CBCS CURRICULAR FRAMEWORK (2020 - 21)

TABLE 1: B.Sc.(Ca.M.E.) Programme SEMESTER - I

S.NO	Name of the Course	Course Code	Part No	Type of the Paper	Total Marks	IA TEST	Sem End Exam	Teaching Hours	Credits
1	ENGLISH PRAXIS-I	ENGT11B	I	First Language	100	25	75	4	3
2	HINDI-I	HINT11	I	Second Language	100	25	75	4	3
3	TELUGU-I	TELT11A							
4	PROBLEM SOLVING IN C	CSCT11B	III	Core	100	25	75	4	4
5	DIFFERENTIAL EQUATIONS	MATT11A	III	Core	100	25	75	6	5
6	BASIC CIRCUIT THEORY	ELET11A	II	Core	100	25	75	4	4
7	PROBLEM SOLVING IN C LAB	CSCP11B	II	Core Lab	50	10	40	2	1
8	CIRCUIT THEORY LAB	ELEP11A	II	Core Lab	50	10	40	2	1
9	ENVIRONMENTAL STUDIES	CLSCT01	II	Life Skill	50	10	40	2	2
10	ENTERPRENEURSHIP DEVELOPMENT	LSCT04	II	Life Skill	50	10	40	2	2
		TOTAL(Maximum)			700	165	535	30	25

TABLE 2: B.Sc.(Ca.M.E) Programme SEMESTER - II

S.NO	Name of the Course	Course Code	Part No	Type of the Paper	Total Marks	IA TEST	Sem End Exam	Teaching Hours	Credits
1	**ENGLISH PRAXIS-II**	**ENGT21B**	I	First Language	100	25	75	4	3
2	**TELUGU-II**	**TELT21A**	I	Second Language	100	25	75	4	3
3	**HINDI-II**	**HINT21**							
4	**DATA STRUCTURES**	**CSCT21B**	III	Core	100	25	75	4	4

CBCS CURRICULAR FRAMEWORK (2020 - 21)									
5	**SOLID GEOMETRY**	**MATT21A**	III	Core	100	25	75	6	5
6	**ELECTRONIC DEVICES AND CIRCUITS**	**ELET21A**	II	Core	100	25	75	4	4
7	**DATA STRUCTURES LAB**	**CSCP21B**	II	Core Lab	100	25	75	2	1
8	**ELECTRONIC DEVICES AND CIRCUITS LAB**	**ELEP21A**	II	Core Lab	50	10	40	2	1
9	**COMMUNITY SERVICE PROJECT**	**CAIP2**	II	CSP	100	100	0	0	4
10	**HUMAN VALUES AND PROFESSIONAL ETHICS**	**LSCT06**	II	Life Skill	50	10	40	2	2
11	**ELECTRONIC SYSTEM DESIGN AND MANUFACTURE WITH PCB**	**SDCELEP01**	III	Skill Development	50	10	40	2	2
12	**YOGA**	**CEXP01**	IV	Extension Activity	50	10	40	2	2
		TOTAL(Maximum)			900	290	610	32	31

TABLE 3: B.Sc.(Ca.M.E) Programme SEMESTER - III									
S.NO	**Name of the Course**	**Course Code**	**Part No**	**Type of the Paper**	**Total Marks**	**IA TEST**	**Sem End Exam**	**Teaching Hours**	**Credits**
1	HINDI-III	HINT01	I	Second Language	100	25	75	4	3
2	TELUGU-III	TELT01A	I						
3	DATABASE MANAGEMENT SYSTEMS	CSCT34B	III	Core	100	25	75	4	4
4	ABSTRACT ALGEBRA	MATT31	III	Core	100	25	75	6	5
5	REAL ANALYSIS	MATT01	III	Core	100	25	75	6	5
6	DIGITAL ELECTRONICS	ELET31	II	Core	100	25	75	4	4
7	DATABASE MANAGEMENT SYSTEMS LAB	CSCP33A	II	Core Lab	50	10	40	2	1
8	DIGITAL ELECTRONICS LAB	ELEP31	II	Core Lab	50	10	40	2	1
9	PERSONALITY ENHANCEMENT AND LEADERSHIP	LSCT11	II	Life Skill	50	10	40	2	2

