये पाठ्यांशों द्वारा विध्यार्थियों का ज्ञान मापन किया जाता सकता हैं।	PO4
	CO5	हमारी भाषा का उपयोग हम किस भाषा का प्रयोग करते हैं, उसके द्वारा समाज कल्याण, विद्यार्थियों का उज्वल भविष्य हेतु उपयोगी होना चाहिए।	PO6

CO-PO MATRIX

CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1			H				
CO2		M					
CO3		H					
C04				M			
CO5						H	

I. गद्य संदेश :

1. साहित्य की महत्ता - महावीर प्रसाद द्विवेदी
2. सच्ची वीरता- सरदार पूर्णसिंह
3. मित्रता - आचार्य रामचन्द्र शुक्ल

II. कथा-लोक :

1. मुक्तिधन - प्रेमचंद
2. गूदड साई - जयशंकर प्रसाद
3. उसने कहा था - चन्द्रधरशर्मा गुलेरी

III. व्याकरण :

1. लिंग
2. वचन
3. विलोम शब्द

IV. कार्यालय हिन्दी

1. अंग्रेजी से हिन्दी
2. हिन्दी से अंग्रेजी

V. अवकरण

Reference Books:

गद्य संदेश

Hindi Text Book for B.A., B.Com., & B.Sc.
Published by
LORVEN PUBLICATIONS, 3-5-1108, Blood bank Road, Narayanaguda, Hyderabad.

PARVATHANENI BRAHMAYYA SIDDHARTHA COLLEGE OF ARTS & SCIENCE :: VIJAYAWADA-520 010.
(An Autonomous College in the jurisdiction of Krishna University, Machilipatnam)

SEMESTER–I **Credits – 3**

TITLE OF THE PAPER: HINDI–I **COURSE CODE:HINT11**

No. of Pages: 2	**Roll No.:**	**Max. Marks: 75M**
Time: 3 Hrs.	**No. of Questions: 08**	**Pass Min. : 30M**

1. ***निम्न लिखित प्रसंगों में से किन्ही दो की सप्रसंग व्याख्या कीजिए :-*** **2 X 8 = 16M L3**

अ. ज्ञान-राशि के संचित कोष ही का नाम साहित्य है ।

आ. सत्व-गुण के समुद्र में जिन का अन्तः-
करण निमग्न हो गया वे ही महात्मा, साधु और वीर है ।

इ. कुसंग का ज्वर सबसे भयानक होता है ।

2. ***किसी एक गद्यांश का सारांश लिखकर उसकी विशेषताएँ बताइए ।*** **14ML1**

अ. मित्रता आ. सच्ची वीरता

3. ***किसी एक कहानी का सारांश लिखकर उसकी विशेषताएँ बताइए:-*** **10ML1**

अ. गूढडसाई आ. उसने कहा था

4. ***किन्हीं पाँच वाक्यों को लिंग बदलकर वाक्य फिर से लिखिए :-*** **5 X 1 = 5ML3**

1. लडका बाजार जा रहा है ।

2. अध्यापक पाठ पढ़ाते हैं ।

3. पंडित पूजा करता है ।

4. शेर जंगल में दौडता है ।

5. वह एक बडा गायक है ।

6. बच्ची रो रही है ।

7. पिताजी घर जा रहे हैं ।

8. नौकर बाजार से सामान लाता है ।

5. ***किन्हीं पाँच वाक्यों को वचन बदलकर फिर से लिखिए:-*** **5 X 1 = 5ML3**

1. सभा में विद्वान बोल रहा है ।

2. लडकी मैदान में दौडती है ।

3. औरत घर में काम करती है ।

4. मैं खाना खाता हूँ ।

5. वह कहानी लिखता है ।

6. ये बाजार जा रहे हैं ।

7. गाय मैदान में चरती है ।

8. यहाँ एक नेता है ।

6. ***किन्ही पाँच शब्दों के विलोम रूप लिखिए :-*** **5 X 1 = 5ML3**

1. अंधकार	**2.** लायक
3. अनुकूल	**4.** ज्ञान
5. सफल	**6.** उचित
7. बडा	**8.** नाम

7. ***अ) किन्हीं पाँच अंग्रेजी शब्दों को हिन्दी में रूपांतर कीजिए:-*** **5 X 1 = 5ML1**

1. Balance	**2.** Goods
3. Loss	**4.** Call letter
5. Advance	**6.** Cheque
7. Bill	**8.** Labour

आ) किन्ही पाँच हिन्दी शब्दों को अंग्रेजी में रूपांतर कीजिए :- **5 X 1 = 5M L1**

1. अनुदान
2. हिसाब
3. निधि
4. विभाग
5. पूंजी
6. दस्तावेज
7. श्रम
8. उद्योग

8. अवकरण कीजिए :- **10ML3**

आदर्श विद्यार्थी लगन और तपस्या की आँच में पिघलकर स्वयं को सोना बनाता है । जो छात्र सुख-सुविधा और आराम के चक्कर में पड़े रहते हैं, वे अपने जीवन की नींव को ही कमजोर बना लेते हैं । परिश्रमी विद्यार्थी को यदि सफलता न मिले, तो वह निराश नहीं होता है । बल्किवह बार-बार मेहनत करके सफलता प्राप्त करता है । वह सदा यह जानने की इच्छा रखता हैं व जानने केलिए सचेष्ट रहता है कि कार्य में सफलता क्यों नहं मिली । वह यह भी जानता है कि बिना परिश्रम के केवल इच्छा मात्र से ही कोई सफलता प्राप्त नहीं कर सकता । अर्थात, परिश्रम से ही कार्य पूर्ण होते हैं । इससे सिद्ध होता है कि सफलता करने के लिए हमें बार-बार अभ्यास एवं कठिन परिश्रम करने की आवश्यकता होती है । ठीक उसी प्रकार, जैसे रस्सी के बार-बार घिसने से पत्थर पर भी निशान बनजाता है ।

1. उपरोक्त गद्यांश का उचित शीर्षक दीजिए ?
2. कौन लगन और तपस्या की आँच में पिघलकर स्वयं को सोना बनाता है ?
3. कार्य कैसे पूर्ण होते हैं ?
4. जीवन की नींव कमजोर क्यों हो जाती है ?
5. परिश्रमी विद्यार्थी असफल होने पर क्या करते हैं ?

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SEMESTER–II **Credits – 3**

TITLE OF THE PAPER: HINDI–II **COURSE CODE:HINT21**

HINDI -II **2020-2021**

COURSE NAME	COURSE OUTCOMES	COURSE OUTCOMES	PO'S
HINT21	CO1	भारतीय संस्कृति ,भारत सभ्यता ,भारतीय इतिहास व नारी का समाज में महत्व, पर्यावरण की आवश्यकता	PO4
	CO2	समाज में व्याप्त कुरीतियों से विद्यार्थियों का परिचय	PO4
	CO3	पत्र लेखन में पारिवारिक एवं व्यापारिक पत्रों की जानकारी	PO6
	CO4	भाषा परिज्ञान की वृद्धि	PO1
	CO5	तकनीकि शब्दावली से सरकारी कार्यालयों में प्रयुक्त शब्दों की जानकारी	PO7

CO-PO MATRIX

CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1				M			
CO2				L			
CO3						L	
C04	H						
CO5							M

I. गद्य संदेश :

1. संस्कृति और साहित्य का परस्पर संबंध - डॉ. जी. सुन्दर रेड्डी
2. आम फिर बौरा गये - आचार्य हजारी प्रसाद द्विवेदी
3. भारत एक है - रामधारी सिंह दिनकर

II. कथा लोक :

1. जरिया - चित्रा मुद्गल
2. भूख हडताल - श्री बालशौरि रेड्डी
3. परमात्मा का कुत्ता - मोहन राकेश

III. व्याकरण :

1. कारक
2. संधि क्विच्छेद
3. वर्तनी दोष

IV. कार्यालय हिन्दी

1. अंग्रेजी से हिन्दी
2. हिन्दी से अंग्रेजी

V. पत्र लेखन :

1. पुस्तकों का आर्डर देते हुए पत्र
2. छुट्टी माँगने के पत्र
3. भाई के नाम पर - हिन्दी सीखने की आवश्यकता पत्र
4. नौकरी केलिए आवेदन पत्र

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SEMESTER–II **Credits – 3**

TITLE OF THE PAPER: HINDI–II **COURSE CODE:HINT2I**

No. of Pages: 2	**Roll No.:**	**Max. Marks: 75M**
Time: 3 Hrs.	**No. of Questions: 08**	**Pass Min. : 30M**

1. *निम्न लिखित प्रसंगों में से किन्ही दो की सप्रसंग व्याख्या कीजिए :-* 2 X 8 = 16M L3

अ. मानव कल्याण केलिए पुरुषार्थ पर जितना जोर यहाँ के साहित्य में दिया गया था - उतना अन्य किसी साहित्य में हमें दृष्टिगोचर नहीं होता ।

आ. उन दिनों भारतीय लोगों का हृदय अधिक संवेदनशील था । आज हमारा संवेदन थोथा हो गया है । पुरानी बातों पढ़ने से ऐसा मालूम होता है जैसे कोई अद्यभूला पुराना सपना है ।

इ. कहते हैं पहले पहल अगस्त्य ऋषि ने विंध्याचल को पार करके दक्षिण के लोगों को अपना संदेश सुनाया था ।

2. *किसी एक गद्यांश का विवेचन कीजिए ।* 14M L1

अ. भारत एक है आ. संस्कृति और साहित्य का परस्पर संबंध

3. *किसी एक कहानी का सारांश लिखकर उसकी विशेषताएँ बताइए:-* 10M L1

अ. जरिया आ. परमात्मा का कुत्ता

4. *किन्हीं पाँच कारक जोड कीजिए:-* 5 X 1 = 5M L3

1. राम ——— पत्र लिखा ।
2. रमेश कलम —— लिखता है ।
3. मेज —— किताब है ।
4. राम —— पत्नी सीता है ।
5. कृष्ण ने कंस —— मारा ।
6. ये रमेश —— बच्चे हैं ।
7. यह सुनील —— घर है ।
8. जंगल — पशु-पक्षी रहते हैं ।

5. *किन्हीं पाँच शब्दों का संधि-विच्छेद कीजिए :-* 5 X 1 = 5M L3

1. विद्यालय	2. पित्राज्ञा	3. नयन	4. एकैक
5. स्वागत	6. इत्यादि	7. तपोवन	8. सदैव

6. *किन्ही पाँच शब्दों का वर्तनी दोष लिखिए :-* 5 X 1 = 5M L3

1. पाठशला	2. कविइत्री	3. बोजन	4. लढ़का
5. बाषा	6. अधयापक	7. छात्र	8. हीन्दी

7. *अ) निम्न लिखित में से किन्हीं पाँच अंग्रेजी शब्दों को हिन्दी में रूपांतर कीजिए:-* 5 X 1 = 5M L1

1. Agriculture	2. Botany
3. Code	4. Dairy
5. Training	6. System
7. Normal	8. Gland

आ) निम्न लिखित में से किन्हीं पाँच हिन्दी शब्दों को अंग्रेजी में

रूपांतर कीजिए:- 5 X 1 = 5M L1

1. मनो विज्ञान
2. रक्त वर्ग
3. कवच
4. विषम
5. प्राणि विज्ञान
6. तापमान
7. रसायन
8. ऊष्मा

8. किसी एक पत्र लिकिए :- 10M L3

1. चार दिन की छुट्टी माँगते हुए अपने प्रधानाचार्य के नाम एक पत्र लिखिए ।
2. हिन्दी सीखने की आवश्यकता पर अपने भाई के नाम पर पत्र लिखिए ।

1.3.1: Institution integrates cross-cutting issues relevant to Professional Ethics, Gender, Human Values, Environment and Sustainability and other value framework enshrined in Sustainable Development Goals and National Education Policy – 2020 into the Curriculum

NAME OF THE PROGRAM : B.Sc. MPCS (MATHEMATICS)

NAME OF THE PROGRAM : B.Sc. MPCS (Mathematics) REGULATION 15 & 20						
NAME OF THE COURSE	**Couse Code**	**Professional Ethics**	**Gender**	**Human values**	**Environmental and Sustainability**	**other value framework enshrined**
Ring theory and Vector calculus	**MATT51**	While the direct connections between advanced mathematics and professional ethics or sustainable development goals may not be explicit, the underlying themes of structure, integrity, and problem-solving resonate across disciplines. Both mathematics and ethical frameworks emphasize the importance of rigorous analysis, accountability, and the impact of decisions on society and the environment. Its role in addressing complex global challenges.	The topics are more technical and mathematical, they provide essential skills that can indirectly support gender equity by fostering critical thinking, analytical skills, and inclusivity in education. Integrating these mathematical concepts with gender-focused initiatives can enhance educational outcomes and promote broader participation in STEM fields.	The SDGs emphasize values like equity, justice, and sustainability, paralleling the structured approaches in mathematics that encourage logical reasoning and problem-solving.Mathematical modeling can help quantify progress toward these goals, informing decisions that promote human well-being.	While abstract algebra may not directly apply to environmental issues, its concepts are foundational for understanding complex systems, such as those used in environmental modeling and sustainability research. The course could touch upon how algebraic structures underpin computer simulations that help solve environmental challenges, like modeling resource distribution networks or optimizing renewable energy systems.	By studying and applying these graph and tree structures, we can model and integrate values like fairness, sustainability, inclusion, and efficiency into various frameworks, aligning with ethical decision-making and social responsibility in diverse fields.
Differential Equations	**MATT11A**	Understanding differential equations equips students with problem-solving skills used in fields like engineering, medicine, and economics. Emphasizing ethical considerations, students could explore how the solutions derived from differential equations impact society. For example, responsible modeling of environmental systems or medical data requires ethical practices to ensure accuracy and prevent misuse.	The course could highlight the contributions of diverse mathematicians and scientists from various genders and cultures in the development of differential equations.	using real-world examples that reflect social justice, such as modeling population dynamics or public health challenges, could integrate human values into the curriculum.	Differential equations are often used to model environmental systems, such as pollution levels, climate change, and resource consumption. By integrating sustainability into the course, students can explore how mathematical models can support the United Nations' SDGs, particularly those related to climate action, life below water, and life on land.	The NEP-2020 emphasizes holistic and multidisciplinary education. In line with this, differential equations could be taught with a broader interdisciplinary focus, linking mathematics with fields like environmental science, economics, and public health. The policy also encourages fostering critical thinking and ethical decision-making, which can be integrated into problem-solving approaches in the course.

REAL ANALYSIS	**MAT T41**	It looks like you're listing a comprehensive set of topics in mathematical analysis, focusing on sequences, series, limits, continuity, differentiation, and integration. These concepts are foundational in calculus and real analysis, often explored in undergraduate mathematics coursesintegrity in Problem-Solving, Accuracy and Precision,Collaboration and Communication,Application of Mathematical Principles	Gender representation in mathematical fields can influence who engages with topics like sequences and series. Encouraging diverse voices can enhance creativity and problem-solving.Representation in Mathematics,Access to Education,Stereotypes and Bias,Research and Contributions	The topics you listed in mathematical analysis can indeed relate to various human values, especially in the context of education, research, and ethical practice,integrity, preservance, collaboration and critical thinking	The mathematical concepts you've outlined can indeed have connections to environmental sustainability, particularly in how they are applied in various fields. Here are some ways in which these topics relate to sustainability:Modeling and Predictions, optimization , data analysis, resource management,energy efficiency	the mathematical concepts you've mentioned can intersect with various value frameworks beyond just human values and environmental sustainability.Social Justice Framework,Economic Framework,Cultural Framework,Ethical Framework, Global Citizenship Framework
Graph Theory	**MATTCL65**	While most of these topics are purely technical, graph theory concepts support ethical considerations in **network reliability** (like assessing vulnerabilities, data integrity) and **privacy concerns**. Understanding the **connectivity** and **security** of networked systems, for example, may play a role in **professional ethics** related to **data sharing** and **information security**.	NIL	NIL	Graphs and trees in environmental modeling make complex sustainability issues more understandable and manageable, whether for resource conservation, infrastructure planning, or analyzing human impact on ecosystems. The algorithms and principles from graph theory allow us to create optimal, sustainable systems by minimizing waste, lowering carbon footprints, and preserving resources.These theoretical concepts are foundational in fields such as environmental engineering, ecology, and resource management, where understanding and optimizing networks and structures can lead to more sustainable outcomes.	By studying and applying these graph and tree structures, we can model and integrate values like fairness, sustainability, inclusion, and efficiency into various frameworks, aligning with ethical decision-making and social responsibility in diverse fields.
Discrete Mathematics	**MATTCL64**	The topics are primarily mathematical and logical concepts that fall under discrete mathematics, combinatorics, and algebra, rather than professional ethics or sustainable development goals (SDGs). However, there are connections that can be made between these mathematical principles and ethical frameworks in the context of decision-making and problem-solving.	The topics are more technical and mathematical, they provide essential skills that can indirectly support gender equity by fostering critical thinking, analytical skills, and inclusivity in education. Integrating these mathematical concepts with gender-focused initiatives can enhance educational outcomes and promote broader participation in STEM fields.	By integrating these mathematical concepts into educational frameworks focused on human values, we can cultivate a generation that values critical thinking, inclusivity, and social responsibility. This alignment supports both personal development and broader societal goals.	While abstract algebra may not directly apply to environmental issues, its concepts are foundational for understanding complex systems, such as those used in environmental modeling and sustainability research. The course could touch upon how algebraic structures underpin computer simulations that help solve environmental challenges, like modeling resource distribution networks or optimizing renewable energy systems.	The application of counting principles and combinatorics can enhance understanding of resource management and optimization, essential for sustainable practices. This supports environmental stewardship and responsible resource usage.The methods of proof and logical inference foster a culture of inquiry and critical thinking. These skills enable individuals to question assumptions, analyze arguments, and make informed choices, contributing to an empowered and informed society.

MATHEMATICS	MAT T51	2017 – 18 Onwards	B.A (EMS), B.Sc.(A,B,C,K & CAMS)

RING THEORY & VECTOR CALCULUS

SEMESTER-V **PAPER - V** **No of Credits: 5**

OBJECTIVE: TO ENHANCE THE COMPUTATIONAL SKILLS AND APPLICATIONAL SKILLS AND MEMORY POWER OF STUDENTS.

UNIT – 1: RINGS& SUB RINGS: (12 hrs)

1.1 Definition of Ring and basic properties, Boolean Rings

1.2 Divisors of zero and cancellation laws in a Ring, Integral Domains, Division Ring and Fields

1.3 The characteristic of a ring – Definition – Theorems.

1.4 Sub Rings – theorems- related problems.

UNIT – 2: IDEALS & HOMOMORPHISMS. (18 hrs)

2.1 Ideals and Principal ideals – theorems and related problems.

2.2Maximal Ideals & Prime Ideals.

2.3 Definition of Homomorphism, types of Homomorphism, Elementary Properties of Homomorphism.

2.4Homomorphic image – theorems- related problems.

2.5 Problems on Homomorphisms and Isomorphisms.

2.6 Kernel of a Homomorphism – Fundamental theorem of Homomorphism.

UNIT –3: VECTOR DIFFERENTIATION (15 hrs)

3.1 Vector point function – definition – ordinary derivatives of vectors and properties.

3.2 Vector differential operator ∇, gradient of a scalar point function – properties – problems on grad f.

3.3 Divergence & Curl operators – Solenoidal&Irrotational vectors – related problems.

3.4 Vector identities – related problems.

UNIT – 4 :VECTOR INTEGRATION (15 hrs)

4.1 Definition of Line Integral – related problems.

4.2 Definition of Surface Integral – related problems.

4.3 Definition of Volume integral – related problems.

UNIT – 5: APPLICATIONS OF VECTOR INTEGRATION (15 hrs)

5.1 Green's theorem in a plane – related problems

5.2 Gauss Divergence theorem – related problems.

5.3 Problems on Stoke's theorem only.

(P.T.O)

Prescribed Text books:				
S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHER	YEAR OF PUBLICATION
1.	V. Venkateswara Rao, N. Krishna Murthy.	A text book of mathematics for B.A / B.Sc Volume – II (Unit – II). Pg: 187 - 290	S-Chand& Co	2014
2.	V. Venkateswara Rao, N. Krishna Murthy	A text book of mathematics for B.A / B.Sc Volume – III (Unit – III & IV). Pg: 227 - 385	S-Chand& Co	2012

Reference books:				
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 – III	Deepthi Publications	3rd Edition 2006 – 2007
2	Dr. A. Anjaneyulu	A text book of mathematics for B.A/B.ScVol – I	Deepthi Publications	4th Edition 2004 – 2005
3	A.R. Vashistha& A.K Vashistha	Modern Algebra	Krishna Prakashan Media Ltd.	2007

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SEMESTER – V **Model Paper** **PAPER – V**

COURSE CODE : MAT T51 Time: 3hrs.
TITLE OF THE PAPER : RING THEORY & VECTOR CALCULUS Max. Marks: 75

SECTION – A

Answer any FIVE of the following **5 x 5 = 25 M**

1. If R is a Boolean ring, then prove that R is commutative.
2. If S is an Ideal of a commutative ring with unity and $1 \in S$, then S=R.
3. Prove that every homomorphic image of a commutative ring is commutative.
4. If $f : R \to R^1$ is a homomorphism, then prove that Ker f is an Ideal of R.
5. Find grad f at the point (1, 1, -2) where $f = x^2y + y^2x + z^2$
6. Prove that $div\,\bar{r} = 3$ and $curl\,\bar{r} = \bar{0}$.
7. Find $\int_c \bar{F}.d\bar{r}$, where $\bar{F} = 3xy\bar{i} - y^2\bar{j}$, C is the curve $y = 2x^2$ in XY plane from (0, 0) to (1, 2).
8. Evaluate by stoke's theorem, $\int_c \bar{F}.d\bar{r}$ where $\bar{F} = yz\bar{i} + zx\bar{j} + xy\bar{k}$ and C is the curve $x^2 + y^2 = 1, z = y^2$.

SECTION – B

Answer the following questions. **5 x 10 = 50 M**

9. a) Prove that characteristic of an integral domain is either zero or prime.

   (OR)

   b) If R is a Ring and S_1, S_2 are two subrings of R, then prove that $S_1 US_2$ is a subring of R iff either $S_1 \subseteq S_2$ or $S_2 \subseteq S_1$
10. a) An ideal S of a commutative ring R with unity is a maximal ideal $\Leftrightarrow \frac{R}{S}$ is a field.

    (OR)

    b) State and Prove Fundamental theorem of Homomorphism.
11. a) Find the directional derivative of $\varnothing = x^2 - 2y^2 + 4z^2$ at (1, 1, -1) in the direction of $2i + j - k$.

    (OR)

    b) If $\bar{A}, \bar{B}$ are differential vector point functions, then show that

    $i) div(\bar{A}X\bar{B}) = \bar{B}.curl\bar{A} - \bar{A}.curl\bar{B}$

    $ii) curl(\bar{A}X\bar{B}) = \bar{A}(div\bar{B}) - \bar{B}(div\bar{A}) + (\bar{B}.\nabla)\bar{A} - (\bar{A}.\nabla)\bar{B}.$

(P.T.O)

12. a) Evaluate $\int_s \bar{F}.Nds$, where $\bar{F} = zi + xj - 3y^2zk$ and S is the surface $x^2 + y^2 = 16$ included in the first octant between Z=0 and Z=5.

(OR)

b) If $\bar{F} = (2x^2 - 3z)i - 2xyj - 4xk$, then evaluate i) $\int_v div\,\bar{F}\,dv$ ii) $\int_v curl\,\bar{F}\,dv$, where V is the closed region bounded by x=0, y=0, z=0, 2x+2y+z = 4.

13. a) State and Prove Gauss Divergence theorem.

(OR)

b) Verify Stoke's theorem for the function $\bar{F} = x^2i + xyj$ integrated round the square in the plane Z=0, whose sides are along the line x=0, y=0, x=a, y=a.

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PARVATHANENI BRAHMAYYA SIDDHARTHA COLLEGE OF ARTS &SCIENCE

VIJAYAWADA-10.

(An Autonomous College in the jurisdiction of Krishna University, Machilipatnam)

MATHEMATICS	MAT T11A	2016 – 17 onwards	B.Sc.A,B,C\&B.A (EMS), B.Sc(CAMS)

DIFFERENTIAL EQUATIONS

SEMESTER-I **No of Credits: 5**

OBJECTIVE:TO ENHANCE THE COMPUTATIONAL SKILLS AND APPLICATIONAL SKILLS AND MEMORY POWER OF STUDENTS.

UNIT-I: DIFFERENTIAL EQUATIONS OF FIRST ORDER& FIRST DEGREE

(18Hrs)

1.1 Linear Differential Equations

1.2 Differential Equations Reducible to Linear Form, Bernoulli's differential equations.

1.3 Exact Differential Equations

1.4 Integrating Factors, 1/Mx+Ny, 1/Mx-Ny, $e^{\int f(x)dx}, e^{\int g(y)dy}, and\ \ Inspection\ method$

1.5 Change of Variables

UNIT-II: ORTHOGONAL TRAJECTORIES &DIFFERENTIAL EQUATIONS OF FIRST ORDER BUT NOT FIRST DEGREE (18Hrs)

2.1 Orthogonal Trajectories

2.2 Self Orthogonal Trajectories

2.3 Equations solvable for p

2.4 Equations solvable for y

2.5 Equations solvable for x

2.6 Equations Homogeneous in X & Y

2.7 Equations that do not contain x (or y)

2.8 Clairaut's Equation and Equations reducible to clairaut's form.

UNIT – III: Higher order linear differential equations-I (18Hrs)

3.1 Solution of homogeneous linear differential equations of order n with constant coefficients3.2 Solution of the non-homogeneous linear differential equations with constant coefficients

by means of polynomial operators.

3.3 General Solution of f(D)y=0

3.4 General Solution of f(D)y=Q when Q is a function of x.

3.5 $\frac{1}{f(D)}$ is Expressed as partial fractions.

3.6 P.I. of f(D)y = Q when Q= be^{ax}

3.7 P.I. of f(D)y = Q when Q is b sin ax or b cosax.

UNIT – IV:Higher order linear differential equations-II (18Hrs)

4.1 Solution of the non-homogeneous linear differential equations with constant coefficients.

4.2 P.I. of f(D)y = Q when Q= bx^k

4.3 P.I. of f(D)y = Q when Q= $e^{ax}V$

4.4 P.I. of f(D)y = Q when Q= xV

4.5 P.I. of f(D)y = Q when Q= x^mV where v = sin bx and cosbx

UNIT-V:Higher order Differential Equations –III (18Hrs)

5.1 The Cauchy-Euler Equation.

5.2 Linear differential Equations with non-constant coefficients

5.3 Method of Variation of parameters.

Prescribed Text book:

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHER	YEAR OF PUBLICATION
1	V.Krishna Murthy	A text book of mathematics for B.A/B.ScVol – I	S-Chand&co	2015

Reference books:

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
2	RaiSinghania	Ordinary& Partial Differential Equations	S-Chand	2009
3	ZafarAhsan	Differential Equations and their applications	Prentice-Hall of India Pvt Ltd, McGraw Hill	2000

PARVATHANENI BRAHMAYYA SIDDHARTHA COLLEGE OF ARTS &SCIENCE :: VIJAYAWADA-10.
(An Autonomous College in the jurisdiction of Krishna University, Machilipatnam)

SEMESTER – I

Model Paper

COURSE CODE : MATT11A

TITLE OF THE PAPER : DIFFERENTIAL EQUATIONS

Time: 3hrs. Max. Marks: 75

Section – A

Answer any FIVE questions **5x5=25**

1. Solve $2xy\,dy - (x^2+y^2+1)\,dx = 0$
2. Solve $x\frac{dy}{dx} + 2y - x^2 \log x = 0$
3. Find the orthogonal trajectories of the family of $r = a(1-\cos\theta)$ where a is a parameter.
4. Solve $x = y + p^2$
5. Find C.F of $(D^3 + 3D^2 + 3D + 1)y = e^{5x}$
6. Find the P.I of $(D^3 + 4D)y = \sin 2x$
7. Solve $d^2y/dx^2 + y = \text{Cosec } x$ by the method of variation of parameters.
8. Solve $\frac{d^2y}{dx^2} - (\cot x)\frac{dy}{dx} - (1-\cot x)y = e^x \sin x$

Section – B

Answer ALL questions. **(5 x 10 = 50 marks)**

Unit - I

9. Solve $x(1 + xy)\,dy + y(1 - xy)\,dx = 0$

(OR)

10. Solve $x\frac{dy}{dx} + y = y^2 \log x$

Unit - II

11. Find the orthogonal trajectories of the family of curves $x^{2/3} + y^{2/3} = a^{2/3}$, where 'a' is the parameter.

(OR)

12. Solve $y + px = p^2 x^4$

Unit - III

13. Solve $(D^2 + 4D + 4)y = e^{4x}$

(OR)

14. Solve $(D^2 - 2D + 3)y = \cos 2x$

Unit - IV

15. Solve $\frac{d^2y}{dx^2} - 6\frac{dy}{dx} + 13y = 8e^{3x}\sin 2x$

(OR)

16. Solve $(D^4 + 2D^2 + 1)y = x^2\cos x$

Unit - V

17. Solve $\left[(x-1)D^2 - xD + 1\right]y = (x-1)^2$ by the method of variation of parameters.

(OR)

18. Solve $(x^2D^3 + 2x^3D^2 - x^2D^2 + x)y = 1$

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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
IV	MAT T41	CORE	REAL ANALYSIS	100	25	75	6	5

Course Outcomes of MAT T41

S. No	C.O
	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.
2	Apply the Ratio, Root, Alternating series and limit comparison tests for convergence and absolute convergence of an infinite series of real numbers.
3	Calculate the limit and examine the continuity of a function at a point.
4	Understand the consequences of various mean value theorems for differentiable functions.
5	Determine the Riemann integrability and the Riemann-Stieltjes integrability of a bounded function and prove a selection of theorems concerning integration.

CO-PO MATRIX							
CO-PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**
CO1					**M**		
CO2					**H**		
CO3							**M**
CO4						**M**	
CO5							**M**

MATHEMATICS	**MAT T41**	**2021-2022 onwards**	**B.Sc. (MPC, MSCS)**

REAL ANALYSIS

SEMESTER-IV **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, Sub sequences, 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'sTheorem, 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 ACTIVITES:

- Quiz Competitions, Seminars
- Group Discussions

WEB LINKS:

https://drive.google.com/file/d/1BPWJAS6NqSxmYt2VMShpEEM4z52_pbW_/view?usp=sharing
https://drive.google.com/file/d/1oFNosFs8JWqB2pKGqpYtgauRI3BGtJBB/view?usp=sharing

Prescribed Text books:				
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

Reference books:				
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 – IV

Model Paper

COURSE CODE : MAT T

TITLE OF THE PAPER : REAL ANALYSIS

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

Section – A

Answer any FIVE questions **(5x5=25 marks)**

1. Prove that every convergent sequence is bounded. (CO1,L2)
2. Prove that a convergence sequence has a unique limit. (CO1,L2)
3. Test for convergence of $\sum_{n=1}^{\infty}\frac{\sqrt{n}}{n^2+1}$. (CO2,L3)
4. Examine for continuity the function $f(x)=|x|+|x-1|$ at $x=1$ (CO3,L2)
5. If $f(x)=\frac{e^{1/x}}{1+e^{1/x}}$ find whether $\underset{x\to 0}{Lt}\, f(x)$ exists or not. (CO3,L2)
6. 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,L3)
7. Prove that $f(x)=\frac{x}{\sin x}$ is increasing in $\left[0,\frac{\pi}{2}\right]$ (CO4,L3)
8. Prove that $f(x)=x[x]$ is integrable on $[0,2]$ and find $\int_0^2 x[x]dx$ (CO5,L3)

Section – B

Answer ALL questions. **(5 x 10 = 50 marks)**

Unit – I

9(a).If $S_n=\frac{1}{n+1}+\frac{1}{n+2}+.....+\frac{1}{n+n}$ then show that $\{S_n\}$ is convergent. (CO1, L2)

(OR)

9(b).State and Prove Cauchy's general principle of convergence for sequences. (CO1,L2)

Unit – II

10(a).State and Prove D'Alembert's ratio test. (CO2, L3)

(OR)

10(b).Show that the Series $\sum_{n=1}^{\infty}(-1)^n\left(\sqrt{n^2+1}-n\right)$ is conditionally convergent. (CO2, L3)

Unit - III

11(a). Prove that if $f : S \to R$ is uniformly continuous then f is continuous in S. Is the converse true? Justify your answer. (CO3, L2)

(OR)

11(b).If $f : [a,b] \to R$ is continuous on $[a,b]$, then prove that f is bounded on $[a,b]$ and attains its bounds. (CO3, L2)

Unit - IV

12(a).State and prove Rolle's theorem. (CO4, L3)

(OR)

12(b).Using Lagrange's theorem show that $x > \log(1+x) > \frac{x}{1+x}$. (CO4, L3)

Unit - V

13(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)

13(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	MATTCL65	CORE	GRAPH THEORY	100	25	75	5	5

Course Outcomes of MATTCL65

S. No	C.O
	Upon successful completion of this course, students should have the knowledge and skills to:
CO1	Define various types of graphs
CO2	Understand the concept of vertex connectivity and edge connectiviy in graphs
CO3	Evaluate Euler path, circuit and Hamilton paths ,circuits
CO4	Distinguish various types of trees and their properties
CO5	Analyze Prim`s and Kruskal`s algorithms

CO-PO MATRIX							
CO-PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**
CO1					**H**		
CO2					**H**		
CO3					**M**		
CO4							**L**
CO5						**L**	

MATHEMATICS	MAT TCL65	2016 – 17 onwards	B.A((EMS)B.Sc(MPC,MPCS,MECS,MSCS)

OBJECTIVE: TO ENHANCE THE COMPUTATIONAL SKILLS & APPLICATION SKILLS.

Unit I: Graphs and Subgraphs **(15 hrs)**

1.1 Graphs, Simple Graph, Multiple Graph, Undirected and Directed graph, degree of vertex, the Handshaking theorem.
1.2 Travelling Salesman problem, types of Graphs
1.3 Subgraphs and Isomorphism of graphs
1.4 Operations of graphs.
1.5 Adjacency and Incidence matrix

Unit II : Connectivity **(15hrs)**

2.1 Paths, cycles, connectivity
2.2 Connectedness in undirected graph
2.3 Cut vertex, cutset, bridge
2.4 Connectedness in directed graphs
2.5 Edge connectivity.

Unit III: Eulerian Graphs&Hamilton Graphs **(15hrs)**

3.1 **Eulerian graph:** Definitions- Eulerian graph , Eulerian trail, Eulerian Circuit, Euler path
3.2 Theorems on Eulerian graphs – related problems
3.3 Fleury's Algorithm- related problems
3.4 **Hamilton graph:** Definitions-Hamilton circuits, Hamilton path, Hamilton graph
3.5 Theorems on Hamliton graphs- related problems

Unit IV: Trees **(15hrs)**

4.1 Trees, properties, distance and centres in trees
4.2 Rooted and binary trees, Spanning tree
4.3 Algorithms for constructing spanning trees- BFS and DFS algorithms
4.4 Cayley's theorem

Unit V : Spanning tree **(15hrs)**

5.1 Weighted graph, minimal spanning trees Kruskal's algorithm and Prim's algorithm
5.2 Tree traversal
5.3 Representation of algebraic structure by binary tree

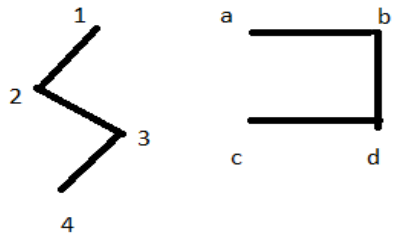
Prescribed Text book:				
S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHER	YEAR OF PUBLICATION
1.	Dr.Swapan Kumar Sankar	A Text Book of Discrete Mathematics	S.Chand& Co.	2012
Reference Text books:				
1.	J.A.Bondy and U.S.R.Murthy	Graph theory with Applications	Mac.Millan Press	Second Edition-2009
2.	Introduction to Graph theory	S.Arumugham and S. Ramachandran	Scitech Publications, Chennai-17	
3.	Graph theory and	H.S. Govinda Rao	Galgotia Publications	
4.	combinations	Discrete Mathematics for Computer scientists and mathematicians	Prentice – Hall India Pvt.Ltd	
	Joe L. Mott, Abraham Kandel, Theodore P.Baker.			

SEMESTER – VI **Model Paper** PAPER – VII(B-2) CLUSTER**ELECTIVE**
COURSE CODE : MAT TCL65 Time: 3hrs.
TITLE OF THE PAPER : GRAPH THEORY Max. Marks: 75

Answer any **TEN** choosing atleast **THREE** from each section. **10 x 7.5 = 75 M.**

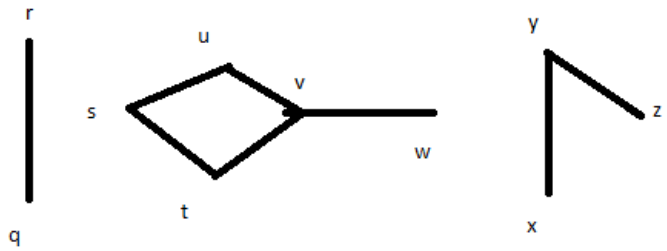
Section A

1. Show that the degree of the vertex of a simple graph G on n vertices cannot exceed n-1 (CO1, L3)
2. Explain Travelling sales man problem. (CO1, L3)
3. Show that the two graphs shown in the figure are isomorphic (CO1,L3)



4. If a graph (connected or disconnected) has exactly two vertices of odd degree the show that there must be a path joining these twoi vertices (CO2,L3)
5. Find the (CO2,L3)

i) Vertex sets of the components
ii) Cut vertices
iii) Cut edges of the graph given below



6. Show that the edge connectivity of a graph G cannot exceed the minimum degree of a vertex in G ie., $\lambda(G) \leq \delta(G)$ (CO2,L3)

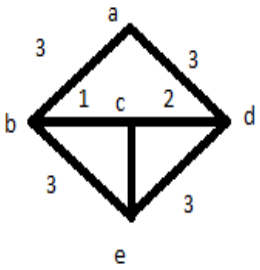
Section B

7. Define Eulerian trail, Eulerian circuit, Eulerian path and Eulerian graph. Show that a non empty connected graph G is Eulerian implies its vertices are all of even degree. (CO5,L3)
8. Explain Fleury's Algorithm. (CO5, L3)

9. Give an example of a graph which is Hamiltonian but not Eulerian and vice versa.(CO5,L3)
10. For any positive integer n, if G is connected graph with n vertices and n-1 edges then G is a tree. (CO4, L3)
11. Define Spanning tree and show that a simple graph G has a spanning tree iff G is connected. (CO4, L3)

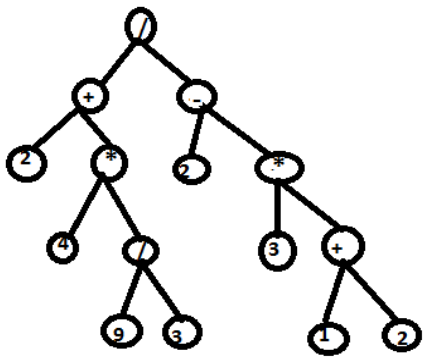
12. State and prove Cayley's theorem. (CO4, L3)

13. Define minimal spanning tree and use Kruskal's algorithm to find a minimal spanning tree for the graph (CO5,L3)



14. Prove that the maximum no. of vertices on level n of a binary tree is 2^n where $n \geq 0$. (CO4, L3)

15. Determine the value of the expression represented in the following binary tree. (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
VI	MATTCL64	CORE	DISCRETE MATHEMATICS	100	25	75	5	5

Course Outcomes of MATTCL64

S. No	C.O
	Upon successful completion of this course, students should have the knowledge and skills to:
CO1.	Show logical equivalances by using truth tables and rules and to build logical concept.
CO2.	Learn concept related to counting & advanced counting.
CO 3.	Solve counting problems using the principle of inclusion & exclusion.
CO 4.	Define the generating function of a sequences.
CO 5.	Understand the concepts of Boolean algebra & Boolean functions.

CO-PO MATRIX							
CO-PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**
CO1					**H**		
CO2					**H**		
CO3						**M**	
CO4						**M**	
CO5							**L**

MATHEMATICS	MAT TCL64	2017 – 18 Onwards	B.A(EMS),B.Sc. (MPC, MPCS, MECS, MSCS)

DISCRETE MATHEMATICS

SEMESTER-VI PAPER – VIII (B – 1) CLUSTER ELECTIVE No of Credits: 5

OBJECTIVE: TO ENHANCE THE ANALYTICALSKILLS & APPLICATION SKILLS.

UNIT – I: SETS, FUNCTIONS, RELATIONS AND LOGIC. **(15 hrs)**

1.1 Sets and Operations of sets.

1.2 Relations and Functions.

1.3 Fundamentals of Logic.

1.4 Logical Inferences.

1.5 Methods of Proof of an implication.

1.6 First order logic and other methods of proof.

1.7 Rules of inferences for quantified propositions.

UNIT – II: COUNTING PRINCIPLES **(15 hrs)**

2.1 Basics of Counting.

2.2 Combinations and Permutations.

2.3 Enumeration of Combinations and Permutations.

2.4 Enumerating Combinations and Permutations with repetitions.

2.5 Enumerating Permutations with Constrained repetitions.

UNIT – III: MATHEMATICAL INDUCTION, PRINCIPLE OF INCLUSION – EXCLUSION AND MULTINOMIAL THEOREMS. **(15 hrs)**

3.1 Mathematical Induction

3.2 The Principle of Inclusion – Exclusion.

3.3 Binomial Coefficients

3.4 The Binomial & Multinomial Theorems.

UNIT – IV: RECURRENCE RELATIONS **(15 hrs)**

4.1 Generating functions of sequences

4.2 Calculation coefficients of generating functions.

4.3 Recurrence relations.

4.4 Solving recurrence relations by substitution and generating functions.

4.5 The method of Characteristic roots.

UNIT – V: BOOLEAN ALGEBRA **(15 hrs)**

5.1 Introduction

5.2 Boolean Algebra

5.3 Boolean Functions

5.4 Switching Mechanisms

5.5 Minimization of Boolean functions.

Prescribed Text book:				
S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHER	YEAR OF PUBLICATION
1.	Joe L. Mott, Abraham Kandel, Theodore P.Baker.	Discrete mathematics for computer scientists and mathematics	Prentice – Hall of India Private Limited.	2nd Edition – 2009.

Reference Text book:				
S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHER	YEAR OF PUBLICATION
1.	Dr. Swapan Kumar Sarkar.	A Text Book of Discrete Mathematics	S. Chand Publication	2012

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SEMESTER – VI **Model Paper** PAPER –VIII (B – 1) CLUSTER ELECTIVE
COURSE CODE : MAT TCL64 Time: 3hrs.
TITLE OF THE PAPER : DISCRETE MATHEMATICS Max. Marks: 75

Answer any **TEN** choosing at least **THREE** from each section. **10 x 7.5 = 75 M.**

SECTION – A

1. Let R be the relation on the natural numbers N = {1, 2, 3,……}, defined by "x+2y=10", that is, let $R=\{(x,y)/n\in N, y\in N, x+2y=10\}$. Find (a) The domain and range of R.(b) R^{-1} (CO 1, L1)

2. Prove that $[(p\wedge\sim q)\rightarrow r]\rightarrow[p\rightarrow(q\vee r)]$ is a tautology. (CO 1, L 1)

3. Prove or disprove the validity of the following argument:
   Every living thing is a plant or a animal.
   David's dog is alive and it is not a plant.
   All animals have hearts.
   Hence, David's dog has a heart. (CO1, L 1)

4. When two different dice are rolled, find
   a) In how many ways can we get a sum of 4 or 8?
   b) In how many ways can we get an even sum? (CO2, L2)

5. Suppose there are 15 red balls and 5 white balls. Assume that the balls are distinguishable and that a sample of 5 balls is to be selected.
   a) How many samples of 5 balls are there?
   b) How many samples contain 3 red balls and 2 white balls? (CO2, L2)

6. Consider the word TALLAHASSEE. How many arrangements are there
   a) Where no two letters 'A' appear together?
   b) Of 4 of the letters taken from TALLAHASSEE? (CO2, L2)

SECTION – B

7. Use mathematical induction to prove that $1^3+2^3+.....+n^3=\left[\frac{n(n+1)}{2}\right]^2$, whenever 'n' is a positive integer. (CO3, L 1)

8. In a class of 50 students, 20 students play football and 16 students play hockey. It is found that 10 students play both the games. Find the number of students who play neither football nor hockey. (CO3, L 1)

9. (a) Find the expansion of $(x+y)^6$.

(b) Find the coefficient of x^5y^8 in $(x+y)^{13}$. (CO3, L1)

10. Find the **coefficient of** x^{10} in a). $\frac{1}{(1-x)^3}$ and b). $\left(x^3+x^4+.....\right)^2$ (CO4, L3)

11. Solve the recurrence relations with the given initial conditions a) $a_n = a_{n-1}+2$; $a_0 = 3$.

b) $a_n = a_{n-1}+n; a_0 = 1$. (CO4, L3)

12. Solve $a_n - 5a_{n-1} + 6a_{n-2} = 0,\ for\ n \geq 2$ and $a_0 = 1, a_1 = -2,$ by the generating function. (CO4, L 3)

13. In a Boolean algebra B, for $a,b \in B$, prove that

a) $a+(a\cdot b)=a$

b) $a\cdot(a+b)=a$

(CO5 ,L3)

14. State and Prove De'morgan laws in Boolean algebra. (CO5 ,L3)

15. Minimize the switching function $\sum m(0,2,8,12,13)$. (CO 5,L 3)

****

1.3.1: Institution integrates cross-cutting issues relevant to Professional Ethics, Gender, Human Values, Environment and Sustainability and other value framework enshrined in Sustainable Development Goals and National Education Policy – 2020 into the Curriculum

NAME OF THE PROGRAM : B.Sc. MPCS (PHYSICS)

NAME OF THE PROGRAM : B.Sc. MPCS (PHYSICS) REGULATION 15 & 20						
NAME OF THE COURSE	**Couse Code**	**Professional Ethics**	**Gender**	**Human values**	**Environmental and Sustainability**	**other value framework enshrined**
MECHANICS AND PROPERTIES OF MATTER	PHYT11A	From accurate calculations in vector fields to ethical applications in material science and aerospace, these principles ensure that students apply physics responsibly, supporting societal welfare, scientific honesty, and public safety in their future professions	NIL	NIL	This syllabus fosters eco-conscious practices in physics, emphasizing resource efficiency, conservation, and sustainable technology. Students learn to apply physics in ways that respect ecological balance, supporting responsible use of natural resources and promoting a sustainable future.	Aligned with a values framework, this syllabus promotes ethical responsibility, critical thinking, and a respect for nature. By connecting physics concepts to societal and environmental issues, students develop a sense of duty toward responsible innovation, lifelong learning, and social progress, enriching both personal and professional growth.
ANALOG AND DIGITAL ELECTRONICS	PHYTEL61	The syllabus emphasizes responsible engineering practices, ensuring safety and reliability in electronic circuit design. Understanding FETs and Op-Amps encourages adherence to ethical standards in technology application. Emphasizing quality in data processing circuits and sequential logic reinforces the importance of integrity, accountability, and professional responsibility in engineering practices.	NIL	NIL	The syllabus incorporates principles of environment and sustainability by emphasizing the importance of efficient electronic designs that minimize energy consumption and waste. Understanding FETs, Op-Amps, and data processing circuits encourages sustainable practices, promoting eco-friendly technologies and the development of solutions that contribute to a greener future in electronics and engineering.	The syllabus aligns with value frameworks by fostering critical thinking and problem-solving skills through practical applications of electronics. Emphasizing teamwork in projects and understanding ethical implications encourages respect for diversity and inclusivity. The focus on operational amplifiers and digital circuits promotes innovation and responsibility in creating technology that benefits society.

MECHANICS, WAVES AND OSCILLATIONS	PHYT11B	By embracing ethical principles, professionals across various fields of mechanics and physics can significantly advance scientific knowledge and technology. This commitment fosters trust, integrity, and respect within the scientific community, ensuring their contributions positively impact society while upholding the highest standards of professionalism and responsibility.	NIL	NIL	The syllabus emphasizes environment and sustainability by exploring the mechanics of particles and rigid bodies, highlighting energy-efficient designs in rocket and satellite motion. Understanding oscillations and ultrasonic applications promotes sustainable technologies, while celestial mechanics and GPS concepts encourage eco-friendly navigation solutions, contributing to a sustainable future in science and engineering.	The syllabus aligns with other value frameworks by fostering critical thinking and innovation through the study of mechanics and relativity. Emphasizing teamwork in problem-solving encourages collaboration, while understanding oscillations and ultrasonics promotes responsibility in technological applications, ensuring that students appreciate ethical considerations and the broader impact of their work.
ELECTRICITY, MAGNETISM & ELECTRONICS	PHYT41A	The syllabus emphasizes professional ethics by encouraging students to understand the implications of their work with electric fields, dielectrics, and electronic devices. Comprehending concepts like electromagnetic induction and circuit behavior fosters a commitment to responsible practices in technology development and application.	NIL	NIL	The syllabus incorporates environmental considerations through the study of electromagnetic waves and their applications, prompting students to evaluate the environmental impact of their work. Understanding the principles of electrostatics and magnetostatics aids in the development of cleaner technologies that can mitigate negative effects on the environment.	The syllabus integrates various value frameworks by emphasizing critical thinking and problem-solving in electrostatics, dielectrics, and digital electronics. This approach encourages ethical decision-making, cultural sensitivity, and social responsibility, ensuring students recognize the broader implications of their technological advancements on society and fostering a holistic understanding of their professional responsibilities.
ELCTRONIC INSTRUMENTATIO N	PHYSET02	The syllabus emphasizes professional ethics by highlighting the importance of accuracy, precision, and sensitivity in measurements. Understanding instruments and their specifications fosters responsible usage and accountability. Students are encouraged to appreciate the ethical implications of measurement errors and the necessity for integrity in instrument design and application in various fields.	NIL	NIL	The syllabus incorporates environment and sustainability by emphasizing the importance of accurate measurements in environmental monitoring. Understanding instruments like voltmeters and transducers is crucial for assessing ecological impacts. Operational amplifiers and ADCs can enhance data collection, contributing to sustainable practices in various fields, including environmental science and renewable energy technologies.	The syllabus aligns with various value frameworks by promoting accuracy and integrity in measurements through understanding instrument specifications and classifications. It encourages ethical practices in data collection and analysis, fostering a culture of responsibility in technology use. Emphasizing operational amplifiers and transducers supports innovation while respecting societal and environmental values.

PHYSICS	PHYT11A	2016-17	B.Sc.

Semester-I **Paper-I** **Credits-3**

Work load: 60 hrs per semester 4 hrs/week

MECHANICS AND PROPERTIES OF MATTER

Objectives

Mechanics is the study of forces that act on bodies and the resultant motion that those bodies experience. With roots in physics and mathematics, Mechanics is the basis of all the mechanical sciences: civil engineering, materials science and engineering, mechanical engineering and aeronautical and aerospace engineering. Mechanics provides the "building blocks" of static's, dynamics, strength of materials, and fluid dynamics.

- The major objectives of this course are for students to learn the fundamental principles of classical mechanics to develop solid and systematic problems solving skills and to lay the foundation for further studies in Physics
- Summarize the concepts of classical relativity, define inertial and non inertial reference frames , and explain the logic behind the ether hypothesis and the reasons for its demise.
- Explain the two postulates of relativity and how they lead to the relativity of simultaneity.
- Understand the concepts of time dilation and length contraction and calculate the relationship between time intervals and length observed in different inertial frames

COURSE OUTCOME NO	Upon successful completion of this course, students should have the knowledge and skills to:	PROGRAM OUTCOME NO
Co1	Use the concepts and theorems in this unit students can verify conservative nature of forces and solve the Maxwell's equations in higher studies.	PO1,PSO1
Co2	Understand the nature of collisions, how forces acting on different bodies, the utilization of multistage rockets in launching the various satellites with different velocities, at different heights.	PO3,PSO2
Co3	Use the concept of rotating motion is used in automobiles . Use the concepts of processional motion in the construction of Gyrocompass which is used in navigation and understand that the spin of the earth is similar to spin motion of symmetric top.	PO4,PSO1
Co4	Understand why the planets are revolving in different orbits with different velocities around the sun. One can estimate the time periods and heights of the planets in terms of the time period and height of the earth with respect to the sun.	PO7,PSO3
Co5	Derive Einstien's mass-energy relation by using the concept of variation of mass with velocity. Understand that the tools and machines which are used in industries , agriculture and health sciences are based on the principles of mechanics.	PO6,PSO4

CO-PO MATRIX								
	CO-PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**
PHYSET02	**CO1**	2						
	CO2			3				
	CO3				2			
	CO4							3
	CO5						2	

UNIT-I (10 hrs)

1. Vector Analysis

1.1) Scalar and vector fields, 1.2) gradient of a scalar field and its physical significance. 1.3) Divergence and curl of a vector field with derivations and physical interpretation. 1.4) Vector integration (line, surface and volume) 1.5) Statement and proof of Gauss and Stokes theorems.

UNIT-II (10 hrs)

2. Mechanics of particles

2.1)Laws of motion(Newton's laws) 2.2)motion of variable mass system 2.3)Equation of motion of a rocket - motion of rocket under constant gravitational field- multi stage rocket 2.4)Conservation of energy and momentum, 2.5)Collisions in two and three dimensions, 2.6)Concept of impact parameter, scattering cross-section, 2.7)Rutherford scattering angle-derivation.

UNIT-III (16 hrs)

3. Mechanics of Rigid bodies 3.1) Definition of rigid body, rotational kinematic relations 3.2)equation of motion for a rotating body 3.3) angular momentum 3.4) Euler equations and its applications 3.5) precession of a top 3.6) Gyroscope 3.7) precession of the equinoxes.

4. Mechanics of continuous media

4.1) Elastic constants of isotropic solids and their relations 4.2) Poisson's ratio and expression for Poisson's ratio in terms of y, n, k. Classification of beams 4.3) types of bending 4.4) point load 4.5) distributed load 4.6)shearing force and bending moment 4.7) sign conventions.

UNIT-IV (12Hrs)

5. Central forces

5.1) Central forces, definition and examples 5.2) characteristics of central forces 5.3) conservative nature of central forces, 5.4) conservative force as a negative gradient of potential energy, 5.5) equation of motion under a central force.5.6) Derivation of Kepler's laws 5.7)Motion of satellites, 5.8)idea of Global Positioning System (GPS).

UNIT-V (12 hrs)

6. Special theory of relativity

6.1) Galilean relativity 6.2) absolute frames. 6.3) Michelson-Morley experiment, negative result 6.4) Postulates of special theory of relativity 6.5) Lorentz transformation 6.6)time dilation 6.7)length contraction 6.8)addition of velocities 6.9)mass-energy relation. 6.10) Concept of four-vector formalism.

REFERENCE BOOKS:

1. B. Sc. Physics, Vol.1, Telugu Academy, Hyderabad
2. Fundamentals of Physics Vol. I - Resnick, Halliday, Krane ,Wiley India 2007

3. Unified Physics, Vol. 1, S.L. Gupata & S. Guptha, Jai Prakash Nath & Co, Meerut.
4. College Physics-I. T. Bhimasankaram and G. Prasad. Himalaya Publishing House.
5. University Physics-FW Sears, MW Zemansky & HD Young,Narosa Publications, Delhi
6. Mechanics, S.G.Venkatachalapathy, Margham Publication, 2003.

PHYSICS	PHYTEL61	2017-'18	B.Sc.

Paper–VII-(A) Elective (Electronics) **Semester –VI**
No. of Hours per week: 04 **Total Lectures:60**

ANALOG AND DIGITAL ELECTRONICS

Course objectives:

1.To understand the operation of the various bias circuits of MOSFET and Analyze and design MOSFET bias circuits.
2. To understand the operation and design of operational amplifier circuits.
3. To understand the design and analysis of different multiplexers.
4.To understand the different types of flip-flops circuits.
.

COURSE OUTCOME NO	Upon successful completion of this course, students should have the knowledge and skills to:	PROGRAM OUTCOME NO
Co1	Understand the fundamental concepts (construction, working and drain & transfer characteristics) of semiconductor devices, FET& MOSFET. Apply the knowledge in construction of Electronic devices .	PO1,PSO1
Co2	Understand the operation of basic differential amplifiers and their applications in Linear Integrated circuits. Learn the basic function of Operational Amplifier (IC741), Ideal and Practical characteristics and its parameters (Offset voltages, CMRR, Slew rate and Virtual Ground).	PO3,PSO2
Co3	Understand the function of Operational Amplifier as inverting and non- inverting amplifier. Understand the versatility of Operational Amplifier as summing amplifier, difference amplifier, Comparator, integrator and differentiator) in performing different mathematical operations.Apply the knowledge in design the various digital devices	PO2,PSO1
Co4	Understand, analyze, design and troubleshoot a broad range of combinational circuits (Multiplexer, Demultiplexer, Encoder and Decoder) using digital ICs. Understand the operation and characteristics of digital ICs (RTL, DTL, TTL, ECL, and CMOS)	PO4,PSO3
Co5	Understand the pin configuration and basic function of internal architecture of IC555 Timer. Understand the construction and operation of flip flops (RS, Clocked SR, JK, D, T, and Master-Slave).Implement the knowledge in conversion of flip flops (RS Flip flop to JK Flip flop and JK Flip flop to to T Flip flop).	PO5,PSO4

CO-PO MATRIX								
PHYSET02	CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
	CO1	2						
	CO2			1				
	CO3		3					
	CO4				2			
	CO5					1		

Unit-I (12 Hours)
Field Effect Transistor

1(a) FET-Construction, Working, drain and transfer characteristics and uses.
1(b) MOSFET-enhancement MOSFET, depletion MOSFET, construction and working Characteristics of MOSFET, applications of MOSFET.

Unit-II (12 Hours)
Operational Amplifiers-I

2(a) Operational Amplifiers: Basic differential amplifiers, Op-Amp supply voltage, IC identification, Internal blocks of Op-Amp.
2(b) Characteristics of ideal and practical Op-Amp (IC 741) its parameter off set voltages and currents, CMRR, slew rate, concept of virtual ground.

Unit-III (12Hours)
Operational Amplifiers-II

3(a) Applications of Op-Amp: Op-Amp as voltage follower, Inverting amplifier, Non-inverting amplifier, voltage follower.
3(b) Summing amplifier, difference amplifier, comparator, integrator, Differentiator.

Unit-IV (12 Hours)
Data processing circuits and IC 555 Timer

4(a) Data processing circuits: Multiplexers, De-multiplexers, encoders, decoders Characteristics for Digital ICs -RTL, DTL, TTL, ECL CMOS (NAND & NOR Gates).
4(b) IC 555 Timer -Its pin diagram, internal architecture.

Unit-V (12Hours)
Sequential digital circuits

5(a) Sequential digital circuits:Flip-flops, RS, Clocked SR, JK.
5(b) D, T, Master-Slave, Flip- flop,Conversion of Flip flops.

Reference Books
1. Digital Electronics by G.K.Kharate Oxford University Press
2. Unified Electronics by Agarwal and Agarwal.
3. Op- Amp and Linear ICs by Ramakanth A Gayekwad, 4th edition PHI
4. Digital Principles and Applications by Malvino and Leach, TMH, 1996, 4th edition.

5. Digital Circuit design by Morris Mano, PHI
6. Switching Theory and Logic design by A.AnandKumar, PHI
7. Operations amplifier by SV Subramanyam.

P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

Siddhartha Nagar, Vijayawada – 520 010

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Title of the Paper: MECHANICS, WAVES AND OSCILLATIONS

Offered to: B.Sc. (MPC & MPCs) | **Course Type:** Core (TH)
Year of Introduction: 2020-21 | **Year of Revision:** 2021-2022
Percentage of Revision:15% | **Course Code:** PHYT11B
Semester: I | **Credits:** 03
Hours Taught: 60 hrs. per Semester | **Max. Time**: 4 Hours

Course Prerequisites (if any):

To be eligible for BSc Physics admission, students need to graduate 10+2 with PCBM, or PCM as compulsory subjects.

Course Description:

The students would learn about the behaviour of physical bodies it provides the basic concepts related to the motion of all the objects around us in our daily life. The course builds a foundation of various applied field in science and technology; especially in the field of mechanical engineering. The course comprises of the study laws of motion, momentum, energy, rotational motion, gravitation, special relativity and study of superposition of harmonic oscillations, waves motion (general), oscillators, sound.

Course Objectives:

1. Offer a comprehensive grasp of Newtonian mechanics principles and their application in solving problems related to the dynamic motion of classical mechanical systems.
2. Describe the constraints of Newtonian mechanics concerning motion at extremely high velocities, leading to the introduction of the special theory of relativity.
3. Facilitate practical learning through hands-on experiments aimed at investigating various properties of matter and oscillations.
4. Through the study of Fourier analysis, enable students to analyze diverse mechanical, optical, and electromagnetic wave phenomena.
5. Acquire knowledge of ultrasonic waves and their application across various fields.

Course outcomes:

On successful completion of this course, the students will be able to:

CO1: Understand rotational kinematic relations and their applications, such as with symmetric tops, and apply Kepler's laws to describe celestial motion.

CO2: Learn Newton's laws and their applications, including projectile and rocket motion, and grasp reference frames' significance.

CO3: Apply rotational kinematic relations and explore gyroscopes' principles, applications, and precessional motion.

CO4: Analyze central forces in planetary motion, waves, and oscillations, solving problems on coupled oscillations and normal modes.

CO5: Study harmonics in strings and gain knowledge of ultrasonic waves, their production, detection, and applications.

CO-PO MATRIX								
	CO-PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**
PHYT11B	**CO1**					M		
	CO2						M	
	CO3						M	
	CO4							M
	CO5						M	

Unit	Learning Units	Lecture Hours
I	A. **Mechanics of Particles** (5 hrs) Review of Newton's Laws of Motion, Motion of variable mass system, Multistage rocket, Concept of impact parameter, scattering cross-section, Rutherford scattering-Derivation. B. **Mechanics of Rigid bodies** (7 hrs) Rigid body, rotational kinematic relations, Equation of motion for a rotating body, Angular momentum and Moment of inertia tensor, Euler equations, Precession of a spinning top, Gyroscope, Precession of the equinoxes	12
II	A. **Celestial mechanics** Central force - definition and examples, characteristics of central forces, conservative nature of central forces, Equation of motion under a central force B. **Orbital mechanics** Kepler's laws of planetary motion- Proofs, Motion of satellites – **escape velocity, orbital velocity**, Basic idea of Global Positioning System (GPS	12
III	A. **Frames of reference and transformation** (5 hrs) Introduction to relativity, Frames of reference - Galilean transformations, absolute frames, Michelson-Morley experiment & negative result. B. **Consequences of relativistic transformations** (7 hrs) Postulates of Special theory of relativity, Lorentz transformation, time dilation, length contraction, variation of mass with velocity, Einstein's mass-energy relation	12
IV	A. **Undamped, Damped and Forced oscillations**: (07 hrs) Simple harmonic oscillator, damped harmonic oscillator, forced harmonic oscillator - differential equations and its solutions, Resonance, Logarithmic decrement, Relaxation time and Quality factor. B. **Fourier analysis (05 hrs)** Fourier theorem (Statement & limitations), evaluation of the Fourier coefficients using Fourier's theorem, analysis of periodic wave functions - square wave, triangular wave.	12

V	A. **Vibrating Strings**: (07 hrs) Transverse wave propagation along a stretched string, General solution of wave equation and its significance, Modes of vibration of stretched string clamped at ends, Overtones and Harmonics. B. **Ultrasonics**: (05 hrs) Ultrasonics, General Properties of ultrasonic waves, Production of ultrasonics by piezoelectric and magnetostriction methods, Detection of ultrasonics, Applications of ultrasonic waves, SONAR	12

TEXT BOOKS

1. B. Sc. Physics, Vol.1, Telugu Academy, Hyderabad
2. Unified Physics - Waves and Oscillations, Jai PrakashNath & Co.Ltd.

REFERENCE BOOKS:

1. Fundamentals of Physics Vol. I - Resnick, Halliday, Krane, Wiley
2. College Physics-I. T. Bhimasankaram and G. Prasad. Himalaya Publishing House.
3. University Physics-FW Sears, MW Zemansky & HD Young, Narosa Publications, Delhi
4. Mechanics, S.G. Venkatachalapathy, Margham Publication, 2003.
5. Waves and Oscillations. N. Subramanyam and Brijlal, VikasPulications.
6. Waves & Oscillations. S. Badami, V. Balasubramanian and K.R. Reddy, Orient Longman.
7. The Physics of Waves and Oscillations, N.K. Bajaj, Tata McGraw Hill
8. Science and Technology of Ultrasonics- Baldevraj, Narosa, New Delhi,2004

STUDENT ACTIVITY

1. Seminars
2. Assignments.

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

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Title of the Paper: ELECTRICITY, MAGNETISM & ELECTRONICS

Offered to: B.Sc. (MPC & MPCs) **Course Type: Core (TH)**
PHYT41A

Year of Introduction: 2021-22 **Year of Revision: -** **Percentage of Revision:100%**

Semester: IV **Credits: 03**

Hours Taught: 60 hrs. per Semester **Max.Time: 3 Hours**

Course Objective:

1. Understand the magnetic effects of electric current.
2. Study the unification of electric and magnetic phenomena.
3. To gain knowledge about Maxwell's equations and EM waves
4. develop competence in using laboratory instruments to carry out experiments to study different electromagnetic phenomena, that will enhance student's classroom learning

Course outcomes:

On successful completion of this course, the students will be able to:

CO1 Remember and recollect of basic electrodynamic definitions and apply in daily life.

CO2 Understanding of electrodynamics and relativity.

CO3 Ability to define and derive expressions for the energy both for the electrostatic and magnetostatic fields and derive Poynting's theorem from Maxwell's equations and physical interpret.

CO4 Analyze Maxwell's equation in different forms (differential and integral) and apply them to diverse engineering problems.

CO5 Gain the knowledge of basic gates and number system.

CO-PO MATRIX								
	CO-PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**
PHYT41A	**CO1**					L		
	CO2						L	
	CO3						H	
	CO4							H
	CO5							M

Syllabus

Unit	Learning Units	Lecture Hours
I	**A) Electrostatics: (6hrs)** Gauss's law-Statement and its proof, Electric field intensity due to (i) uniformly charged solid sphere and (ii) an infinite conducting sheet of charge, Deduction of Coulomb's law from Gauss law, Electrical potential–Equipotential surfaces, Potential due to a (i) point charge (ii) uniformly charged sphere **B) Dielectrics: (6 hrs)** Polar and Non-polar dielectrics - Electric displacement D, electric polarization P, Relation between D, E and P, Dielectric constant and electric susceptibility.	12
II	**A) Magnetostatics: (6 hrs)** Biot-Savart's law and its applications: (i) calculation of B due to long straight wire and (ii) solenoid, Ampere's Circuital Law and its application to Solenoid, Hall effect, determination of Hall coefficient and applications. **B) Electromagnetic Induction: (6 hrs)** Faraday's laws of electromagnetic induction, Lenz's law, Self-induction and Mutual induction, Self-inductance of a long solenoid, Mutual inductance of two coils, Energy stored in a magnetic field, Eddy currents and Electromagnetic damping	12
III	**A) Alternating currents: (6 hrs)** Alternating current - Relation between current and voltage in LR and CR circuits, Phasor and Vector diagrams, LCR series and parallel resonant circuit, Q –factor, Power in ac circuits, Power factor.	12

	B) Electromagnetic waves-Maxwell's equations: (6 hrs) Idea of displacement current, Maxwell's Equations-Derivation, Maxwell's wave equation (with derivation), Transverse nature of electromagnetic waves, Poynting theorem (Statement and proof)	
IV	**Basic Electronic devices:** **A) Diodes**: PN junction diode, Zener diode and Light Emitting Diode (LED) and their I-V characteristics, Zener diode as a regulator **B) Transistors**: Transistors and its operation, CB, CE and CC configurations, Input and output characteristics of a transistor in CE mode, Relation between alpha, beta and gamma; Hybrid parameters, Determination of hybrid parameters from transistor characteristics; Transistor as an amplifier.	12
V	**Digital Electronics:** Number systems, Conversion of binary to decimal system and vice versa, Binary addition & Binary subtraction (1's and 2's complement methods), Laws of Boolean algebra, Basic logic gates, DeMorgan's laws-Statements and Proofs, NAND and NOR as universal gates, Exclusive-OR gate, Half adder and Full adder circuits.	12

TEXT BOOKS

1. BSc Physics, Vol.3, Telugu Akademy, Hyderabad.
2. Electricity and Magnetism, D. N. Vasudeva. S. Chand & Co.

REFERENCE BOOKS

1. Electricity, Magnetism with Electronics, K. K. Tewari, R. Chand& Co.,
2. Principles of Electronics, V.K. Mehta, S. Chand& Co.,
3. Digital Principles and Applications, A. P. Malvino and D. P. Leach, Mc Graw Hill Edition.

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)

- ❖ Field studies (individual observations and recordings as per syllabus content and related areas (Individual or team activity)
- ❖ Study projects (by very small groups of students on selected local real-time problems pertaining to the syllabus or related areas. The individual participation and contribution of students shall be ensured (team activity)

GENERAL

- ❖ Group Discussion
- ❖ Visit Research Stations/laboratories and related industries
- ❖ Others

RECOMMENDED ASSESSMENT METHODS

Some of the following suggested assessment methodologies could be adoptee

- ➢ The oral and written examinations (Scheduled and surprise tests),
- ➢ Practical assignments and laboratory reports,
- ➢ Observation of practical skills,
- ➢ Efficient delivery using seminar presentations,
- ➢ Viva voce interviews.

***

MODEL QUESTION PAPER

Title of the Paper: ELECTRICITY, MAGNETISM & ELECTRONICS

Section-A

Answer the following: 5X10=50M

1 a) State Gauss law in electrostatics. Obtain an expression for potential due to point charge. (CO1, L1)

OR

b) Define D, E and P. Derive the relation between them. Hence deduce the relation between dielectric constant and susceptibility (CO3, L1)

2. a) Explain Biot-Savert Law. Derive an expression for the magnetic induction for infinite long straight wire. (CO2, L2)

OR

b) State Faraday's and Lenz's Law. Derive an expression for a long solenoid. (CO2, L2)

3 a) Derive an expression for the current flowing in an LCR series circuit. Explain resonance condition (CO3, L3)

OR

b) Write Maxwell's equations in differential form. Derive the equation of electromagnetic wave and hence evaluate the velocity of light in free space. (CO1, L3)

4 a) Explain the working and V-I characteristic of PN junction diode. (CO4, L2)

OR

b) Explain the working of PNP and NPN transistors. (CO3, L2)

5 a) State and prove De Morgan laws. (CO4, L2)

OR

b) Discuss the construction and working of Half Adder and Full Adder and give their truth tables. (CO3, L2)

SECTION B

Answer any THREE of the following

3X5=15M

6. Define electric potential. Write a note on equi potential surfaces. (CO1, L1)

7. What is Halll effect? Write its applications. (CO2, L1)

8. Explain about Q-factor (CO2, L2)

9. Derive the relation between α and β (CO3, L2)

10. Explain how NAND gate can act as universal gate. (CO4, L1)

SECTION C

Answer any TWO of the following.

2X5=10M

11. Find the resonant frequency of LCR series with L = 2mH, C=0.8μf and R = 100KΩ (CO4, L3)

12. In a transistor base current and emitter current are 0.09mA and 9.09mA respectively. Calculate current gains α and β (CO4, L3)

12. Find the binary equivalent of 625. (CO4, L3)

13. Add binary numbers 110, 111 and 101 (CO4, L3)

P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

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Reaccredited at the level 'A^{+}' by the NAAC

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Title of the Paper: Electronic Instrumentation

Offered to: B.Sc. (MPC&MPCs)

Course Type: Core (TH) PHYSET02

Year of Introduction: 2022-23 **Year of Revision:** NIL

Percentage of Revision: NIL

Semester: V/VI **Credits: 03**

Hours Taught: 45 hrs. per Semester

Course Objectives:

- Explain basic concepts and definitions in measurement.
- Describe the bridge configurations and their applications.
- 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 and their applications

CO5 Understand the fundamental theory of Transducers and bridges

CO-PO MATRIX								
PHYSET02	**CO-PO**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**
	CO1					M		
	CO2						M	
	CO3					L		
	CO4							H
	CO5						H	

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.

Model Question Paper

ELECTRONIC INSTRUMENTATION

Max Marks: 75

Section A

Answer ALL questions **5X10=50M**

1. 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)

2 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)

3 A) Explain in brief Piezoelectric transducer. (CO3, L2)

   (OR)

   B) Discuss about Wheatstone's bridge. (CO3, L2)

4 A) Explain A/D and D/A converters. (CO4, L2)

   (OR)

   B) Discuss about various display devices. (CO4, L2)

5 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)

Section B

Answer any FIVE of the following **5X5=25M**

6. Distinguish between accuracy and precession of a measurement. (CO1, L1)
7. What are the uses of function generator? (CO1, L1)
8. Write a short note on photo transducer. (CO2, L1)
9. What are the various applications of CRO? (CO2, L1)
10. Explain any two specifications of CRO. (CO3, L2)
11. Distinguish between DC and AC bridges. (CO3, L2)
12. Explain A/D Converter using successive approximation type. (CO3, L2)
13. Explain LED display systems. (CO4, L2)
14. Explain summing and difference amplifier? (CO5, L2)
15. What are the ideal characteristics of op-amp? (CO5, L1)

1.3.1: Institution integrates cross-cutting issues relevant to Professional Ethics, Gender, Human Values, Environment and Sustainability and other value framework enshrined in Sustainable Development Goals and National Education Policy – 2020 into the Curriculum

NAME OF THE PROGRAM : B.Sc. MSCS (STATISTICS)

NAME OF THE PROGRAM : B.Sc. MSCS (STATISTICS) REGULATION 15 & 20						
NAME OF THE COURSE	**Couse Code**	**Professional Ethics**	**Gender**	**Human values**	**Environmental and Sustainability**	**other value framework enshrined**
Statistical Methods for Cognitive Systems	**STAT26**	Ethical implications of regression analysis in making predictions and decisions that impact communities and environments. Bayes' theorem, with applications highlighting ethical decision-making in uncertain situations.Techniques for presenting data effectively, using tables, diagrams, and graphs, ensuring clarity and integrity in communication.	Exploration of lines of regression and coefficients, emphasizing applications in gender analysis.Applications of probability in assessing gender-related risks and outcomes, with a focus on conditional probability and Bayes' theorem.echniques for presenting data effectively through tables, diagrams, and graphs, ensuring gender-specific insights are clearly communicated.Group discussions on interpreting gender-disaggregated data and the potential implications for policy and practice.	Introduction to the concept of correlation, highlighting its relevance to human values.Discussion on how regression analysis can inform policies that align with human values and social equity.ntroduction to data types, and methods for presenting data through tables, diagrams, and graphs, highlighting the importance of transparency and clarity in communicating findings.Discussion of skewness and kurtosis to understand the implications of data shapes for human values and policy-making.	Applications of correlation analysis in assessing relationships between environmental variables (e.g., pollution levels and health outcomes).Exploration of probability theorems (addition theorem, multiplication theorem, Bayes' theorem) and their applications in environmental risk assessment and modeling.Group discussions and projects focused on interpreting data in the context of sustainability and making policy recommendations based on findings.	Applications of regression analysis in predicting outcomes based on different value frameworks, such as economic growth, social equity.Techniques for presenting data effectively using tables, diagrams, and graphs, tailored to various audiences and value perspectives.Analysis of skewness and kurtosis to assess the shape of data distributions and their implications for understanding value frameworks and societal impacts.
Applied Statistics	**22STAT01**	This course offers an interdisciplinary approach to understanding the intersection of professional ethics, statistical methods, and sustainable development. It focuses on how ethical considerations play a crucial role in achieving the Sustainable Development Goals (SDGs) and the National Education Policy (NEP) 2020.	This course explores the critical role of gender in achieving the Sustainable Development Goals (SDGs) and the National Education Policy 2020 (NEP-2020). It provides a comprehensive understanding of gender-related issues within the context of sustainable development and equips students with statistical tools to analyze and address gender disparities.	This course examines the vital role of human values in shaping sustainable development and educational policies, focusing on their integration within the Sustainable Development Goals (SDGs) and the National Education Policy (NEP) 2020. Students will explore how ethical considerations and core human values—such as respect, integrity, empathy, and social responsibility—can drive positive change in society	The course you described does not directly focus on environmental and sustainability issues in Sustainable Development Goals (SDGs) and NEP-2020. However, the statistical concepts and techniques covered can be applied to address environmental and sustainability concerns related to these topics.	Students will explore how these values—such as social equity, environmental sustainability, economic viability, and cultural inclusivity—shape policies and practices aimed at fostering a sustainable and just society. The course will also integrate statistical methods for assessing the impact of these values in various contexts.

Applied Statistics for Business Analytics	**22STAT34**	Students will explore how ethical principles guide decision-making and practice in various professional fields, emphasizing the importance of integrity, accountability, and social responsibility in fostering sustainable development and quality education.	Studentss will explore how gender considerations are integrated into policy-making, educational practices, and social initiatives, with an emphasis on statistical analysis and experimental designs to assess gender equity and outcomes.	Students will explore how human values such as integrity, respect, empathy, and equity influence policy-making, educational practices, and societal development. The course will also incorporate statistical methods and experimental designs to evaluate the impact of these values on sustainable outcomes.	Discussion of the three principles of experimental designs, including Completely Randomised Design (CRD), Randomised Block Design (RBD), and Latin Square Design (LSD), with practical applications in environmental research.Estimating methods for elasticity using Leontief's and Pigou's approaches, with an emphasis on environmental data. SQC in monitoring environmental compliance and sustainability efforts.index numbers in measuring environmental indicators, including pollution indices and sustainability metrics.	Utilize quality control measures to promote and monitor adherence to ethical and social values in various contexts.Understanding the importance of index numbers in measuring progress towards value-based development goals, including equity indices and social welfare metrics.
Sampling Techniques and Design of Experiments	**22STAT41**	focuses on how ethical considerations influence data collection, analysis, and interpretation in research, particularly in the context of sustainable development and social equity. Participants will learn about sampling methodologies, experimental designs, and their ethical implications in ensuring integrity and inclusivity in research practices.Recognize the importance of professional ethics in research related to sustainable development.	To analyze how different sampling methods can reflect gender dynamics and address disparities.Discussion of complete enumeration versus sampling, focusing on the need for gender-sensitive approaches in survey design.One-way and two-way classification, highlighting the importance of gender in data interpretation and analysis.Apply appropriate sampling techniques that ensure gender inclusivity and equity.	Overview of sample survey principles and steps, emphasizing the significance of human values in survey design.Exploration of sampling and non-sampling errors, with attention to how these can impact human values and the integrity of data.One-way and two-way classifications, including how to interpret results in the context of human values.Conduct statistical analyses that take into account human values, contributing to the realization of the SDGs and NEP-2020 objectives.	Understanding populations and samples in the context of environmental studies and assesment.Exploration of sampling and non-sampling errors and their impact on environmental data integrity.Limitations of sampling and strategies to mitigate biases, particularly in environmental contexts.Discuss the environmental implications of choosing sampling methods.Understanding main effects and interaction effects in environmental experiments, including statistical analysis and the application of Yates' procedure to assess factorial effects.	Analysis of main effects and interaction effects for 2^2 and 2^3 factorial experiments, with an emphasis on sustainable practices.Design and analyze experiments that contribute to effective data-driven solutions for sustainability challenges

Operations Research - I	**STASET01**	Concepts of feasible and optimum solutions in the context of ethical resource allocation.Analysis of the associated cost vector and its importance in ethical decision-making.Utilizing this technique in ethical scenarios involving resource constraints.Optimal solution methods including the MODI method, with an emphasis on fairness and efficiency.	Definition of objective functions, constraints, and non-negative restrictions with a focus on gender-related variables.Detailed examination of the Simplex Algorithm for solving LPP, emphasizing its application in gender-related resource allocation.Mathematical formulation of transportation problems and their implications for gender equity in resource distribution.Group discussions on the effectiveness of optimization techniques in promoting gender equity and empowerment.	Understanding the canonical and standard forms of LPP as tools for fostering human values.Practical exercises focused on solving simple linear programming problems (2 and 3 variables) with human values in mind.Application of the Hungarian Method and handling unbalanced assignment problems with a focus on human values.	Discussion of canonical and standard forms of LPP and their applications in environmental decision-makingDefinitions and significance of basic solutions, degenerate solutions, and basic feasible solutions in environmental contextsMathematical formulation of the transportation problem with an emphasis on efficient distribution of resources (e.g., water, energy).	Overview of Linear Programming Problems (LPP) and their relevance to diverse value frameworks.Examination of canonical and standard forms of LPP and their application to enhance decision-making processes.Practical exercises on solving linear programming problems (2 and 3 variables) that reflect community interests and values.Application of the Hungarian Method and addressing unbalanced assignment problems with a focus on community needs.