CBCS CURRICULAR FRAMEWORK (2020 - 21)									
10	ELEMENTARY NUMBER THEORY	SDCMATT01	II	Skill Development	50	10	40	2	2
11	CYBER SECURITY ESSENTIALS	SDCCSCT05	II	Skill Development	50	10	40	2	2
		TOTAL(Maximum)			750	175	575	34	29
TABLE 4: B.Sc.(Ca.M.E) Programme SEMESTER - IV									
S.NO	Name of the Course	Course Code	Part No	Type of the Paper	Total Marks	IA TEST	Sem End Exam	Teaching Hours	Credits
1	ENGLISH PRAXIS-III	ENGT01A	I	First Language	100	25	75	4	3
3	OPERATING SYSTEMS	CSCT41C	II	Core	100	25	75	4	4
5	OBJECT ORIENTED PROGRAMMING USING JAVA	CSCT01	II	Core	100	25	75	4	4
6	LINEAR ALGEBRA	MATT41A	II	Core	100	25	75	6	5
7	MICROCONTROLLER AND INTERFACING	ELET41A	II	Core	100	25	75	4	4
8	ANALOG CIRCUITS AND COMMUNICATIONS	ELET01	II	Core	100	25	75	4	4
9	OPERATING SYSTEMS LAB	CSCP41C	II	Core Lab	50	10	40	2	1
8	OBJECT ORIENTED PROGRAMMING USING JAVA LAB	CSCP01	II	Core Lab	50	10	40	2	1
9	MICROCONTROLLER AND INTERFACING LAB	ELEP41A	II	Core Lab	50	10	40	2	1
10	ANALOG CIRCUITS AND COMMUNICATIONS LAB	ELEP01	II	Core Lab	50	10	40	2	1
11	INTERNSHIP	CAIP4		IHP	100	100	0		4
12	DISASTER MANAGEMENT	SDCGT01	III	Skill Development	50	10	40	2	2
13	NCC/NSS/SPORTS/CULTURAL/CLUBS	CEXP02	IV	Extension Activity	50	50	0	2	2
		TOTAL(Maximum)			1000	350	650	38	36
TABLE 5: B.Sc.(Ca.M.E) Programme : SEMESTER - V									
S.NO	**Name of the Course**	**Course Code**	**Part No**	**Type of the Paper**	**Total Marks**	**IA TEST**	**Sem End Exam**	**Teaching Hours**	**Credits**

CBCS CURRICULAR FRAMEWORK (2020 - 21)									
1	NUMERICAL METHODS	MATSET01	II	CORE	100	25	75	5	5
2	MATHEMATICAL SPECIAL FUNCTIONS	MATSET02	II	CORE	100	25	75	5	5
3	MULTIPLE INTEGRALS AND APPLICATIONS OF VECTOR	MATSET03	II	CORE	100	25	75	5	5
4	INTEGRAL TRANSFORMS WITH APPLICATIONS	MATSET04	II	CORE	100	25	75	5	5
5	PARTIAL DIFFERENTIAL EQUATIONS AND FOURIER SERIES	MATSET05	II	CORE	100	25	75	5	5
6	NUMBER THEORY	MATSET06	II	CORE	100	25	75	5	5
7	INDUSTRIAL ELECTRONICS	ELESET01	II	CORE	100	25	75	3	3
8	INDUSTRIAL ELECTRONICS LAB	ELESEP01	II	CORE LAB	50	10	40	3	2
9	ELECTRONIC INSTRUMENTATION	ELESET02	II	CORE	100	25	75	3	3
10	ELECTRONIC INSTRUMENTATION LAB	ELESEP02	II	CORE LAB	50	10	40	3	2
11	EMBEDDED SYSTEM DESIGN	ELESET03	II	CORE	100	25	75	3	3
12	EMBEDDED SYSTEM DESIGN LAB	ELESEP03	II	CORE LAB	50	10	40	3	2
13	CONSUMER ELECTRONICS	ELESET04	II	CORE	100	25	75	3	3
14	CONSUMER ELECTRONICS LAB	ELESEP04	II	CORE LAB	50	10	40	3	2
15	DATA COMMUNICATION AND NETWORKING	ELESET05	II	CORE	100	25	75	3	3
16	DATA COMMUNICATION AND NETWORKING LAB	ELESEP05	II	CORE LAB	50	10	40	3	2
17	VLSI DESIGN	ELESET06	II	CORE	100	25	75	3	3
18	VLSI DESIGN LAB	ELESEP06	II	CORE LAB	50	10	40	3	2
19	INTERNET OF THINGS	ELESET07	II	CORE	100	25	75	3	3
20	INTERNET OF THINGS LAB	ELESEP07	II	CORE LAB	50	10	40	3	2
21	VERILOG HDL WITH PROGRAMMING	ELESET08	II	CORE	100	25	75	3	3
22	VERILOG HDL WITH PROGRAMMING LAB	ELESEP08	II	CORE LAB	50	10	40	3	2
23	BIG DATA ANALYTICS USING R	CASSET01	II	CORE	100	25	75	3	3

CBCS CURRICULAR FRAMEWORK (2020 - 21)									
24	BIG DATA ANALYTICS USING R LAB	CASSEP02	II	CORE LAB	50	10	40	3	2
25	DATA SCIENCE USING PYTHON	CASSET02	II	CORE	100	25	75	3	3
26	DATA SCIENCE USING PYTHON LAB	CASSEP03	II	CORE LAB	50	10	40	3	2
27	MOBILE APPLICATION DEVELOPMENT	CASSET03	II	CORE	100	25	75	3	3
28	MOBILE APPLICATION DEVELOPMENT LAB	CASSEP04	II	CORE LAB	50	10	40	3	2
29	CYBER SECURITY AND MALWARE ANALYSIS	CASSET04	II	CORE	100	25	75	3	3
30	CYBER SECURITY AND MALWARE ANALYSIS LAB	CASSEP05	II	CORE LAB	50	10	40	3	2
31	MULTIMEDIA TOOLS AND APPLICATIONS	CASSET05	II	CORE	100	25	75	3	3
32	MULTIMEDIA TOOLS AND APPLICATIONS LAB	CASSEP06	II	CORE LAB	50	10	40	3	2
33	DIGITAL IMAGING	CASSET06	II	CORE	100	25	75	3	3
34	DIGITAL IMAGING LAB	CASSEP07	II	CORE LAB	50	10	40	3	2
		TOTAL(Maximum)			**800**	**190**	**610**	**34**	**30**

TABLE 6: B.Sc.(Ca.M.E.) Programme SEMESTER - VI									
S.NO	**Name of the Course**	**Course Code**	**Part No**	**Type of the Paper**	**Total Marks**	**Internal Assessment**	**External Assessment Component**	**Monitoring Hours**	**Credits**
1	Internship in Electronics	ELEIAP6	II	Core Project	200	50	150	6	12
2	Internship in Computer Science	CSCIAP6							

PARVATHANENI BRAHMAYYA SIDDHARTHA COLLEGE OF ARTS &SCIENCE ,VIJAYAWADA - 520 010

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

DEPARTMENT OF COMPUTER SCIENCE

Foundation of Data Science Lab	**CSCPCL61/CSCP64**	**2017-18/ 2019 - 20**	**B.Sc(MSCS,MPCS,MECS/CAMS ,CAME), BCA**

SEMESTER – VI **CREDITS: 2**

Course Outcome	**Upon successful completion of this course, students should have the knowledge and skills to:**	**Program Outcome**
CO_1	Able to create and find class of objects in R.	PO5, PO7
CO_2	Perform operations on Matrices, lists, factors, arrays, vectors .	PO5, PO7
CO_3	To import data into R from excel or notepad.	PO5, PO7
CO_4	To implement programs involving control structures of R.	PO5, PO7
CO_5	Able to generate graphs that help in drawing useful results.	PO5, PO7

List of Experiments

1. Create a vector in R and perform operations on it (arithmetic operations, combining vectors, retrieving elements of vector, assign names to vector elements).
2. Create integer, complex, logical, character data type objects in R and print their values and their class using print and class functions.
3. Create a matrix of values in R and extract data from matrix. (Ex. Second row third elements etc) find transpose of matrix and combine two matrices using Rbind and Cbind functions.
4. Create a list in R and perform operations on it like list slicing, sum and mean functions, head and tail functions and finally delete list using rm() function.
5. Create data frame in R and perform operations on it.
6. Import data into R from text and excel files using read.table () and read.csv () functions.
7. Print name of your current working directory and set working directory to your directory in R.
8. Write code in R to find out whether number is prime or not.
9. Print numbers from 1 to 100 using while loop and for loop in R.
10. Create a factor in R by specifying levels. And print it then modify some values in it.
11. Find factorial of a number using recursion in R.
12. Perform arithmetic operations in R using switch case.

13. Create a dataset and draw different types of graphs using plot, boxplot, histogram, stripchart, line functions.
14. Demonstrate Kmeans clustering for any dataset of your choice.
15. Demonstrate Time series for any dataset

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VIJAYAWADA – 520 010.

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COMPUTER SCIENCE	**CSCTCL61/ CSCT66**	**2017-18/ 2019-20**	**B.Sc(MSCS,MPCS,MECS/CAMS ,CAME)**

SEMESTER – VI

Paper-VIII: Elective – II (CLUSTER A – 1)
Foundation of Data Science

Course Objectives:

1. To make students familiar with fundamental concepts of data science – process, managing and exploring data.
2. To provide basic knowledge in modelling methods.
3. To make students familiar with R – programming
4. To educate students on graphical analysis and to various plots.