STATISTICS	STAT26	2020-21 Onwards	CSCS (Computer Science with Cognitive Systems)

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 Solvingdata 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

Title of the course :Statistical Methods for Cognitive systems

Course Code : STAT26

Course Outcome	Course: CSCS(Computer Science with Cognitive Systems) Upon successful completion of this course, students should have the knowledge and skills to:	PO Mapping
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)

Model Paper

Max. Marks : 70
Min. Pass Mark :28

Section – A

Answer the following **5 x 4M = 20M**

1. (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)

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)

3. (a) Define Skewness. Write the measures of Skewness? (CO – 3, L – 2)

(OR)

(b) Define Kurtosis and explain its types. (CO – 3, L – 2)

4. (a) Write the properties of regression coefficients. (CO –4, L – 2)

OR

(b) Write a short notes on correlation (CO-4, L-2)

5. (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**

6. (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

7. (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

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 $\beta_1 \text{ and } \beta_2$. (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 2/3 and the probability that he passes both a Physics test and an English test is 14/45.The probability that he passes at least one test is 4/5. What is the probability that he passes the English test? (CO –5, L – 3)

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STATISTICS	STAP22	2020-21 Onwards	CSCS (Computer Science with Cognitive Systems)

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 β_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 bivariatedata
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)

22STAT01: Applied Statistics

Offered to: B.SC (MSCs, MSCa)

Course Type: Core (Theory) **Year of Introduction: 2021-22**

Semester: IV **60Hours** **Credits: 4**

Course Prerequisites: Students required knowledge in Mathematics and Statistical techniques

Course Description: This course provides the study of data related to population growth, construction index numbers. Also this course deals with industry problems and analyse and get solutions.

Course Objectives:

1) To enable the students to develop basic knowledge in Applied Statistics
2) To provide understanding in some advanced statistical techniques which are used for solving business problems.

Course Outcomes:

Course Outcome	Upon successful completion of this course, students should have the knowledge and skills to:	Programme Outcomes Mapping
CO 1	Understand the notation and formulae concerning the use and construction of index numbers.	PO - 4
CO 2	construct the Quality Control charts for Variables.	PO – 6
CO3	construct the Quality Control charts for Attributes	PO – 6
CO 4	Obtain the knowledge on asses the population growth by using vital statistics	PO - 7
CO 5	Helps asses the normalization processes of different scores and estimating the IQ levels.	PO - 6

Syllabus

Course Details

Unit	Learning Units	Lecture Hours
I	**Index Numbers** Basic problems involved in the construction of index numbers. Construction of index numbers - Simple aggregate, Weighted aggregate, Simple price relative and Weighted price relative methods. The criteria of good index number. Cost of living index number. Uses and Limitations of index numbers.	12
II	**Statistical Quality Control – I** Introduction. Basis of SQC. Uses of SQC. Types of controls – Process &Product. Construction of 3-σ limits. Construction of Mean ($\bar{x}$) and Range (R) charts. Interpretation of $\bar{x} and R charts$	12
III	**Statistical Quality Control – II** Construction of p and c charts - Fixed control limits. Interpretation of p and c - charts. Natural and Specification limits. Acceptance sampling inspection plans – AQL, LTPD, AOQL and ASN. OC curves.	12
IV	**Vital Statistics**	12

	Introduction, definition and uses of vital statistics, sources of vital statistics. Measures of different Mortality and Fertility rates, Measurement of population growth. Life tables: construction and uses of life tables.	
V	**Statistics in Psychology & Education** Introduction. Scaling procedures – Scaling of scores – Z or σ scores, Standard and normalized scores, T and Percentile scores. Reliability of test scores – Def. index and parallel tests. Methods of determining test reliability. Validity of test scores.	**12**

Text Book:

1. Fundamentals of Applied Statistics, 2014, S.C. Gupta and V.K. Kapoor ; Sutan Chand &Sons , New Delhi.

Reference Books:

1. Goon A.M., Gupta M.K. and Dasgupta B. (2001): Fundamentals of Statistics (Vol.2), World Press.
2. Mukhopadhyay, P (2011):Applied Statistics, 2nd edition revised reprint, Books and Allied(P) Ltd.
3. Agarwal, B.L. Basic Statistics, New Age International Publishers, New Delhi, 6th edition 2013

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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PARVATHANENI BRAHMAYYA
SIDDHARTHA COLLEGE OF ARTS & SCIENCE
Autonomous
Siddhartha Nagar, Vijayawada–520010
Re-accredited at 'A+' by the NAAC

Model Question Paper

22STAT01:Applied Statistics **Semester: IV**
Offered to: B.SC (MSCs, MSCa)
Max.Marks: 70 Marks **Max.Time: 3Hours**
Min. Pass: 28 Marks

Section – A

Answer the following **5 x 4M = 20M**

1. Define SQC and write its uses (L- 1, CO – 2)
   OR
   Explain 3 –σ limits (L – 2, CO – 2)
2. What are the applications of C- chart (L – 3, CO – 3)
   OR
   Briefly explain ASN and OC curves (L – 3, CO – 3)
3. Explain base shifting in index numbers (L – 2, CO – 1)
   OR
   From the following data calculate Index Number by simple (i) aggregate and (ii) relative method (L – 3, CO – 1)

Commodity	A	B	C	D
Price in 1980	162	256	257	132
Price in 1981	171	164	189	145

4. Explain the sources of vital statistics (L – 2, CO – 4)
   OR
   Explain reproduction rates (L – 2, CO – 4)
5. Explain scaling methods (L – 2, CO – 5)
   OR
   Explain concept of t and percentile scores (L – 2, CO – 5)

Section – B

Answer the following **5 x 10M = 50M**

6. (a) Explain the basic problems involved in the construction of index numbers (L – 2, CO – 1)
   OR
   (b) Find the cost of living index number by family budget method from the following data (L – 5, CO – 1)

Commodities	Base Year	Current Year	% of Weights
	Price	Price	
A	20	26	17
B	28	31	29
C	34	40	20
D	92	95	34

7. (a) Explain different fertility rates (L – 2, CO – 4)
   OR

(b) Fill in the blanks of the following table which are marked with ? (L – 2, CO – 4)

Age	l_x	d_x	q_x	p_x	L_x	e_x^o
20	693435	?	?	?	?	35081126
21	690673	-	-	-	-	?

8. (a) Explain the construction of mean and range charts (L – 2, CO – 2)

OR

(b) Explain the statistical basis of SQC (L – 2, CO – 2)

9. (a) Explain the construction of fraction defective chart (L – 2, CO – 3)

OR

(b) Explain the construction of number of defects per unit chart (L – 2, CO – 3)

10. (a) Letter grades A,B,C,D and E are assigned by two teachers X and Y to the students of class for Honesty. The table gives the distribution of the proportion of individuals in each rating (L – 5, CO – 5)

Teacher	A	B	C	D	E
X	0.10	0.15	0.50	0.20	0.05
y	0.20	0.40	0.20	0.10	0.10

OR

(b) Define reliability and validity tests. (L – 2, CO – 5)

***

22STAL01:Applied Statistics
Semester: IV **30 Hours** **Credits: 1**
Offered to: B.SC (MSCs, MSCa)
Course Type: Practical

Course Objectives:
1) To enable the students to develop basic knowledge in Applied Statistics
2) To provide understanding in some advanced statistical techniques which are used for solving business problems.

Course Outcomes:		
Course Outcome	Upon successful completion of this course, students should have the knowledge and skills to:	**Programme Outcomes Mapping**
CO 1	Measure the Mortality and Fertility rates and the construction of Life tables	PO - 5
CO 2	construct the Quality Control charts for Variables and attribute charts	PO - 6
CO 3	Construct the various types of index numbers	PO - 6

Practical No	Theme	Key Topics
1	Control Charts	Construction of Mean & Range charts
2	Control Charts	Construction of p & c charts
3	Index Numbers	Construction of Weighted index numbers
4	Index Numbers	Testing of good index number
5	Index Numbers	Construction of Whole sale price index number
6	Vital Statistics	Determining of Mortality rates
7	Vital Statistics	Determining of Fertility & reproduction rates
8	Vital Statistics	Construction of life tables
9	Psychology & Education	Scaling of ratings using Normal distribution

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Question Paper Pattern for Practical Course

SEE (LAB) Model Question Paper

22STAL01:Applied Statistics Lab

Offered to: B.SC (MSCs, MSCa)
Max. Marks: 50 **Max. Time: 3Hrs**

Pass. Min: 20

(A)	**Evaluation Procedure**	**35 Marks**
I	Experiments (Exam & Execution)	**30 Marks**
II	Viva	**3 Marks**
III	Record	**2 Marks**
(B)	**CONTINUOUS ASSESMENT(Internal)**	**15 MARKS**

15 marks for the continuous assessment (Day to day work in the laboratory shall be evaluated for 15 marks by the concerned laboratory teacher based on the regularity/ record/viva). Laboratory teachers are mandated to ensure that every student completes 80%-90% of the lab assessments.

TOTAL: (A)+(B) = **50 MARKS**

P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

Siddhartha Nagar, Vijayawada – 520 010

Autonomous -ISO 9001 – 2015 Certified

22STAT34: Applied Statistics for Business Analytics

Offered to: BBA (Business Analytics) **Course Type:** Core (Theory)

Year of Introduction:2021

Semester: III **75 Hours** **Credits: 4**

Course Prerequisites: Students required basic knowledge in Mathematical and Statistics techniques.

Course Description: This course provides the study of data related to time, psychology and life. Also this course also deals with the mathematical models for time series data, demand and Supply analysis

Course Objectives:

1) To enable the students to develop basic knowledge in Applied Statistics
2) To provide understanding in some advanced statistical techniques which are used for solving business problems.
3) To design of sample surveys.

Course Outcomes:

Course Outcome	Upon successful completion of this course, students should have the knowledge and skills to:	ProgrammeOutcomesMapping
CO 1	Develop the construct the Quality Control charts for Variables.	PO - 1
CO 2	Obtain knowledge on construct the Quality Control charts for Attributes	PO - 1
CO3	Understand the construction of Index numbers and able to Measure the Mortality and Fertility and Construction of Life tables	PO - 2
CO 4	Get the knowledge in design the complete random design, randomized block design and latin square design Layouts with their application to business	PO - 2
CO 5	Obtained the knowledge on demand analysis with real time applications used in industry.	PO – 3

Syllabus

Unit	Learning Units	Lecture Hours
I	**Statistical Quality Control-I** Introduction to Statistical Quality Control - SQC definition, Uses, Control Charts and Basis of control charts-3-σ limits. Process Control and product control - Control limits, Specification Limits and Tolerance Limits. Tools for SQC. Control charts for Variables - Control Chart for Mean $\bar{X}$ -chart, Range: R- Chart and Interpretation of $\bar{X}$ -chart and R charts.	12
II	**Statistical Quality Control-II** Control Charts for Attributes - Control chart for fraction defective p –chart - Fixed control limits and Variable control limits. Control chart for Number of defects per Unit (C-chart) - Fixed control limits and Variable control limits. Applications of C – Chart.	12

III	**Index numbers** Introduction, Characteristics and Uses of index numbers, Types of Index Numbers - Simple or Unweighted Index Numbers, Weighted Index numbers, Test of Adequacy for the formula of an index numbers, Cost of Living Index numbers and simple problems.	**12**
IV	**Design of Experiments** Introduction, Terminology in Experimental Designs- important terms, definitions and three principles of Experimental Designs. Completely Randomised Design (CRD), Randomised Block Design (RBD)–one observation per cell and Latin Square Design (LSD)and simple problems.	**12**
V	**Demand Analysis** Introduction, Laws of demand and supply, Price elasticity of demand and supply, Types of data - Family budget data and Time series data. Estimating methods for elasticity - Leontief's method (from time series data) and Pigou's method (from time series data).	**12**

Note: Proofs of theorems and derivations of problems and distributions are excluded.

Text Book:

1. S.C. Gupta, (2016), Seventh Edition, Fundamentals of Statistics, Mumbai: Himalaya Publishing House.

2. Fundamentals of Applied Statistics, 2014, S.C.Gupta and V.K. Kapoor; Sutan Chand &Sons New Delhi.

Reference Books:

1. Levine, D.M., Berenson, M. L. & Stephan, D. (2012*), Statistics for managers using* Microsoft Excel, New Delhi: Prentice Hall India Pvt.
2. Sharma, J. K. (2013), *Business statistics*, New Delhi: Pearson Education
3. Agarwal, B.L. Basic Statistics, New Age International Publishers, New Delhi, 6th edition 2013

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

22STAT34: Applied Statistics for Business Analytics

Offered to: BBA (Business Analytics) **Course Type:** Core (Theory)
Semester: III **Max.Marks: 70**
Max.Time : 3Hours **Pass Min : 28**

Section – A

Answer the following questions **5 x 4M = 20Marks**

1. a) Define SQC and write its uses
   (OR)
   b) Explain 3 –σ limits
2. a) Write the applications of C- chart
   (OR)
   b) Explain the procedure for fraction defective(p) chart.
3. a) Explain base shifting in index numbers
   (OR)
   b) From the following data calculate Index Number by simple (i) aggregate and (ii) relative method

Commodity	A	B	C	D
Price in 1980	162	256	257	132
Price in 1981	171	164	189	145

4. a) Explain the principle of randomization in experimental design
   (OR)
   b) Explain the layout of LSD
5. a) Write a short note on (i) law of demand (ii) law of supply
   (OR)
   b) Define price elasticity of demand and income elasticity of demand. Point out their uses in economic analysis.

Section – B

Answer the following questions **5 x 10M = 50Marks**

6. a) A machine is set to deliver packets of a given weight.10 samples of size 5 each were recorded. Below are given relevant data

Sample no	1	2	3	4	5	6	7	8	9	10
Mean	15	17	15	18	17	14	18	15	17	16
Range	7	7	4	9	8	7	12	4	11	5

   (OR)
   b) The following data provides the measurements of the axles of bicycle wheels.12 were taken so that each sample contains the measurements of 4 axles. The measurements which were more than 5 inches are given here obtain control limits for mean and range charts and also comment on the nature of the process
   139, 140, 142, 136, 145, 146, 148, 145, 140, 140, 141, 138
   140, 142, 136, 137, 146, 148, 145, 146, 139, 140, 137, 140
   145, 142, 143, 142, 146, 149, 146, 149, 146, 147, 141, 139
   142, 144, 144, 139, 141, 142, 146, 144, 146, 144, 138, 139.

7. a) The following data gives the number of defectives in 10 independent samples of varying sizes from a production process

Sample number	1	2	3	4	5	6	7	8	9	10
Sample size	2000	1500	1400	1350	1250	1760	1875	1955	3125	1575
No of defectives	425	430	216	341	225	322	280	306	337	305

   (OR)

b) During an examination of equal length of cloth, the following are the number of defects observed 2,3,4,0,5,6,7,4,3,2. Draw a control charts for the number of defects and comment whether the process is under control or not.

8. a) Calculate price index numbers for the year 2000 with 1995 as base year using Laspeyre's, Paasche's and Fisher's index numbers

Commodity	Quantity		Value	
	1995	2000	1995	2000
A	100	150	500	900
B	80	100	320	500
C	60	72	150	360
D	30	33	360	297

(OR)

b) Find the cost of living index number by family budget method from the following data

Commodities	Base Year	Current Year	% of Weights
	Price	Price	
A	20	26	17
B	28	31	29
C	34	40	20
D	92	95	34

9. a) A set of data involving four "tropical feed stuffs A, B, C, D" tried on 20 chicks is given below. All the twenty chicks are treated alike in all respects except the feeding treatments and each feeding treatment is given to 5 chicks. Analyze the data using CRD.

Feed	Gain in weight				
A	55	49	42	21	52
B	61	112	30	89	63
C	42	97	81	95	92
D	169	137	169	85	154

(OR)

b) Consider the results given in the following table for an experiment involving six treatments in four randomized blocks. The treatments are indicated by numbers within parentheses. Analyze the data and state the conclusion.

Blocks	Yield				
1	24(1)	27(3)	20(2)	16(4)	2495)
2	22(3)	28(2)	27(1)	15(4)	22(5)
3	26(5)	19(4)	38(1)	36(3)	39(2)
4	17(5)	31(2)	28(1)	14(4)	34(3)

10. a) Define price elasticity of demand and income elasticity of demand. Point out their uses.

(OR)

b) The demand function for a commodity X is given by $x = 300 - 0.5p_x^2 + 0.02p_0 + 0.05y$ Where x is the quantity demanded of X, p_x the price of X ,$p_0$the price of related Commodity and y is the constant income. Compute (i) the price elasticity of demand for X (ii) the income elasticity of demand for X w.r.t. $p_0$whenp_x= 12, p_0 = 10 and y = 200.

***

P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

Siddhartha Nagar, Vijayawada – 520 010

Autonomous -ISO 9001 – 2015 Certified

Title of the Course: Sampling Techniques and Design of Experiments

Offered to: BA(EMS) & B.SC (MSCs, M.S.Ca &M.S.Ds) **Course Code:22STAT41**

Course Type: Core (Theory) **Credits: 4**

Year of Introduction: 2021-22 **Semester: IV**

Hours Taught: 60periods. **Max.Time:** 3 Hours

Course Prerequisites: Basic Knowledge of Mathematics, Counting principles, distributions, Estimation and Testing of Hypothesis.

Course Description: This course helps the students to understand the various sampling ideas to conduct the socio economics studies. Introduces the basic concepts and principles of experimental design

Course Objectives:

1) To impart basic concepts in Sampling Theory.
2) To explore various sampling techniques and understand their merits and drawbacks.
3) To understand the basic terminology in experimental design.
4) To develop the students ability to plan an experiment.
5) Obtaining relevant information from the experiment in relation to the statistical hypothesis under study.

Learning Outcomes: At the end of the course, the student will

1) Acumen to apply for collecting data for various studies.
2) ability to understand the design for comparing the various fields.
3) develop the skill of identifying important inputs that impact the output.

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 principles and principal steps of sampling, and different sampling techniques. Apply different sampling techniques to take samples and computeunbiased estimates and confidence limits of population parameters.	PO - 5
CO 2	To analyse the unbiasedness and efficiencies of estimates obtained using different sampling techniques.	PO - 6
CO3	To understand the basic concepts and principles of experimental designs.	PO - 5
CO 4	To Analyze the various design of experiment concepts and missing plot techniques.	PO - 6
CO 5	To Identify the factors and variable for the experiment for building statistical model.	PO - 7

Syllabus

Unit	Learning Units	Lecture Hours
I	**Introductory Concepts of sampling :** Concepts of Population and Sample, Basic principles of sample survey, The principles steps in a sample survey, Complete enumeration Vs Sampling, Sampling and non-sampling errors, Limitations of sampling, Types of sampling, Non Probability sampling methods, Probability sampling methods **Simple Random sampling:** SRSWR definition and procedure of selecting a sample, SRSWOR definition and procedure of selecting a sample , expectation of sample mean and variance of sample mean in srswor and srswr, advantages and disadvantages.	12
II	**Stratified random sampling:** Stratified random sampling, Advantages and Disadvantages Allocation and types of allocation. Estimation of population mean, and its variance. Comparison between proportional and optimum allocations with SRSWOR. **Systematic sampling:** Procedure of construction, types, merits and demerits of systematic sampling. Comparison of systematic sampling with Stratified and SRSWOR	12
III	**Analysis of variance :** Analysis of variance(ANOVA) –Definition and assumptions. One-way classification, Two way classification.(one observation per cell) **Design of Experiments:** Terminology, Principles of design of experiments, CRD: Layout, advantages and disadvantage and Statistical analysis of Completely Randomized Design(C.R.D)	12
IV	Randomized Block Design (R.B.D) and Latin Square Design (L.S.D) with their layouts, advantages and disadvantage and Statistical analysis, Missing plot technique in RBD and LSD. Efficiency RBD over CRD, Efficiency of LSD over RBDand CRD.	12
V	**Factorial experiments** – Main effects and interaction effects of 2^2 and 2^3 factorial experiments and their Statistical analysis. Yates procedure to find factorial effect totals.	12

Text Book:

Fundamentals of Applied 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.
5. Sanjay Arora and Bansi Lal:. 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

***

Model Question Paper

Max.: 70 Marks **Course Code: 22STAT41** **Min. Pass : 28 Marks**

Sampling Techniques and Design of Experiments

Section A

Answer the following Questions. **5 x 4M = 20M**

1.(a). Define the terms Population and Sample with examples (CO-1,L-2)

(OR)

(b). Write the advantages of simple random sampling (CO-1,L-2)

2.(a). Write a short note on Stratified random sampling (CO-2,L-2)

(OR)

(b). Write the merits and demerits of Stratified random sampling(CO-2,L-2)

3.(a). Define the terms (i) Treatments (ii) Blocks (iii) Experimental error (CO-3,L-1)

(OR)

(b).Define ANOVA and Write its assumptions (CO-3,L-1)

4.(a).Write the applications of Completely randomized design (CO-4,L-2)

(OR)

(b).Explain the layout of Latin square design (CO-4,L-2)

5.(a).Define Factorial experiments and write its uses (CO-5,L-2)

(OR)

(b).Explain the Yates Procedure for Factorial effect totals. (CO-5,L-2)

Section – B

Answer the following. **5 x 10M =50M**

6 a) Explain basic principles of sampling (CO-1,L-2)

(OR)

b) In SRSWOR, the sample mean square is an unbiased estimate of the population mean square (CO-1,L-2)

7 a) Show that $V(\overline{y_{st}})_{Ney} \leq V(\overline{y_{st}})_{P} \leq V(\overline{y_{n}})_{R}$ (CO-2,L-2)

(OR)

b) If the population consists of a linear trend then Show that (CO-2,L-2)

$V(\overline{y_{st}}) \leq V(\overline{y_{sys}}) \leq V(\overline{y_{n}})_{R}$

8 a) Explain the principles of design of experiments (CO-3,L-2)

OR

b) Explain analysis of Completely randomized design (CO-3,L-2)

9 a) Explain analysis of Randomized block design (CO-4,L-2)

(OR)

b) Explain analysis of Latin square design (CO-4,L-2)

10 a) Explain analysis of 2^2 – factorial design (CO-5,L-2)

OR

b) Explain analysis of 2^3 – factorial design (CO-5,L-2)

***

P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

Siddhartha Nagar, Vijayawada – 520 010

Autonomous -ISO 9001 – 2015 Certified

Title of the Course : Sampling Techniques and Design of Experiments Lab

Offered to: BA(EMS) & B.SC (M.S.Cs, M.S.Ca &M.S.Ds) **Course Code:22STAL41**

Course Type: Core (Practical) **Credits: 1**

Year of Introduction: 2021-22 **Semester: IV**

Hours Taught: 30periods **Max. Time: 2** Hours

Course Prerequisites (if any): Nil

Course Outcomes:		
Course Outcome	Upon successful completion of this course, students should have the knowledge and skills to:	**Programme Outcomes Mapping**
CO 1	To draw the sample from the population using sampling techniques	PO – 5
CO 2	To Construct suitable designed experiment for a given real life data.	PO - 6

List of Practicals

1. Simple random sampling with and without replacement. Comparison between SRSWR & SRSWOR
2. Stratified random sampling – proportional & optimum allocations. Comparison between proportional & optimum allocations with SRSWOR
3. Systematic sampling with N = nk. Comparison of systematic sampling with stratified and SRSWOR
4. Analysis of CRD
5. Analysis of RBD. Relative efficiency of RBD over CRD
6. Estimation of single missing observation in RBD and its analysis
7. Analysis of LSD. Relative efficiency of LSD over CRD and RBD
8. Estimation of single missing observation in LSD and its analysis
9. Analysis of 2^2 with RBD layout

Question Paper Pattern for Core Lab Courses

(A) SEE (LAB) Model Question Paper

Max.Marks: 35 **Max.Time: 3Hours**

Pass. Min: 14

I. **Answer the following.** **Max. Marks: 30**

Q1

Q2

Q3

Q4

Q5

II Viva **2 Marks**

III Record **3 Marks**

(B) CONTINUOUS ASSESMENT(internal) **15 MARKS**

TOTAL : (A)+(B) = 50MARKS

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 Simples 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, 15th 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, 5th 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)

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ParvathaneniBrahmayya

Siddhartha College of Arts & Science, Vijayawada

Model paper

Course Code: STASET01

OPERATIONS RESEARCH-I

SECTION A

Answer any FIVE questions. **5 X5M = 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

$$Min\ Z = 1.5x_1 + 2.5x_2$$

Subject to conditions

$$x_1 + 3x_2 \geq 3$$

$$x_1 + x_2 \geq 2$$

and $x_1, x_2 \geq 0$.

10. (a) Using simple method to

Minimum z = x2 - 3x3 + 2x5

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

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)

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 tstks 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

***

1.3.1: Institution integrates cross-cutting issues relevant to Professional Ethics, Gender, Human Values, Environment and Sustainability and other value framework enshrined in Sustainable Development Goals and National Education Policy – 2020 into the Curriculum

NAME OF THE PROGRAM : TELUGU

NAME OF THE PROGRAM : TELUGU REGULATION 15 & 20						
NAME OF THE COURSE	**Couse Code**	**Professional Ethics**	**Gender**	**Human values**	**Environmental and Sustainability**	**other value framework enshrined**
TELUGU - I	**TELT11**	Across these texts, the recurring themes of duty, respect, justice, and self-awareness underline the essence of professional ethics. They encourage individuals to act with integrity, make ethically sound decisions, and foster an environment of respect and equality in their professional lives. Adhering to these principles not only enhances personal character but also contributes positively to society as a whole.	Overall, while some of these works may reflect traditional gender roles, they often provide critical insights that encourage discussions on gender equality, women's empowerment, and the need for social change. Analyzing these texts through a gender lens can reveal both the progress made and the ongoing challenges in achieving true equality.	These works collectively promote values such as empathy, justice, resilience, empowerment, patriotism, and the importance of community and personal growth.	Overall, while these texts may not explicitly focus on environmental issues, they provide rich contexts that can encourage discussions about sustainability, social justice, and the importance of preserving our natural resources.	Together, these works foster a multifaceted understanding of human values, including morality, justice, identity, and resilience. They encourage readers to reflect on their roles within society, the impact of their choices, and the importance of compassion and understanding in navigating complex social landscapes. Through their rich narratives, these texts serve as a mirror to societal values and challenges, urging a continuous dialogue about ethics and humanity.
TELUGU - II	**TELT21**	In summary, these works collectively emphasize the importance of humility, justice, social responsibility, effective communication, and personal integrity in fostering ethical professional behavior.	Overall, while some texts may uphold traditional gender roles, others might advocate for equity and empowerment. Analyzing them in detail can reveal nuances in their treatment of gender issues.	These texts collectively promote fundamental human values like humility, responsibility, equality, compassion, integrity, and continuous self-improvement, which are essential for a fulfilling life and harmonious society.	These interpretations aim to bridge traditional wisdom with modern environmental ethics, encouraging a sustainable approach to life by drawing on values rooted in respect, responsibility, and community.	Each of these texts underscores values that contribute to building a virtuous, harmonious, and socially responsible life.
TELUGU - III	**TELT01**	• Integrity: Upholding moral principles in relationships and society. • Empathy and Compassion: Understanding and supporting others in their struggles. • Social Justice: Challenging inequality and promoting fairness. • Personal Responsibility: Acknowledging the impact of one's choices on others and society. • Loyalty: Being true to commitments and relationships. These works collectively encourage readers to reflect on their ethical values and the impact of their actions on the broader society.	• Representation: Each work, while reflective of its time, provides avenues for discussing gender roles and the potential for equality. Character Development: Many female characters showcase strength, resilience, and agency, which can inspire discussions around gender equality. Critique of Norms: The texts often critique traditional societal norms and advocate for a more equitable society. By examining these works, readers can gain insights into historical and contemporary perspectives on gender equality in Telugu literature.	Collectively, these works emphasize essential human values such as compassion, love, resilience, social justice, and the importance of relationships. They encourage readers to reflect on their own lives and interactions with others, promoting a deeper understanding of human experience and moral responsibility.	By interpreting these texts through an environmental lens, readers can glean valuable insights into the themes of sustainability and the human condition in relation to nature.	Across these texts, the overarching value frameworks include: Ethical Living: A strong emphasis on dharma and moral conduct. Social Commentary: Critiques of societal norms and exploration of caste, gender, and individual freedom. Emotional Depth: Exploration of love, longing, and the human experience. Cultural Heritage: Preservation and reflection of traditional values while questioning their relevance in contemporary society. These works collectively contribute to a nuanced understanding of the values that define human relationships and societal structures in Indian literature.

TELUGU - II	**TELT21A**	Integrity: Upholding honesty and transparency in writing and criticism. Respect: Valuing diverse voices and cultural contexts. Responsibility: Acknowledging the social impact of literature and its role in shaping perspectives. Fairness: Ensuring equitable treatment of all creators and critics in discussions. These ethical principles serve as a foundation for responsible engagement with literature, fostering a respectful and enriching literary community.	Overall, many of these topics have the potential to engage with themes of gender equality, whether through explicit discussion of women's rights, representation, and empowerment or through subtler critiques of gender norms in society and literature. The analysis of these themes can foster a deeper understanding of gender issues in Telugu literature and arts.	Empathy: Understanding and sharing the feelings of others. Respect: Valuing the dignity of all individuals, especially in cultural contexts. Integrity: Honesty and moral principles in both personal and societal contexts. Courage: The strength to confront fear and challenges. Community and Support: The importance of social bonds and collective strength. These lessons together reflect a rich tapestry of human values that promote introspection, respect for culture, and a deeper understanding of human relationships and experiences.	The lessons may not explicitly focus on environmental and sustainability themes, literature often reflects societal values, including our relationship with nature. Exploring these themes in Telugu literature can help raise awareness and foster a deeper understanding of environmental issues. If you're looking for specific texts or themes within these works, I can help you further!	By engaging with these frameworks, learners can gain a deeper understanding of not only Telugu literature but also the broader human experience.
TELUGU - III	**TELT01A**	Adhering to these ethical principles helps maintain professionalism and trust in communication and media.	Curriculum Content: Include readings and resources that showcase gender equality and highlight successful individuals from various genders. Discussions and Debates: Organize discussions on gender issues in media and literature, encouraging students to critically analyze representations. Guest Speakers: Invite speakers from diverse backgrounds who can share their experiences and insights regarding gender equality in creative fields. By integrating these approaches, educators can foster a learning environment that values and promotes gender equality across all lessons.	hese human values highlight the importance of ethical communication, creativity, cultural sensitivity, and social responsibility in all forms of writing and expression.	By integrating these environmental and sustainability themes into the curriculum, students can not only enhance their writing and communication skills but also become more informed and engaged citizens committed to protecting the environment.	These frameworks can help students develop a well-rounded skill set that is applicable in various professional and personal contexts.

PARVATHANENI BRAHMAYYA SIDDHARTHA COLLEGE OF ARTS & SCIENCE :: VIJAYAWADA-520 010.
(An Autonomous College in the Jurisdiction of Krishna University, Machilipatnam)

TELUGU	TELT11	2016-'17 2019-20	B.A., B.Com.-(Gen, TPP & CA), B.B.A., B.B.A.-Ana., B.C.A., & B.Sc.

SEMESTER–I

Credits – 3

I. ప్రాచీన కవిత్వం

1. గంగాశంతనుల కథ – నన్నయ

(శ్రీ మహాభారతం – ఆదిపర్వం – నాల్గవ ఆశ్వాసం, 120వ పద్యం "నరవరుడగు శంతనునకు మరనదికిని...." నుండి 165వ పద్యం "దివ్య భూషణాలంకృత....." వరకు)

2. ద్రౌపది పరిదేవనం – తిక్కన

(శ్రీ మహాభారతం – ఉద్యోగపర్వం – తృతీయాశ్వాసం, 100వ పద్యం "ధర్మనందను పలుకులు..." నుండి 125వ పద్యం "అనియు బడిలగ బలికిన ..." వరకు.)

II. ఆధునిక కవిత్వం

1. కన్యక – గురజాడ అప్పారావు
2. దేశచరిత్రలు – శ్రీరంగం శ్రీనివాసరావు

III. కథానికలు

1. చింతలతోపు – పాపినేని శివశంకర్
2. సావుకూడు – బండి నారాయణస్వామి

IV. వ్యాకరణం

1. సంధులు:– సవర్ణదీర్ఘ, గుణ, యణాదేశ, వృద్ధి, అత్వ, ఇత్వ, ఉత్వ, త్రిక, గసడదవాదేశ, రుగాగమ, టుగాగమ, ఆమ్రేడిత సంధులు.
2. సమాసములు:– తత్పురుష, కర్మధారయ, ద్వంద్వ, ద్విగు, బహువ్రీహి సమాసాలు.
3. అక్షర దోషాలు:– దోషాలు సరిదిద్ది సాధురూపాలు రాయాలి.

Reference books:

1. సాహితీ నిలయం,
మూలితో పబ్లికేషన్స్,
9-4-9K, కైకలూరు,
గుంటూరు, ఏ.పి.

Parvathaneni Brahmayya Siddhartha College of Arts and Science
Vijayawada 520010
An autonomous college in the Jurisdiction of Krishna University, Machilipatnam)

Telugu	TELT21	2018-19	B.A,B.Sc.,B.Com,B.Com Computers, Appilications, B.Com E-commerce,BBA,BBABA,B.Com TPP,BCA

Semester -II SYLLABUS Credits: 3

అభ్యసన ఫలితాలు :

CO 1 : గతంలో జరిగిన గుణదోషాలు గ్రహించి సజ్జన మైత్రి బంధాన్ని అలవర్చుకొని ప్రవర్తించగలరు

CO 2 : మానవ వికాసాలను అర్థం చేసుకొని ఇంకా ఎదుగుదలకు తోడ్పడండి మనుషులంతా ఒకటి అనే సదుద్దేశంతో ముందుకు సాగ గలదు

CO 3 : తెలికైన మాటల రూపంలో గ్రహించిన విషయాలని తనతో జీవిస్తున్న సమాజానికి ఉపయోగించి ఉత్తమ పౌరులుగా ప్రవర్తనకు దారితీస్తుంది

CO 4 : వ్యక్తులు మనిషి అభ్యున్నతికి మాత్రమేనని గ్రహించి వాని ద్వారా భవిష్యత్ తరాలు సక్రమ పద్ధతిలో ప్రయాణించటానికి అవకాశం కల్పించేది

CO 5 : నేర్చిన విషయ జ్ఞానం మన మస్తిష్కంలో ఎంతవరకు నిక్షిప్తమై ఉందనే ..విషయాలు గుర్తు చేసేందుకు ఉపయోగకరం

ప్రాచీన కవిత్వం

1.మను చరిత్ర - అలసాని పెద్దన

(మను చరిత్ర ద్వితీయాస్వాసం 31 వ పద్యం నుండి 68వ పద్యం)

2.సుభద్ర పరిణయం - చేమకూర వెంకట కవి

(విజయ విజయ విలాసం తృతీయాస్వాసం 93వ పద్యం నుండి 139 వ పద్యం)

ఆధునిక కవిత్వం

1.ముసాఫర్లు - జాషువా

2.మేఘ దూతం - పుట్టపర్తి నారాయణాచార్యులు

కథానికలు

1.కులవృత్తి - కొలకలూరి ఇనాక్

2. మార్పు వెనుక మనిషి -శీలా సుభద్రాదేవి

ఉపవాచకం (నవల)

బతుకాట - డాక్టర్ .వి. ఆర్ .రాసాని

Telugu III	TELT01	2018-19	B.A,B.Sc.,B.Com,B.Com Computers, Applications, B.Com E-commerce, BBA,BBABA,B.Com TPP,BCA

SYLLABUS

Semester –III & IV Credits: 3

అభ్యసన ఫలితాలు

CO 1 ప్రాచీన పద్యభాగం గత వైభవాన్ని ప్రవర్తనలను తెలియజేయడం వలన మన నాగరికత సంస్కృతి తెలుసుకోవడానికి అవకాశం:

CO 2 : నూతన ఆలోచనలు కలిగి వాటిని వ్యక్తీకరించినట్లయితే దాని వలన ప్రయోజనం

CO 3 : గ్రహించవలసినది సులభంగా గ్రహించి తన భావాల్ని వ్యక్తీకరించేందుకు ఉపయోగపడటం

CO 4 : భాషలోని లయ సౌందర్యం అవగాహన చేసుకుని ఆచరించేందుకు సహకరించటం

CO 5: వినడానికి వినసంపైన మాటల పొందిగా ఇందులో కనిపిస్తుంది

ప్రాచీన కవిత్వం

1. వామనవతారం -పోతన

(శ్రీ మహా భాగవతం ఎనిమిదవ స్కంధం 582వ పద్యం నుండి 621)

2.శాలివాహన విజయం కొరవి గోపరాజు

(సింహాసనద్వాత్రింశికప్రథమ శ్వాసం 115 వ పద్యము నుండి 165 వ పద్యం వరకు)

3.ఆధునిక కవిత్వం

హరిజన శతకము -కుసుమ ధర్మన్న

వంటిల్లు -విమల

గద్యభాగం / వ్యాస సంపుటి

1. అభి వ్యక్తి నైపుణ్యాలు - సుబ్బారావు

2. వ్యక్తిత్వ వికాసం -ఆచార్య రాచపాలెం చంద్రశేఖరరెడ్డి

వ్యాకరణం

చందస్సు : ఉత్పలమాల, చంపకమాల,, శార్దూలం, కందం, తేటగీతి ,ఆటవెలది ,సీసం

అలంకారాలు : శబ్దాలంకారాలు, ఉపమా ,,ఉప్రేక్ష, రూపక ,స్వభావక్తి ,అతిశయోక్తి , అర్థాంతరన్యాసాలంకారాలు

PARAVATHANENI BRAHMAYYA SIDDHARTHA COLLEGE OF ARTS & SCIENCE, VIJAYAWADA- 520 010
(An Autonomous College in the jurisdiction of Krishna University)

TELUGU	TEL T21A	2020-21	B.A., B.com-GEN, CA,Tax,A&F,BPM,,B.BA, B.BA- B.A,B.CA,B.Sc.,& CSCS.

SEMESTER – II

పాఠ్య ప్రణాళిక

Credits – 3

TELUGU – II

యూనిట్-I

1.ఆధునిక కవిత్వం – పరిచయం

2 .కన్యక - గురజాడ వేంకట అప్పారావు

3 .కొండవీడు- దువ్వూరి రామిరెడ్డి

(కవి కోకిల గ్రంథావళి-ఖండ కావ్యాలు - నక్షత్రాల సంపుటి నుండి)

4. మాతృ సంగీతం - అనిసెట్టి సుబ్బారావు

(అగ్నివీణ కవితాసంపుటి నుండి)

యూనిట్ – II

5. తెలుగు కథానిక - పరిచయం

6. భయం /కథ/- కాళీ పట్నం రామారావు

7. స్వేదం ఖరీదు ?/ కథ/-రెంటాల నాగేశ్వరరావు

యూనిట్- III

8. తెలుగు 'నవల' - పరిచయం

9. రథ చక్రాలు/ నవల /- మహీధర రామ్మోహన రావు

(సంక్షిప్త ఇతివృత్తం మాత్రమే)

10. రథ చక్రాలు/ సమీక్షా వ్యాసం /- డా. యల్లా ప్రగడ మల్లికార్జునరావు

యూనిట్ – IV

11. తెలుగు నాటకం- పరిచయం
12. యక్షగానము / నాటకము / నాటిక / – ఎం. వి. ఎస్. హరనాథ రావు
13. అపురూప కళారూపాల విధ్వంస దృశ్యం యక్షగానము / సమీక్షావ్యాసం – డి. కందిమళ్ళ సాంబశివ రావు

యూనిట్ – V

14. తెలుగు సాహిత్య విమర్శ - పరిచయం
15. విమర్శ - స్వరూప స్వభావాలు , ఉత్తమ విమర్శకుడు-లక్షణాలు .

ఆధార గ్రంథాలు / వ్యాసాలు:

1. ఆధునిక కవిత్వం – పరిచయం – ప్రొ. ఎస్వీ. సత్య నారాయణ
2. తెలుగు కథానిక – పరిచయం – ప్రొ. రాచపాళెం చంద్రశేఖర రెడ్డి
3. తెలుగు నవల – పరిచయం – వల్లంపాటి వెంకట సుబ్బయ్య
4. సాంఘిక నవల – కథన శిల్పం – ప్రొ. సి . మృణాళిని.
5. తెలుగు నాటకం – పరిచయం – ప్రొ. ఎస్.గంగప్ప
6. తెలుగు సాహిత్య విమర్శ- పరిచయం – ప్రొ. జి.వి. సుబ్రహ్మణ్యం
7. నూరేళ్ళ తెలుగు నాటక రంగం – ప్రొ. మొదలి నాగభూషణ శర్మ
8. నాటక శిల్పం – ప్రొ . మొదలి నాగభూషణ శర్మ

TELUGU	TELT01A	2021-'22	B.A., B.Com., B.B.A., B.B.A.-Ana, B.C.A., & B.Sc.,

SEMESTER–III/IV

Credits – 3

TELUGU-III

పాఠ్య ప్రణాళిక

యూనిట్-I

వ్యక్తీకరణ నైపుణ్యాలు

1. భాష-ప్రాథమికాంశాలు:- భాష-నిర్వచనం, లక్షణాలు, ఆవశ్యకత, ప్రయోజనాలు.
2. 'వర్ణం-పదం-వాక్యం', వాక్య లక్షణాలు, సామాన్య-సంయుక్త-సంశ్లిష్ట వాక్యాలు.
3. భాషా నిర్మాణంలో 'వర్ణం-పదం-వాక్యం' ప్రాధాన్యత.

యూనిట్-II

సృజనాత్మక రచన

4. కవితా రచన:- ఉత్తమ కవిత - లక్షణాలు.
5. కథా రచన:- ఉత్తమ కథ - లక్షణాలు.
6. వ్యాస రచన:- ఉత్తమ వ్యాసం - లక్షణాలు.

యూనిట్-III

అనువాద రచన

7. అనువాదం:- నిర్వచనం, అనువాద పద్ధతులు.
8. అనువాద సమస్యలు:- భౌగోళిక, భాషా, సాంస్కృతిక సమస్యలు, పరిష్కారాలు.
9. అభ్యాసము:- ఆంగ్లం నుండి తెలుగునకు ఒక పేరాను అనువదించడం.

యూనిట్-IV

మాధ్యమాలకు రచన-I:- ముద్రణ / ప్రింట్ మీడియా

10. ముద్రణా మాధ్యమం / అచ్చు /:- పరిచయం, పరిధి, వికాసం.
11. వివిధ రకాల పత్రికలు - పరిశీలన, పత్రికా భాష, శైలి, వైవిధ్యం.
12. పత్రికా రచన:- వార్తా రచన, సంపాదకీయాలు, సమీక్షలు - అవగాహన.

యూనిట్-V

మాధ్యమాలకు రచన-II:- ప్రసార మాధ్యమం / ఎలక్ట్రానిక్ మీడియా

13. ప్రసార మాధ్యమాలు:- నిర్వచనం, రకాలు, విస్తృతి, ప్రయోజనాలు.
14. శ్రవణ మాధ్యమాలు-రచన:- రేడియో రచన, ప్రసంగాలు, నాటికలు, ప్రసార సమాచారం.
15. దృశ్య మాధ్యమాలు-రచన:- వ్యాఖ్యానం / యాంకరింగ్, టెలివిజన్ రచన.

1.3.1: Institution integrates cross-cutting issues relevant to Professional Ethics, Gender, Human Values, Environment and Sustainability and other value framework enshrined in Sustainable Development Goals and National Education Policy – 2020 into the Curriculum

NAME OF THE PROGRAM : B.Sc. (BZC) - ZOOLOGY

NAME OF THE PROGRAM : B.Sc. BZC (Zoology) REGULATION 15 & 20						
NAME OF THE COURSE	**Couse Code**	**Professional Ethics**	**Gender**	**Human values**	**Environmental and Sustainability**	**other value framework enshrined**
EMBRYOLOGY, ANIMAL PHYSIOLOGY AND ECOLOGY	ZOOT41	Non-maleficence: Avoiding harm to humans, animals, and the environment. Beneficence: Contributing positively to scientific knowledge and human well-being. Autonomy: Respecting the autonomy of individuals, whether in reproductive rights or in participation in research. Justice: Ensuring fair treatment and equitable access to biological advancements. Sustainability: Ethical duty to maintain biodiversity and minimize environmental degradation.	Awareness of Reproductive HealthUnderstanding Gender Differences,Gender Sensitivity, better understanding and appreciation of gender differences, reducing biases, and fostering a more inclusive mindset	Respect for Liferesponsible behavior in health, environment, and ethical considerationsEmpathy and Compassion Sustainability and Stewardship ethics in science, health, and environmental stewardship.	Ecosystem Functioning, Bioremediation, Sustainable Agriculture, Climate Change Mitigation, Renewable Energy Production, Water Quality and Treatment, Biodiversity Conservation, Sustainable Food Systems, Environmental Monitoring, Education and Awareness	Conservation and Biodiversity,Sustainable Resource Useemphasizes the need to minimize pollutants that affect human health and ecosystems, supporting cleaner technologies and reducing the reliance on harmful chemicals and Climate Change Mitigation
BIOMOLECULES,GENETICS,ORGANIC EVOLUTION AND ANIMAL BEHAVIOUR	ZOOT31	Genetic Research and Manipulation Conservation and Evolution Research Ethics Public Health and Ethics Social and Behavioral Ethics Environmental Ethics Biological Research Implication	Genetics and Gender Disorders. Evolution and Gender Roles Ethology and Social Behavior Health Disparities Reproductive Biology Social and Cultural Influences Gender and Evolutionary Psychology Artificial Selection and Gender	Ethical Considerations in Genetic Research Health and Well-being Biodiversity and Conservation Social Responsibility Cultural Sensitivity Moral Responsibility in Technology	Biodiversity and Conservation Agriculture and Food Security Genetic Diversity Evolutionary Biology Natural Selection and Adaptation Ethology and Behavior Species Interaction Ecosystem Services	Biodiversity and Ecosystem Health Agriculture and Food Security Climate Change Adaptation Natural Resource Management Health and Disease Management Education and Awareness Policy and Governance

IMMUNOLOGY	ZOOTEL61	Research Ethics Clinical Ethics Equity in Healthcare Public Health Ethics Conflict of Interest	Environmental Stewardship, Responsible Research Practices, Biodiversity Conservation, Social Responsibility,Interdisciplinary Collaboration, Sustainability and Ethics, Equity and Inclusivity, Professional Accountability, Education and Advocacy, Ethical Decision-Making	Solidarity Informed Decision-MakingResponsibilityJustice and EquitvCompassion and Empathy Respect for LifeEthical Considerations in Genetic Research	Impact of Health on Ecosystems Vaccine Development and Sustainability Wildlife and Disease Antibiotic Resistance Climate Change and Health Public Health Initiatives	Health and Well-Being Equity in Health Access Ecosystem Health Zoonotic Disease Management Resilience to Climate Change Research and Innovation Public Health Education
ANIMAL BIOTECHNOLOGY	ZOOT51A	Safety and Risk Assessment Transparency and Honesty Confidentiality, Equity and Access, Environmental Impact Public Engagement , Intellectual Property, Dual Use Dilemma , Regulatory Compliance	Gender Bias in Research, Access to Technologies,Impact of Biotechnology on Women's Health,Ethics of Reproductive Technologies,Gendered Impacts of Genetic Engineering,Professional Representation,Social and Cultural Dimensions,Policy and Advocacy	Respect for Human Dignity,Equity and Justice,Responsibility and Accountability,Transparency and Trust,Environmental Stewardship,Empowerment and Autonomy,Compassion and Care Cultural Sensitivity	Sustainable Agricultural Practices,Bioremediation,Conservation of Biodiversity,Reduction of Resource Use,Biofuels,Waste Management,Ecological Risk Assessment,Climate Change Mitigation,Sustainable Aquaculture,Public Engagement and Education	Food Security,Health and Wellbeing,Environmental Protection,Resource Efficiency,Renewable Energy,Biodiversity Conservation,Economic Development,Climate Change Mitigation,Sustainable Water Management,Community Engagement

PARVATHANENI BRAHMAIAH SIDDHARTHA COLLEGE OF ARTS AND SCIENCE; VIJAYAWADA.

(An autonomous college in the jurisdiction of Krishna University)

SEMESTER- IV **PAPER- IV**

TITLE: EMBRYOLOGY, ANIMAL PHYSIOLOGY AND ECOLOGY

NO OF HOURS: 60 **CREDITS: 04**

WEF: 2018-19 **COURSE CODE: 22ZOO T41**

AIM

- Understanding the biological functions of the body.
- Critical understanding of ecological surroundings, their influence of life, adaptations of organisms to different habitats and the behavior of organisms.

LEARNING OUTCOMES

- The study of fundamentals of embryology
- The study of functional aspects of the body.
- Understanding the mechanism of homeostasis
- Understanding the mechanism of coordination in the body.
- Understanding the structural and functional aspects of an ecosystem.
- Understanding the dynamics of populations

CO1. Understand the concepts gametogenesis, formation of primary germ layers, Foetal membranes and placenta.

CO2. Discuss the structure and functions of digestive and respiratory systems, cardiovascular system and excretory system.

CO3. Explain the functions of nervous system, Muscle contraction, endocrine systems and reproduction.

CO4. Evaluate the Physical and chemical factors, Functional aspects of an ecosystem and Animal communities, community interactions.

CO5. Asses the Habitat Ecology and adaptations, Population Ecology and Zoogeography.

CO-PO MATRIX

CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1						M	
CO2					L		
CO3					M		
CO4					M		
CO5					H		

UNIT I

1.0. Embryology

1.1. Spermatogenesis, oogenesis and Fertilization. **4 hours**

1.2. Types of eggs **1 hour**

1.3. Types of cleavages **2 hours**

1.4. Development of frog up to gastrulation and formation of primary germ layers **3 hours**

1.5. Foetal membranes and their significance in chick embryo **2 hours**

1.6. Placenta in mammals: types and functions **2 hours**

UNIT II

2.0 Physiology - I

2.1 Digestive system: process of digestion **2 hours**

2.2 Absorption of digested food **1 hour**

2.3 Respiratory system - Pulmonary ventilation, transport of oxygen and carbon dioxide **4 hours**

2.4 Circulatory system - Structure and functioning of heart, Cardiac cycle. **3 hours**

2.5 Excretory system - Structure of nephron, urine formation, and counter current mechanism **4 hours**

Unit-III

3.0 Physiology - II

3.1.1 Nerve impulse -Resting membrane potential, origin and propogation of action potentials along myelinated and non myelinated nerve fibres **3 hours**

3.1.2 Muscle contraction - Ultra structure of muscle fibre, molecular and chemical basis of muscle contraction **3 hours**

3.1.3 Endocrine glands - Structure, secretions and the functions (of hormones) of pituitary, thyroid, parathyroid, adrenal glands and pancreas **5 hours**

3.1.4 Hormonal control of reproduction in human being **1 hour**

UNIT IV

4.0. Ecology I

4.1. Physical and chemical factors of an ecosystem

4.1.1. Pressure **1 hour**

4.1.2. Atmospheric gases: oxygen and carbon dioxide. **2 hours**

4.2 Functional aspects of an ecosystem

4.2.1. Biogeochemical cycles: nitrogen cycle, phosphorus cycle and carbon cycle **2 hours**

4.3 Animal communities

4.3.1 Types of communities **1 hour**

4.3.2. Community structure **1 hour**

4.3.3. Ecotone and edge effect, **1 hour**

4.4 Community interactions

4.4.1 Prey-predator relationships **2 hours**

4.4.2. Competition **1 hour**

UNIT V

5.0. Ecology - II

5.1 Habitat Ecology and adaptations

5.1.1. Ecological habitat and niche **1 hour**

5.1.2. Desert adaptations **2 hours**

5.1.3. Pelagic adaptations **1hour**

5.2. Population Ecology

5.2.1. Characteristics of animal populations **2 hours**

5.3. Zoogeography **3 hours**

5.3.1 Zoogeographical regions: Study of physical and faunal peculiarities of Oriental, Australian and Ethiopian regions.

Suggested Readings

1. **Gerard J. Tortora and Sandra Reynolds Garbowski** *Principles of Anatomy and Physiology*, Tenth Ed., John Wiley & Sons
2. **Arthur C. Guyton MD**, *A Text Book of Medical Physiology,* Eleventh ed., John E. Hall, Harcourt Asia Ltd.
3. **William F. Ganong**, *A Review of Medical Physiology*, 22 ed, McGraw Hill, 2005
4. **Sherwood, Klandrof, Yanc,** *Animal Physiology*, Thompson Brooks/Coole, 2005.
5. **Sherwood, Klandrof, Yanc,***Human Physiology*, Thompson Brooks/Coole, 2005.
6. **Knut Scmidt-Nielson,** *Animal Physiology***,** 5th ed, Cambridge Low Price Edition.

7. **Roger Eckert and Randal,** *Animal Physiology***,** 4th ed, Freeman Co, New York**.**
8. **Balinisky B.I.** *An introduction to Embryology*, 5th ed, Thompson Brook, Coole.
9. **Mc Ewen, R.s.** ***Vertebrate Embryology*****,** Oxford and IBH Publishing Co. New Delhi.
10. **M.P.Arora**, '*Ecology*' Himalaya Publishing company.
11. **P.D.Sharma**, *Environmental Biology'*.
12. **P.R.Trivedi and Gurdeep Raj**. '*Environmental Ecology'*
13. **Buddhadev Sarma and Tej Kumar**, *Indian Wildlife Threats and Preservation*
14. **Chapman J.L. and Reiss M.J,** *Ecology Principles and Applications*, Second Ed., Cambridge University Press, London.
15. **Benny Joseph,** *Environmental Studies*, TATA MGraw Hill Com., New Delhi.
16. **Eugene P. Odum**, *Fundamentals of Ecology* Third Ed., NataraJ Publishers, Dehradun.
17. **Balinisky B.I.** *An introduction to Embryology*, 5th ed, Thompson Brook, Coole.
18. **Mc Ewen, R.s.** ***Vertebrate Embryology*****,** Oxford and IBH Publishing Co. New Delhi.

Textbooks

1. **A.K. Berry,** *A Text Book of Animal Physiology***,** Delhi
2. Subrahmanyam N.S. &. Sambamurthy A.V.S.S, *Ecology,* Narosa Publishing House*,* New Delhi

IV SEMESTER END EXAMINATIONS
II B.SC., ZOOLOGY PAPER – IV PAPER CODE: ZOO T41
EMBRYOLOGY, ANIMAL PHYSIOLOGY AND ANIMAL ECOLOGY
MODEL PAPER

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

SECTION –A

Answer and **FIVE** of the following **5x5=25 Marks**
Draw neat labeled diagrams wherever necessary.

1. Types of eggs
2. Fate maps of frog blastula
3. Structure of nephron
4. Absorption of lipids
5. Adrenal hormones
6. Phosphorous cycle
7. Ecotone and edge effect

8. Pelagic adaptations

SECTION – B

Answer any **FIVE** of the following **5X10=50 Marks**

Draw neat labeled diagrams wherever necessary.

11. Write an essay on foetal membranes and their significance in chick embryo.

OR

Describe the process of gametogenesis

12. Explain the process of transportation of Oxygen through blood.

OR

Describe the structure and functioning of mammalian heart.

13. Write an essay on hormonal control of reproduction in human beings.

OR

Explain the propagation of action potential along myelinated and non-myelinated nerve fibres.

14. Explain pressure as an ecological factor.

OR

Explain prey-predator relationships in animal communities.

15. Write an essay on the various adaptations of desert animals.

OR

Describe the physical features and fauna of Ethiopian region

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SEMESTER- III **PAPER- III**

COURSE CODE: ZOO T31

TITLE OF THE PAPER: Biomolecules, Genetics, Organic Evolution and Animal Behaviour

NO OF HOURS: 60 **CREDITS: 04**

WEF: 2018-19 **COURSE CODE: ZOO T31**

AIM

- To study the genetic aspects of life and application of genetics
- The molecular study of living organisms, development and their evolution

Learning outcomes

- To understand the mechanism and patterns of evolution
- To study the manipulation of genetic material in living organisms.
- Application of genetics in improving the economically important animals.
- To study and understand the Genetical relation between and amongst the animals.
- To study the behavioral patterns in various animals

COURSE OUTCOMES

CO1. Understanding the structure and classifications of carbohydrates, amino acids, proteins, lipids and Nucleic acids.

CO2. In evaluating the chemical basis of heredity and detailed understanding of genetic methodology.

CO3. To understand the Origin and development of animals and the process of evolution.

CO4. To understand the motivated and learning behavior in animals.

CO5. To understand the mating, social behavior and Biological clocks in various Species.

CO-PO MATRIX							
CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1						M	
CO2					L		
CO3						M	
CO4						M	
CO5					H		

UNIT I – Biomolecules **(12 Hours)**

1.1 Carbohydrates-Classification of carbohydrates,Structure of glucose **3 hours**

1.2 Proteins-Classification of proteins, General properties of amino acids **3 hours**

1.3 Lipids - Classification of lipids **1 hour**

1.4 Nucleic acids

1.4.1. Deoxyribo Nucleic Acid - Structure, replication **3 hours**

1.4.2. Ribo Nucleic Acid - Structure, types **2 hour**

UNIT II- Genetics **(16 Hours)**

2.1.Mendel's laws- Law of segregation and independent assortment (animal examples)**2 hours**

2.2.Linkage and crossing-over **2 hours**

2.3.Gene interactions (Incomplete dominance,Co-dominance, lethal genes, epistasis & Pleiotropy) **2 hours**

2.4. Phylogenetic and Cladistic Evolution **1 hour**

2.5. Genetic code and properties of genetic code **2 hours**

2.6. DNA damage and repair **1hour**

2.7.Human karyotyping and amniocentesis **2 hours**

2.8.Autosomal and allosomal disorders(Klinefelter syndrome, Turner syndrome, Down syndrome, Cri-du-chat syndrome& Sickle cell anaemia) **2 hours**

2.9.Multiple alleles with the examples of blood typing **2 hours**

UNIT-III Organic Evolution **(13 Hours)**

3.1. Hardy-Weinberg hypothesis **1 hour**

3.2. Modern synthetic theory of evolution **2 hours**

3.3. Variations **2 hours**

3.4. Isolating mechanisms **2 hours**

3.5 Natural selection (Industrial melanism) **1 hour**

3.6. Types of natural selection (directional, stabilizing & disruptive) **1 hour**

3.7. Artificial selection **1 hour**

3.8. Speciation – allopatry and sympatry **1 hour**

3.9. Micro evolution vs Macro evolution (Example: Darwin's finches) **2 hours**

UNIT- IVAnimal Behaviour-I (9 hours)

4.1 Ethology and its branches. **1 hour**

4.2 Concepts of Ethology (motivation, fixed action patterns, releasers, learning) **8 hours**

UNIT-VAnimalBehaviour-II (10 hours)

5.1. Biological clocks&rhythms

Circadian rhythms **4 hours**

Circalunar rhythms

Circannular rhythms

5.2. Kinesis and Taxis **1 hour**

5.3 Social Behaviour in Insects (Honey bees) and Apes, Altruism **2 hours**

5.4. Sexual behaviour in animals (Intra sexual selection & Inter sexual selection)**1 hour**

5.5. Colouration& Mimicry **2 hours**

Suggested Readings

1. **Lodish, Berk, Zipursky, Matsudaria, Baltimore, Darnel**l *'Molecular Cell Biology'* W.H. Freeman and company New York..
2. **James D. Watson, Nancy H. Hopkins** '*Molecular Biology of the Gene'*
3. **Jan M. Savage**. *Evolution*, 2nded, Oxford and IBH Publishing Co., New Delhi.
4. **Peter Volpe**, E. *Understanding Evolution*, 5thed, Universal book stall, New Delhi.
5. **Neil A. Cambel., Jane B. Reece**. '*Biology*, 7thed, Cimmings'

Textbooks

1. **Mohan P. Arora**. '*Molecular Biology'*by., Himalaya Publishing House. Pvt. Ltd
2. **VeerabalaRastogi,** *Evolutionary Biology,* KedarnathRamnath

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III SEMESTER END EXAMINATIONS

II B.SC., ZOOLOGY PAPER – III PAPER CODE: ZOO T31

BIOMOLECULES, GENETICS, ORGANIC EVOLUTION AND ANIMAN BEHAVIOUR

MODEL PAPER

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

Draw neat labeled diagrams wherever necessary.

SECTION –A

Answer and **FIVE** of the following **5x5=25 Marks**

1. General properties of amino acids **CO1, L1**
2. Types of RNA **CO1, L1**
3. Klinefelter syndrome **CO2, L2**
4. Epistasis **CO2, L1**
5. Industrial melanism**CO3, L2**
6. Allopatry and sympatry**CO3, L1**
7. Classical conditioning **CO4, L2**
8. Circadian rhythms **CO5, L2**

SECTION – B

Answer any **FIVE** of the following **5X10=50 Marks**

9. Write an essay on the classification of carbohydrates. **CO1, L1**

OR

Describe the double helical structure of DNA. **CO1, L2**

10. Define genetic code and explain its properties. **CO2, L1**

OR

Describe Mendel's laws of inheritance with examples. **CO2, L2**

11. Define isolation. Discuss various isolating mechanisms. **CO3, L2**

OR

Give an account of the modern synthetic theory of evolution. **CO3, L2**

12. Write an essay on motivated behavior. **CO4, L2**

OR

Explain imprinting and habituation learning methods. **CO4, L2**

13. Write an essay on social organization in honey bees. **CO5, L1**

OR

Give an account of the types of mimicry in animals. **CO5, L2**

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ZOOLOGY SYLLABUS FOR VI SEMESTER

ZOOLOGY - PAPER - VII(A) COURSE CODE: ZOO TEL61

IMMUNOLOGY

WEF: 2018-19

Periods: 60 Max. Marks: 75

LEARNINGOUTCOMES:

• Mechanisms of protection against infection
• hypersensitivity reactions • autoimmunity • tolerance • transplantation immunology
• the immune response to cancer
• application of immunological methods in other sciences and in medicine
• research techniques, including methods of molecular biology.

COURSEOUTCOMES

CO1. Understand the Overview of Immune system, Cells and organs of Immune system.

CO2. Distinguish the structures of antigens.

CO3. Describe the structural arrangements and functions of Antibodies and Monoclonal antibodies.

CO4. Understand the principles and working of immune system.
CO5. Identify Immune system in health and disease.

CO-PO MATRIX							
CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1					H		
CO2					L		
CO3					M		
CO4					M		
CO5					H		

UNIT - I

1.1 Overview of Immune system (15 HOURS)

1.1.1. Introduction to basic concepts in Immunology 2 hours

1.1.2. Innate and adaptive immunity 6 hours

1.2 Cells and organs of Immune system

1.2.1. Cells of immune system 3 hours

1.2.2. Organs of immune system 4 hours

UNIT - II

2.1 Antigens (9 HOURS)

2.1.1. Basic properties of antigens 2 hours

2.1.2. B and T cell epitopes, haptens and adjuvants 5 hours

2.1.3. Factors influencing immunogenicity 2 hours

UNIT - III

3.1 Antibodies (8 HOURS)

3.1.1. Structure of antibody 2 hours

3.1.2. Classes and functions of antibodies 3 hours

3.1.3. Monoclonal antibodies- Production and functions of Monoclonal antibodies 3 hours

UNIT - IV

4.1 Working of Immune system (11 HOURS)

4.1.1. Structure and functions of major histocompatibility complexes 4 hours

4.1.2. Exogenes and Endogenes pathways of antigen presentation and Processing 4 hours

4.1.3. Basic properties and functions of cytokines 3 hours

UNIT - V

5.1 Immune system in health and disease (17 HOURS)

5.1.1. Introduction to concepts of autoimmunity and immune deficiency Diseases (Grave's diases, Hashimoto's Thyroiditis, X-linked hyper-IgM syndrome and Bare-lymphocyte syndrome) 4 hours

5.1.2. Hypersensitivity reactions 4 hours

5.1.3. Biopsy – Types and uses of Biopsy 1 hour

5.1.4. An elementary idea of cell transformation and cancer 2 hours

5.2 Vaccines

5.2.1. General introduction to vaccines 2 hours

5.2.2. Types of vaccines 4 hours

SUGGESTED READINGS:

1. **Richard A. Glodsby, Thomas J Kind, Barbara A. Osborne, Janis Kubey,** *Immunology,* 5th ed, Freeman and Co. New York

2. **Ivan Roitt,** *Immunology*, 4th ed, Johanthan Brostoff, Moshy, London.
3. An Introduction to Immunology, by C.V. Rao.
4. **Nandini Shetty,** *immunology,* New Age International Publcations
5. **Dr. N. Armugam, Prof.Dulsy Fatima, Pro.A.Mani, Dr.L.M.Narayanan and Dr.A.M.Selvaraj,** *Immunology and Micrrobiology,* Saras Publications

V SEMESTER END EXAMINATIONS
III B.SC., ZOOLOGY - PAPER – VII (A)
PAPER CODE: ZOO TE161
IMMUNOLOGY
MODEL PAPER

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

Draw neat labeled diagrams wherever necessary for sections A and B.

SECTION –A

Answer and FIVE of the following **5x5=25 Marks**

1. Lymph node
2. B - cells
3. Properties of antigens
4. Haptans and Adjuvants
5. Monoclonal antibodies
6. IgE antibody
7. Properties of cytikines
8. Biopsy

SECTION – B

Answer the following questions **5X10=50 Marks**

9.Write an essay on adaptive or acquired immunity.

Or

Describe the primary lymphoid organs.

10.Write an essay on T - cells.

Or

Explain the different factors influencing immunogenicity.

11.Describe the structure of an antibody.

Or

Describe the structure and properties of IgA and IgD.

12.Give an account of different pathways of antigen presentation and processing

Or

Describe the structure and functions of Major Histocompatability Complex.

13.Give an account of the various hypersensitivity reactions.

Or

Give an account of the different types of vaccines.

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SEMESTER- V **PAPER- V**

COURSE CODE: ZOO T51A

TITLE OF THE PAPER: ANIMAL BIOTECHNOLOGY

- Be able to describe how genes are expressed and what regulatory mechanisms contribute to control of gene expression.
- Be able to describe basic principles and techniques in genetic manipulation and genetic engineering.
- Be able to describe gene transfer technologies for animals and animal cell lines.
- Be able to describe techniques and problems both technical and ethical in animal cloning.
- Be able to describe the contribution 'functional genomics' is making and is likely to make in animal biotechnology now and in the future.

Course outcomes

CO1. Intended to provide an overview and current developments in different areas of animal biotechnology.
CO2. Understanding the concept of gene cloning and expression

CO3. Understanding the latest developments in transgenic technology.

CO4. Understanding the principles of animal cell culture and its application.

CO5. Understanding the principles of animal hybridoma technology and its application.

CO-PO MATRIX							
CO-PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**
CO1						M	
CO2					L		
CO3					H		
CO4						M	
CO5					H		

Syllabus

UNIT 1: Techniques of Recombinant DNA technology (15 Hours)

1.1. Cloning:
1.1.1. Procedure of gene cloning, Use of linkers, adaptors and DNA Probes 4 hours
1.2. PCR:
1.2.1. Basics of PCR 1 hour
1.2.2 Principle and procedure of PCR. 2 hours
1.3. DNA Sequencing Methods:
1.3.1. Maxam Gilbert and Sanger method of DNA sequencing 4 hours
1.4 Blotting Techniques
1.4.1Southern, Northern and Western blotting techniques 4 hours

UNIT 2: Animal Cell Culture Technology (10 Hours)

2.1. Cell culture media: Natural and Synthetic 2 hours
2.2. Types of Cell cultures:
2.2.1. primary culture, Protocols for Primary Cell Culture, secondary culture, 2 hours
2.2.2. continuous cell lines; Established Cell lines (common examples such as MRC, HeLa, CHO, BHK, Vero); 3 hours
2.2.3. Organ culture; Cryopreservation of cultures. 1 hour
2.3Stem cells:
2.3.1. Types of stem cells, applications 2 hours

UNIT 3: Assisted Reproductive Technologies (12 Hours)

3.1. Manipulation of reproduction in animals:
3.1.1. Artificial Insemination, *In vitro*fertilization. 2 hours
3.1.2. Super ovulation, Embryo transfer, Embryo cloning 4 hours
3.2.Gene Transfer Techniques
3.2.1Micro injection,Electroporation, Biolistic method(gene gun), liposome and viral mediated delivery. 3 hours
3.3 Transgenic Animals
3.3.1. Gene transfer; 1 hour
3.3.2 Production of transgenic animals Transgenic – sheep, - fish 2 hours

UNIT 4 : Applied Biotechnology I (12 Hours)

4.1. Hybridoma Technology:
4.1.1.Cell fusion, Production of Monoclonal antibodies (mAb), Applications of mAb 3 hours

4.2. Industry:

4.2.1. Fermentation& Different types of Fermenters 5 hours

Submerged cultures, batch cultures, Fed batch & Continuous culture fermenters; Stirred tank, Air Lift, Fixed Bed and Fluidized fermenters;

4.2.2. Downstream processing – Filtration, centrifugation, extraction, chromatography, spray drying and lyophilization 4 hours

UNIT 5: Applied Biotechnology II (11 Hours)

5.1.Production of Vaccines (Hep-B) ,Hormones(Insulin) and Diagnostics(Biochips/Micro arrays for fluid leak detections in medical diagnosis for various diseases. 5 hours

5.2.Microbial Supplement Production. 4 hours

5.3.Ethical,Legal, Social and Disposable issues of Genetically Modified Organisms 2hours

SUGGESTED READING

1. Brown TA. (2010). Gene Cloning and DNA Analysis.6th edition.Blackwell Publishing, Oxford, U.K.

2. Clark DP and Pazdernik NJ. (2009). Biotechnology: Applying the Genetic Revolution. Elsevier, Academic Press, USA

3. Primrose SB and Twyman RM. (2006). Principles of Gene Manipulation and Genomics, 7th edition. Blackwell Publishing, Oxford, U.K.

4. Sambrook J and Russell D. (2001). Molecular Cloning-A Laboratory Manual. 3rd edition. Cold, Spring Harbor Laboratory Press

5. Wiley JM, Sherwood LM and Woolverton CJ. (2008). Prescott, Harley and Klein's Microbiology. McGraw Hill Higher Education

6. Brown TA. (2007). Genomes-3. Garland Science Publishers

7. Primrose SB and Twyman RM. (2008). Genomics: Applications in human biology. Blackwell Publishing, Oxford, U.K.

8. Animal Cells Culture and Media, D.C. Darling and S.J. Morgan, 1994.BIOS Scientific Publishers Limited.

9. Methods in Cell Biology, Volume 57, Jennie P. Mathur and David Barnes, 1998. Animal Cell Culture Methods Academic Press.

10. P.K. Gupta: Biotechnology and Genomics, Rastogi publishers (2003).

11. B.D. Singh: Biotechnology, Kalyani publishers, 1998 (Reprint 2001)

SEMESTER – V END EXAMINATIONS

III B.SC., ZOOLOGY PAPER – V PAPER CODE: ZOO T51A

ANIMAL BIOTECHNOLOGY

MODEL PAPER

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

SECTION –A

Answer and FIVE of the following 5x5=25 Marks

Draw neat labeled diagrams wherever necessary.

1. DNA probe
2. Cloning
3. PrinciplesofPCR
4. Microinjection
5. Cryopreservation
6. Artificial Insemination
7. Fermentation
8. Embryo transfer

SECTION – B

Answer the following questions5X10=50 Marks

Draw neat labeled diagrams wherever necessary.

9. Explain in detail about Maxum-Gilbert method of DNA sequencing.

OR

Explain in detail about the blotting techniques

10. What is Cell Culture?Write about the types of Cell Cultures.

OR

Define stem cells. Explain Embryonic and Adult stem cells and their applications

11. Write about the production of Transgenic animals and add a note on transgenic sheep..

OR

What is IVF? Explain in detail

12. Explain the production of Monoclonal Antibodies with applications.

OR

What is Fermentation?Give an account on different types of Fermenters

13. Explain the production of Insulin by r-DNA technology.

OR

Write about the ethical, legal, social and disposable issues of Genetically Modified Organisms.

1.3.1: Institution integrates cross-cutting issues relevant to Professional Ethics, Gender, Human Values, Environment and Sustainability and other value framework enshrined in Sustainable Development Goals and National Education Policy – 2020 into the Curriculum

NAME OF THE PROGRAM: M.Sc. CHEMISTRY (ORGANIC CHEMISTRY)

NAME OF THE PROGRAM : MSC CHEMISTRY(ORGANIC) REGULATION 17 , 20 & 22

Name of the Course	Couse Code	Professional Ethics	Gender	Human values	Environmental and Sustainability	other value framework enshrined
General Chemistry	CH1T1	1. Data Integrity: Accurate reporting of data is essential; manipulation or falsification of results is unethical. 2. Transparency:Clear documentation and sharing of methodologies ensure reproducibility and trust in scientific findings. 3. Responsibility:Analysts must ensure their methods are valid and reliable, and that they acknowledge limitations. 4.Continuous Improvement: Ongoing education and adherence to best practices enhance the credibility of analytical results.	In analytical practices and data interpretation, gender sensitivity is crucial to ensure that studies are inclusive and representative. This can involve:Designing experiments that consider potential gender-related variables. Analyzing data to identify any gender biases in results. Ensuring equal representation in sampling to validate findings across different demographics.This comprehensive overview combines key concepts in analytical chemistry, statistical treatment of data, and programming fundamentals, while also emphasizing the importance of gender sensitivity in scientific research. If you need more detail on any specific area, feel free to ask.	The understanding and application of these analytical techniques and statistical methods are crucial in various fields, including healthcare, environmental monitoring, and quality control. The ability to analyze data accurately supports informed decision-making and promotes ethical practices in scientific research and industry, ultimately benefiting society.	Analytical techniques are crucial for monitoring environmental pollutants and assessing sustainability.	Titrimetric Analysis: Used for determining nutrient levels in soil and water, essential for sustainable agriculture and water management. Spectrophotometry: Used for measuring pollutants in air and water, as well as for analyzing food and pharmaceutical products Potentiometry: Used for pH measurements in soil and water, and for monitoring environmental pollutants Statistical Analysis: Used for evaluating data quality and making informed decisions about environmental monitoring and remediation Computer Programming: Used for automating analytical processes and developing data analysis tools, improving efficiency and
Inorganic Chemistry	CH2T2	1)Responsible Conduct of Research (RCR). 2). Safety and Environmental Impact . 3). Intellectual Property and Collaboration. 4). Application Ethics. 5). Transparency and Reproducibility. 6). Education and Communication. 7).Diversity and Inclusion. Understanding the principles of inorganic and organometallic chemistry not only advances scientific knowledge but also necessitates a strong ethical framework to guide research practices, applications, and collaboration in the scientific community.	1)Representation in STEM. 2)Mentorship and Role Models. 3)Interdisciplinary Approaches. 4)Impact of Gender on Research Focus.	1. Sustainable Development: Catalysis & Polymerization 2. Healthcare Innovations: Bio-inorganic Chemistry & Vitamin B12. 3. Technological Advancement: Materials Science 4. Environmental Responsibility: Pollution Reduction & Green Chemistry 5. Scientific Education and Ethics: Research Integrity & Public Engagement 6. Interdisciplinary Collaboration:The integration of chemistry with biology, medicine, and materials science exemplifies the value of	1) Catalysis: Organometallic compounds are essential in green chemistry for catalyzing reactions efficiently and reducing waste. 2) Energy Storage: Metal clusters and organometallics can be used in the development of new materials for energy storage and conversion technologies. 3) Biomimetic Systems: Insights from bioinorganic chemistry can lead to sustainable practices in	Environmental Impact: Green chemistry principles in the synthesis and use of organometallic compounds and metal clusters. Minimizing waste and energy consumption. Social Impact: Development of new materials and technologies for sustainable solutions. Improving human health through advancements in medicine. Economic Impact: Creating innovative products and processes. Stimulating economic growth and job creation. By combining theoretical knowledge with practical applications, you can gain a solid foundation in these areas of inorganic chemistry.
Advanced Organic Spectroscopy	20CH3T1	Integrity of Data: Accurate reporting and interpretation of spectroscopic data are essential. Misrepresentation can lead to flawed conclusions and potential harm. Intellectual Honesty: Acknowledging contributions from previous research and maintaining transparency in methodologies uphold the integrity of the scientific process. Safety and Environmental Responsibility: When conducting experiments, ethical considerations regarding safety protocols and environmental impact should be prioritized. Application of Knowledge: Utilizing spectroscopic techniques responsibly in research, ensuring that findings are used for the advancement of science and society. In summary, the ability to interpret NMR and other spectroscopic data is critical for structural elucidation in organic chemistry, and maintaining ethical standards is crucial for scientific integrity and	Inclusivity in Research: Gender sensitivity in scientific research involves acknowledging and addressing biases that may affect research outcomes or participation in the field. Representation in STEM: Encouraging diverse voices in spectroscopy and related fields can lead to innovative ideas and approaches. Education and Outreach: Promoting NMR and spectroscopy in a way that is accessible to all genders fosters a more inclusive environment, inspiring future scientists. By integrating these advanced spectroscopic techniques with an awareness of gender sensitivity, the field of organic chemistry can advance not only in scientific understanding but also in creating an equitable research environment.	Ethical Considerations: Importance of using these techniques responsibly in drug discovery and environmental monitoring. Societal Impact: Advancements in understanding molecular structures can lead to significant improvements in healthcare, sustainable practices, and materials science.This comprehensive approach allows chemists to deduce complex structures efficiently while considering ethical implications in their applications.	Environmental Applications: NMR spectroscopy can analyze pollutants, study natural products, and understand biomolecular interactions in environmental contexts. Techniques can aid in the development of sustainable materials by characterizing novel compounds and ensuring compliance with environmental standards. b. Sustainability in Chemical	Quality Education : Advancing knowledge in analytical techniques contributes to better educational resources in chemistry and materials science. Industry, Innovation, and Infrastructure : Innovations in spectroscopy techniques drive advancements in material characterization, crucial for developing sustainable materials. Responsible Consumption and Production : Understanding molecular structures can lead to more sustainable chemical processes and the development of eco-friendly materials. Partnerships for the Goals : Collaborative research efforts in spectroscopy can foster
Organo Metallic Reagents	22CH4E4	1)Safety and Environmental Responsibility : Chemical Safety. 2)Sustainable Practicesesearch Integrity Data Integrity. 3) Collaboration and Community Open Science. 4) Mentorship and Educationt: Societal Impact. 5) Adherence to Regulations: By integrating these ethical considerations into research practices, chemists not only advance their field but also contribute positively to society and the environment.	1. Representation in Research 2) Inclusive Language: 3) Mentorship and Collaboration: 4) Access to Resources 5) Cultural Context 6) Work-Life Balance	1) Advancements in Medicine: Pharmaceutical Synthesis &Targeted Therapies. 2) Sustainable Chemistry: Green Chemistry & Renewable Resources. 3) Innovation in Material Science: Advanced Materials & Durable Products. 4) Food and Agriculture: Agrochemicals & Food Preservation. 5) Education and Knowledge Dissemination: Scientific Understanding & Collaboration. 6) Ethical considerations.Responsible Research The relevance of organometallic compounds to human values is multi-faceted, affecting health, sustainability, technological advancement, and ethical considerations in research. Their applications demonstrate how chemistry can address real-world challenges, ultimately	Reduction of Toxicity: Many of these reagents allow for the reduction of toxic byproducts and solvents, promoting safer laboratory practices and industrial processes. Resource Efficiency: By facilitating more efficient synthetic routes, these organometallic compounds can help decrease the overall consumption of raw materials. Green Chemistry Principles: The use of these reagents aligns with the principles of green chemistry, which advocate for reducing environmental impacts	Industry, Innovation, and Infrastructure: The development of more efficient synthetic methodologies supports innovation in chemical manufacturing. Responsible Consumption and Production: Emphasizing processes that reduce waste and energy use aligns with sustainable production practices. Climate Action: Utilizing less toxic reagents and reducing energy-intensive steps contributes to mitigating climate change impacts. Partnerships for the Goals: Collaborative research in organometallic chemistry can drive sustainable practices across industries. The applications of organometallic compounds significantly contribute to more sustainable chemical practices, aligning with multiple
Green Chemistry	22CH4E1	Sustainability: Green chemistry promotes practices that reduce environmental impact, aligning with ethical obligations to protect human health and the environment. Safety: Designing safer chemicals minimizes risks to chemists and consumers, embodying a commitment to welfare. Transparency: Ethical practices require clear communication of chemical risks and benefits. Innovation: Adopting green chemistry principles fosters innovation in the industry, essential for addressing global challenges. Incorporating green chemistry principles into organic synthesis not only promotes environmental sustainability but also aligns with professional ethics by prioritizing safety, transparency, and social responsibility in chemical practices.	Diverse Perspectives: Inclusive research teams bring varied perspectives that can enhance creativity and problem-solving in scientific endeavors. Access to Education: Promoting gender equity in STEM fields encourages a broader range of talent and ideas in fields like green chemistry, where innovative solutions are needed. Ethical Considerations: Understanding the social implications of scientific work includes recognizing how environmental issues disproportionately affect different genders, especially in developing regions. Role Models: Highlighting women in science can inspire future generations to pursue careers in chemistry and related fields, fostering a more inclusive scientific community. By integrating gender sensitivity into the discussion of green chemistry and organic synthesis, we ensure that diverse voices contribute to sustainable solutions that benefit all.	The overarching theme of these green chemistry principles and methods is their alignment with human values, including: Sustainability: Protecting the environment for future generations. Health and Safety: Reducing risks associated with toxic chemicals. Efficiency: Using resources wisely to minimize waste. Innovation: Seeking new methods that support a greener future.By integrating these principles into chemical processes, we not only advance scientific knowledge but also uphold the values that foster a healthier planet and society.	These green chemistry principles and methodologies are vital for: Reducing Environmental Impact: By minimizing waste and using safer materials, we lower pollution levels and conserve resources. Promoting Safety: Safer chemicals and processes reduce risks to human health and the environment. Energy Efficiency: Green synthetic methods often require less energy, contributing to sustainability by lowering carbon emissions. Innovative Solutions: Development of	The principles and practices of green chemistry directly contribute to several. Good Health and Well-being through safer chemical processes. Affordable and Clean Energy via reduced energy requirements. Industry, Innovation, and Infrastructure through the adoption of advanced technologies like microwave and ultrasound synthesis. Responsible Consumption and Production by minimizing waste and using sustainable materials. Climate Action by reducing emissions associated with chemical processes. In summary, integrating green chemistry principles and innovative synthesis methods can significantly advance the sustainability agenda, promoting a healthier planet and a more sustainable future.