COURSE OUTCOME NO	**Upon successful completion of this course, students should have the knowledge and skills to**	**PROGRAM OUTCOME NO**
CO_1	Able to load data in to R and spot problems in data loaded.	PO5,PO7
CO_2	Identify which modeling method best suits an application.	PO5,PO7
CO_3	Able to organize data in the form of R objects and manipulate them as needed.	PO5,PO7
CO_4	Able to generate graphs that help in drawing useful results.	PO5,PO7
CO_5	Document and transfer the results and communicate the findings using visualization techniques.	PO5,PO7

UNIT I - Introduction to Data Science **12 periods**

1.1 Data science process

1.1.1 Roles

1.1.2 Stages in data science project

1.2 Loading data into R

1.2.1 Working with data from files

1.2.2 Working with relational databases

1.3 Exploring data

1.3.1 Using summary statistics to spot problems

1.3.2 Spotting problems using graphics and visualization

1.4 Managing data

1.4.1 Cleaning

1.4.2 Sampling for modelling and Validation

UNIT II - Modelling Methods **12 periods**

2.1 Choosing and evaluating models

2.1.1 Mapping problems to machine learning

2.1.2. Evaluating clustering models

2.2 Validating models

2.2.1 Identifying Common Model Problems

2.2.2 Quantifying Model Soundness

2.3 Cluster analysis

2.3.1 Distances

2.3.2 Preparing the data

2.3.3 K – means Algorithm

UNIT III - Introduction to R Language **12 periods**

3.1 Reading and getting data into R

3.1.1 Viewing named objects

3.1.2 Types of data items and structure of data items

3.1.3 Working with history commands

3.1.4 Saving our working R

3.2 Working with objects

3.2.1 Manipulating objects

3.2.2 Viewing objects

3.2.3 Constructing objects

UNIT IV – Tables & Graphics **12 periods**

1.1 Summary tables

1.1.1 Making contingency tables

1.1.2 Selecting parts of a table object

1.1.3 Converting an object into a table

1.1.4 Testing for table objects

1.2 Manipulating data and extracting components

1.2.1 creating data for complex analysis

1.2.2 summarizing data

1.3 Introduction to graphical analysis

1.3.1 Box-Whisker Plots

1.3.2 Scatter plots

1.3.3 Pairs plots

1.3.4 Line charts

1.3.5 Pie charts

1.3.6 Bar charts

UNIT V - Delivering Results **12 periods**

5.1 Displaying multivariate data
5.2 Plot () function
5.3 Matrix plots
5.4 Multiple plots in one window
5.5 Exporting graph
5.6 Using graphics parameters

Prescribed Text books:

1. Nina Zumel, John Mount, "Practical Data Science with R", Manning Publications, 2014.(UNIT I,II)
2. Mark Gardener, "Beginning R - The Statistical Programming Language", John Wiley & Sons, Inc., 2012.(UNIT III,IV.V)

Reference Books:

1. Jure Leskovec, AnandRajaraman, Jeffrey D.Ullman, "Mining of Massive Datasets", Cambridge University Press, 2014.
2. W. N. Venables, D. M. Smith and the R Core Team, "An Introduction to R", 2013.
3. Tony Ojeda, Sean Patrick Murphy, Benjamin Bengfort, AbhijitDasgupta, "Practical Data Science Cookbook", Packt Publishing Ltd., 2014.
4. Nathan Yau, "Visualize This: The FlowingData Guide to Design, Visualization, and Statistics", Wiley, 2011.
5. Boris lublinsky, Kevin t. Smith, Alexey Yakubovich, "Professional Hadoop Solutions", Wiley, ISBN: 9788126551071, 2015.

Student Activity:

1. Collect data from any real time system and create clusters using any clustering algorithm
2. Read the student exam data in R perform statistical analysis on data and print results.

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

Course Code: CSCTCL 61/CSCT66 Title: Foundation of Data Science
Class/Group: B.Sc(MSCS,MPCS,MECS/CAMS ,CAME) Max: 75 Marks
Semester: VI Time: 3Hrs.

Semester End Model Question Paper

Section - A

Answer any Five Questions. 5 X 5 = 25 Marks

1. List and Explain the roles in a data science project.(CO1,L4)
2. Explain in brief loading data into R from Files .(CO1,L2)
3. Define four common model problems.(CO2,L1)
4. Explain with example viewing named objects in R using ls() command.(CO3,L2)
5. Explain about manipulating vectors in R.(CO3,L2)
6. How do you convert an object into a table?(CO4,L1)
7. List different summary commands for tables? Explain any two of them?(CO4,L4)
8. Write about the plot() function in R.(CO5,L1)

Section – B

Answer ALL of the following questions. 5 X 10 = 50 Marks

9) A) List different stages of Data Science Project and explain them.(CO1,L1)

(or)

B) What are the various problems encountered when using data summaries?(CO1,L1)

10) A) Explain in detail about mapping problems to machine learning tasks.(CO2,L2)

(or)

B) Apply K-Means algorithm to your own example and explain.(CO2,L3)

11) A) Apply various methods for reading and getting data into R .(CO3,L3)

(or)

B) Construct list, factor, data frame and apply operations on them.(CO3,L3)

12) A) Explain how to Making Contingency tables in R with example?(CO4,L2)

(or)

B) What are the various charts used in R? Explain any 3 of them ?(CO4,L1)

13) A) Develop matrix plot and explain it.(CO5,L3)

(or)

B) Explain about exporting graphs.(CO5,L2)

PARVATHANENI BRAHMAYYA SIDDHARTHA COLLEGE OF ARTS & SCIENCE VIJAYAWADA – 10

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Sub: ELECTRONICS	Course code : ELEP61	Year:2020– 21	Group: B.Sc (CA.M.E)	Credits -2

TITLE: VERILOG-HDL PROGRAMMING LAB

CO_1: To remember the different types of Data flow, Behavioral and gate level.

CO_2: To understand the basic Hardware description language

CO_3: To apply the knowledge on Verilog module and observe it's text future in terms of graph.

LAB LIST:

1. Verilog description for AND LOGIC GATE using behavioral modeling.

2. Verilog description for OR LOGIC GATE using behavioral modeling.

3. Verilog description for NAND LOGIC GATE using behavioral modeling.

4. Verilog description for NOR LOGIC GATE using behavioral modeling.

5. Verilog description for Half-adder using behavioral modeling.

6. Verilog description for Full-adder using behavioral modeling.

7. Verilog description for 2x4 Decoder using behavioral modeling.

8. Verilog description for 4x1 MUX using behavioral modeling.

9. Verilog description for 1x4 De-MUX using behavioral modeling.

10. Verilog description for D-Flip-flop using behavioral modeling.

SOFTWARES: Write the Verilog code for the following problems and simulate using any HDL simulator/synthesis software (Xilinx)

1. **Interfacing 16×2 LCD with Raspberry Pi.**
2. **Controlling a DC – Motor with Raspberry Pi.**
3. **Controlling a Stepper Motor with Raspberry Pi.**
4. **Color detector using color sensor TCS3200 with Raspberry Pi.**
5. **Control a Relay using IR with Raspberry Pi.**
6. **Motion detection using PIR Sensor and Buzzer with Raspberry Pi.**
7. **Distance measurement using HCSR04 with Raspberry Pi.**
8. **Interfacing Nokia5110 LCD with Raspberry Pi.**
9. **Interfacing GPS Module with Raspberry Pi.**
10. **Interfacing DHT11 sensor and IOT Monitor with Raspberry Pi.**

Hardware(s) required:

- The Raspberry Pi 3 Model B+.
  - Broadcom BCM2837B0, Cortex-A53 (ARMv8) 64-bit SOC @ 1.4GHz
  - 1GB LPDDR2 SDRAM
  - 2.4GHz and 5GHz IEEE 802.11.b/g/n/ac wireless LAN, Bluetooth 4.2, BLE
  - Gigabit Ethernet over USB 2.0 (maximum throughput 300 Mbps)
  - Extended 40-pin GPIO header
  - Full-size HDMI
  - 4 USB 2.0 ports
  - CSI camera port for connecting a Raspberry Pi camera
  - DSI display port for connecting a Raspberry Pi touch screen display
  - 4-pole stereo output and composite video port
  - Micro SD port for loading your operating system and storing data
  - 5V/2.5A DC power input

- Power-over-Ethernet (POE) support (requires separate POE HAT)

- 32-Gb Memory Card.
- 5V/2.5A DC power adapter

Software(s) required:

Rasbian/NOOBS Operating System.

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An Autonomous College in the jurisdiction of Krishna University, Machilipatnam

Sub: ELECTRONICS	Course code: ELET61	Year: 2020 – 21	Group: B.Sc. CAME	Credits – 3

Semester – 6 **TITLE** **Paper – VI**

Verilog-HDL Programming

Course Outcomes:

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

C01: To understand the basic concepts of Verilog HDL language.PO7

CO2:. To understand gate level, data flow, behavioral and switch level digital circuits. PO6

CO3: To gain practical experience by design, model, implement and verifying several digital circuits PO6

CO4: To understand the differences between simulation and synthesis.PO5

CO5: To verify that a design meets with timing and constraints, by both manual and through the use of computer aided design tools.PO7

ELET61		P01	P02	P03	P04	P05	PO6	P07
	C01							H
	CO2						L	
	CO3						M	
	CO4					L		
	CO5							H

Unit – I: **14L**

Introduction, Evaluation of computer aided digital design, Emergency of HDL, Typical design flow, Importance of HDL-Popularity& trends, Hierarchical Modeling Concepts- Design Methodologies Modules and instances. Components of Simulation, Basic concepts, Data types, System Tasks and Compiler Directives;

Unit – II: **12L**

Modules and Ports- List of ports, Port Declaration, Port Connections Rules, Inputs, outputs, in-outs, Gate-Level Modeling-Gate types, Gate Delays and Dataflow Modeling-Continuous Assignments, Delays, Expressions, Operators, and Operands, operator types.