P.B. Siddhartha College of Arts & Science, Vijayawada – 520 010
(An Autonomous College in the jurisdiction of Krishna University)

Accredited at A+ Grade by NAAC

M.Sc.(Organic Chemistry)
GENERAL CHEMISTRY (CH1T1)

S.No	COURSE OUTCOMES	PO's
	After completion of the course, the student will be able to :	
1	Demonstrate sound knowledge in fundamentals and application of titrimetry analysis, computers Fortran programming and basic statistical procedures.	1,7
2	Experiment various titrations on their own by analytical techniques and finding the results by graphical methods and can also apply statistical principles on experimental data.	1,6
3	Develop skills in problem solving, critical thinking and analytical reasoning of chemistry related problems.	1,5
4	Implement the Fortran 77 programs for various chemistry related problems and draw the conclusions.	1,2
5	Analyze the data obtained in quantitative analysis whether consistant or not as per the statistical rules.	1,2,6

CO-PO MATRIX

	CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
COURSE CODE CH1T1	CO1	H						M
	CO2	H					L	
	CO3	H				M		
	CO4	H	M					
	CO5	M	M				L	

UNIT I

Treatment of analytical data : Classification of errors - Determinate and indeterminate errors -Minimisation of errors - Accuracy and precision - Distribution of random errors - Gaussian distribution - Measures of central tendency - Measures of precision - Standard deviation - Standard error of mean - student's t test - Confidence interval of mean - Testing for significance - Comparison of two means – F - test - Criteria of rejection of an observation - propagation of errors - Significant figures and computation rules - Control charts - Regression analysis - Linear least squares analysis.

UNIT-II

Titrimetric Analysis: Classification of reactions in titrimetric analysis- Primary and secondary standards-Neutralisation titrations-Theory of neutralisation indicators-Mixed indicators- Neutralisation curves-Displacement titrations-Precipitation titrations-Indicators for precipitation titrations-Volhard method-Mohr method- Theory of adsorption indicators-Oxidation reduction titrations-Change of electrode potentials during titration of Fe(II) with

Ce(IV)- Detection of end point in redox titrations-Complexometric titrations- Metal ion indicators-Applications of EDTA titrations-Titration of cyanide with silver ion.

UNIT -III

Visible spectro photometry – Theory of spectrophotometry and colorimetry, Beer-Lambert's law - Deviations from Beers law. Classification of methods of colour measurement or comparison (standard series method, Duplication method, Dilution method, photoelectric-photometer method, spectrophotometer method)-Instrumentation – Applications-determination of phosphates, chlorides, Iron, Manganese, chromium - Photometric titrations-Spectrophotometric determination of pK value of an indicator

Turn Over

UNIT – IV

Potentiometry: Advantages of potentiometric methods - Reference electrode - Standard hydrogen electrode .Acid- alkali or Neutralisation titration, Oxidation – reduction titrations, Precipitation titrations, complexometric titrations, Methods of end point location (Graphical, Differentiation method, Pinkhof- Treadwell method). Calomel electrode -Indicator electrodes: Metal-metal ion electrodes - Inert electrodes -Membrane electrodes - theory of glass membrane potential - Direct potentiometry , potentiometric titrations - Applications.

UNIT V

Programming in FORTRAN 77 - Flow charts-Constants and variables - Arithmetic expressions - Arithmetic statement - Replacement statement - Input and output statements - Format specifications -Termination statement - Branching statement - IF statement - Arithmetic and logical IF statement - GOTO statement - - Subscripted variable and DIMENSION Statement - DATA Statement. Control statements - DO statement - Rules for DO statements - Functions and subroutines – common statement

Flow charts and computer programs for

i) Summing of power series $1+x+x^2+x^3+\ldots.+x^n$
ii) Rate constant of First order reaction or Beer's law by linear least square method.
iii) Hydrogen ion concentration of a strong acid/Quadratic equation.
iv) Solution for Vander Waals equation or Hydrogen ion concentration of a monoprotic Weak acid.
v) Standard deviation and variance of univariant data.

REFERENCES:

1. Vogel's text book of quantitative analysis. (3^{rd} edition)Addition Wesley Longmann Inc.
2. Quantitative analysis R.A Day and A.L.Underwood. Prentice Hall Pvt.Ltd.
3. Principles of computer programming (Fortran 77 IBM PC)V.Rajaraman, Prentice Hall.
4. An introduction to Digital computers.V.Rajaraman and T.Radhakrishnan
5. Fundamentals of Analytical Chemistry – Skoog and West
6. Instrumental Methods of analysis – B K Sharma.

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PARVATHANENI BRAHMAYYA SIDDHARTHA COLLEGE OF ARTS & SCIENCE

M. Sc., CHEMISTRY – SECOND SEMESTER

CH2T2: INORGANIC CHEMISTRY – II

Objectives: 1.To emphasize the need and role of organometallic compounds and complexes as catalysts in large scale manufacturing procedures.

1. To accentuate the role of metal ions and other non metallic elements like sulphur, Phosphorus etc., in enzymes, transportation and storage processes.
2. To enumerate the role of molecular spectroscopy in understanding the structures and bonding aspects of metal clusters.

Course: Inorganic chemistry (code CH2T2)		
S.No	COURSE OUTCOMES	PO`S
	The graduate 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.	1,2
2	Comprehend the basic and advanced concepts of metallic & non metallic clusters, Inorganic reaction mechanisms, organo metallic chemistry, electronic & magnetic properties of complexes and bio inorganic chemistry.	1,6
3	Apply the conceptual knowledge gained in the concepts 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
4	Analyze the role of metallic & non metallic clusters / cages, inorganic reaction mechanisms, organo metallic chemistry, electronic & magnetic properties of complexes in understanding the similarities and differences among the concepts of chemistry.	1,3
5	Assess that how far the concepts of metallic & non metallic clusters, Inorganic reaction mechanisms, organo metallic chemistry, electronic & magnetic properties of complexes and bio inorganic chemistry are useful in rendering theoretical explanations for the concepts in chemistry.	1,7

CO-PO MATRIX								
COURSE CODE CH2T2	CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
	CO1	M	L					
	CO2	L					H	
	CO3	H	M					
	CO4	L		H				
	CO5	M						L

UNIT-I

Non metal cages and metal clusters:

Structure and bonding in phosphorous-oxygen, phosphorous-sulphur cages; structure and bonding in higher boranes with (special reference to B_{12} icosahedra). Carboranes, metalloboranes, metallocarboranes.

Metal clusters:

Classification- LNCs and HNCs **,** Isoelectronic and Isolobal relationships , electron counting rules: Wade's and Lauher's rules. M-M multiple bonding; preparation, structrure and bonding in dinuclear $[Re_2Cl_8]^{2-}$ ion, trinuclear $[Re_3Cl_9]$, tetra nuclear $W_4(OR)_{16}$, hexa nuclear $[Mo_6Cl_8]^{4+}$ and $[Nb_6Cl_{12}]^{+2}$, Applications of clusters.

UNIT-II

Organ metallic chemistry of transition metals:

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 reductive elimination, insertion and elimination. Applications of organometallic compounds- Catalytic hydrogenation, Hydro formylation, Zeigler- Natta catalyst for polymerization of olefins.

UNIT III

Reaction mechanism of transition metal complexes:

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, complementary and non – complementary reactions.

UNIT IV

Term symbols and their derivation. Microstates, Hunds rules to predict ground terms and ground states. List of ground energy and higher energy terms from d^1 to d^9 configurations **Electronic spectra of transition metal complexes** Electronic configurations and Spectroscopic terms. Selection rules, Slator–Condon parameters, Racah parameters, Term separation energies for d^n configurations Orgel diagrams. Tanabe- Sugano diagrams for d^1 to d^9 configurations. Calculations of Dq, B and β parameters. Charge transfer spectra.

UNIT-V

Bio-inorganic chemistry and Magnetic properties of complexes

Storage and transport of dioxygen by Hemoglobin and Myoglobin. Vitamin B_{12} and its importance. **Magnetic properties of transition metal complexes** 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.

References:

1. Inorganic Chemistry, Huheey. Harper and Row.
2. Concise inorganic chemistry, J. D. Lee, ELBS.
3. Inorganic chemistry, K.F. Purcell and J.C. Kotz, Holt Saunders international
4. Organometallic chemistry, R.C. Mehrotra and A. Singh. New Age International.
5. Advanced Inorganic Chemistry, Cotton and Wilkinson, Wiley Eastern

6. Inorganic reaction mechanism, Basolo and Pearson, Wiley Eastern
7. Bioinorganic Chemistry, K. Hussan Reddy
8. Biological Aspects of inorganic chemistry, A. W. Addison, W. R. Cullen, D. Dorphin and G. J.James. Weliey Interscience.
9. Photochemistry of coordination compounds, V.Balzani and V.Carassiti. Academic Press.
10. Text book of Coordination chemistry by K.SomaSekhar rao and K.N.K. vani, Kalyani Publishers.
11. Concise Co-ordination Chemistry,Gopalan & Ramalingan Vikas Publishing House Pvt. Ltd., 2014.
12. Co-ordination chemistry, D.Banerjee Tata Mc Graw Hill, 1993.
13. Principles of Inorganic Chemistry, Puri Sharma & Kalia, Vishal Pub, 2008.
14. Inorganic chemistry, Huheey, A.Kieter, , L.Keiter, 4th edition, Pearson education, Asia.

P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE
DEPARTMENT OF CHEMISTRY
M.Sc – CHEMISTRY (ORGANIC CHEMISTRY)
III SEMESTER

20CH3T1: ADVANCED ORGANIC SPECTROSCOPY

Course: Advanced Organic Spectroscopy **(code 20CH3T1)**		
S.No	COURSE OUTCOMES	PO`s
	The student will be able to	
1	Memorize the basic concepts of advanced organic spectroscopy	2,7
2	Sumarize the principle, theory and advanced aspects of ^{1}HNMR, ^{13}C NMR, 2D NMR, ORD & CD spectroscopic techniques.	1,2,7
3	Display the knowledge gained in the areas of ^{1}HNMR, ^{13}C NMR, 2D NMR, ORD & CD spectroscopic techniques in chosen job role.	1, 6
4	Interpret the spectral data of ^{1}HNMR, ^{13}C NMR, 2D NMR, ORD & CD in elucidating the structure of the molecule.	1, 7
5	Assess that how far the spectral data of ^{1}HNMR, ^{13}C NMR, 2D NMR, ORD & CD are useful in establishing the structure of the molecule.	1, 7

CO-PO MATRIX								
COURSE CODE 20CH3T1	CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
	CO1		H					M
	CO2	M	M					L
	CO3	H					H	
	CO4	H						M
	CO5	H						M

UNIT – I

Proton NMR Spectrscopy:

Determination of structure of organic compounds using PMR data. Spin system, Nomenclature of spin system, spin system of simple and complex PMR spectrum (Study of A_2 – AB – AB_2. ABX – ABC – AMX interactions)

Simplification of complex spectra- nuclear magnetic double resonance, chemical shift reagents, solvent effects on PMR Spectrum. Nuclear Overhauser Effect (NOE).

UNIT-II

13C-NMR spectroscopy:

Similarities and Difference between PMR and CMR-CMR recording techniques -BBC-BBD-SFORD-Gate pulse CMR spectrum.

General considerations, chemical shift (aliphatic, olefinic, alkyne, aromatic, heteroaromatic and carbonylcarbon), coupling constants. Typical examples of CMR spectroscopy – simple problems.

UNIT-III

ORD& CD Curves:

Optical rotatory dispersion: Theory of optical rotatory dispersion – Cotton effect – CD curves-types of ORD and CD curves-similarities and difference between ORD and CD curves. α- Halo keto rule, Octant rule – application in structural studies.

UNIT-IV

2D NMR spectroscopy:

Definitions and importance of COSY – HOMCOR & HETCOR, NOESY, INADEQUATE, J.resolved spectroscopy (HOM2DJ, HET2DJ), INDOR, INEPT,.DEPT.

Study of COSY – HOMCOR & HETCOR, NOESY, INADEQUATE, J.resolved spectroscopy (HOM2DJ, HET2DJ), INDOR, INEPT, DEPT taking simple organic compounds as examples.

UNIT –V

Structural Elucidation of Organic compounds Using UV, IR, 1H-NMR, 13C-NMR and Mass spectroscopy.

References :

1. Introduction to Spectroscopy – D. L. Pavia, G.M. Lampman, G. S. Kriz, 3rd Ed. (Harcourt College publishers).
2. Spectrometric identification of organic compounds R. M. Silverstein, F. X. Webster, 6th Ed.John Wiley and Sons.
3. Spectroscopic methods in organic chemistry - D. H. Williams and I Flemming McGraw Hill, 4th edition.
4. Absorption spectroscopy of organic molecules – V. M. Parikh
5. Organic structural Spectroscopy- Joseph B.Lambert, Shurvell, Lightner, Cooks, Prentice-Hall (1998).
6. Organic structures from spectra –Field L.D., Kalman J.R. and Sternhell S. 4th Ed. John Wiley and sons Ltd.
7. Organic spectroscopy – Principle & Applications – Jag Mohan, Narosa, 2nd edition, Publishing house.

Parvathaneni Brahmayya Siddhartha College of Arts & Science: Vijayawada
(An autonomous college in the jurisdiction of Krishna university)

M.Sc (ORGANIC CHEMISTRY)
IV SEMESTER

ORGANO METALLIC REAGENTS

S.No	COURSE OUTCOMES	PO`S
	The student will be able to	
1	Memorize the synthetic roots and applications of organo metallic reagents.	2,7
2	Appreciate the methods of synthesis and reactivity of various organo metallic reagents	1,2,7
3	Investigate the conceptual knowledge in various organo metallic reagents in organic synthesis	1, 6
4	Interpret the role of organo metallic reagents in organic synthesis	1, 7
5	Assess the role of specific of organic metallic reagents as catalysts in organic synthesis	1, 7

CO-PO MATRIX								
COURSE CODE 22CH4E4	CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
	CO1		H					M
	CO2	M	M					L
	CO3	H					H	
	CO4	H						H
	CO5	H						M

UNIT-I

Organo Magnesium and Lithium compounds: Preparation of Grignard reagents with alkyl, allyl, and propargyl halides, alkylation reaction with carbonyl compounds, esters, imines and nitriles, epoxides, acids, acid chlorides, carbon dioxide, carbon disulfide, sulfur dioxide. Preparation of alkyl lithium reagents, Lithium Di isopropyl amide (LDA) and its synthetic applications.

UNIT-II

Organo Copper and Nickel compounds: Organo copper reagents - preparation, reactions, organocuprates, lithium organocuprates (Gilman reagents). Organ nickel compounds: π-ally nickel complexes, preparation of 1,5cyclicdienes, nickel carbonyl.

UNIT-III

Organo Palladium compounds: Preparation of palladium reagents, π-allyl palladium complexes – formations, reactions – prenylation, formation of conjugated dienes, synthesis of

macro cyclic nitrogen hetero cyclic. Heck reaction, Stille coupling reaction, Sonogashira coupling reaction, Suzuki coupling reaction.

UNIT-IV

Organoboranes: Preparation of Organobornaes viz hydroboration with BH_3-THF, dicylohexylboranes, disiamylborane, thexylborane, 9-BBN and catechol boranes .protonolysis, oxidation, isomerization and cyclization. Free radical reactions of organoboranes, reactions with α-bromoketones, α-bromoesters, carbonylation, the cyan borate process and the reaction of alkenylboranes and trialkyltrialkynyl borates.

UNIT-V

Organosilanes: Synthetic applications of organ silicon compounds, protection of functional groups, trimethylsilly ethers, sillylenolethers, trimethylsilyliodide, trimethylsilyltriflate, Peterson olefination. Synthetic applications of α-silylcarbanion and β-silylcarbonyl compounds, alkenylsilanes, Allylsilanes, the β-effect - control of rearrangement of carboniumions by silicon.

Reference books:

1. Organometallic in Synthesis AManual by MSchlosser, L.Hegedus, B.Lipshutzetal, JohnWily&sons.

2. Modern methods of organic synthesis by W.Carruthers (Cambridge).

3. Organic synthesis by H.O.House.

4. Organometallics: A concise introduction, ChristophElschenbroich, 3rdedition, Willey-VCH.

5. Advanced Organic Chemistry, F.ACareyand R.J.Sundberg.Plenum.

6. Transition metals in the synthesis of complex organic molecules, Hegedus, L.S, second edition, University Science, Book, CA, 1999.

7. Organo metallic Chemistry and Catalysis, Astruc, D, SpringerVerlag, 2007.

8. Organo transition metal chemistry: Applications to organic synthesis, Davies, S.G, Pergamon Press, New York, 1986.

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22CH4E1 : GREEN CHEMISTRY

Course Code	22CH4E1	I A Marks	30
No. of Lecture Hours / Week	4	End Exam Marks	70
Total Number of Lecture Hours	60	Total Marks	100
Seminar	-	Exam Hours	03

Course: GREEN CHEMISTRY		
S.No	COURSE OUTCOMES	PO`S
	The student will be able to	
1	Memorize the principles of green chemistry and concepts related to green organic synthesis.	2,7
2	Understand the role and significance of green organic synthesis.	1,2,7
3	Exercise the basic and advanced knowledge gained in green organic synthesis in chosen job role.	1, 6
4	Analyse how far green methods are environmentally benign over conventional methods of synthesis.	1, 7
5	Evaluate the principles of green chemistry in organic synthesis.	1, 7

CO-PO MATRIX								
COURSE CODE 22CH4E1	CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
	CO1		H					M
	CO2	M	M					L
	CO3	H					H	
	CO4	H						M
	CO5	H						M

Unit-I

Principles of Green Chemistry: Prevention of waste / by-products, atom economy, Hazardous products-Designing of safer chemicals-energy requirements Selection of appropriate solvents and starting materials-Use of protecting groups and catalysis-Designing of biodegradable products. green organic synthesis of paracetamol, catechol, adipic acid, urethane and ibuprofen.

Unit-II

Microwave assisted reactions: Theory of Microwave, advantages, disadvantages, applications-water as solvent: Hoffmann elimination, hydrolysis, oxidation of Toluene, oxidation of alcohols, hydrolysis of methyl benzoate to benzoic acid.

Organic solvents: Esterification reactions, Fries rearrangement, Ortho ester Claisen rearrangement, DielsAlder reactions, synthesis of chalcones, decarboxylation.

Solid state reactions (solvent free): De acetylation, deprotection, saponification of esters, synthesis of anhydrides from dicarboxylic acid, synthesis of nitriles from aldehydes.

Unit-III

Phase Transfer Catalysis: Definition, Mechanism, Types, advantages and applications of PTC – C-alkylation, N-alkylation, Darzen's reaction, Wittig reaction, Benzoyl cyanides from benzoyl chloride, alcohols from alkyl halides, Crown ethers – Introduction, synthetic applications: esterfication, saponification, Anhydride formation, $KMnO_4$ oxidation, aromatic substitution, elimination.

Unit-IV

Ultrasound assisted green synthesis: Introduction, instrumentation, types of sono chemical reactions – Homogeneous reactions – Curtius rearrangement of Benzoyl azide to phenyl isocyanate. Heterogeneous Liquid-Liquid reactions - Esterification, saponification, Hydrolysis, substitutions, additions. Heterogeneous Solid – Liquid Reactions–oxidation, reduction, hydroboration, coupling, Bouveault reaction, Strecker reaction.

Unit-V

Ionic liquids: Definition-Types of Ionic Liquids- properties- Application in organic synthesis-alkylation, allylation, oxidation, hydrogenation, hydroformylation, alkoxycarbonylation, carbon-carbon bond forming reactions-suzuki coupling, Heck reaction, stille coupling.

Textbooks/Referencebooks:

1. New Trends in Green Chemistry by V.K.Ahluwalia, M.Kidwai.

2. Green Chemistry: Environment Friendly Alternatives by Rashmi Sanghi, M.M.Srivastava

3. Green Solvents for Organic Synthesis by V.K.Ahluwalia, RajenderS.Varma.

4. Organic synthesis – special Techniques, V.K.Ahluwalia, Renu Aggarwal.

5.Green Chemistry - V.K.Ahluwalia, Ane Books Pvt. Ltd.,

1.3.1: Institution integrates cross-cutting issues relevant to Professional Ethics, Gender, Human Values, Environment and Sustainability and other value framework enshrined in Sustainable Development Goals and National Education Policy – 2020 into the Curriculum

NAME OF THE PROGRAM: M.Sc. COMPUTATIONAL DATA SCIENCE

NAME OF THE PROGRAM : MSC COMPUTATIONAL DATA SCIENCE REGULATION 22						
Name of the Course	Course Code	Professional Ethics	Gender	Human values	Environmental and Sustainability	other value frameworks enshrined
Data Structures	22DS1T1	Discusses ethical implications of data structure design in software, emphasizing efficient algorithms that can handle sensitive data securely.	NIL	Encourages responsible use of algorithms and data structures, especially in applications like search and sorting, which affect data access and processing fairness.	Highlights the importance of efficient data structure operations to reduce computational costs and resource usage.	Demonstrates practical applications of data structures, such as stacks, queues, and trees, that are integral to a variety of software applications.
Oriented Prograı	22DS1T2	Encourages ethical programming practices through responsible handling of file and database operations, data cleaning, and privacy.	NIL	Highlights fairness in data handling, data integrity, and transparency, especially in modules related to data structures and file handling.	Introduces efficient coding practices, focusing on optimized data handling and storage to reduce computational resource usage.	Practical applications and project-based learning, emphasizing real-world use cases of Python in data analysis, visualization, and database operations.
Advanced Database Management Systems	22DS1T3	Highlights responsible data management and database security in transaction processing, concurrency control, and distributed database management.		Promotes data integrity and fairness in data handling practices, focusing on maintaining accurate, transparent databases.	Encourages efficient database design, particularly in NoSQL and distributed systems, which can reduce resource usage and improve performance.	Emphasizes real-world application through data modeling (ER and relational) and practical database management tasks in both SQL and NoSQL systems.
Data Mining Techniques	22DS1T4	Emphasizes ethical use and interpretation of data mining patterns, privacy considerations, and responsible user interaction with mining results.	Not explicitly applicable in the syllabus, though can be supplemented with considerations on fairness and bias detection in data processing.	Promotes fair and accurate representation of data, which is reinforced through data cleaning, integration, and transformation processes.	Focuses on efficiency and scalability in data warehousing, as well as optimized resource use in data mining processes to reduce computational resource needs.	Covers practical data mining methods (e.g., OLAP, data warehouse modeling, association rules, classification, clustering), enhancing industry-ready skills.
Data Structures Lab	22DS1L1	Promotes ethical problem-solving skills and disciplined coding practices in data structures and algorithm implementations.	Not explicitly applicable but can promote inclusivity by encouraging gender-neutral variable naming and examples.	Not directly applicable but can include aspects of collaboration and sharing in code documentation and clarity for team development projects.	Efficient coding and optimization, especially in sorting and search algorithms and tree structures, reduces time and memory usage.	Focuses on practical data structures like Stacks, Queues, Linked Lists, Trees, and Hashing, which are widely used in various industry applications.
Object Oriented Programming Lab	22DS1L2	Encourages ethical coding practices, especially in error handling and code clarity in assignments like the Simple Calculator and file handling.	NIL	NIL	Efficient programming practices can be emphasized in mathematical calculations, particularly in assignments involving distance and area calculations.	Many assignments focus on practical applications, such as tax calculation, distance computation, and file operations, demonstrating the relevance of Python in real-world scenarios.

NAME OF THE PROGRAM : MSC COMPUTATIONAL DATA SCIENCE REGULATION 22						
Name of the Course	**Couse Code**	**Professional Ethics**	**Gender**	**Human values**	**Environmental and Sustainability**	**other value framework enshrined**
Essentials of Statistics for Data Science Using R	22DS2T1	Emphasizes ethical considerations in data collection and analysis, promoting transparency and integrity in statistical practices and reporting.	NIL	Encourages the fair representation of data and diverse perspectives in data analysis, especially in bi-variate analysis and hypothesis testing.	Focuses on efficient data management and processing methods, particularly in data collection and external interface integration.	Covers practical applications of statistics and R programming, including data analysis, regression, hypothesis testing, and connecting to external data sources.
Machine Learning	22DS2T2	Emphasizes ethical considerations in machine learning, particularly in data handling, model interpretation, and bias mitigation in algorithm selection.	Not explicitly addressed in the syllabus, but relevant when discussing bias in algorithms and the importance of diverse datasets in model training.	Encourages responsible and fair use of machine learning models, particularly in classification and regression tasks to avoid discrimination and bias.	Focuses on the efficiency of algorithms and resource usage, especially in model training and evaluation phases to minimize environmental impact.	Covers practical applications of machine learning techniques and frameworks, preparing students for real-world challenges in data science and analytics.
Web Technologies	22DS2T3	Discusses ethical considerations in web development, including data privacy, user consent, and responsible data handling in dynamic web applications.	Emphasizes the importance of accessibility and usability in web design, ensuring all users have equitable access to online information and services.	Relevant when discussing user interactions, form handling, and ensuring inclusivity in web applications to cater to diverse user demographics.	NIL	Focuses on practical applications of web technologies, covering various languages and tools for developing dynamic, responsive websites and web applications.
Machine Learning Lab	22DS2L1	Discusses ethical considerations in handling datasets, including data privacy, informed consent, and responsible use of data during modeling and analysis.	Relevant when demonstrating classification algorithms to ensure that models do not reinforce gender bias and are designed to be fair and equitable across different demographic groups.	Emphasizes the importance of using inclusive datasets that represent diverse populations in regression and classification algorithms to avoid bias.	NIL	Focuses on practical applications of machine learning algorithms using sample datasets, enhancing students' skills in real-world data analysis and model deployment.
Web Technologies Lab	22DS2L2	Discusses responsible use of technology and ensuring user data is handled with privacy and security, particularly in forms and data collection processes.	Relevant when creating registration forms and handling user data, ensuring that the design respects user identity and preferences.	Emphasizes inclusivity and accessibility in web design, ensuring that forms and information are user-friendly and cater to diverse user needs.	NIL	Focuses on practical implementations of web technologies, enhancing students' skills in creating functional web pages and applications.

22DS1L1: DATA STRUCTURES LAB

Course Name	Data Structures Lab			L	T	P	C	CIA	SEE	TM
Course Code	22DS1L1			0	0	6	3	30	70	100
Year of Introduction: 2020	Year of Offering: 2022	Year of Revision: No Revision		Percentage of Revision: 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 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

Course Name	Object Oriented Programming Lab		**L**	**T**	**P**	**C**	**CIA**	**SEE**	**TM**
Course Code	22DS1L2		0	0	6	3	30	70	100
Year of Introduction: 2020	**Year of Offering:** 2022	**Year of Revision**: No Revision			**Percentage of Revision:** 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 t o 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 calcuate area of troangle using Heron's formula. (CO1, L1)
   (Hint: Heron's formula is given as: 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 equcation. (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 garter than 75%, then the grade is Distinction. If aggregate is 60>= and <75, then grade is First Division. If the aggregate is 50>= and <60, then the grade is Second Division. If aggregate is 40>= and <50, then the garde 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 *Amstrong 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 begining 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 begining 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)

22DS1T1: DATA STRUCTURES

Course Name	Data Structures		L	T	P	C	CIA	SEE	TM
Course Code	22DS1T1		4	0	0	4	30	70	100
Year of Introduction: 2021	Year of Offering: 2022	Year of Revision: No Revision	Percentage of Revision: 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*, *Tress*, *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 S*tring 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 = 50 Marks)

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

Course Name	Object Oriented Programming		L	T	P	C	CIA	SEE	TM
Course Code	22DS1T2		4	0	0	4	30	70	100
Year of Introduction: 2021	Year of Offering: 2022	Year of Revision: No Revision			Percentage of Revision: 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 t o 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) Whit 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

Course Name	Advanced Database Management Systems			L	T	P	C	CIA	SEE	TM
Course Code	22DS1T3			4	0	0	4	30	70	100
Year of Introduction: 2021	Year of Offering: 2022	Year of Revision: 2022		Percentage of Revision: 7%						
L-Lecture, T-Tutorial, **P**-Practical, **C**-Credits, **CIA**-Internal Marks, **SEE**-External Marks, **TM**-Total Marks										

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 t o 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 - Shrading - 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 *Shrading* 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)

22DS1T4: DATA MINING TECHNIQUES

Course Name	Data Mining Techniques		L	T	P	C	CIA	SEE	TM
Course Code	22DS1T4		4	0	0	4	30	70	100
Year of Introduction: 2020	Year of Offering: 2022	Year of Revision: No Revision			Percentage of Revision: 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 t o 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 lean 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: Lean different Classification & Prediction Methods.
CO5: U*nderstand* & *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 Multiered 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 Starnet 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 Propagatio*n (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-M*eans 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

22DS2E2: DESIGN & ANALYSIS OF ALGORITHMS

Course Name	Design & Analysis of Algorithms			L	T	P	C	CIA	SEE	TM
Course Code	22DS2E2			4	0	0	4	30	70	100
Year of Introduction: 2005	Year of Offering: 2021	Year of Revision: 2022		Percentage of Revision: 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 t o 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(nlogn) 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. Coremen TH Leiserson CE, Rivest R L and Stein, Clifford, Introduction to Algorithms, PHI , Third Edition, 2010, 35th 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)

22DS2E2

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

Course Name	Machine Learning Lab		L	T	P	C	CIA	SEE	TM
Course Code	22DS2L1		4	0	0	4	30	70	100
Year of Introduction: 2021	Year of Offering: 2021	Year of Revision: 2022	Percentage of Revision: 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

Course Name	Web Technologies Lab		L	T	P	C	CIA	SEE	TM
Course Code	22DS2L2		0	0	6	3	30	70	100
Year of Introduction: 2020	Year of Offering: 2022	Year of Revision: No Revision	Percentage of Revision: 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*, S*vele*t 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 a internal DTD file. (CO3, L6)
24. Create an external DTD file. (CO3, L6)
25. Create a 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,
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 JScript Query. (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.

22DS2T1: ESSENTIALS OF STATISTICS FOR DATA SCIENCE USING R

Course Name	Essentials of Statistics for Data Science Using R		L	T	P	C	CIA	SEE	TM
Course Code	22DS2T1		4	0	0	4	30	70	100
Year of Introduction: 2021	Year of Offering: 2021	Year of Revision: 2022			Percentage of Revision: 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 o 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 Analysi.*
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.& Sounderpandian, 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 **Max.Marks: 70**

Answer all questions. All question carry equal marks. **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

Course Name	Machine Learning		L	T	P	C	CIA	SEE	TM
Course Code	22DS2T2		4	0	0	4	30	70	100
Year of Introduction: 2021	Year of Offering: 2021	Year of Revision: 2022	Percentage of Revision: 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 Leaning*.
- 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 Leaning*.
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 Cassification 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'REILY -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 Leaning 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

Course Name	Web Technologies		L	T	P	C	CIA	SEE	TM
Course Code	22DS2T3		4	0	0	4	30	70	100
Year of Introduction: 2021	Year of Offering: 2021	Year of Revision: 2022	Percentage of Revision: 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 t o 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 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).

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, 5th 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)

1.3.1: Institution integrates cross-cutting issues relevant to Professional Ethics, Gender, Human Values, Environment and Sustainability and other value framework enshrined in Sustainable Development Goals and National Education Policy – 2020 into the Curriculum

NAME OF THE PROGRAM : MA ENGLISH

NAME OF THE PROGRAM : MA ENGLISH REGULATION 17 , 20 & 22						
Name of the Course	**Couse Code**	**Professional Ethics**	**Gender**	**Human values**	**Environmental and Sustainability**	**other value framework enshrined**
POETRY-I	**EN1T2**	Milton's *Paradise Lost* delves into themes of free will and morality, embodying a struggle between divine authority and human agency, thus reflecting on ethical dilemmas.	n Chaucer's *The Canterbury Tales* , particularly in the portraits of the Knight and the Squire, we see a reflection on the values of chivalry and social status, raising questions about gender roles and the expectations placed on men and women in society.	Keats, through *Ode on a Grecian Urn* and *Ode to a Nightingale* , examines the relationship between beauty, nature, and mortality, promoting environmental awareness and human values in the face of transience, Browning's My Last Duchess and The Last Ride Together interrogate power dynamics in relationships and the ethical implications of possessiveness and control. Lastly, Tennyson's Ulysses and Lotus Eaters reflect on the quest for meaning and the tension between ambition and contentment, while Arnold's Scholar Gypsy and Dover Beach address the search for truth and the challenges of faith in a changing world, highlighting human values in a modern context.	Pope's *The Rape of the Lock* satirizes social vanity and the triviality of aristocratic values, raising issues of gender dynamics and societal ethics. Keats, through *Ode on a Grecian Urn* and *Ode to a Nightingale* , examines the relationship between beauty, nature, and mortality, promoting environmental awareness and human values in the face of transience. Wordsworth's Tintern Abbey and Ode on Intimations of Immortality celebrate nature's role in shaping human consciousness and ethical understanding, aligning with themes of sustainability.	John Donne's poems, such as *The Sun Rising* and *The Ecstasy* , explore love and intimacy, challenging traditional notions of gender and personal connection, while also valuing human emotions.these texts create a rich tapestry of moral and ethical reflections that remain relevant today.
PROSE AND FICTION-II	**EN2T4**	William Golding's *Lord of the Flies* serves as a profound commentary on human nature and morality, exploring the fragility of civilization and the inherent darkness within humanity, raising questions about ethics, community, and the environmental implications of societal breakdown	Virginia Woolf's *A Room of One's Own* foregrounds the necessity of financial independence and personal space for women's creative expression, highlighting gender inequalities and the importance of women's voices in literature.	Somerset Maugham's stories, *The Happy Man* and *Princess September* , explore human values through the lens of happiness and the superficiality of societal expectations, questioning the nature of contentment and fulfillment.	Doris Lessing's *Flight* and *No Witchcraft for Sale* examine the intersection of culture and gender, addressing themes of colonialism, power dynamics, and the human connection to nature, emphasizing environmental sustainability in the context of indigenous knowledge and respect for the land.	Together, these works engage with critical issues surrounding identity, power, and the ethical responsibilities of individuals within their communities and the natural world.
VICTORIAN AGE	**20EN2T1**	Tennyson's In Memoriam reflects on loss and mourning within the context of societal change, emphasizing the human condition's complexity and the ethical implications of personal grief. William Thackeray's Vanity Fair satirizes the moral compromises of society, highlighting the impact of social class on individual ethics and human relationships. Thomas Carlyle's The Hero as Poet presents the idea of the artist as a moral guide, emphasizing the ethical implications of creative expression.	Robert Browning's dramatic monologues, such as "Andrea del Sarto" and "A Grammarian's Funeral," explore individual morality and the struggle for artistic integrity, addressing gender roles and the societal expectations of the time.	Robert Burns' Red, Red Rose and To a Mouse evoke themes of compassion and empathy, underscoring human values and the interconnectedness of all beings, while also touching upon the environmental conditions of rural life.Charles Dickens' A Tale of Two Cities examines the effects of social injustice and class disparity, urging a moral responsibility towards the marginalized.	Emily Brontë's Wuthering Heights explores themes of passion, revenge, and the human psyche against the backdrop of nature, offering a gothic reflection on the environment's influence on human behavior.	John Ruskin's Unto This Last critiques industrial capitalism and advocates for ethical economic practices that prioritize human dignity and community welfare, aligning with sustainable development principles.
AMERICAN LITERATURE-I	**20EN3T4**	Walt Whitman's "Song of Myself" (selections 1-5, 17, 52) emphasizes the interconnectedness of all beings, advocating for a holistic understanding of humanity that aligns with human values and ethical responsibility. His celebration of individuality and collective experience fosters an ethical framework that champions inclusivity and environmental awareness.	Nathaniel Hawthorne's The Scarlet Letter delves into themes of morality, social judgment, and individual integrity, highlighting the ethical dilemmas faced by individuals within societal constructs, which resonates with contemporary discussions on professional ethics and gender.Twain's narrative highlights themes of friendship, moral growth, and the complexities of race and gender through Huck's journey	Emily Dickinson's poems, such as 303, 328, 341, 511, 640, and 712, often reflect on inner life, nature, and existential themes, offering profound insights into human values and the complexities of gender. Her exploration of the self and the natural world invites reflection on how personal and societal values shape our understanding of sustainability. O'Neill's play examines the dehumanizing effects of industrialization and class disparity, reflecting on human values and the ethical responsibilities of individuals within a capitalist society.	Henry David Thoreau's Walden (selected chapters) serves as a foundational text for environmental sustainability, advocating for a simple, mindful existence in harmony with nature. Thoreau's reflections on self-sufficiency and natural living underscore the importance of environmental stewardship.Edgar Allan Poe's The Purloined Letter can be interpreted through a lens of ethical governance and transparency, addressing the importance of integrity in both personal and societal contexts, relevant to sustainable practices in today's world.	Ralph Waldo Emerson's The American Scholar promotes self-reliance and intellectual freedom, urging individuals to contribute ethically to society while fostering a sense of community. This aligns with the principles of professional ethics in sustainable development.
LITERARY THEORY AND CRITICISM-I	**20EN3T1**	Matthew Arnold's Study of Poetry explores the relationship between poetry and society, advocating for the need for literary works to embody cultural values. T.S. Eliot's Tradition and the Individual Talent emphasizes the balance between individual creativity and cultural context, promoting an ethical approach to literary production. Dr. Johnson's Preface to Shakespeare highlights the importance of literary integrity and the moral responsibilities of writers.	Wordsworth's Preface to Lyrical Ballads champions the authenticity of human experience, advocating for the representation of ordinary lives and emotions, thus fostering a deeper understanding of gender and social issues.	Sidney's An Apology for Poetry defends the moral value of poetry as a vehicle for human values and social commentary, reflecting its potential to inspire ethical behavior.	Northrop Frye's exploration of archetypes in literature reveals universal themes that resonate across cultures, further enhancing discussions on ethics and sustainability in the narrative of human experience.	Together, these critical perspectives highlight the vital role literature plays in shaping ethical frameworks and understanding the interconnectedness of social, cultural, and environmental issues in the pursuit of sustainable

M.A ENGLISH - I SEMESTER
EN1T2: POETRY-I

Subject Code :	EN1T2	I A Marks	30
No. of Lecture Hours / Week	06	End Exam Marks	70
Total Number of Lecture Hours	90	Total Marks	100
Seminar / Group Discussions	01 Hour/Week	Exam Hours	03

Objectives:

1. To train the students to analyze the trends in literary expression of the period.
2. To study the movements that has occurred from 14th century to 19th century British poetry.
3. To expose the students to the impact of ever changing trends brought about by social and scientific developments.