Unit – III: **10L**

Behavioral Modeling- Structured Procedures, Procedure Assignment, Timing Controls and Conditional Statements, Multi-way branching, Tasks and functions.

Unit – IV: **12L**

Switch level modeling-MOS switches, CMOS switches, Bi-directional switches, power and ground, Resistive switches, Delay specifications on switches, Examples.

Unit – V: **12L**

Logic Synthesis with verilog HDL-Impact of logic synthesis, verilog HDL synthesis, Synthesis Design flow- RTL to gates, RTL description and Translation, Verification of gate- level , Modeling Tips for logic synthesis.

TEXT BOOKS:

1. Verilog HDL-Aguide to Digital Design and Synthesis-Samir Palnitkar-ISBN: 0134516753; Pub: Prentice Hall PTR.

2. Fundamentals of Digital logic with Verilog design-2e, Brown Vranesic, McGrawHill education, ISBN-13:978-0-07-066724-2.

REFERENCE BOOKS:

1. *M.D.Ciletti, "Modeling, Synthesis and Rapid Prototyping with the Verilog HDL", PHI, 1999.*

2. *J Bhaskar, "A Verilog HDL Primer (3/e)", Kluwer, 2005.*

OUTCOMES:

After successful completion of the course, the students are able to

1. Identity the suitable Abstraction level for a particular digital design
2. Model digital systems in Verilog HDL using gate level and data flow modelling
3. Write behavioral models of digital circuits using Verilog HDL
4. Design and verify the functionality of digital circuit /system using test benches and performs timing, delay modeling.
5. Apply Verilog HDL for switch level modeling.

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

MODEL QUESTION PAPER

TITLE: Verilog HDL Programming

Course Code: ELET61 **Maximum Marks: 75M**

Time: 3 Hours **Pass Minimum: 30M**

SECTION – A

Answer any Five of the following **5x5=25M**

1. Explain about Evolution of computer aided digital design

2. Write about importance of HDL.

3. Discuss briefly about ports, list of ports and declaration of ports in a module.

4. Explain about Buf/NOT gates in brief with truth tables

5. Discuss briefly about various loop conditions in behavioral modeling

6. Explain the difference between task and functions

7. Write a 2x1 mux using switch level modeling

8. Explain briefly about synthesis design flow.

Section – B

Answer ALL following questions: **5 x 10 = 50 M**

9. (a) Explain about basic building block in verilog module in detail

(or)

(b) (i) Discuss briefly about system task operations in verilog.

10. (a) Discuss briefly about the Gate level delays in Gate level modeling.

(or)

(b) Explain different types of expression, operands, operators used in data flow modeling

11. (a) Explain about Procedural assignments for Blocking and non-blocking statements.

(or)

(b)Discuss about the conditional statements in behavioral modeling

12. (a) Discuss about different types of MOS switches used in switch level modeling

(or)

(b) Explain about the Resistive and Bi-directional switches in switch level modeling

13. (a) Explain about Logic synthesis with verilog and computer aided logic synthesis in brief.

(or)

(b) Discuss about modeling tips for logic synthesis flow in brief.

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VIJAYAWADA - 520 010
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Sub: ELECTRONICS	Course code: ELET62	Year: 2020 – 21	Group: B.Sc. CAME	Credits – 3

Semester – 6 **Paper – VI**

TITLE: Introduction to Raspberry – Pi and its Applications

Objectives:

- This Course can gain knowledge of Raspberry Pi's architecture, components, and fundamental functionalities.
- This Course is to develop the ability to write and execute Python programs for Raspberry Pi applications, with a focus on GPIO interactions.
- This Course is to apply theoretical knowledge to practical scenarios by working on diverse Raspberry Pi projects, fostering skills in project design and implementation.

Course outcomes:

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

CO_1: Gain a comprehensive knowledge of Raspberry Pi components, architecture, and basic functionalities. PO5

CO_2: Develop the ability to write and execute Python programs tailored for Raspberry Pi, enabling interaction with GPIO pins and peripherals. PO6

CO_3: Get proficiency in GPIO, Wiring-Pi utilization, and hardware interfacing, showcasing the ability to design and implement practical projects. PO6

CO_4: Learn how to interface and control various peripherals and sensors using Raspberry Pi, expanding the capability to integrate hardware components into projects. P05

CO_5: Acquire skills in conceptualizing and implementing practical projects utilizing Raspberry Pi, demonstrating creativity and problem-solving in real-world applications. PO6

ELET61		P01	P02	P03	P04	P05	PO6	P07
	C01							H
	CO2						L	
	CO3						M	
	CO4					L		
	CO5							H

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.

OUTCOMES:

Upon completion of this course, students will able to

1. Create a fully functional computer using Raspberry Pi.
2. Use Python based IDEL, trace and debug Python code on the device.
3. Measure physical parameters using sensors.
4. Implementation various protocols for wired and wireless communication.
5. Interfaces different motors and create robot.

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

MODEL QUESTION PAPER

TITLE: Introduction to Raspberry – Pi and its Applications

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.

Department of Mathematics

COURSE STRUCTURE

Sem	Course Code	Paper	Title of the Paper	Total Marks	Internal Exam	Sem.End Exam	Teaching Hours	Credits
VI	**MAT T62**	CORE	Numerical Analysis	100	25	75	5	5

Course Outcomes of MATT62

S. No	C.O Upon successful completion of this course, students should have the knowledge and skills to:	
CO1.	Apply numerical methods to find our solution of algebraic equations using different methods under different conditions, and numerical solution of system of algebraic equations.	
2.	Apply various interpolation methods and finite difference concepts.	
3.	Apply numerical methods to obtain approximate solutions to mathematical problems.	
4.	Analyse and evaluate the accuracy of common numerical methods.	
5.	Find the roots of algebraic and transcendental equations.	

CO-PO MATRIX

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

PARVATHANENI BRAHMAYYA SIDDHARTHA COLLEGE OF ARTS &SCIENCE::VIJAYAWADA-10.

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

MATHEMATICS	**MAT T62**	**2019 –20 Onwards** **2020 –21 Onwards**	**B.Sc. (CAMS)** **B.Sc. (CAME)**

NUMERICAL ANALYSIS

SEMESTER-VI **PAPER – VII (ELECTIVE)** **No of Credits: 5**

OBJECTIVE: TO ENHANCE THE COMPUTATIONAL SKILLS AND APPLICATION SKILLS.

UNIT-I: FINITE DIFFERENCES & INTERPOLATION WITH EQUAL INTERVALS (15Hrs)

1.1. Introduction of finite differences, Formulae, Operator Δ, ∇, E and differences tables.
1.2. Fundamental theorem of difference calculus.
1.3. Missing terms and Factorial notation.
1.4. Differences of zeros.
1.5. Newton forward interpolation formula, theorem and related problems.
1.6. Newton backward interpolation formula, theorem and related problems.

UNIT-II : INTERPOLATION WITH UNEQUAL INTERVALS (15 hrs)

2.1. Divided differences, Properties and Related problems.
2.2. Relation between divided differences, Forward, Backward and Central difference.
2.3. Newton's divided difference theorem and related problems.
2.4. Lagrange's interpolation with unequal intervals theorem and related problems.

UNIT-III : CENTRAL DIFFERENCE INTERPOLATION FORMULAE (15 hrs)

3.1. Gauss's forward difference formulae and problems.
3.2. Gauss's backward difference formulae and problems.
3.3. Stirling's central difference formulae and problems.
3.4. Bessel's formulae and problems.
3.5. Everett's formulae and problems.

UNIT-IV: INVERSE INTERPOLATION (15 hrs)

4.1. Introduction.
4.2. Lagrange's Method and related problems.
4.3. Successive Approximation Method and related problems.

UNIT-V: SOLUTION OF ALGEBRAIC AND TRANSCEDENTAL EQUATIONS (15 hrs)

5.1. Bisection Method and related problems.
5.2. Iteration Method and related problems.
5.3. False Position Method and related problems.
5.4. Newton Raphson Method and related problems.

Prescribed Text book:				
S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHER	YEAR OF PUBLICATION
1.	S.S Sastry	Numerical Analysis	Prentice Hall of India Private Limited	1999

Reference Text books:				
S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHER	YEAR OF PUBLICATION
1.	Gupta & Malik	Calculus of finite differences and Numerical analysis	Krishna PrakasanMandir - Merrut New Age International Publishers.	1999
2.	G.Shankar Rao	Numerical analysis	PragatiPrakashan.	2010
3.	Dr. D. Chitti Babu	Numerical analysis		2009

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SEMESTER – VI **Model Paper** **PAPER – VII (ELECTIVE)**

COURSE CODE : **MAT T62** Time: 3hrs.
TITLE OF THE PAPER : NUMERICAL ANALYSIS Max. Marks: 75

Answer any **TEN** choosing at least **THREE** from each section. **10 x 7.5 = 75 M.**