COURSE OUTCOMES:

COURSE OUTCOME NO	Upon successful completion of this course, students are able to:
CO-1	Acquaint with the major literary movements, and develop an understanding on poems that focus on nature and environment which helps them to critically appreciate literary text. PO 1,3,4
CO-2	Equip with the trends of literature from 14th century with reference to social, cultural and religious aspects which in turn develops their awareness on society and broaden their social interaction. PO 1,5,7
CO-3	Obtain the popular literary device, and implement it in their creative writing. Epic, Milton's Grand style of writing, the concept of Romantic poetry, Romantic Age, classical Age, Mock epic and the age of Neo-Classism. PO 2,7
CO-4	Develop interpretation skills of Poetry and enhance their communication skills. PO 1, 5, 7
CO-5	Develop communication skills in a broadened perspective by reading different kinds of poetry such as Romantic poetry, dramatic monologue, and pastoral element in the poetry. PO 1,6,7

CO-PO MATRIX- EN1T2							
CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	H		M	M			
CO2	H				M		M
CO3		M					M
CO4	H				M		M
CO5	H					M	M

Details of the Syllabus

Unit 1	Literary history / movements /history of ideas /genres/Intensive study of the Asterisk marked texts.
Unit 2	Chaucer : Prologue to The Canterbury Tales – Knight's Portrait, The Squire's Portrait, Oxford student, Nun's Portrait
	John Donne : The Sun Rising, The Ecstasy.
Unit 3	* John Milton : Paradise Lost, Book I.
Unit 4	Alexander Pope : The Rape of the Lock
	* John Keats : Ode on a Grecian Urn, Ode to Nightingale.
Unit 5	William Wordsworth : Tintern Abbey, Ode on Intimations of Immortality.
	Robert Browning : My Last Duchess, The Last Ride Together. Tennyson : Ulysses, Lotus Eaters
	Mathew Arnold : Scholar Gypsy, Dover Beach

Text books:

	Author	Title	Publisher
1	John Milton	Paradise Lost, Book I	Macmillan
2	John Donne	"The Sun Rising", "The Ecstasy".	Macmillan

Reference books:

	Author	Title	Publisher

1.	Thomas Humprey Ward	The English Poets (Vol: I to IV)	Macmillan
2.	Pratt and Arnold	The English Poets: Chaucer to Donne	Macmillan

M.A ENGLISH - II SEMESTER
EN2T4 - PROSE AND FICTION-II

Subject Code :	EN2T4	I A Marks	30
No. of Lecture Hours / Week	06	End Exam Marks	70
Total Number of Lecture Hours	90	Total Marks	100
Seminar / Group Discussions	01 Hour/Week	Exam Hours	03

Course Outcomes (COs):

1. Learn about the variety of structures in novel, they get the proper understanding of the literary terms like imagery, symbolism. PO 1, 3
2. Feminism and Virginia Woolf's ideas about life and living of women in modern era is understood by the students. PO 5
3. Doris Lessing's contribution to literature and her themes are understood by the students by associating them to the real life. Simple living and concept of freedom are understood by the students by reading Somerset Maugham's short stories apart from the techniques of writing short stories; the style of the writer is clearly expressed to students. PO 5, 7
4. Concept of individuality, pastoral elements, Thomas Hardy's imaginary world and setting is understood by the students. Oedipus complex and the concept of an autobiographical novel is understood by the students. PO 1, 6
5. William Golding's allegory and James Joyce's style of stream-of-consciousness novels are understood by the students. PO 1, 3

CO-PO MATRIX- EN2T4							
CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	H		M				
CO2					H		
CO3					H		M
CO4	H					M	
CO5	H		M				

Syllabus

Unit 1	Literary history / movements /history of ideas /genres/Intensive study of the Asterisk marked texts.
Unit 2	* Virginia Woolf : Room of One's Own(1929)
Unit 3	Somerset Maugham: The Happy Man(1924), Princess September(1939) CO3 Doris lessing : Flight(1957); No witchcraft for sale(1986)
Unit 4	Thomas Hardy : Mayor of Casterbridge D.H. Lawrence : Sons and Lovers(1913)
Unit 5	James Joyce : Portrait of an artist as a young man. William Golding :Lord of the Files(1954)

Text Books

	Author	Title	Publisher
1	Virginia Woolf	Room of One's Own	Oxford University Press
2	Thomas Hardy	Tess of D'Urbervilles	Oxford University Press
3	William Golding	Lord of the Files.	Oxford University Press
4	D.H. Lawrence	Sons and Lovers	Oxford University Press
5	James Joyce	Portrait of an artist as a young man.	Penguin

Reference Books

	Author	Title	Publisher
1	Humphreys.R	The Stream of Consciousness in the Modern Novel 1954	Oxford University Press
2	J.W.Beach	The Twentieth Century Novel	Oxford University Press
3	David Daiches	The Novel and The Modern World	Oxford University Press

P.B.SIDDHARTHA COLLEGE OF ARTS AND SCIENCE
DEPARTMENTOFENGLISH
M.AENGLISH II SEMESTER
PaperCode –20EN2T1
PaperTitle:VICTORIAN AGE

COURSE OUTCOME:

Course Code: 20 EN2T1	Title of the Paper: Victorian Age
COURSE OUTCOME NO	Upon successful completion of this course, students are able to:
CO-1	Describe and execute different literary terms and socio economic cultural conditions of the period and develop the quality of social responsibility.
CO-2	Understand different poetic forms like an elegy, dramatic monologue, lyric etc., and are able to analyse the texts with reference to those techniques.
CO-3	Students are able to comprehend effectively about the kinds of novels and significance of novels of that particular age and develop the quality of social interaction.
CO-4	Apply Victorian prose style and new trends of Victorian age in interpreting the literary texts.
CO-5	Learn the characteristics of Victorian Age and do comparative study by taking society and human nature into consideration.

CO-PO MATRIX- 20 EN2T1							
CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	H						
CO2							H
CO3	H						
CO4			M				
CO5				M			

SYLLABUS

P.B.SIDDHARTHA COLLEGE OF ARTS AND SCIENCE
DEPARTMENTOFENGLISH
M.AENGLISH II SEMESTER
PaperCode –20EN2T1
PaperTitle:VICTORIAN AGE

No.ofhoursperweek:04Totalmarks:100 Total credits: 04(Internal:30M&External:70M)

Details of the Syllabus:

Unit1	Socio economic and cultural conditions of the period, Victorian compromise, elegy, dramatic monologue, novel of social realism, the gothic novel, Victorian notions
Unit2	Alfred Tennyson: In Memoriam(1-10 sections) Robert Browning: " Andrea Del Sarto", " A Grammarians Funeral"
Unit3	Robert Burns: Red Red Rose, To a Mouse John Ruskin: Unto this Last (Two Chapters)
Unit4	Charles Dickens: A Tale of Two Cities William Thackeray: Vanity Fair
Unit5	Thomas Carlyle: The Hero as Poet Emily Bronte: Wuthering Heights

Text Books:

	Author	Title	Publisher
1	Alfred Tennyson	In Memoriam	WW Norton &co
2	Robert Browning	Andrea Del Sarto", " A Grammarians Funeral	Internet
3	Robert Burns	Red Red Rose, To a Mouse	Internet
4	John Ruskin	Unto this Last	FQ Classics
5	Charles Dickens	A Tale of Two Cities	Penguin
6	William Thackeray:	Vanity Fair	Maple press pvt.ltd.
5	Thomas Carlyle	The Hero As Poet	Kessinger Publishing (2010)

Reference Books:

	Author	Title	Publisher
1	Gertrude Himmelfarb(Editor)	The Spirit of the Age: Victorian Essays	Yale University press
2	Judith Flanders	Inside the Victorian Home: A Portrait of Domestic life in Victorian England	Norton Company

P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE
Siddhartha Nagar, Vijayawada – 520 010.
NAAC reaccredited at 'A+' level
Autonomous - ISO 9001 – 2015 Certified

Title of the Paper: AMERICAN LITERATURE-I
Semester: III

Course Code	20EN3T4	Course Delivery Method	Class Room / Blended Mode
Credits	04	CIA Marks	30
No. of Lecture Hours / Week	04+1	Semester End Exam Marks	70
Total Number of LectureHours	05	Total Marks	100
Year of Introduction :	Year of Offering :	Year of Revision :	Percentage of Revision :

Course Objective: To introduce the students to a range of texts from the canon of American literature; to familiarize the students with the social conditions that informed American literature; To sensitize the students to the cultural underpinnings of American Literature; To enable the students, appreciate and analyses American literature in an informed way.

Course Outcomes:

CO1: This course helps the students to understand the American life andculture that has evolved through the colonial life.
The birth of the Colonial America: and its emancipation from the control of the Government of England. The students learn the history of American Literature. PO 4

CO2: The evolution of democratic elements and symbolism is shown by American Poets. Walt Whitman in his poetry shows the mystical and metaphorical elements, similarly the concept of self and the theme of death is portrayed by Emily Dickinson. PO 1, 3

CO3: The awareness of America's historical background and cultural links with Europe helps the students to understand the American belief in self-Reliance. The students learn why Americans believe in democracy, in liberty and equity. PO 1, 2

CO4: The students get the knowledge of the various classics of American literature. They also learn the evolution of American Poetry, Fiction, Drama and the circumstances that existed for the development of American Literature. PO 1

CO5 : The student understands the great influence of the American world of letters that has been exercising on both the creative writing and critical trends in other countries. PO 5, 7

CO-PO MATRIX- 20 EN3T4							
CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1				H			
CO2	H		M				
CO3	H	H					
CO4	H				M		
CO5					M		M

Syllabus

Course Details

Unit	Learning Units	Lecture Hours
I	Walt Whitman: "Song of Myself". Selections from 1 to 5, 17, 52. Emily Dickinson: 303, 328, 341, 511, 640, 712.	12
II	The American Scholar by R.W. Emerson Walden (5 chapters only) by Henry David Thoreau	12
III	The Scarlet letter by Nathaniel Hawthorne The Purloined Letter by Edgar Allen Poe	12
IV	The Hairy Ape by Eugene O' Neill	12
V	Huckleberry Finn by Mark Twain	12

Reference books:	
1	Dickinson, Emily, and Thomas Herbert Johnson. The Complete Poems. Faber & Faber, 1975.
2	Emerson, Ralph Waldo. The Complete Prose Works of Ralph Waldo Emerson. Ward, Lock &Co, 1898.
3	Francis, Pauline, and Mark Twain. Huckleberry Finn. ReadZone, 2013.
4	Hummer, Theo, and Nathaniel Hawthorne. The Scarlet Letter. Insight Publications, 2011.
5	O'Neill, Eugene. The Hairy Ape. Project Gutenberg, 2003.
6	Poe, Edgar Allan. The Purloined Letter. EpubBooks, 2013.
7	Thoreau, Henry David. Walden. Mifflin, 1964.
8	Whitman, Walt, et al. Song of Myself, and Other Poems. Counterpoint, 2010.
9	Gerber, John C. Twentieth Century Interpretations of The Scarlet Letter: a Collection ofCritical Essays. Prentice-Hall, 1968.
10	Jenkins, Philip. A History of the United States. Palgrave, an Imprint of Macmillan Publishers Limited, 2017.
11	Spiller, Robert E. Literary History of the United States: Bibliography. Macmillan, 1963.
12	**E-content / E-books** https://americanliterature.com/

P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE
Siddhartha Nagar,
Vijayawada – 520 010.
NAAC reaccredited at
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Title of the Paper: LITERARY THEORY AND CRITICISM-I
Semester: III

Course Code	**20EN3T1**	Course Delivery Method	Class Room / Blended Mode
Credits	04	CIA Marks	30
No. of Lecture Hours / Week	04+1	Semester End Exam Marks	70
Total Number of Lecture Hours	05	Total Marks	100
Year of Introduction :	Year of Offering :	Year of Revision :	Percentage of Revision :

Course Objective:

Students will have the opportunity to:
Introduce a wide range of critical methods and literary theories with anemphasis on the most prominent theorists, texts, schools, and ideas. Emphasize on the careful reading of primary theoretical texts, with attentionto historical and social contexts.

CourseOutcomes:

CO1: After going through the lessons, the students will be able to define what criticism is, justify the need for criticism, discuss the function of criticism, state the principle of criticism, know the different kinds of criticism, and make a distinction between literature and criticism. PO 1

CO2: The students will be familiarized with the important critical movements. PO 7

CO3: They will learn to apply specific theoretical concepts, theories, and terms to literary and cultural text's and analyze strengths and limitations of critical/theoretical arguments. PO 7, 1

CO4: They will be encouraged to take further reading in critical theories. PO 1, 2

CO5: They will be acquainted with the works of significant criticism from Aristotle to the present time. **PO 1, 2**

CO-PO MATRIX- **20EN3T1**							
CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	H						
CO2							M
CO3	M						H
CO4	M	H					
CO5	M	M					

Syllabus

Course Details

Unit	Learning Units	Lecture Hours
I	Basic literary terms and overview History of Literary Criticism from the beginning to the twentieth centuryTraditional approaches to criticism Aristotle: Poetics Plato: Selections from The Republic (Books 1, 6 & 7)	12
II	Sydney: An Apology for Poetry Dr. Johnson: Preface to Shakespeare	12
III	Wordsworth: Preface to Lyrical Ballads Matthew Arnold: Study of Poetry	12
IV	T.S. Eliot : Tradition and the Individual Talent I.A. Richards : Four kinds of Meaning	12
V	Cleanth Brooks: Irony as a Principle of Structure Northrop Frye : Archetypes of literature	12

Reference books:
1. David Lodge ed., Twentieth Century Literary Criticism: A Reader 2. A.H. Gilbert, ed. Literary Criticism: Plato to Dryden 3.M.A.R. Habib, A History of Literary Criticism and Theory from Plato to the Present 4. D.A. Russell and M. Winterbottom, eds, Ancient Literary Criticism 5.R. Wellek, A History of Modern Criticism: 1750-1950 6.W. Wimsatt Jr. &Cleanth Brooks, Literary Criticism: A Short History 7.Blamires, Harry. A History of Literary Criticism. Delhi: Macmillan, 2001 8.Nagarajan, M.S. English Literary Criticism & Theory: An Introductory History. Hyderabad: Orient Longman, 2006

1.3.1: Institution integrates cross-cutting issues relevant to Professional Ethics, Gender, Human Values, Environment and Sustainability and other value framework enshrined in Sustainable Development Goals and National Education Policy – 2020 into the Curriculum

NAME OF THE PROGRAM: M.Sc. MATHEMATICS

NAME OF THE PROGRAM : MSC MATHEMATICS REGULATION 17 & 20						
Name of the Course	**Couse Code**	**Professional Ethics**	**Gender**	**Human values**	**Environmental and Sustainability**	**other value framework enshrined**
ORDINARY DIFFERENTIAL EQUATIONS	**MA1T3**	NIL	NIL	NIL	**Climate Change Modeling**: Systems of differential equations and special functions are used in climate models to predict the impact of greenhouse gases, temperature changes, and energy flows.	NIL
OPERATIONS RESEARCH	**MA3T5**	NIL	NIL	NIL	**Sustainability and Efficiency**: Many of these techniques also align with sustainability goals, as they encourage the efficient use of resources, reducing waste and environmental impacts.	NIL
PARTIAL DIFFERENTIAL EQUATIONS	**20MA2T3**	NIL	NIL	NIL	**Hydrological Models**: First-order PDEs can model groundwater flow, pollutant dispersion, and air quality management. **Atmospheric and Ocean Dynamics:** Systems of first-order PDEs are essential in modeling weather patterns and climate changes, including the transport of heat, moisture, and pollutants in the atmosphere or oceans.	NIL
PROBABILITY AND STATISTICS	**20MA3T2**	**Ethical Research and Development**: Understanding correlation helps in research by preventing misuse of data (avoiding false causation), ensuring ethical and accurate decision-making based on data, and preventing biases in scientific conclusions.	NIL	NIL	NIL	NIL
MATHEMATICAL MODELLING	**20MA4T4**	NIL	NIL	NIL	1.Prey and Predator Models 2.Population Growth Models are useful for estimation of the population of humans or animals in the given region.	NIL

M.Sc. MATHEMATICS I SEMESTER
MA1T3: ORDINARY DIFFERENTIAL EQUATIONS

Subject Code :	MA1T3	I A Marks	30
No. of Lecture Hours / Week	06	End Exam Marks	70
Total Number of Lecture Hours	90	Total Marks	100
Seminar	01	Exam Hours	03

Objectives : To learn various methods for finding solutions of an ordinary differential equation and to study the characteristics of solutions.

COURSE OUTCOME	Upon successful completion of this course, students will be able to:
CO1	formulate and solve first order and second order differential equations.
CO2	determine power series and frobenius series solutions of first and second order differential equations.
CO3	solve linear systems of differential equations.
CO4	understand the properties of solutions of Legendre and Bessel Equations.
CO5	apply Laplace transforms to determine the solutions of differential equations.

Mapping of Course Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1							**H**
CO2			**H**				
CO3						**H**	
CO4			**H**				
CO5	**H**						

UNIT-I

Second order linear equations: Introduction, The general solution of the homogeneous equation, The use of a known solution to find another, The homogeneous equation with constant coefficients , The method of undetermined coefficients, The method of variation of parameters. (Sections 14 to 19 of Chapter 3 of [1])

UNIT-II

Power series solutions and special functions: Introduction, A review of power series, Series solutions of first order equations, Second order Linear equations-Ordinary points, Regular singular points, Regular singular points (continued), Gauss ‘s hyper geometric equation (Sections 26 to 31 of Chapter 5 of [1])

UNIT-III

Systems of linear differential equations: Differential operators and an operator method, Applications, Basic theory of linear systems in normal form: Two equations in two unknown functions, Homogenous Linear Systems with constant coefficients: Two equations in two unknown functions (Sections 7.1. to 7.4 chapter 7 of [2])

UNIT-IV

Some special functions of Mathematical Physics: Legendre polynomials, Bessels functions, The Gamma function, Properties of Bessel functions. (Sections 44 to 47 of chapter 8 of [1])

UNIT-V

Laplace Transforms: Introduction, A few remarks on theory, Applications to differential equations, Derivatives and Integrals of Laplace transforms, Convolutions.
(Sections 48 to 53 of chapter 9 of [1])

Prescribed books: [1] G.F. Simmons, *Differential equations with Applications and Historical Notes*, Second edition , Tata Mc Graw Hill, (2003).
[2] Shepley L Ross, John Wiley & Sons, *Differential Equations*, Third edition (1984).

Reference book: E.A. Coddington, *An Introduction to Ordinary Differential Equations*, PHI(1989).

M. Sc. DEGREE EXAMINATION
MODEL QUESTION PAPER
First Semester
Mathematics

Paper III – ORDINARY DIFFERENTIAL EQUATIONS

Time: Three hours **Answer ONE question form each unit. All questions carry equal marks.** **Maximum: 70 Marks**

UNIT-I

1. (a) If y_1 and y_2 are are two linearly independent solutions of $y^{11}+P(x)y^1+Q(x)y=0$ on [a,b], then show that $c_1y_1+c_2y_2$ is the general solution on [a,b]. **(CO1)**
   (b) Solve the Euler's equidimensional equation $x^2y^{11}+3xy^1+10y=0$. **(CO1)**

(OR)

2. (a) Find the General Solution of $y^{11}+4y = 2e^x + 4\cos 2x$ using the method of undetermined coefficients. **(CO1)**
   (b) Solve $xy^{11} – (1+x)y^1 + y = x^2 e^{2x}$ using the method of variation of parameters. **(CO1)**

UNIT-II

3. (a)Define Ordinary Point and find the general Solution of $(1+x^2)y^{11}+2xy^1-2y=0$ in terms of power series in x. **(CO2)**

   (b)Define Regular Singular Point and find the General solution of $2x^2y^{11}+ xy^1-(x+1)y=0$ at the regular singular point x=0 . **(CO2)**

(OR)

4. (a) Show that the equation $x^2y^{11}- 3xy^1+(4x+4)y=0$ has only one Frobenius Series Solution. Find it. **(CO2)**

   (b) Show that the equation $4x^2y^{11}- 8x^2y^1+(4x^2+1)y=0$ has only one Frobenius Series Solution. Find the general solution. **(CO2)**

(P.T.O)

UNIT-III

5. Use the operator method to find the general solution of each of the following linear systems

$$\frac{dx}{dt}+\frac{dy}{dt}-2x-4y=e^{t}, \quad \frac{dx}{dt}+\frac{dy}{dt}-y=e^{4t}$$ **(CO3)**

(OR)

6. Find the general solution of the following linear system
dx/dt = 5x+4y , dy/dt = -x+y **(CO3)**

UNIT-IV

7. (a) Derive Generating function for Legendre polynomials. **(CO4)**
(b) Derive Rodrigue's formula for Legendre polynomials.

(OR)

8. (a) Show that the zeros of Bessel functions $J_p(x)$ and $J_{p+1}(x)$ occur alternately. **(CO4)**
(b) Find the Bessel series of $f(x) = x^p$, in terms of $J_p(\lambda_n x)$, where λ_n are the positive zeros of $J_p(x)$. **(CO4)**

UNIT-V

9. (a) Solve the differential equation $xy^{11} + (2x+3)y^{1} + (x+3)y = 3e^{-x}$, $y(0) = 0$ using Laplace transforms. **(CO5)**
(b) Evaluate $\int_0^\infty \frac{e^{-ax} Sin\, bx}{x}$ dx, where a and b are positive constants. **(CO5)**

(OR)

10. (a) Show that $L[x \cos ax] = \frac{p^2-a^2}{(p^2+a^2)^2}$ and use this result to find $L^{-1}[\frac{1}{(p^2+a^2)^2}]$. **(CO5)**
(b) Define Convolution and solve the Integral equation
$y(x) = e^{x}[1 + \int_0^x e^{-t}\, y(t)\, dt]$ using Laplace transforms. **(CO5)**

***

M.Sc. MATHEMATICS III SEMESTER
MA3T5: OPERATIONS RESEARCH-I

Subject Code :	MA3T5A	I A Marks	30
No. of Lecture Hours / Week	06	End Exam Marks	70
Total Number of Lecture Hours	90	Total Marks	100
Seminar	01	Exam Hours	03

Objectives : To develop problem solving skills and to acquire knowledge on basic concepts of linear programming problems, Transportation problems, Assignment problems and Job sequencing.

COURSE OUTCOME	Upon successful completion of this course, students will be able to:
CO1	Formulate and solve a linear programming problem
CO2	Convert standard business problems into linear programming problems and can solve using simplex algorithm
CO3	Formulate and solve transportation problems
CO4	Formulate and solve the Assignment problem and can compare Transportation and Assignment proble
CO5	Formulate and solve Job sequencing problems

Mapping of Course Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1			**H**				
CO2							**H**
CO3						**M**	
CO4			**M**				**H**
CO5	**H**						

UNIT – I

Mathematical Background : Lines and hyperplanes: Convex sets, Convex sets and hyperplanes, Convex cones. [Sections 2.19 to 2.22 of Chapter 2of [1]].
Theory of the simplex method : Restatement of the problem, Slack and surplus Variables , Reduction of any feasible solution to a basic feasible solution, Some definitions and notations , Improving a basic feasible solution, Unbounded solutions, Optimality conditions, Alternative optima, Extreme points and basic feasible solutions.
[Sections 3.1, 3.2, 3.4 to 3.10 of Chapter 3 of [1]]

UNIT –II

Detailed development and Computational aspects of the simplex method: The Simplex method, Selection of the vector to enter the basis, degeneracy and breaking ties, Further development of the transportation formulas, The initial basic feasible solution –artificial variables, Tableau format for simplex computations, Use of the tableau format, conversion of a minimization problem to a maximization problem, Review of the simplex method , Illustrative examples.
[Sections 4.1 to 4.5, 4.7 to 4.11 of Chapter 4 of [1]].

UNIT –III

Transportation problem: Introduction, properties of the matrix **A**, The Simplex Method and transportation problems, Simplifications resulting from all $y_{ij}^{\alpha\beta} = \pm 1$ or 0, The Transportation Problem Tableau, Bases in the transportation Tableau, The Stepping-Stone algorithm, Determination of an initial basic feasible solution, Alternative procedure for computing $z_{ij} - c_{ij}$; duality. [Sections 9.1 to 9.7 & 9.10, 9.11 of Chapter 9 of [1]].

UNIT –IV

The Assignment problem : Introduction, Description and Mathematical statement of the problem, Solution using the Hungarian method, The relationship between Transportation and Assignment problems, Further treatment of the Assignment problem, The Bottleneck Assignment problem. (Chapter 6 of [2])

UNIT V

Job Sequencing: Introduction, Classification, Notations and Terminologies, Assumptions, Sequencing Problems: Sequence for n jobs through two machines, Sequence for n jobs through three machines, Sequence for 2 jobs through m machines, Sequence for n jobs through m machines (Sections 12.1 to 12.5 of chapter 12 of [3])

PRESCRIBED BOOKS:

[1] G.Hadley, *Linear programming,* Addison Wesley Publishing Company(1978).
[2] Benjamin Lev and Howard J. Weiss, *Introduction to Mathematical Programming,* Edward Arnold Pub, London (1982).
[3] Rathindra P. Sen, *Operations Research- Algorithms and Applications*, PHI(2009).

REFERENCE BOOK: Nita H.Shah, Ravi M. Gor, Hardik Soni, *Operations Research***,** PHI(2010).

(MA3T5A)

M.Sc. DEGREE EXAMINATION
MODEL QUESTION PAPER
Third Semester
Mathematics
Paper V – Operations Research-I

Time: Three hours **Answer ONE question form each unit.** **Max: 70 Marks**

All questions carry equal marks.

UNIT – I

1. (a) Define convex set. Prove that the collection of all feasible solutions to a L.P.P constitutes a convex set whose extreme points correspond to the B.F.S.

(b) Find all basic feasible solutions for the system

$$2x_1 + 6x_2 + 2x_3 + x_4 = 3$$
$$6x_1 + 4x_2 + 4x_3 + 6x_4 = 2$$

$X_i >= 0$, i=1,2,3,4. (CO1)

(OR)

2. (a) Prove that the set of all convex combinations of a finite number of points $x_1, x_2, ..., x_n$ is a convex set.

(b) Define an extreme point of a convex set. If a closed strictly bounded convex set X has a finite number of extreme points, then prove that any point in the set can be written as a convex combination of the extreme points. (CO1)

UNIT – II

3. Write the simplex algorithm. (CO2)

(OR)

4. Solve the following L.P.P using simplex method. (CO2)

$$\max z = 6x_1 - 2x_2$$
$$sub: 2x_1 - x_2 \leq 2$$

$$X_1 \leq 4$$

$$x_1, x_2 \geq 0.$$

UNIT – III

5. (a) Explain the procedure of obtaining the optimum solution to the transportation problem.

(b) Find the optimal solution by finding the IBFS using the Vogel's method for the following(CO3)

	I	II	III	Av a
A	2	7	4	5
B	3	3	1	8
C	5	4	7	7
D	1	6	2	14
Req:	7	9	18	

(OR)

6 . Solve the following Transportation Problem using stepping stone algorithm. (CO3)

	I	II	III	IV	supply
A	40	44	48	35	160
B	37	45	50	52	150
C	35	40	45	50	190
Demand	80	90	110	220	

UNIT - IV

7.(a) Explain the Hungarian method.

(b) Solve the following assignment problem by using Hungarian method. (CO4)

	I	II	III	IV	V
A	45	30	65	40	55
B	50	30	25	60	30
C	25	20	15	20	40
D	35	25	30	30	20
E	80	60	60	70	50

(OR)

8. Formulate the assignment problem mathematically and solve the following by using bottle neck assignment algorithm. (CO4)

	A	B	C	D
1	2	4	2	4
2	8	5	4	5
3	4	6	8	9
4	8	4	2	4

UNIT - V

9 (a) Discuss Johnson's procedure for determining an optimal sequence for processing n jobs through two machines .

(b) Five jobs are performed first on machine X and then on machine Y. Then time taken in hours by each job on each machine is given below: (CO5)

Jobs	A	B	C	D	E
Time on machine X	12	4	20	14	22
Time on machine Y	6	14	16	18	10

Determine the optimum sequence of jobs that minimizes the total elapsed time to complete the jobs. Also compute the idle time.

(OR)

10 (a) Explain how to process n jobs through m machines. (CO5)

(b) Find the optimal sequence for the following problem to minimize time and also obtain elapsed time:

Jobs	Machine A	Machine B	Machine C
1	13	8	13
2	8	9	12
3	12	10	11
4	7	7	14
5	10	6	15
6	6	11	14

***

P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

Siddhartha Nagar, Vijayawada – 520 010
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Title of the Course: PARTIAL DIFFERENTIAL EQUATIONS
Semester : II

Course Code	20MA2T3	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 : 2017-18	Year of offering : 2022-23	Year of Revision: 2022-23	Percentage of Revision :10%

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**	**PO6**	**PO7**
CO1			**M**				
CO2			**H**				
CO3						**H**	
CO4						**H**	
CO5	**H**						

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
2. www.epgp.inflibnet.ac.in
3. 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

PARTIAL DIFFERENTIAL EQUATIONS – 20MA2T3

Time: 3 hours **Max. Marks: 70**

1. Answer all questions. **(10x2=20)**

a) Define orthogonal trajectories of a system of curves on the given surface. (CO1)
b) Define Pfaffian differential equation. (CO1)
c) State the necessary and sufficient condition for the integrability of Pfaffian differential equation. (CO2)
d) Define compatible systems of a partial differential equations. (CO2)
e) Define Wave equation and Laplace equation (CO3)
f) Define Greens function. (CO3)
g) State two types of boundary value problems for Laplace equations. (CO4)
h) Classify Second order PDE's and give an example. (CO4)
i) Define Helmholtzs equation. (CO5)
j) Write Riemann-Volterra solution for one dimensional wave equation. (CO5)

Answer the following questions. All questions carry equal marks. (5X10=50)

2. 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)

(OR)

b) Verify that the equation $(z+y)+z(z+x)dy-2xy$ dz = 0 is integrable and find its primitive. (CO1)

3. a) Explain the charpit's method of solving the equation $f(x,y,z,p,q) = 0$. Using this method, find a complete integral of the equation $(p^2+q^2)y=qz$. (CO2)

(OR)

b) Find a complete integral of $p^2x+q^2y=$ z using Jacobi's method. (CO2)

(P.T.O.)

4. a) Solve the equation $r+s-2t = ex+y$ with usual notation. (CO3)

(OR)

b) Solve the equation $r+4s+t+rt-s^2 = 2$ using Monge's method. (CO3)

5. 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)

(OR)

b) State and Prove Kelvin's inversion theorem. (CO4)

6 a) Derive D'Alembert's solution of the one-dimensional wave equation. (CO5)

(OR)

b) If ψ 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 by the conditions $y = 0, \psi = f(x), \partial\psi/\partial y = g(x)$, then find ψ using Riemann-Volterra Method. (CO5)

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Parvathaneni Brahmayya Siddhartha College of Arts & Science: Vijayawada.
(An autonomous college in the jurisdiction of Krishna University)

M.Sc (Mathematics) Programme - III Semester

PROBABILITY& STATISTICS

(w.e.f admitted batch 2020-21)

Course Code	**20MA3T2**	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 : 2021-22	Year of offering : 2021-22	Year of Revision: ------	Percentage of Revision : ----

Course Objectives : The objective of this course is to introduce the basic concepts of statistics like probability theory, distributions, correlation, regression and sampling distributions.

COURSE OUTCOME	Upon successful completion of this course, students will be able to:
CO1	Understand the theorems on probability and solve the problems related to various diversified situations.
CO2	Understand various properties of expectation, variance and generating functions.
CO3	Apply poisson distribution and normal distribution to solve problems in Engineering and related fields.
CO4	Solve the problems using correlation and regression analysis.
CO5	Solve the statistical problems with different statistical techniques like chi-square distribution.

Mapping of Course Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	**M**						
CO2							**H**
CO3			**H**				
CO4							**H**
CO5	**H**						

(Turn over)

Course Details:

Unit	Learning Units	Lecture Hours
I	**Theory of Probability-I:** Random Experiment, Sample Space & Elementary Events, Event, Axiomatic probability, Some theorems on probability, Boole's Inequality, Conditional Probability, Multiplication theorem of probability, Independent events, Multiplication theorem on probability for independent Events, Extension of Multiplication theorem of Probability to n Events, Baye's theorem. (Sections 3.8.1, 3.8.2, 3.8.5 and 3.9 to 3.14 of Chapter3 & 4.2 of Chapter4 of [1])	15
II	**Random Variables and Distribution functions**: Distribution Function, Discrete random variable, Continuous random variable, Two Dimensional Random variables. Mathematical expectation**,** Moments of a distribution function, Moment generating functions, Characteristic functions and their properties Chebychev inequality, Probability generating functions. [5.2 to 5.5(up to 5.5.5.) of Chapter- 5, Chapter 6 except 6.7 and 7.1, 7.2, 7.3, 7.5 and 7.9 of Chapter 7]	15
III	**Probability Distributions:** Discrete, Binomial and Poisson distributions and their properties. **Continuous Probability Distributions:** Normal and Rectangular distributions and their properties. [8.1 to 8.5 of Chapter 8 and 9.1 to 9.3 of Chapter 9]	15
IV	**Correlation and Regression**: Correlation, Karl pearson's coefficient of correlation, Calculation of correlation coefficient for bivariant frequency distribution, Spearman's rank correlation coefficient. **Linear regression:** Regression coefficients and their properties - Angle between two lines of regression. [10.1 to 10.5 and 10.7.1 of Chapter 10 and Chapter 11 (upto 11.2.3)]	15
V	**Sampling distribution**: Sampling and Large sample tests. **Exact sampling distributions**:2, t and F-distributions. [Chapter-14, Chapter 15 up to 15.6.4 and Chapter 16 up to 16.6 except 16.4]	15

Prescribed Text Book:

1. Gupta S.C.and Kapoor V.K, **Fundamentals of Mathematical Statistics**, 11th Edition, New Delhi, Sultan Chand &Sons.

Reference Book:

1. Walpole Myers, Keying Ye, **Probability and Statistics for Engineers and Scientists**, 9th edition, Pearson Publications

Course has focus on :Employability / **S**kill Development

Websites of Interest: 1. www. nptel.ac.in

2. www.epgp.inflibnet.ac.in

3. www.ocw.mit.edu

P B SIDDHARTHA COLLEGE OF ARTS AND SCIENCE::VIJAYAWADA

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M. Sc. Mathematics

Third Semester

PROBABILITY & STATISTICS - 20MA3T2

Time:3 hours **Max. Marks : 70**

1. Answer all questions. **(10x2=20)**

a) Define Equally likely events. (CO1)
b) Define Axiomatic probability. (CO1)
c) Define Correlation. (CO2)
d) Define random variable. (CO2)
e) Define moment generating function. (CO3)
f) Define Normal distribution. (CO3)
g) Define characteristic function. (CO4)
h) Write Application of Normal distribution. (CO4)
i) Define chi-square distribution of goodness of fit. (CO5)
j) Write properties of F-distribution. (CO5)

Answer the following questions. All questions carry equal marks. **(5X10=50)**

2 (a) State and prove multiplication theorem of probability. (CO1)

(OR)

(b) State and prove Baye's theorem. (CO1)

3 (a) If $X_1, X_2, \ldots X_n$ are random variables, then Prove that

$$E(X_1 + X_2 + \ldots . X_n) = E(X_1) + E(X_2) + \ldots . E(X_n)$$ (CO2)

(OR)

(b) Write properties of Characteristic function. (CO2)

4 (a) Using MGF derive mean and variance of Binomial distribution. (CO3)

(OR)

(b) Write properties of Normal distribution. (CO3)

5 (a) Calculate Karl-Pearson's coefficient of correlation between expenditure on advertising and sales from the data given below advertising

Expenses (000's)	39	65	62	90	82	75	25	98	36	78
Sales (Lakhs Rs.)	47	53	58	86	62	68	60	91	51	84

(CO4)

(OR)

(b) What is Linear regression? Find the angle between two regression lines. (CO4)

6 (a) The number of scooter accidents per month in a certain town were as follows:

12 8 20 2 14 10 15 6 9 4

Are there frequencies in agreement with the belief that accident conditions were the Same during this 10 month period?

(CO5)

(OR)

(b) Ten cartons are taken at random from an automatic filling machine. The mean net weight of the 10 cartons is 11.8 and s.d. is 0.15. Does the sample mean differ significantly from the intended weight of 12 Kg.You are given that v=9 and $t_{0.05}$ =2.26. (CO5)

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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: MATHEMATICAL MODELLING
Semester : IV

Course Code	20MA4T4	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 : 2021-22	Year of offering : 2021-22	Year of Revision:	Percentage of Revision :

Course Objectives : The objectives of this course is to enable students with the basic Mathematical modelling skills such as formulation of Mathematical Models, Solving the Mathematical Models and interpreting the solutions of Mathematical Models.

COURSE OUTCOME	Upon successful completion of this course, students will be able to:
CO1	Understand different classifications of Mathematical Models
CO2	Formulate and solve Mathematical Models of Ordinary differential equations
CO3	Formulate and solve Mathematical Models through systems of ordinary differential equations
CO4	Formulate and solve Mathematical Models through difference equations
CO5	Formulate and solve Mathematical Models through Graphs.

Mapping of Course Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	**M**						
CO2						**H**	
CO3						**H**	
CO4			**H**				
CO5				**H**			

UNIT – I

Mathematical Modelling - Need, Techniques, Classifications and simple illustrations: Simple situations requiring Mathematical Modelling, Classification of Mathematical Models, Some characteristics of Mathematical Models.

Mathematical Modelling through Ordinary differential equations of first order: Mathematical Modelling through differential equations, Linear growth and Decay Models, Non linear growth and Decay Models, Compartment Models, Mathematical Modelling in dynamics through ordinary differential equations of first order, Mathematical Modelling of Geometrical problems through ordinary differential equations of first order.

(Sections 1.1 to 1.4 of Ch. 1 and Sections 2.1 to 2.6 of Ch. 2 of [1])

UNIT – II

Mathematical Modelling through systems of ordinary differential equations of first order:

Mathematical Modelling in population dynamics, Mathematical Modelling of epidemics through systems, Compartment Models through systems, Mathematical Modelling in Economics, Mathematical Models in Medicine etc, Mathematical Modelling in Dynamics.

(Sections 3.1 to 3.6 of Ch.3 of [1])

UNIT – III

Mathematical Modelling through Ordinary differential equations of Second order:

Mathematical Modelling of planetary motions, Mathematical Modelling of circular Motion and Motion of satellites, Mathematical Modelling linear differential equations of second order, Miscellaneous Mathematical Models.

(Sections 4.1 to 4.4 of Ch.4 of [1])

UNIT – IV

Mathematical Modelling through difference equations:

The need for Mathematical Modelling through difference equations, Some simple Models, Basic theory of Linear difference equations with constant coefficients, Mathematical Modelling through difference equations in Economics, Finance, Population dynamics, Genetics and Probability theory, Miscellaneous examples.

(Sections 5.1 to 5.6 of Ch.5 of [1])

UNIT – V

Mathematical Modelling through Graphs:

Situations that can be modelled through graphs, Mathematical Models in terms of directed graphs, Mathematical Models in terms of Signed graphs, Mathematical Models in terms of weighted graphs , and Mathematical Models in terms of un oriented graphs.

(Sections 7.1 to 7.5 of Ch.7 of [1])

PRESCRIBED BOOK:

1. J N Kapur, Mathematical Modelling, New Age International Publishers, 2008

REFERENCE BOOKS:

1. Sandip Banerjee, Mathematical Modelling- Models, Analysis and Applications

2. W.J.Meyer , Concepts of Mathematical Modelling , Mc Graw Hill. 1985

Course has Focus on : Foundation

Websites of Interest : 1. www. nptel.ac.in
2. www.epgp.inflibnet.ac.in
3. 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

MATHEMATICAL MODELLING- 20MA4T4

Time:3 hours **Max. Marks: 70**

1. Answer all questions. **(10x2=20)**

a) Classify the Mathematical Models. (CO1)
b) Write some characteristics of Mathematical Models (CO1)
c) Define compartment model with an example. (CO2)
d) Give an example of a Mathematical Model in Economics (CO2)
e) State Kepler's laws of planetary Motions. (CO3)
f) Define Linear difference equation. (CO3)
g) Give an example of a Mathematical Model through difference equations. (CO4)
h) Define complete graph and give an example. (CO4)
i) Define weighted digraph. (CO5)
j) Define planar graph and give an example. (CO5)

Answer the following questions. All questions carry equal marks. (5X10=50)

2. a) Find the Orthogonal trajectories of the families of curves $y^2+x^2-2ax=0$ (CO1)

(OR)

b) Explain briefly about Non Linear growth and decay Models with examples. (CO1)

3. a) Explain briefly about Prey –Predator Models with examples. (CO2)

(OR)

b) Show that the Model represented by $\frac{dx}{dt} = x(4-x-y), \frac{dy}{dt} = y(15-5x-3y), x \geq 0, y \geq 0$ has a position of equilibrium, this position is stable and two species can coexist. (CO2)

4. a) Solve $x^{11}+8x^{1}+36x=24\cos 6t$ and discuss the behavior of the solution as t approaches Infinity. (CO3)

(OR)

b) Explain briefly about Mathematical Modelling of planetary motions under the inverse square law. (CO3)

5. a) Solve $x_{t+2} -7x_{t+1}+12x_t=0$ and discuss the behavior of the solution as x tends to ∞. (CO4)

(OR)

b) Explain the concept of Mathematical Modelling through difference equations in genetics. (CO4)

6. a) Explain about Konigberg Problem and suggest deletion or addition of minimum number of bridges which may a lead a solution of the problem. (CO5)

(OR)

b) Explain the concept of Mathematical Modelling in terms of weighted digraphs with an example. (CO5)

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1.3.1: Institution integrates cross-cutting issues relevant to Professional Ethics, Gender, Human Values, Environment and Sustainability and other value framework enshrined in Sustainable Development Goals and National Education Policy – 2020 into the Curriculum

NAME OF THE PROGRAM: MATER OF BUSINESS ADMINISTRATION(MBA)

NAME OF THE PROGRAM : MBA REGULATION 17 & 22						
Name of the Course	**Couse Code**	**Professional Ethics**	**Gender**	**Human values**	**Environmental and Sustainability**	**other value framework enshrined**
BUSINESS, GOVERNMENT & SOCIETY	**BA114 (R17 Regulation)**	Professional ethics underpin business ethics, corporate governance, and corporate social responsibility, guiding fair and transparent decision-making. Upholding these ethics fosters positive societal contributions, builds trust, and mitigates legal and reputational risks. In a globalized world, strong professional ethics are essential for sustainable success and social welfare.	The curriculum on Business Ethics, Corporate Governance, and Corporate Social Responsibility emphasizes fairness, inclusion, and equality, promoting gender equality as a vital component of professional ethics. Ethical organizations recognize gender diversity as essential for fostering a just society and as a driver of business success and social well-being.	The curriculum on Business Ethics, Corporate Governance, and CSR is linked to human values, emphasizing ethical behavior, fairness, accountability, and social responsibility. By prioritizing these areas, businesses promote integrity, justice, compassion, and sustainability, guiding decisions that benefit shareholders, employees, customers, and society, ultimately enhancing overall human well-being.	The curriculum on Business Ethics, Corporate Governance, and CSR supports environmental sustainability by promoting ethical decision-making and accountability. It encourages businesses to adopt eco-friendly practices and manage resources responsibly, contributing to sustainable development. Integrating sustainability into their ethical framework helps businesses fulfill moral obligations and promote long-term ecological balance.	The curriculum on Business Ethics, Corporate Governance, and CSR aligns with NEP 2020 by promoting ethics, social responsibility, and sustainable development. It equips students with skills for professional success while fostering awareness of their societal and environmental roles, supporting the holistic development of responsible and competent citizens as envisioned by NEP 2020.
LEADERSHIP & TEAM MANAGEMENT	**BA432 (R17 Regulation)**	The Leadership curriculum emphasizes the importance of professional ethics, ensuring leaders act with integrity, fairness, and responsibility. Ethical behavior in decision-making, team management, and change management fosters trust, accountability, and transparency. Leaders who model ethical standards set a precedent for their teams, promoting long-term success and organizational sustainability.	The Leadership curriculum addresses gender dynamics, helping leaders recognize and mitigate biases, foster inclusivity, and ensure equal opportunities for all. Emphasizing gender inclusivity enhances representation and diverse perspectives in leadership roles, ultimately improving organizational effectiveness. Effective leadership must consider the varied experiences and challenges faced by individuals of all genders.	The curriculum emphasizes leadership principles rooted in human values, empowering leaders to foster ethical behavior and mutual respect. This approach cultivates a positive organizational culture, enhancing collaboration and trust, which ultimately drives sustained success and promotes a responsible and inclusive work environment for all stakeholders.	This comprehensive curriculum develops leadership competencies while equipping future leaders to tackle pressing environmental challenges. By emphasizing effective, ethical, and collaborative practices, it prepares them to create sustainable solutions and foster a culture of responsibility, ensuring they can positively impact both their organizations and the planet.	The curriculum effectively integrates leadership dimensions aligned with NEP 2020 values, promoting ethical leadership, collaboration, adaptability, and evidence-based practices. This holistic approach develops leadership competencies while fostering a commitment to societal values, ensuring future leaders can positively impact their communities and organizations in complex, dynamic environments.
GROWTH LAB	**GE01A (R20 Regulation)**	The curriculum promotes professional ethics through effective communication, business etiquette, and personal grooming, reflecting respect and integrity. It emphasizes conflict resolution and stress management, fostering ethical decision-making and accountability. By enhancing self-awareness and interpersonal skills, it equips students to uphold ethical standards in professional settings.	The curriculum promotes gender awareness through diverse communication styles, professional attire, and grooming that respect cultural differences. It emphasizes equitable interpersonal relations, conflict resolution, and emotional intelligence, fostering an inclusive environment where all genders can thrive and engage effectively in both personal and professional settings.	The curriculum promotes human values by fostering self-awareness, empathy, and respect through effective communication, professional etiquette, and conflict resolution. It encourages ethical behavior, emotional intelligence, and social responsibility, equipping students to build positive relationships and actively contribute to a compassionate, inclusive society.	In summary, the curriculum effectively integrates environmental awareness and sustainability themes. By enhancing understanding of personality, professionalism, and interpersonal relations, it equips students to be conscientious individuals committed to sustainability, encouraging responsible behavior and providing the skills needed to advocate for environmental stewardship in their personal and professional lives.	The curriculum aligns with NEP 2020 by promoting personal development, effective communication, cultural awareness, professionalism, emotional intelligence, and resilience. By integrating these skills, it prepares students to navigate personal and professional challenges, fostering well-rounded individuals who contribute positively to society and supporting NEP 2020's vision of inclusive, equitable education.
LIFE SKILLS LAB	**GE04 (R20 Regulation)**	The curriculum emphasizes professional ethics through responsible citizenship, effective communication, and personal management. It fosters ethical decision-making, moral development, and social responsibility, preparing students to face workplace challenges with integrity. By enhancing interpersonal skills and problem-solving abilities, it equips individuals to uphold ethical standards in their professional lives.	The curriculum promotes gender equality and respect through personal management and social skills. It emphasizes responsible behavior, effective communication, and problem-solving, empowering all genders to navigate challenges confidently. By exploring occupational skills, it fosters equitable opportunities, creating an inclusive environment that values diverse contributions from everyone.	The curriculum emphasizes human values by fostering self-awareness, empathy, and responsible citizenship. It encourages social responsibility, effective communication, and moral development, preparing students to navigate personal and interpersonal challenges ethically. By promoting independence and problem-solving skills, it nurtures individuals who contribute positively to society and uphold essential human values.	The curriculum promotes environmental sustainability by integrating responsible citizenship and personal management skills, emphasizing resource management and informed consumer choices. It fosters awareness of social and moral responsibilities, equipping students with skills to engage in sustainable practices, advocate for environmental stewardship, and contribute positively to their communities.	This curriculum aligns with NEP 2020 values by fostering holistic development through life skills education. It emphasizes self-awareness, responsible citizenship, interpersonal skills, and ethical behavior while promoting critical thinking and problem-solving. By integrating personal, social, and occupational skills, it prepares students for lifelong learning and active societal participation.
Personality Development Through Life Enlightenment Skills	**22PG101 (R22 Regulation)**	Professionalism entails adhering to ethical standards and responsibilities in one's career, emphasizing values like diligence, accountability, and respect. It fosters competence and integrity, nurturing a culture of trust within workplaces. By setting high standards of excellence, professionalism promotes societal progress and contributes positively to organizational and community growth.	Holistic development should transcend gender, providing equal opportunities for self-exploration and personal growth. However, societal norms often impose gendered expectations, such as stereotypes that women should be nurturing and men assertive. These limitations can hinder individuals from fully embracing their diverse personalities and potentials, impacting overall personal development.	Holistic personality development focuses on emotional, intellectual, social, and ethical growth, enabling individuals to excel professionally while fostering harmony in society. Essential values like empathy, respect, integrity, and responsibility cultivate well-rounded individuals who can adapt and contribute positively to their communities, enhancing overall social well-being.	Virtue is essential for promoting environmentally responsible behavior. Individuals who embody integrity and responsibility are more inclined to reduce their carbon footprint and engage in sustainable practices. Compassion and justice motivate people to consider the impacts of environmental degradation on vulnerable populations, inspiring them to advocate for sustainability and conservation efforts.	Wisdom entails the thoughtful application of knowledge, experience, and ethics in decision-making. It is guided by values like prudence, foresight, and care, enabling individuals to balance short-term gains with long-term consequences. This careful approach fosters informed choices that benefit both individuals and society as a whole.

(R17 Regulation)

BA114: BUSINESS, GOVERNMENT & SOCIETY (4L + 1T + 1P)

Subject Code :	BA114	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 Decription: Business, Government & Society examines the dynamic relationships among businesses, governmental institutions, and society. The course explores how these entities interact, influence each other, and shape economic, social, and environmental outcomes.

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 endeavor to maximize returns while responsibly managing their duties to all stakeholders of business.

CO-2 Understand and appreciate the importance of Corporate Governance and to know the elements of governance in organizations'.

CO-3 Understand the rationale for government interventions in market systems and to know various public policies and their impact.

CO-4 Develop the skills needed to work through ethical dilemmas in a globalized economic era.

CO-5 Understand the concepts of Corporate Social Responsibility and to know the CSR models and best practices that are in vogue in corporate sector.

Contribution of Course Outcomes towards the achievement of Program Outcomes & Strength of correlations (3-High, 2-Medium, 1-Low,0-Nil)										
BA114		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PSO1**	**PSO2**
	CO1	H	H							H
	CO2	M			M					H
	CO3		H		H					H
	CO4			H	H				M	
	CO5	M			M					H

UNIT I

Introduction: Relationship among Business, Government and Society (BGS) – Importance of Business, Government and Society to Managers - Dynamic Forces Impacting Business Environment- Models of BGS Relationships - Market Capitalism Model, Dominance Model, Countervailing Forces Model and Stakeholder Model.

UNIT II

Corporate Governance: Definition and Significance of Corporate Governance - Historical Perspective of Corporate Governance - International Perspective on Corporate Governance (Overview) - Theoretical Foundations of Corporate Governance - **Elements of Governance in Organizations - Obligation to Stakeholders of Business - Major Corporate Governance Failures in Domestic and MNCs - Whistle-blowing and Corporate Governance.**

UNIT III

Public Policies: The Role of Public Policies in Governing Business - Classification and Levels of Public Policy - Public Private Partnerships - Government Regulations in Business - **Environmental Concerns and Corporations -Laws Governing Environment - New Industrial Policy, 2015 - India's Competitiveness in the World Economy.**

UNIT IV

Business Ethics: Concept and Definition of Business Ethics - Importance of Ethics, Values and Morals for Business Success - Evolution of Business Ethics - Ethical Theories and Approaches-Unethical Issues in Business - **Ethical Dilemmas and Decision Making – Managing Ethical Organizations.**

UNIT V

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 - CSR in Indian Perspective - Movement from CSR to Shared Value and Beyond the Thinking of Social Progress.**

NOTE* **BOLD**: CONTENT CAN BE DELIVERED **ONLINE**

Case Study (Not Exceeding 300 words)

PRACTICAL COMPONENTS:

- Students are expected to study any five CSR initiatives by Indian organizations and submit a report for the same.
- A group assignment on "The relationship between Business, Government and Society in Indian Context and relating the same with respect the models studied in unit-1.
- Case studies/Role plays related ethical issues in business with respect to 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, Sept 13, 1970
6. New York Times Magazine
7. Manual G Velasquez ,Business Ethics: Concepts & Cases, sixth edition2010 PHI publications

8. K.Aswathappa, Essentials of Business Environment, Himalya Publishing House. Page 14 of 56
9. Justin Paul, Business Environment, Tata McGraw Hill.
10. Francis Cherunilam, Business Environment - Text and Cases, Himalya Publishing
11. Recent Economic Survey Reports - Government of India
12. Praveen B Malla, Corporate Governance: Concept, Evolution and India Story, Routledge.
13. Bob Tricker, Corporate Governance: Principles, Policies and Practices, Oxford University Press.
14. Mathur, Corporate Governance and Business Ethics, Macmillan India Ltd.

BA432: LEADERSHIP & TEAM MANAGEMENT

Subject Code :	BA432	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 Description: Leadership & Team Management explores the principles, theories, and practical strategies essential for effective leadership and high-performance team management in organizational settings. The course integrates leadership theories with team dynamics to develop skills in motivating teams, fostering collaboration, and achieving organizational goals.

Course outcomes: By the end of the course, students will be able

CO-1 To familiarise the students the importance of advanced leadership.
CO-2To provide an insight about the various theories of leadership.
CO-3 To enable the students to understand the importance of leadership and change management
CO-4To provide expert knowledge about the use of teams and role of teams in decision making
CO-5To impart knowledge on effective team work and promoting team success

Contribution of Course Outcomes towards the achievement of Program Outcomes & Strength of correlations (3-High, 2-Medium, 1-Low,0-Nil)										
BA432		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PSO1**	**PSO2**
	CO1	H							M	
	CO2		H						M	
	CO3		H						M	
	CO4		H	M						H
	CO5		H							H

UNIT- I

Introduction to Leadership – Definition – Importance of advanced leadership – Roles of a leader –Leadership Traits and Ethics – Personality Traits and Leadership – Traits of Effective Leaders – Leadership Attitudes – Ethical Leadership – Achievement Motivation Theory.

UNIT-II

Leadership Behavior and Motivation – Leadership Behavior and Styles – University of Michigan and Ohio Studies, Leadership Grid – Leadership and Motivation – Content and Process Theories – Reinforcement Theory – Contingency Leadership Theories and Models – Leadership Continuum theory.

UNIT-III

Leader-follower Relations – Followers, Evolution of Dyadic Theory – Leader Member Exchange Theory, Fellowship, Delegation, Coaching, and Managing Conflict – Leadership and Change Management.

UNIT-IV

Team Leadership, Organizational Leadership – The Use of Teams in Organizations – Types of Teams, Decision Making in Teams – Leadership Skills for Effective Team Meetings – Ginnet's Team Effectiveness Leadership Model – Virtual and Self-Managed Teams.

UNIT-V

Team Dynamics – Nature of Teams – Team Vs Groups – Team Issues – Effective Team Work – Changing Role of Leadership in Self-Managed Teams – Implementing Teams in organizations, promoting team success.

Case Study (Not Exceeding 300 words)

Practical Components

- Choose 3 successful & 3 failed leaders and identify the contributing factors and present your findings to the class.
- Across domains like sports & business & religion, develop an essay on the underlying trends and how these brands can leverage them.
- Write a comprehensive essay on management vs. leadership
- Interview 5 thought & practice leaders about their life learning's on leadership. Present your findings to a panel of these leaders
- Choose 3 leaders who tasted success after failures and 3 who tasted failure after early successful and develop the lessons from both groups. Present your findings to a panel of these leaders.

References:

1. Andrew J Durbrin, Leadership-Research findings, Practice, and skills, 7th Ed.(,2012) Publisher -Cengage Learning.
2. Christopher F. Achua,Robert N. Lussier, (2013)5th Ed., Effective Leadership, South Western/Cengage Learning India
3. Gary Yukl, Leadership in Organizations,8th (2013) Pearson Education
4. Griffin & Moorhead, Organizational Behaviour, 10thEd(2012).,Cengage Learning India Pvt. Ltd.
5. 5.Richard L Hughes, Robert C. Ginnett, Curphy PresidentGordonJ , Leadership-Enhancing the Lessons of experience,8th Ed.,(2014) TMH.

(R20 Regulation)
GROWTH LAB (1L + 1T + 1P) GE01A

Description : A "Personality Development" course aims to enhance individuals' personal and professional qualities, fostering self-awareness, confidence, interpersonal skills, and overall well-being. This course typically integrates psychological theories with practical exercises to help participants understand and develop their personalities effectively.

Subject Code :	GE01A	I A Marks	50
No. of Lecture Hours / Week	03	End Exam Marks	-
Total Number of Lecture Hours	45	Total Marks	50
Practical Component	01 Hour/Week	Exam Hours	03

Course Outcomes: By the end of the course, students will be able

- CO-1 To develop orientation towards business etiquettes and the proper etiquette practice for different business scenarios.
- CO-2 To learn the etiquette requirements for meeting, telephone, entertaining, internet business interaction scenarios.
- CO-3 To minimize nervousness in social situations.
- CO-4 To understand various mechanisms of conflict resolution and to know the importance of interpersonal relationships.
- CO-5 To know the importance of time management and the techniques that cope up with Stress.

Contribution of Course Outcomes towards the achievement of Program Outcomes & Strength of correlations (3-High, 2-Medium, 1-Low,0-Nil)										
GE01A		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PSO1**	**PSO2**
	CO1	H	H						M	
	CO2		H	M					M	
	CO3		M					H	M	
	CO4					H	M			H
	CO5							M	M	

UNIT I:
Introduction to Personality: Concept, Meaning and Definition of Personality – Physical Appearance and Body Language – **Voice Modulation and Diction** – Communication styles.

UNIT II:
Business Style and Professional Image: Dress Code – Guidelines for Appropriate Business Attire – Multi-cultural Dressing – **Personal Grooming for Success – Business Etiquettes, Media Etiquettes, and Table Etiquettes.**

UNIT III:
Impression Management: Impression Formation – Tactics – Self presentational Motive – Compass Qualities – Toxic Traits – **Social Context: Norms and Roles – Powerful Persuasion Strategies.**

UNIT IV:
Interpersonal Relations & Conflict Management: Analysis of different Ego States – Analysis of Transactions – **Causes of Conflicts – Conflicts Resolution and Management.**

UNIT V:
Stress and Time Management: Causes of Stress, Types of Stress – Coping with Stress and stress Management Techniques – Time as a Resource – Individual Time Management Styles – Better Time Management Techniques.

Note * Bold : Content can be delivered online

Reference Text Books:
1. Barun.K.Mitra, *Personality Development and Soft Skills*, I Edition, Oxford University Press. 2012.
2. E.H. McGrath, *Basic Managerial Skills for all*, 9th Edition, Prentice Hall. India Learning Private Limited , 2011.

LIFE SKILLS LAB (1L + 1P + 1T)

Description : A "Life Skills" course focuses on equipping individuals with essential skills and knowledge necessary for personal growth, well-being, and success in various aspects of life. This course typically covers a wide range of topics aimed at enhancing self-awareness, interpersonal relationships, emotional intelligence, and practical life management skills.

Course Outcomes: By the end of the course, students will be able:

CO-1 To make the students to understand what is life and the concept of life skills
CO-2 To make the students to understand the importance personal management and managing the finance and family
CO-3 To make them aware of the importance of self-awareness, self-confidence and Socially Responsible behaviour
CO-4 To make them aware of the importance of occupational skills**,** knowing & exploring occupational possibilities
CO-5 To make them understand the importance of Coping, Coping Strategies and Moral Development and Social Exclusion

Contribution of Course Outcomes towards the achievement of Program Outcomes & Strength of correlations (3-High, 2-Medium, 1-Low,0-Nil)		

Subject Code :	GE04	I A Marks	50
No. of Lecture Hours / Week	02	End Exam Marks	-
Total Number of Lecture Hours	45	Total Marks	50
Practical Component	01 Hour/Week	Exam Hours	03

GE04		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PSO1**	**PSO2**
	CO1	H							M	
	CO2		H							H
	CO3				M				M	
	CO4							H		H
	CO5			H					M	

UNIT I:
Introduction: Definition of Life Skills – Assumptions about Life Skills – Concept of Skill in Life Skills – Concept of Skill in Life Skills – Primary Goal of Life Skills Program – Life Skills Process Model– Group Development and Group Behaviors.

UNIT II:

Personal Management: Managing Personal Finance – Selecting and Managing a Household – Caring for Personal Needs – Raising Children and Meeting Marriage Responsibilities – Buying, Preparing, and Consuming Food – Buying and Caring for Clothing – Exhibiting Responsible Citizenship – Using Recreational Facilities and Leisure Time – Getting Around the Community (Mobility).

UNIT III:

Personal-Social Skills**:** Achieving Self-Awareness – Acquiring Self-Confidence –Achieving Socially Responsible Behavior – Maintaining Good Interpersonal Skills – Achieving Independence, Achieving Problem-Solving Skills – Communicating with Others.

UNIT IV:

Occupational Skills**:** Knowing & Exploring Occupational Possibilities – Selecting and Planning Occupational Choice – Exhibiting Appropriate Work Habits and Behaviors – Seeking, Securing, and Maintaining Employment – Exhibiting Sufficient Physical-Manual Skills – Obtaining a Specific Occupational Skills.

UNIT V:

Coping Strategies: Concept of Coping – Types of coping strategies:1) appraisal focused (adaptive Cognitive) 2) problem focused (adaptive behavior) 3) emotion focused Empathy – Fundamentals of Moral Development – Interpersonal Influences on Moral Development – Moral Development and Social Exclusion – Morality and Culture– Morality and Intergroup Attitudes – Moral Emotions.

Practical Components:

1. Each student will work on personal goals within our Life Skills class.
2. Each student will respect the different levels of reading/writing competency toward their peers, and work to help others.
3. Opinions will be respected, honored, listened to, and considered when making decisions that affect the entire class.
4. Mrs. Faulkner will choose all recipes (excluding Open Labs).
5. No inappropriate language or illustrations will be used in any of the projects within this Life Skills class.

Reference Text Books:

1. Glencoe, *Applying Life Skills*, McGraw Hill, 2010.
2. Louise A. Liddell and Yvonne S. Gentzler, *Building Life Skills*, Goodheart - Wilcox Publishers, 6th Edition
3. Glencoe, *Managing Life Skills*, McGraw Hill, 2010.
4. Glencoe, *Discovering Life Skills*, McGraw Hill, 2010.
5. Peter Nicholls, Enjoy Being Proud Of Who You Are: 52 Inspirational Life-Skills Messages for Teenagers, Kindle Edition.
6. ShipraVaidya, Developing Entrepreneurial Life Skills: Creating and Strengthening Entrepreneurial Culture in Indian Schools, Springer Publishers, New Delhi.

22 PG 101 :: PERSONALITY DEVELOPMENT THROUGH LIFE ENLIGHTENMENT SKILLS

Course Code	**22PG101**	**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 :2022	Year of Offering :2022	Year of Revision :--	Percentage of Revision :--
Course Focus	**E**mployability	**E**ntrepreneurship	**S**kill Development.

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: By the end of this course students will 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

Contribution of Course Outcomes towards the achievement of Program Outcomes & Strength of correlations (3-High, 2-Medium, 1-Low,0-Nil)		

22PG101		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
	CO1									
	CO2									
	CO3									
	CO4									
	CO5									

COURSE CONTENT

UNIT-I: Introduction to Personality Development: 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; SWOT Analysis (Strengths, Weaknesses, Opportunities and Threats), Individual SWOT. **(15 Hours)**

UNIT – II: Attitude, Motivation and Self-esteem: Conceptual overview of Attitude, Types of Attitudes, Attitude Formation, Advantages and Disadvantages of Positive and Negative Attitude, Ways to Develop Positive Attitude; Concept of Motivation: Definition and Nature of Motivation, Internal and External Motives, Theories of Motivation (Maslow & Herzberg), 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, Importance Building positive self image. **(15 Hours)**

UNIT – III: Communication and Emotional Intelligence: Effective Communication, Types of Communication, Types of Etiquette; Decision-making skills, Steps in Decision Making, Conflict Management and Negotiation; Concept of Leadership, Qualities of a successful leader, Character building; Team-work, Time Management, Work ethics; Emotional Quotient, IQ Vs EQ, Dimensions of Emotional Intelligence, Components of Emotional Intelligence. **(15 Hours)**

UNIT – IV: Holistic Development of Personality: Bhagavadgita 18 Verses ; Chapter 1 – Verses 1 Chapter 2 Verses 17, 23, 35, 47, 48, 62 (Wisdom / Virtue / Professionalism) Chapter 3 Verses 35, 36, 37, 42 Chapter 4 Verses 7 (Virtue) Chapter 6 Verses 5 Chapter 18 Verses 38, 46, 48, 63, 78 (Wisdom) **(15 Hours)**

UNIT –V: Stress Management &Yoga: Meaning and Definition of Stress, Types of Stress, Eustress and Distress, Stress Management; Meaning and definition of Yoga, Historical Perspective of Yoga, Principles of Astanga Yoga by Patanjali; Pranayama, Pranayama: Anulom and Vilom Pranayama, Nadishudhi Pranayama Kapalabhati, Pranayama, Bhramari Pranayama, Nadanusandhana Pranayama; Meditation techniques: Om Meditation, Cyclic meditation: Instant Relaxation Technique (IRT), Quick Relaxation Technique (QRT), and Deep Relaxation Technique (DRT); **(Theory & Practical).** **(15 Hours)**

PRACTICAL COMPONENT:

- ✓ 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 examples 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 seventy percent of body language and conduct activities

REFERENCES:

1) Hurlock, E.B. Personality Development, 28th Reprint. New Delhi: Tata McGraw Hill, 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 PublicSpeaking. NewDelhi. Tata -Mc-GrawHill.2001
5) Mile,D.J Power of positive thinking. Delhi. Rohan Book Company, (2004).
6) PraveshKumar.AllaboutSelf-Motivation.NewDelhi.GoodwillPublishingHouse.2005.
7) Smith,B.BodyLanguage.Delhi:RohanBookCompany.2004
8) Yogic Asanas for Group Training-Part-I:Janardhan Swami Yogabhy as iMandal, Nagpur.
9) Raja yoga or Conquering the Internal Nature by Swami Vivekananda, Advaita Ashrama (Publication Department), Kolkata.
10) Nagendra H.R and Nagaratna R,Yoga Perspective in Stress Management, Bangalore, Swami Vivekananda Yoga Prakashan.

Online Resources:

- https://onlinecourses.nptel.ac.in/noc16_ge04/preview
- https://freevideolectures.com/course/3539/indian-philosophy/11

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NAAC - SSR IV CYCLE

Criterion I - Curricular Aspects 1.3 Curriculum Enrichment

1.3.1: Institution integrates cross-cutting issues relevant to Professional Ethics, Gender, Human Values, Environment and Sustainability and other value framework enshrined in Sustainable Development Goals and National Education Policy – 2020 into the Curriculum

NAME OF THE PROGRAM: MATER OF COMPUTER APPLICATIONS(MCA)

NAME OF THE PROGRAM : MCA REGULATION 17 &20						
Name of the Course	**Couse Code**	**Professional Ethics**	**Gender**	**Human values**	**Environmental and Sustainability**	**other value framework enshrined**
SEMINAR-II	CA2S1	Seminars can include discussions on the ethical implications of emerging technologies, helping students understand the importance of integrity and responsibility in their professional conduct.	The importance of creating equitable opportunities for all students, which can be fostered through targeted seminars.	NIL	Seminars can serve as a venue for exploring sustainable development goals (SDGs) and their applications in technology,	NIL
CLOUD COMPUTING	20CA3T4	Addressing risks such as data privacy, security breaches, and compliance with regulations fosters ethical awareness in students. Discussions on authentication, authorization, and accountability (AAA) in cloud computing can highlight the importance of secure practices, emphasizing ethical considerations in managing sensitive data.	Highlighting the need for diversity in technology teams can improve innovation and inclusivity.	NIL	Exploring open-source cloud architectures can emphasize the importance of collaborative approaches and resource sharing, which support sustainable practices in technology development.	NIL
CRYPTOGRAPHY & NETWORK SECURITY	20CA3T5	Ethical hacking, responsible disclosure, and understanding the impact of security breaches on individuals, organizations, and societies align with NEP's focus on inculcating professional ethics and integrity.	Involving students in teamwork for implementing security algorithms or discussing real-world case studies (e.g., firewalls, digital signatures) can promote inclusive group work, giving equal participation opportunities to all genders.	It can cover responsible use and monitoring without violating individual rights, reflecting human values such as privacy and respect.	Topics like IP Security, Transport Layer Security, and Firewalls can highlight sustainable security approaches, such as developing energy-efficient security systems or algorithms that reduce processing power or resource consumption.	NIL
SOFTWARE ENGINEERING	CA3T4	Teaching software quality assurance highlights the importance of delivering reliable and safe products, which relates to ethical responsibility in protecting users and maintaining trust in technology	Encouraging diverse teams in software projects can lead to more inclusive and innovative solutions. Case studies highlighting women in technology and their contributions can foster a culture of equity in the field.	NIL	Project management can include sustainable project practices, focusing on resource management and the environmental impact of software solutions.	Fostering a comprehensive and socially aware educational environment.

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(An Autonomous College in the jurisdiction of Krishna University)
M.C.A. Programme - II Semester

COURSE	COURSE CODE	L	T	P	C	Year
SEMINARS	CA2S1	4	-	-	4	2020-21

Course Outcomes

CO1: Recall and define key concepts related to the presented computer technologies.(PO1)(PO5)(PO7)
CO2: Explain the fundamental principles and functionalities of the technologies covered in the seminars.(PO1)(PO5)
CO3: identify and analyze real-world applications of the presented technologies in various industries.(PO3)
CO4: Compare and evaluate different approaches or solutions within a chosen technology, considering their strengths and weaknesses,(PO4)(PO6)
CO6: Develop a concise presentation or written report on a chosen technology(PO3)

CO-PO MATRIX								
CA2S1	CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
	CO1	M				H		M
	CO2	H				H		
	CO3	H		H		L		
	CO4			H				
	CO5							H

Seminars are focused learning sessions designed for students to delve deeper into specific computer technologies. They offer a platform to:

- Explore emerging trends:.
- Gain in-depth knowledge:
- Develop presentation skills:.
- Network with professionals:

Overall, seminars bridge the gap between theoretical knowledge and practical applications in the ever-evolving field of computer science.

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NAAC reaccredited at 'A+' level
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: Recall the different cloud deployment models and service models (PO1)(PO5)

CO2: Understand the *Open Source Architectures* and *Services of Cloud Computing*.(PO1)(PO2)(PO5)(PO6)

CO3: Apply *Cloud Applications* using *Popular Cloud Platforms*. .(PO1)(PO3)(PO5)

CO4: Analyze the cost-benefit of migrating specific mobile applications to the cloud. .(PO1)(PO3)(PO5)(PO7)

CO5**:** Evaluate Cloud Risks & Costs + Analyze AAA Model in Cloud Security.(PO1)(PO2)(PO5)

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CO-PO MATRIX								
20CA3T4	CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
	CO1	M				M		
	CO2	H	M			H	L	
	CO3	M		H		H		
	CO4	M		H		H		L
	CO5	H	M	H		H		

Syllabus

Course Details

Unit	Learning Units	Lecture Hours
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.	12
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.	12
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, Programming Support for Amazon EC2, Elastic Block Store (ESB).	12
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, 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. **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.	12
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	12

	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 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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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.(PO1)(PO2)(PO7)(PO5)*

CO2. Make use of *Number Theory*, *Public Key Cryptography and RSA*, *Other Public-Key Crypto Systems* and *Message Authentication Codes..(PO1)(PO2)(PO3)(PO4)*

CO3. Digital Signatures, Key Management and Distribution and User Authentication. (PO1)(PO2)(PO3)(PO5)

CO4.Understand *Transport Level Security*, *Electronic Mail Security* and *IP Security.(PO1)(PO4)*

CO5. Extend *Intruders and Firewalls.* (PO2)(PO5)(PO6)(PO7)

CO-PO MATRIX								
20CA3T5	CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
	CO1	H	M			L		H
	CO2	M	H	M	M			
	CO3	M	M	H		M		
	CO4	M			H			
	CO5		M			H	M	L

Syllabus

Course Details

Unit	Learning Units	Lecture Hours
I	**Computer & 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 **Advanced Encryption Standard:** AES Structure, An AES Example, AES Implementation. Random Bit Generation and Stream Ciphers: Principles of Pseudo Random Number Generation, Pseudo Random Number Generators.	12
II	**Introduction to Number Theory:** 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. **Public Key Cryptography and RSA:** Principles of Public Key Crypto Systems, The RSA Algorithm. **Other Public-Key Crypto Systems:** Key Management, Diffie-Hellman Key Exchange, Elliptic Curve Arithmetic, Elliptic Curve Cryptography. **Message Authentication Codes:** Message Authentication Requirements, Message Authentication Functions, Requirements for Message Authentication Codes, Security of MACs, MACs Based on Hash Functions: HMAC.	12
III	**Digital Signatures:** Digital Signatures, NIST Digital Signature Algorithm. **Key Management and Distribution:** Symmetric Key Distribution Using Asymmetric Encryption,Distribution of Public Keys. **User Authentication:** Kerberos, Remote User-Authentication Using Asymmetric Encryption.	12
IV	**Transport Level Security:** Transport Layer Security. **Electronic Mail Security:** S/MIME, Pretty Good Privacy. **IP Security:** IP Security Overview, IP Security Policy, Encapsulating Security Payload, Combining SecurityAssociations.	12
V	**Intruders:** Intruders, Intrusion Detection, Password Management. **Firewalls:** The Need for Firewalls, Firewall Characteristics and Access Policy, Types of Firewalls.	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 Essentials- Securit y Applications and Standards	Pearson Education (2007), Third Edition.
3	Chris McNab	Network Security Assessment	OReilly (2007), 2nd 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
2. http://faculty.mu.edu.sa/public/uploads/1360993259.0858Cryptography%20and%20Network%20Security%20Principles%20and%20Practice,%205th %20Edition.pd

Co-curricular Activities : Programming Contests, Hackathons & Quiz.

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(An autonomous College in jurisdiction of Krishna University)
M.C.A.,Programme – III Semester

COURSE	COURSE CODE	L	T	P	C	YEAR
SOFTWARE ENGINEEERING	CA3T4	4		-	4	2020-21

Course Outcomes:

After successful completion of course the students will be able to:
CO1: Define basic knowledge on *Software Engineering Methods and Practices*, General Understanding of *Software Process Models* and *Agile Development*. (PO1,PO7)
CO2: Understand *Core Principles*, *Requirements Modeling* & *Data Modeling* concepts. (PO2,PO5)
CO3:Identify d*ifferent Software Testing Approaches* and *Various Aspects of Software Quality Assurance.* (PO4,PO5,PO6)
CO4:Acquire knowledge on various *Process* & *Project Management Concepts* and *Process & Project Metrics*. (PO6)
CO5: Understand *Formal Methods Modelling* & *Estimation for Software Projects*.(PO3,PO4)

CO-PO MATRIX								
CA3T4	CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
	CO1	H						M
	CO2		H			H		
	CO3				L	H	M	
	CO4						H	
	CO5			H	M			

UNIT I

Software and Software Engineering: The Nature of Software: *Defining Software*, *Software Application Domains*, *Legacy Software*, The Unique Nature of WebApps, 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

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, Swimlane 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

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 WebApps, 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

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, WebApp Project Metrics,* Metrics for Software Quality: *Measuring Quality, Defect Removal Efficiency.*

UNIT V

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.

Prescribed Text Book			
	Author	Title	Publisher
1	Roger S Pressman	Software Engineering-A Practitioner's Approach	Seventh Edition, McGraw-Hill, A Business Unit of the McGraw-Hill Companies, Inc., 2010

Reference books			
	Author	Title	Publisher
1	Sommerville	Software engineering	7th Edition, Pearson education
2	S.A.Kelkar	Software Engineering - A Concise Study	PHI.
3	Waman S.Jawadekar	Software Engineering	TMH.
4	AH Behforooz and Frederick J.Hudson	Software Engineering Fundamentals	Oxford (2008)

1.3.1: Institution integrates cross-cutting issues relevant to Professional Ethics, Gender, Human Values, Environment and Sustainability and other value framework enshrined in Sustainable Development Goals and National Education Policy – 2020 into the Curriculum

NAME OF THE PROGRAM: M.Sc. COMPUTER SCIENCE

NAME OF THE PROGRAM : MSC COMPUTER SCIENCE REGULATION 17 & 20						
Name of the Course	**Couse Code**	**Professional Ethics**	**Gender**	**Human values**	**Environmental and Sustainability**	**other value framework enshrined**
OPERATIONS RESEARCH	CS2T2	Emphasizing the nature and scope of operations research encourages ethical decision-making in resource allocation and optimization. Highlighting the impact of these decisions on various stakeholders can foster a sense of responsibility.	In areas like project management and game theory, incorporating diverse teams can lead to more innovative solutions. Discussions can highlight the importance of including women and under represented groups in teams working on optimization and decision-making projects.	NIL	Formulating transportation problems can include considerations for sustainable logistics and minimizing environmental impact, which aligns with NEP's focus on sustainability.	NIL
INTERNET OF THINGS	CS3T1	Understanding the ethical implications of IoT technology and its applications is crucial. Discussions could focus on privacy, security, and data ethics, preparing students to consider the social impacts of their work.	Emphasizing gender equity in the design and implementation of IoT solutions can ensure that the needs of all users are considered.	Highlighting the role of IoT in various sectors (like healthcare, environment, and smart cities) can encourage students to think about how technology can be used for social good, promoting human values in technology development	Smart Cities and Sustainable Development: Discussing the role of IoT in smart cities can emphasize its potential to enhance sustainability through efficient resource management, reducing waste, and improving energy efficiency.	NIL
BIG DATA AND ANALYTICS	20CS4T1	Discussions on the ethical implications of Big Data, such as data privacy, security, and responsible data usage, can help students understand their responsibilities as data professionals.	Encouraging teamwork and collaborative projects can promote gender equity in group settings	NIL	Big Data can be leveraged for sustainable practices, such as environmental monitoring, resource management, and smart city planning	NIL
ARTIFICIAL INTELLIGENCE & MACHINE LEARNING	**20CS4T2**	Introducing ethical considerations related to AI, such as bias in algorithms, data privacy, and the societal impacts of AI technologies This fosters a culture of responsibility in future AI practitioners.	Encouraging teamwork and collaboration in projects can create a more inclusive environment	NIL	Discussing the applications of AI in addressing sustainability challenges—such as climate change, resource management, and sustainable agriculturE aligns with NEP 2020's focus on integrating sustainability into education	NIL

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Programme: M.Sc. (Computer Science)

Title of the Paper: Big Data and Analytics

Semester: IV

Course Code	20CS4T1	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 Outcomes:

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

C01. How data is stored and processed in Hadoop. .(PO1)(PO2)(PO5)

CO2.Understand big data and its role in daily life.(PO1)(PO5)(PO7)

CO3. Choose Map Reduce & Modern Databases used in *Big Data Analytics*. .(PO1)(PO3)(PO5)

CO4.Importance of Hadoop Eco System. .(PO1)(PO2)(PO5)

CO5.Develop Visualization of data with Tableau.(PO5)(PO6)(PO7)

CO-PO MATRIX								
20CS4T1	CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
	CO1	H	H			M		
	CO2	H				H		H
	CO3	H		H		H		
	CO4	H	H			H		
	CO5					H	H	M

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 vrsus NoSQL.

MongoDB: What is MongoDB?, Why MongoDB?, Using JavaScript, Script Object Notation, Generating Unique Key, Support for Dynamic Queries, Storing Binary Data, Replication, Sharding, Updating Information in Place, Terms used in RDBMS and MongoDB, Data Types in MongoDB, MongoDB Query Language?

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 Funtions, Complex Data Types, User Defined Functions, Parameter Substitution.

HBase: HBasics, Concepts, Clients, HBase versus RDBMS.

UNIT V

Introduction to Tableau: What is Tableau?, Opening Existing Workbooks, Creating New Workbooks, Tableau.

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,(*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.

Prescribed Text Book			
	Author	Title	Publisher
1	Seema Acharya, Subhashini Chellappan	BigData and Analytics	Wiley Publications.(Unit I, II, III,IV)
2	George Peck	Tableau 9 - The official guide	Mcgraw hill - 2016

Reference Text Books			
	Author	Title	Publisher
1	Nathan, Marz James Warren	Big Data Principles and Best Practices of Scalable Real Time Data Systems	MANNING Publications 2015
2	Tom White		O'Reilly, Yahoo Press, 3e
3	Stirrup,Nandeshwar,Ohmann ,Floyd		Packt Publishing 2016

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NAAC reaccredited at 'A+' level
Autonomous -ISO 9001 – 2015 Certified

Programme: M.Sc. (Computer Science)

Title of the Paper: Artificial Intelligence & Machine Learning

Semester: IV

Course Code	20CS4T2	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. Define core concepts of AI and its historical development (PO1)(PO5)
CO2. Understand a hybrid neural network or instance-based learner(PO1)(PO3)(P05)
CO3. Apply search algorithms to solve problems using informed and uninformed strategies (PO3)
CO4. Analyze and represent knowledge using First-Order Logic and reasoning techniques (PO2)(PO3)
CO5. Evaluate different learning paradigms for solving various problems. (PO1)(PO3)(P05)

CO-PO MATRIX								
20CS4T2	CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
	CO1	H				M		
	CO2	M		M		M		
	CO3			H				
	CO4		M	H				
	CO6	H		H		H		

Syllabus

Course Details

Unit	Learning Units	Lecture Hours
I	**Introduction:** What Is AI? The Foundations of Artificial Intelligence, The History of Artificial Intelligence. **Solving Problems by Searching:** Problem-Solving Agents, Example Problems, Searching for Solutions, Uninformed Search Strategies, Informed (Heuristic) Search Strategies, Heuristic Functions.	10
II	**First-Order Logic:** Syntax and Semantics of First-Order Logic, Using First-Order Logic, Knowledge Engineering in First-Order Logic. **Inference in First-Order Logic:** Propositional vs. First-Order Inference, Unification and Lifting, Forward Chaining, Backward Chaining, Resolution.	10
III	**Classical Planning:** Definition of Classical Planning ,Algorithms for Planning as State-Space Search, Planning Graphs, Other Classical Planning Approaches, Analysis of Planning Approaches. **Knowledge Representation:** Ontological Engineering, Categories and Objects Events, Mental Events and Mental Objects.	15
IV	**Learning from Examples:** Forms of Learning, Supervised Learning, Learning Decision Trees, Evaluating and Choosing the Best Hypothesis, The Theory of Learning, Regression and Classification with Linear Models. **Reinforcement Learning:** Introduction, Passive Reinforcement Learning, Active Reinforcement Learning, Generalization in Reinforcement Learning, Policy Search, Applications of Reinforcement Learning.	15
V	**Artificial Neural Networks:** 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. **Instance-Based Learning:** 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 Science of Algorithms that Make Sense of Data Cambridge University 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
4. https://machinelearningmastery.com/basic-concepts-in-machine-learning/

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M.Sc., (Computer Science) Programme - II Semester

COURSE	COURSE CODE	L	T	P	C	Year
OPERATIONS RESEARCH	CS2T2	4	-	-	4	2019-20

Course Outcomes:

CO1.How game theorists think and approach a strategic problem.(PO3),(PO6)
CO2. Understand computer's role in operations research and formulate linear programming problems (PO1),(PO2)
CO3.Inspect assignment problems and drive their optimum solution.(PO1),(PO3)
CO4.Apply transportation problems and drive their optimum solution.(PO1),(PO3)
CO5.Evaluate PERT and CPM for decision making and optimally managing projects.(PO1),(PO3),(PO6)

CO-PO MATRIX								
CS2T2	CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
	CO1			H			M	
	CO2	M	M					
	CO3	H		H				
	CO4	H		H				
	CO5	H		H			H	

UNIT I

Linear programming: Nature, Meaning and Scope of Operations Research, Role of Computers in OR, Introduction and Formulation of LP problems, Linear Programming: Graphical Solution for Two Variable Problem, Simplex Method, Artificial Variable Technique: Big M and Two-Phase Methods

UNIT II

Transportation Problem: L. P Formulation of the Transportation Problem, Tabular Representation, Initial Basic Feasible Solution (I.B.F.S.) to Transportation Problem: North West Corner, Least Cost, Vogel's Approximation Methods, The Optimality Test, Transportation Algorithm, MODI (Modified Distribution Method), Some Exceptional Cases: Unbalanced, Prohibited, Maximization Transportation Problems, Time minimization Transportation problem, Simple Problems.

UNIT III

Assignment Problem: Mathematical formulation of the problem, Hungarian method for Assignment problem, Special cases in Assignment problems: Unbalanced, Prohibited, Maximization, Travelling Salesman Problem, A Typical Assignment Problem, Simple Problems.

UNIT IV

Game Theory: Introduction, Pure Strategy, Mixed Strategy, Two Person Zero Sum Game, Minimax-Maximin Criteria, Solution of Games with Saddle Point, Solution of Game without Saddle Point, Principle of Dominance, Solution of game Without Saddle Point, Graphical Method for 2×N and M×2 Games, Solution of Game without Saddle Point - Simplex Method, Simple Problems.

UNIT V

Project Management: Introduction, Rules for Network Construction, Network Diagram Representation, Critical Path Analysis-Forward Pass Calculation, Backward Pass Calculation; Float and Slack Times, Project Evaluation and Review Technique(PERT), Simple Problems.

Prescribed Text Book			
	Author	Title	Publisher
1	KantiSwarup, P.K.Gupta, Man Mohan	Operations Research	15th Edition, 2010, Sultan Chand & Sons, New Delhi.

Prescribed Text Books			
	Author	Title	Publisher
1	S.D.Sharma, HimanshuSharma	Operations Research Theory, Methods and Applications	Improved and Enlarged Edition, Kedar NathRamNath & Co., Meerut.
2	Dr. R. K. Gupta	Krishna's Operations Research	27thEdition,2010, Krishna Prakashan Media (P) Ltd., Meerut
3	J.K.Sharma	Operations Research: Theory and Applications	5th Edition, 2013, Macmillan.
4	Hamdy	Operations Research: An Introduction	A.Taha, 9th edition ,2010, Prentic Hall.

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M.Sc., (Computer Science) Programme - III Semester

COURSE	COURSE CODE	L	T	P	C	Year
INTERNET OF THINGS	CS3T1	4	-	-	4	2020-2021

Course Outcomes:

On successful completion of this course, the students:
CO1.Define Physical and Logical Design of IoT.(PO1)
CO2. Understand Address Real-World Design Constraints in IoT. (PO3)
CO3. Apply IoT in Various Domains. (PO5)
CO4. Distinguish Between IoT and M2M. (PO2)
CO5. Explain IoT Architectural Principles. (PO2)

CO-PO MATRIX								
CS3T1	CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
	CO1	H						
	CO2			H				
	CO3					H		
	CO4		H					
	CO5		H					

UNIT I

Introduction to Internet of Things: Introduction, Physical Design of IOT, Logical Design of IOT, IOT Enabling Technologies, IOT Level and Deployment Templates.

Domain specific IOT: Introduction, Home Automation, Cities, Environment, Energy, Retail, Logistics, Agriculture, Industry, Health & Lifestyle.

UNIT II

IOT & M2M: Introduction, M2M, Differences between IOT & M2M, SDN & NFV for IOT.

IOT System Management with NETCONF- YANG: Need for IOT System Management, Simple Network Management Protocol, Network Operator Requirement, NetConf.

UNIT III

M2M to IOT - An Architectural Overview: Building Architecture, Main Design Principles and Needed Capabilities, An IoT Architecture Outline, Standards Considerations.

Real-World Design Constraints: Introduction, Technical Design Constraints-Hardware is Popular Again, Data Representation and Visualization, Interaction and Remote Control.

UNIT IV

Asset Management: Introduction, Expected Benefits, e-Maintenance in the M2M Era, Hazardous Goods Management in the M2M Era .

Industrial Automation: Service-Oriented Architecture-Based Device Integration, SOCRADES: Realizing the Enterprise Integrated Web of Things, IMC-AESOP: from the Web of Things to the Cloud of Things.

UNIT V

Commercial Building Automation: Introduction, Case Study: Phase One-Commercial Building Automation Today, Case Study: Phase Two - Commercial Building Automation in the Future.

Smart Cities: Introduction Smart Cities, The Need, Smart Cities-A Working Definition, Smart Cities -Some Examples, Roles, Actors, Engagement Transport and Logisticsan IoT Perspective.

Prescribed Text Books			
	Author	Title	Publisher
1	Vijay Madisetti and Arshdeep Bahga.	Operating Systems-Internals and Design PrinciplesInternet of Things (A Hands-on-Approach).	1st Edition, VPT, 2014. (UNIT-I,II)
2	Jan Holler, Vlasios Tsiatsis, Catherine Mulligan, Stefan Avesand, Stamatis Karnouskos, David Boyle	From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence	1st Edition, Academic Press, 2014. (UNIT-III,IV,V)

1.3.1: Institution integrates cross-cutting issues relevant to Professional Ethics, Gender, Human Values, Environment and Sustainability and other value framework enshrined in Sustainable Development Goals and National Education Policy – 2020 into the Curriculum

NAME OF THE PROGRAM: M.Sc. PHYSICS

NAME OF THE PROGRAM : MSC PHYSICS REGULATION 17 , 20 & 22						
Name of the Course	**Couse Code**	**Professional Ethics**	**Gender**	**Human values**	**Environmental and Sustainability**	**other value framework enshrined**
Mathematical Physics	**PH1T1**	As mathematical techniques are often applied in technology and engineering, professionals have an ethical obligation to ensure these tools are used responsibly. This includes considering the societal impacts of their work, such as data privacy and security. Mathematicians and scientists must adhere to ethical standards in research, ensuring accuracy in data representation and the integrity of findings, especially when modeling social or environmental systems.	Encouraging participation of women and marginalized genders in STEM fields can enhance creativity and innovation. Addressing gender biases in education and professional environments is crucial. Ensuring that research considers gender perspectives can lead to more comprehensive solutions to societal problems, particularly in areas like healthcare and education.	Access to mathematical education can promote social equity. Efforts to make STEM education inclusive can help bridge gaps in representation and support diverse perspectives. Mathematical models, such as those in statistics and probability, can inform policies that promote social justice and human rights by providing data-driven insights into societal issues.	Mathematical techniques, like differential equations and statistical models, are essential in environmental science for predicting climate change impacts and resource management. Applications of Fourier and Laplace transforms can optimize energy systems and improve efficiency, contributing to sustainability efforts.	Incorporating these dimensions into the teaching and application of mathematics and physics not only enhances the relevance of the subjects but also cultivates a generation of professionals who are aware of their societal responsibilities.
Classical Mechanics	**PH1T2**	In mechanics and engineering, ethical considerations include the responsibility to conduct research honestly, report results accurately, and acknowledge contributions appropriately. Professionals must prioritize safety in design and application of mechanical systems, ensuring that the work does not harm individuals or communities	Addressing gender disparities in STEM fields is crucial. Encouraging diverse perspectives can lead to more innovative solutions in mechanics and engineering. Promoting female scientists and engineers in mechanics can inspire future generations and change the narrative around gender in these fields	Engineers and physicists are tasked with ensuring that their work contributes positively to society, addressing issues like accessibility, affordability, and user safety. In applying mechanics, professionals must consider the broader impacts of their designs on human life and societal wellbeing	Mechanics can contribute to environmental sustainability through the development of energy-efficient systems and renewable energy technologies.The principles of mechanics can be applied to optimize material use in engineering, leading to less waste and more sustainable practices	classical mechanics is primarily a physical science, its applications and implications resonate deeply with professional ethics, gender equity, human values, and environmental sustainability. Addressing these themes enriches the discipline and promotes a more holistic approach to scientific and engineering challenges.
Atomic and Molecular Physics	**20PH1T3**	Adhering to ethical standards ensures accurate and honest reporting of data obtained from techniques like AAS, FES, and spectroscopy. Misrepresentation of results can have serious implications, especially in fields like environmental monitoring and clinical diagnostics.	Promoting gender equity in scientific fields, including spectroscopy, can lead to diverse perspectives and innovations. Programs supporting women in science can enhance representation and inspire future generations. Spectroscopic techniques can be applied to study gender-specific health issues, ensuring that women's health is prioritized in research agendas..	Analytical techniques can be applied to ensure the safety and quality of food, water, and air, aligning with the value of protecting human health and wellbeing. Respecting individuals' rights in studies involving human subjects or communities is crucial. This includes obtaining informed consent and ensuring confidentiality.	Techniques like AAS and ICP-AES are essential for detecting pollutants and assessing environmental health, aligning with the responsibility to protect ecosystems and biodiversity. Utilizing spectroscopic methods to monitor and manage natural resources effectively can support sustainable practices in industries such as agriculture and mining.	By integrating these dimensions into the practice of spectroscopy and analytical techniques, professionals can foster a more ethical, inclusive, and sustainable approach to scientific research. This holistic perspective not only enhances the integrity and applicability of scientific findings but also promotes a positive impact on society and the environment.
Electronics	**20PH1T4**	Understanding operational amplifiers and circuits requires adherence to safety standards and ethical considerations in design to ensure that electronic systems do not pose risks to users or the environment. Ethical considerations in communication technologies, including data privacy and integrity in modulation and transmission, are crucial.	Emphasizing diversity in fields like electronics and engineering can lead to more innovative solutions that consider different user perspectives. Promotes gender equity in STEM education and careers Understanding user needs through a gender lens can improve product design and functionality, ensuring technology serves all demographics fairly.	Incorporating human values into the design of communication systems and electronic devices ensures that they meet the needs and improve the quality of life for users. Recognizing the societal implications of technology, such as how digital electronics and microprocessors affect daily life, promotes ethical considerations that reflect human values.	Researching and implementing technologies that enhance sustainability, such as renewable energy systems, can stem from foundational knowledge in electronics and communication systems. Understanding the lifecycle of electronic components, including proper disposal and recycling practices, aligns with environmental stewardship.	By integrating these values into the technical content, professionals and students can develop a more holistic understanding of their responsibilities in technology development and implementation.
tistical Mecha	22PH2T1	Researchers must honestly report findings, recognizing that different interpretations (microstates) lead to the same observable outcomes (macrostates). This integrity builds trust in scientific communication.Clearly explaining the phase space concept ensures that others can understand and replicate studies, which is crucial for scientific validation.	Encouraging diverse participation in scientific fields, including statistical mechanics, can lead to richer perspectives and innovations. Understanding how advancements in physics and engineering can address gender disparities in technology access and employment.	Scientists have a duty to apply their knowledge for the greater good, considering the social implications of their work. Incorporating human values in research can help address complex societal issues, ensuring scientific advancements align with ethical standards.	Statistical mechanics can model environmental systems, helping to understand and mitigate ecological impacts. Applying principles of statistical mechanics in industries can lead to more efficient use of resources, reducing waste and promoting sustainability. The study of thermodynamics and statistical mechanics can contribute to developing sustainable energy solutions, such as improving energy efficiency in systems	By recognizing the intersections of classical statistical mechanics with broader societal themes, students and professionals can approach their work with a holistic perspective. This not only enhances the scientific understanding but also fosters a sense of responsibility toward the environment and society, promoting sustainable development and ethical practices in scientific research

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M.Sc., (PHYSICS) Programme - I Semester

COURSE	COURSE CODE	L	T	P	C	Year
MATHEMATICAL PHYSICS	PH1T1	5	-	-	5	2017-18

Course Description: This course helps to learn various mathematical methods used in physics to solve problems.

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 problems
CO2: Apply the concept of different Fourier transforms to solve problems.
CO3: Apply the concepts of Fourier series to solve problems
CO4: Understand the basic concepts of complex analysis and apply them for evaluation of the contour integrals.
CO5: Understand the concepts of tensors and different types.

CO - PO MATRIX								
	CO-PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**
PH1T1	CO1	H					L	M
	CO2		H				L	M
	CO3		H				L	M
	CO4	H					L	M
	CO5	H					L	M

Syllabus		
Unit	**Learning Units**	**Lecture Hours**
	534	

I	**(Special Functions)** Solution by series expansion - Legendre, associated Legendre, Bessel, Hermite andLaguerre equations, physical applications - Generating functions, orthogonalityproperties and recursion relations.	12
II	**(Integral Transforms)** Laplace transform; first and second shifting theorems - Inverse Laplace transforms by partial fractions - Laplace transform of derivative and integral of a function	12
III	**(Fourier Series &Probability Theory)** Fourier series of arbitrary period - Half-wave expansions - Partial sums – Fourier integral and transformations; Fourier transform of delta function. Elementary probability theory, random variables,binomial,poisson, and normal distributions, Central limit theorem.	12
IV	**(Complex Variables)** Complex Algebra, Cauchy – Riemann conditions - Analytic functions - Cauchy's integral theorem - Cauchy's integral formula - Taylor's Series - Laurent's expansion – Singularities - Calculus of residues - Cauchy's residue theorem - Evaluation of residues - Evaluation of contour integrals.	12
V	**(Tensor Analysis)** Introduction - Transformation of coordinates - Contravariant, Covariant and Mixed tensors - Addition and multiplication of tensors - contraction and Quotient Law – The line element - fundamental tensors.	12

Text and Reference Books:

1. Mathematical Methods for Physicists, G. ARFKEN and H.J. WEBER (Elsevier Inc.).
2. Laplace and Fourier Transforms, J.K. GOYAL and K.P. GUPTA (Pragati Prakashan, Meerut).
3. Matrices and Tensors in Physics, A.W. JOSHI (New Age Int).
4. Mathematical Physics, B.D. GUPTA (Vikas Pub. House).
5. Complex Variables, MURRAY R. SPIEGEL (Schaum's Outlines).
6. Vector Analysis, MURRAY R. SPIEGEL (Schaum's Outlines).
7. Probability and statistics by E. Rukmangadachari, Reddy (Pearson)
8. Probability and statistical inference by Hoggs Tanis Rao (Pearson)
9. Probability and Random Processes by S. Palaniammal PHI

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M.Sc., (PHYSICS) Programme - I Semester

COURSE	COURSE CODE	L	T	P	C	Year
CLASSICAL MECHANICS	PH1T2	5	-	-	5	2017-18

Course Description: This course helps to understand the basic concepts behind the classical laws of physics and their mathematical formulation.

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 passion 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 poission 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.

CO - PO MATRIX								
	CO-PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**
PH1T2	CO1	H					L	M
	CO2		H				L	M
	CO3		H				L	M
	CO4	H					L	M
	CO5		H				L	M

Syllabus		
Unit	**Learning Units**	**Lecture Hours**
I	1. Mechanics of a particle: Conservation laws, Mechanics of a system of particles: Conservation laws. 2. Constraints, D'Alembert's principle and Lagrange's equations, Velocity Dependent potentials and the Dissipation function Simple applications of the Lagrangian Formulation, Generalized potential.	12
II	3. Generalized momentum and Cyclic Coordinates, Hamilton function H and conservation of energy, Derivation of Hamilton's equations, Simple applications of the Hamilton Formulation. 4. Reduction to the equivalent one body problem. The equation of motion and first Integrals, classification of orbits, The differential equation for the orbit, Conditions for closed orbits (Bertrand's theorem), The Kepler problem inverse square law of force, The motion in time in the Kepler problem, Scattering in a central force field.	12
III	5. Hamilton's principle, Deduction of Hamilton's equations form modified Hamiltonprinciple, Derivation of Lagrange's equations from variational Hamilton's principle, Simple applications of the Hamilton principle Formulation, Principle of Least Action. 6. Legendre transformations, Equations of canonical transformation, Example: 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.	12
IV	7.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. 8. One dimensional oscillator, Two coupled oscillations, solutions, normal coordinates and normal modes, kinetic and potential energies in normal coordinates, vibrations of linear triatomic molecule.	12
V	9. 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. 10 Symmetric bodies, Euler's equations of motion for a rigid body, Torque-free motion of a rigid body, Coriolis Effect.	12

Text and Reference Books:

1. Classical Mechanics, H.GOLDSTEIN (Addison Wesley) 2005.
2. Classical Mechanics, J.C. UPADHYAYA (Himalaya Publishing House) 2010.
3. Classical Dynamics of Particles and Systems, J.B.MARION (Academic Press).

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Paper – 3:ATOMICANDMOLECULARPHYSICS

Offered to : M.Sc.(PHYSICS)	Course Code : 20PH1T3
Course Type : Core	Course : ATOMIC AND MOLECULAR PHYSICS
Year of Introduction : 2020	Year of offering : 2020
Year of Revision : xxxxx	Percentage of Revision : xxxxx
Semester : I	Credits : 4
Hours Taught : 60 hrs. per Semester	Max.Time : 3 Hours

Course Description: This course gives theory of the basic concepts of atomic spectroscopy and molecular spectroscopy

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

CourseOutcomes:

Attheendof thiscoursethestudentsshouldbeableto:

CO1: Understandtheprincipleandapplicationsofatomicabsorption,emissionspectrometer.

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.

CO - PO MATRIX								
	CO-PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**
20PH1T3	CO1	H					L	M
	CO2		H				L	M

	CO3		H	H			L	M
	CO4	H					L	M
	CO5	H					L	M

Syllabus		
Unit	**Learning Units**	**Lecture Hours**
I	**Atomic Absorption Spectroscopy** 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.	12
II	**Atomic Emission Spectroscopy and Flame Photometry** 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.	12
III	**Rotational Spectroscopy** 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.	12
IV	**Vibrational Spectroscopy** 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	12
V	**Electronic Spectroscopy of Diatomic Molecules** 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- FortratParabolae – Dissociation – Predissociation.	12

Text and Reference Books:

1. Atomic and Molecular Spectroscopy, GurdeepChatwal, Sharma Anand, Himalaya Publishing House

2. Molecular Structure and Spectroscopy, G. Aruldhas, 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).

Paper – 4 : ELECTRONICS

Offered to : M.Sc.(PHYSICS)	Course Code : 20PH1T4
Course Type : Core	Course : Electronics
Year of Introduction : 2004	Year of offering : 2020
Year of Revision : 2020	Percentage of Revision : 30%
Semester : I	Credits : 4
Hours Taught : 60 hrs. per Semester	Max.Time : 3 Hours

Course Description : From this course students learn the basics of opamp , their practical properties and applications. Basics of digital electronics and microprocessor are also covered in this course.

.**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.

CO - PO MATRIX

	CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
20PH1T4	CO1	H					L	M
	CO2	L					L	M
	CO3	M					L	M
	CO4	H					L	M
	CO5	L					L	M

Syllabus		
Unit	**Learning Units**	**Lecture Hours**
I	**Operational Amplifiers** 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.	12
II	**Practical Op-amps** 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.	12
III	**Communication Electronics** 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).	12
IV	**Digital Electronics** Combinational Logic gates- Decoder- encoders- Multiplexer (data selectors)-application of multiplexer - De multiplexer (data distributors),	12

	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.	
V	**Microprocessors** 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.	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).
6. Microprocessor Architecture, Programming and Applications with 8085/8086, R. S.GAONKAR (Wiley Eastern).
7. Electronics: Analog and Digital, I.J. NAGARATH (PHI).

Paper -1: STATISTICAL MECHANICS

Offered to : M.Sc.(PHYSICS)	Course Code : 22PH2T1
Course Type : Core	Course : STATISTICAL MECHANICS
Year of Introduction : 2004	Year of offering : 2022
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 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

.

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.
CO5: Apply statistical laws to the stellar object and particles.

CO - PO MATRIX

	CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
22PH2T1	CO1	H					L	M
	CO2	H					L	M
	CO3	H					L	M
	CO4	H	M				L	M
	CO5		H	M			L	M

Syllabus

Unit	Learning Units	Lecture Hours
I	**Unit-I: Basics of Classical Statistical Mechanics** Introduction, Microstates and Macro states, Phase space, Volume in Phase space, Ensembles-Types of Ensembles, Ensemble average, Liouvilles theorem, Conservation of extension in phase, Equation of motion and Liouville theorem, Equal a prior probability, statistical equilibrium. (CO1)	12
II	**Unit-II: Canonical and Grand Canonical Ensembles** 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	**Unit-III: Partition functions** 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	**UNIT IV: Ideal Bose -Einstein Gas** 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 3He. (CO4)	12
V	**UNIT -V: Ideal Fermi-Dirac Gas** 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).

NAAC - SSR IV CYCLE

Criterion I - Curricular Aspects 1.3 Curriculum Enrichment

1.3.1: Institution integrates cross-cutting issues relevant to Professional Ethics, Gender, Human Values, Environment and Sustainability and other value framework enshrined in Sustainable Development Goals and National Education Policy – 2020 into the Curriculum

NAME OF THE PROGRAM: BBA BUSINESS ANALYTICS

REGULATION R15 & R20

S.NO	NAME OF THE COURSE	COURSE CODE	Professional Ethics	Gender
1	Fundamentals of Business Analytics	MGTT16	• Professional Ethics and Data Management •Sustainable Development • Data-Driven Transparency and Decision Making • Interdisciplinary Learning • Skill Development	• Gender-Equal Learning and Employment Opportunities • Decent Work and Economic Growth • Reduced Inequalities • Community Engagement
2	Business Research Methods	MGT T45	Professional ethics in business research is crucial, ensuring integrity, transparency, and respect throughout the research process. From defining research goals to data collection and analysis, ethics guide decision-making and uphold trustworthiness. Ethical conduct aligns with the purpose and scope of business research, ensuring that collected data, whether primary or secondary, remains unbiased and reliable.	The relationship between gender and business research encompasses various aspects: understanding diverse perspectives in Introduction, prioritizing inclusive data in Importance and Scope, ensuring ethical data collection, and incorporating gender considerations across Exploratory, Descriptive, and Experimental designs. Gender diversity can influence Primary and Secondary data collection methods, questionnaire design, and the choice of sampling techniques to maintain representativeness.

S.NO	NAME OF THE COURSE	COURSE CODE	Professional Ethics	Gender
3	Python for Data Science	22ANAT46	• Ethical Data Handling and Transparency • Equity and Inclusivity through Data Analysis • Data-Driven Transparency and Decision Making • Accountability and Integrity in Data Visualization	• Gender-Equal Learning and Employment Opportunities • Data Analysis for Gender Equity • Supporting Gender-Sensitive Machine Learning Applications • Data Visualization for Inclusive Insights
4	HR Analytics	22ANAT49	Professional ethics in HR analytics ensures the responsible handling of employee data by upholding data privacy, avoiding bias, and fostering transparency and informed consent. Ethical practices ensure accountability in data-driven decisions, balancing business goals with employee well-being to promote a fair and trusted workplace environment.	Gender analytics in HR examines workforce data to identify gender-related trends, aiming to ensure equity in recruitment, pay, promotions, and opportunities. It helps detect bias in hiring practices, supports diversity initiatives, and promotes a balanced workplace. Ethical gender analysis builds a fair, inclusive environment, enhancing organizational effectiveness.
5	Big Data Analytics	ANASET02	Professional ethics is vital in the realm of big data, emphasizing responsible data management, privacy, and security practices. As big data involves handling massive datasets, tools like Hadoop with its features, ecosystem, and architecture, offer frameworks for distributed data storage and processing. The Hadoop MapReduce concept enables data processing across clusters, while YARN components manage resource allocation, facilitating MapReduce application workflows	In exploring Big Data, gender-based considerations could enrich the understanding of data representation and influence within fields like Hadoop and Apache tools. Topics include Big Data fundamentals, Hadoop's core features, architecture, and ecosystem, as well as the YARN framework's workflow and MapReduce processing. Understanding gender diversity in these areas could foster more inclusive design choices, beneficial for big data’s comprehensive applications and equitable representation.

S.NO	NAME OF THE COURSE	COURSE CODE	Human values	Environmental and Sustainability
1	Fundamentals of Business Analytics	MGTT16	• Decent Work and Economic Growth • Human-Centered Ethics • Value-Based Education • Fairness, Inclusivity, and Equity • Ethical Decision-Making • Social Responsibility	• Responsible Consumption and Production • Climate Action • Decent Work and Economic Growth • Environment and Sustainability Education • Skill Development for Sustainability • Sustainable Data Practices
2	Business Research Methods	MGT T45	Human values shape *business research* by ensuring that the process maintains *integrity, respect, transparency,* and *responsibility* from start to finish. These values guide the *introduction to research*, emphasizing the purpose of *business research*—to solve problems, support decisions, and achieve goals ethically. Through each *step of the research process*, human values encourage ethical practices, which align with the *scope of business research* and uphold principles in *research methodology* and *research design* by ensuring accountability and fairness.	Environmental sustainability is an increasingly essential consideration in business research, influencing the processes and methodologies utilized across all stages of research. Business research, aimed at understanding market dynamics and organizational impact, now includes assessing sustainability-related data. Each research step—from formulating questions to sampling, data collection, and analysis—can integrate sustainability indicators, such as ecological impact, resource use, and social responsibility.

S.NO	NAME OF THE COURSE	COURSE CODE	Human values	Environmental and Sustainability
3	Python for Data Science	22ANAT46	• Integrity and Accountability in Data Handling • Inclusivity and Fair Representation in Analysis • Empathy and Social Responsibility in Real-World Applications • Transparency and Ethical Communication in Data Visualization • Empowerment Through Skill Development	• Promoting Sustainable Data Practices • Applications of Statistical Techniques to Sustainability Challenges • Environmental Solutions • Real-World Sustainability Initiatives • Skill Development for Sustainability • Empowerment Through Environmental Data Literacy
4	HR Analytics	22ANAT49	Human values in HR analytics emphasize respect for privacy, fairness, and transparency in data handling, ensuring employees are treated with dignity and equity. Ethical HR practices prioritize well-being and trust, fostering a supportive environment where data-driven decisions enhance both organizational goals and employee satisfaction, aligning business practices with core human values.	Integrating HR analytics with environmental sustainability enhances workforce engagement and retention by aligning employee values with corporate responsibility. Metrics can assess the impact of green initiatives on morale and productivity, fostering a culture of sustainability. Predictive modeling can forecast how sustainability efforts influence job satisfaction and performance, driving organizational success.
5	Big Data Analytics	ANASET02	Big Data concepts relate to Human Values by improving decision-making, enhancing transparency, and creating opportunities for social progress. Hadoop, a crucial tool for managing big data, has features that help solve data-processing challenges. Its ecosystem includes various components like HDFS for storage, MapReduce for processing, and YARN for resource management. YARN's architecture supports efficient job execution workflows. Apache Pig simplifies scripting for big data, offering data models and execution components, while Apache Hive provides a SQL-like interface with partitioning, bucketing, and table management.	Environmental sustainability can leverage Big Data to analyze and interpret vast amounts of environmental data, which aids in understanding complex ecosystems and predicting climate patterns. The Big Data framework, particularly Hadoop, with features like distributed storage and processing, offers a robust ecosystem for handling massive datasets. The Hadoop Ecosystem includes MapReduce, a programming model for processing large data, and YARN, which optimizes resource allocation.

S.NO	NAME OF THE COURSE	COURSE CODE	other value framework enshrined
1	Fundamentals of Business Analytics	MGTT16	• Inclusivity and Equity • Lifelong Learning and Skill Development • Global Citizenship and Social Responsibility • Transparency and Accountability • Inclusivity and Equity • Critical Thinking and Innovation • Ethical Leadership and Responsibility • Interdisciplinary and Holistic Education
2	Business Research Methods	MGT T45	Business research involves systematic investigation to aid decision-making by understanding trends, behaviors, and market needs, encompassing research methodology elements, ethics, sampling, data collection (primary and secondary), and analytical techniques (univariate, bivariate, multivariate) for structured reporting and valuable insights.

S.NO	NAME OF THE COURSE	COURSE CODE	other value framework enshrined
3	Python for Data Science	22ANAT46	• Skill Development and Practical Applications • Lifelong Learning and Skill Development • Data-Driven Decision Making • Ethical and Responsible Use of Data • Analytical Thinking and Problem Solving • Interdisciplinary Learning and Collaboration • Environmental Awareness and Sustainability
4	HR Analytics	22ANAT49	HR analytics can be linked to frameworks like the Balanced Scorecard, emphasizing performance metrics across financial, customer, internal processes, and learning perspectives. By integrating workforce data with strategic objectives, organizations can enhance decision-making, drive accountability, and align HR initiatives with overall business goals, fostering a culture of continuous improvement.
5	Big Data Analytics	ANASET02	Big Data refers to large and complex datasets that traditional data processing applications cannot manage effectively. It is characterized by the "3 Vs": Volume, Velocity, and Variety. Hadoop and its Features, Hadoop Ecosystem and Components, Architecture and Cluster, Hadoop MapReduce Concept, Components and Architecture, YARN Workflow, YARN MapReduce Application Execution Flow.

PARVATHANENI BRAHMAYYA SIDDHARTHA COLLEGE OF ARTS & SCIENCE

VIIJAYAWADA - 520 010

An Autonomous College in the Jurisdiction of Krishna University,
Machilipatnam, Krishna District, Andhra Pradesh, India.

2019-20 batch onwards

Semester: I (BBA BUSINESS ANALYTICS) **Max. Marks: 100**
No of Hours per week:5 **Internal: 25**

Credits: 4 **External: 75**

MGTT16: FUNDAMENTALS OF BUSINESS ANALYTICS

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:

CO1: To show complete overview on business analytics its developments in new era **(PO5,PO7)**

CO2: To show case the need of visual appeal to the data for better understanding **(PO5,PO6,PO7)**

CO3: To demonstrate about the data, data driven concepts and their levels **(PO5,PO7)**

CO4: To apply the data validation, collection and arrangement of data. **(PO5,PO6,PO7)**

CO5: To explain complete overview of Machine Learning & Artificial Intelligence concepts. **(PO5,PO7)**

Mapping of Course Outcomes (COs) with Program Outcomes (POs)

ADMITTED YEAR: 2019-20									
MGTT16	FUNDAMENTALS OF BUSINESS ANALYTICS	CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
		CO1					H		M
		CO2					H	L	M
		CO3					H		M
		CO4					H	L	M
		CO5					H		M

Unit I: Introduction

1.1 Introduction to Business Analytics
1.2 Evolution of Business Analytics
1.3 Business Analytics Applications
1.4 Importance of Business Analytics
1.4 A Categorization of Analytical Methods and Models
- 1.4.1 Descriptive Analytics
- 1.4.2 Predictive Analytics
- 1.4.3 Prescriptive Analytics
- 1.4.4 Inferential Analytics
- 1.4.5 Decision Analytics

1.5 Big Data Analytics

Unit II: Business Intelligence & Data Visualization

2.1 Overview of Business Intelligence & Data Visualization
2.2 Effective Design Techniques
2.3 Principles of Effective Data Dashboards
2.4 Popular BI Tools
2.5 ETL (Extract-Transform-Load)

Unit III: Data Mining

3.1 Data Sampling
3.2 Data preparation
3.3 Treatment of Missing Data
3.4 Identification of Outliers and Erroneous Data
3.5 Variable Representation

Unit IV: Analytics in Business functions

4.1 Financial Analytics
4.2 Human Resource (HR) Analytics
4.3 Marketing Analytics
4.4 Health Care Analytics
4.5 Supply Chain Analytics

Unit V: Data Science & Business Analytics

5.1 Introduction to Data Science
5.2 Importance and Scope of Data Science & Business Analytics
5.2 Introduction to Machine Learning
5.3 Introduction to Artificial Intelligence

Textbook:

1. Fundamentals of Business Analytics, 2ed, R N Prasad, Seema Acharya,ISBN:9788126563791

Reference books:

1. Camm/Cochran/Fry/Ohlmann/Anderson/Sweeney/Williams, Essentials of Business Analytics, 1st Edition, New Delhi: Cengage Learning
2. https://www.simplilearn.com/what-is-business-analytics-article
3. https://www.feedspot.com/infiniterss.php?_src=feed_title&followfeedid=5024578&q=site: https%3A%2F%2Fwww.blastanalytics.com%2Fblog%2Ffeed
4. https://www.gooddata.com/blog/
5. https://www.sisense.com/blog/

Model Question Paper

MGTT16: 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, L2)
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)

Unit - I

9. a) Explain in detail regarding Descriptive, Predictive Analytics & PrescriptiveAnalytics? (L1, L2)

(O**r)**

b) What is Big Data? Briefly Explain the Characteristics and importance of Big Data? (L1, L2)

10. a) What do you mean by Data visualization? Briefly Explain the tools in Data Visualization? (L2, L3)

(Or)

b) Write at least 5 popular Business Intelligence Tools with explanation? (L3)

11. a) Define Data Mining and explain the process of Implementing Data Mining? (L2)

(Or)

b) Explain in detail regarding Outliers and the reasons for occurring of Outliers? (L1, 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? (L2)

13. a) Explain the scope & Importance of Business Analytics? (L2, L3)

(Or)

b) Describe Machine Learning and the Types of Machine Learning? (L2, L3)

Signature of the Course In-charge

Signature of the Programme In-charge **Signature of the HOD**

COMMERCE	MGTT45	2019-20	BBA BBA-Ana

SEMESTER – IV **No. of Credits: 4**

MGTT45: BUSINESS RESEARCH METHODS

Objective: 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, the student should be able to –
CO1: Describe the process of Business Research, its scope and importance **(PO1, PO5)**
CO2: Identify the dimensions of Research methodology and the types of Research design **(PO5, PO6)**
CO3: Identify how Primary and Secondary data are collected during research along with the benefits and limitations of primary & secondary data **(PO3)**
CO4: Appreciate the importance of sampling design in research along with the methods of Sampling **(PO5, PO6)**
CO5: Describe how research data is analyzed along with research report preparation **(PO6, PO7)**

Mapping of Course Outcomes (COs) with Program Outcomes (POs) & PSOs

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	H				L		
CO2					H	M	
CO3					H		
CO4					H	H	
CO5						H	M

UNIT I Introduction to Business Research
1.1 Introduction to Business Research
1.2 Importance of Business Research
1.3 Steps in Business Research process
1.4 Scope of Business Research
1.5 Ethics in Business Research

UNIT II Research Design
2.1 Elements of Research methodology
2.2 Types of Research design – Exploratory Research design, Descriptive Research design and Experimental Research design
2.3 Features of a good research design

UNIT III Data Collection
3.1 Primary Data: Meaning and Types
3.2 Primary data collection methods and instruments
3.3 Process of designing a Questionnaire
3.4 Questionnaire vs. Schedule
3.5 Merits and limitations of Primary data
3.6 Secondary Data: Meaning and Sources
3.7 Merits and limitations of Secondary data

UNIT IV Sampling Design
4.1 Meaning of Sampling
4.2 Steps in Sampling Process
4.3 Probability Sampling Methods
4.4 Non-Probability Sampling Methods
4.5 Characteristics of a good Sample design

UNIT V Data Analysis & Preparation of Research Report
5.1 Steps in Data Preparation
5.2 Data Analytical techniques in Business Research – Univariate Analysis, Bivariate Analysis and Multivariate Analysis
5.3 Structure of a Business Research Report

References:
1. D.R.Cooper & P.S.Schindler: Business Research Methods: 9th Ed. Tata McGraw Hill Education.
2. Naval Bajpai: Business Research Methods: Pearson Education India.
3. Shashi.K.Gupta & Praneet Rangi: Research Methodology: Kalyani Publishers.

Model Question Paper

MGTT45: BUSINESS RESEARCH METHODS

Max. Marks – 70 Pass Marks – 28

Section A

1. A. What is the importance of Business Research?

OR

B. What are the steps involved in Business Research?

2. A. Explain Exploratory Research Design.

OR

B. Explain Descriptive Research Design.

3. A. Explain Primary Data with Examples.

OR

B. Explain Secondary Data with Examples.

4. A. What are the steps involved in Data Sampling?

OR

B. What are the Characteristics of good research design?

5. A. Explain Univariate Analysis.

OR

B. Explain Bivariate Analysis.

Section B

6. A. What is the scope of Business Research?

OR

B. What are the ethics involved in Business Research?

7. A. Explain elements of Research Methodology.

OR

B. Explain the features of good Research Design.

8. A. Compare Questionnaire vs. Schedule.

OR

B. Explain process of creating a Questionnaire.

9. A. Explain Probability Sampling Methods.

OR

B. Explain Non-Probability Sampling Methods.

10 A. Explain Steps involved in Data Preparation.

OR

B. What is the structure of Research Report? Explain.

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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

Code: 22ANAT46

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	**Unit - I** **Introduction to Python** 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	**Unit - II** **Function and its application to business** 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	**Unit - III** **Python Libraries (Matplotlib - Seaborn)** 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	**Unit - IV** **Introduction to data analysis (Theory) package (Stats models, scipy)** 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), **simple** Linear Regression)	12
V	**Unit - V** **Multivariate analysis and EDA,** Dtale and Python Profiing**,** Introduction to machine learning (theory)	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
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 (22ANAT46)

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)

Signature of the Course In-charge

Signature of the Program In-charge **Signature of the HOD**

P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE
Siddhartha Nagar, Vijayawada – 520 010
Autonomous - ISO 9001 – 2015 Certified

HR ANALYTICS

Offered to: BBA – Business Analytics

Course Code: 22ANAT49

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: 21Model - Introduction to HR Metrics and predictive analytics - Data Analytics techniques using software packages.	12
II	Creating business understanding for HR initiatives Workforce segmentation andsearch 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 - Trainingand 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 - HR data quality,validity and consistency - Using historical data - Data exploration - Data visualization	12

Prescribed Text Books			
	Author	**Title**	**Publisher**
1	Martin R Edwards, KirstenEdwards,	"Predictive HR Analytics"	Kogan Page Limited
2	Jac fitz-Enz,	"The New HR Analytics"	Harper Collins Publications

Reference Text Book			
	Author	**Title**	**Publisher**
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-faceCourse has focus on :
Foundation Websites of Interest :
https://www.hrtechnologist.com/articles/hr-analytics/what-is-hr-analytics/ https://www.analyticsinhr.com/blog/what-is-hr-analytics/ https://www.altexsoft.com/blog/how-to-implement-hr-analytics/
https://talenx.io/2020/06/06/what-is-hr-analytics/
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 <u>FIVE</u> 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?

<u>SECTION-B</u>

II) Answer the following **5X10 = 50 Marks**

9. **a).** Explain Human Capital Management in the 21st century Model in detail.

(or)

b). Describe the Evolution of HR Analytics & data sources. Explain Data Analytics techniquesusing 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

Signature of the Course In-charge

Signature of the Program In-charge **Signature of the HOD**

P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

Siddhartha Nagar, Vijayawada – 520 010

Autonomous - ISO 9001 – 2015 Certified

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

Prescribed Text Books			
	Author	**Title**	**Publisher**
	Raj Kamal (Author), Preeti Saxena (Author)	Big Data Analytics, Introduction to Hadoop, Spark, and Machine-Learning Paperback	**McGraw Hill Education 16 February 2019** ISBN-13 **978-9353164966**
	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 **Min. Pass: 30 Marks**

Answer the following questions (5 x 10M = 50Marks)

Unit I

1. (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

2. (a) Briefly discuss about YARN Application and Work-flow (L2)

(Or)

(b) Explain Map-reduce program and frame work (L3)

Unit III

3. (a) Explain briefly PIG Execution modes and Architecture (L3)

(Or)

(b) Pig Execution Procedure. (L3)

Unit IV

4. (a) Write the procedure for HIVE Architecture and components

(Or)

(b) Explain HIVE data Types. (L3)

Unit V

5. (a) Explain HBase data model and physical model. (L3)

(Or)

(b) What is HBase and explain the need of HBase in real world. (L2)