SECTION –A

1. State and prove the fundamental theorem of difference calculus. (CO1, L2)

2. State and prove Newton's – Gregory forward formula for interpolation. (CO1, L2)

3. By using Newton's backward interpolation formula, find the value of tan17° from the following data. (CO1, L2)

θ	0°	4°	8°	12°	16°	20°	24°
$\tan\theta$	0	0.0699	0.1405	0.2126	0.2867	0.3640	0.4452

4. If f(x) = $\frac{1}{x^2}$, find the divided differences *f(a ,b), f(a, b, c)* and *f(a, b, c, d)*. (CO2, L2)

5. State and prove Newton's divided difference formula. (CO2, L2)

6. Find the polynomial of the lowest possible degree from the given data by Lagrange's formula. (CO2, L2)

x	-4	-1	0	2	5
y	1245	33	5	9	1335

SECTION – B

7. State and prove Gauss Forward interpolation formula. (CO3, L2)

8. Use Stirling's formula to find $\boldsymbol{y_{28}}$, given $y_{20} = 49225$, $y_{25} = 48316$,$y_{30} = 47236$, $y_{35} = 45926$, $y_{40} = 44306$. (CO3, L2)

9. Given, $y_{20} = 24$,$y_{24} = 32$,$y_{28} = 35$, $y_{32} = 40$, find y_{25} by Bessel's formula. (CO3, L2)

10.Apply Lagrange's formula inversely to find , to once decimal place, the value of $\boldsymbol{x}$ when $\boldsymbol{y = f(x) = 13.6,}$ given the following table. (CO4, L4)

$\boldsymbol{x}$	30	35	40	45	50
F($\boldsymbol{x}$)	15.9	14.9	14.1	13.3	12.5

11. The following values of y = f(***x***) are given

x	10	15	20
f(***x***)	1754	2648	3564

Find the value of ***x*** for f(***x***) = 3000 by successive approximation method. (CO4, L4)

12. Find the real root of the equation $x^3 + x - 3 = 0$, which lies between 1.2 and 1.3. (CO4, L4)

13. Find the real root of the equation $F(x) = x^3 + x^2 - 1 = 0$, by using Iteration method. (CO5, L4)

14. The equation $x^6 - x^4 - x^3 - 1 = 0$ has one real root between 1.4and 1.5**.** Find the root to four places of decimal by false position method. (CO5, L4)

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15. Find the real root of the equation $x^2 + 4sinx = 0$ correct to four places of decimal by using Newton's- Raphson method. (CO5, L4)

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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	MAT T63	CORE	MATRIX COMPUTATION & DISCRETE MATHEMATICS	100	25	75	5	5

Course Outcomes of MATT63

S. No	C.O	
	Upon successful completion of this course, students should have the knowledge and skills to:	
1.	Solve system of linear equations using LU Decomposition.	
2.	Show logical equivalances by using truth tables and rules and to build logical concept.	
3.	Learn concept related to counting & advanced counting.	
4.	Define the generating function of a sequences.	
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							**L**
CO5							**L**

PARVATHANENI BRAHMAYYA SIDDHARTHA COLLEGE OF ARTS &SCIENCE::VIJAYAWADA-10.

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MATHEMATICS	**MAT T63**	**2019 – 20 Onwards** **2020 – 21 Onwards**	**B.Sc. (CAMS)** **B.Sc. (CAME)**

MATRIX COMPUTATION & DISCRETE MATHEMATICS

SEMESTER-VI PAPER – VIII (ELECTIVE) No of Credits: 5

OBJECTIVE: TO ENHANCE THE ANALYTICALSKILLS & APPLICATION SKILLS.

UNIT-1 MATRIX COMPUTATION: (15 hrs)

1.1 Gaussian Elimination with partial pivoting
1.2 LU Decomposition
1.3 Tridiagonal System
1.4 Quadratic forms
1.5 Solution of Linear & Non-Linear Least square problems (Straight line, Parabola)

UNIT – II: SETS, FUNCTIONS, RELATIONS AND LOGIC. (15 hrs)

2.1 Sets and Operations of sets.

2.2 Relations and Functions.

2.3 Fundamentals of Logic.

2.4 Logical Inferences.

2.5 Methods of Proof of an implication.

2.6 First order logic and other methods of proof.

2.7 Rules of inferences for quantified propositions.

UNIT – III: COUNTING PRINCIPLES (15 hrs)

3.1 Basics of Counting.

3.2 Combinations and Permutations.

3.3 Enumeration of Combinations and Permutations.

3.4 Enumerating Combinations and Permutations with repetitions.

3.5 Enumerating Permutations with Constrained repetitions.

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.	T.K.V.Iyengar, B.KrishnaGandhi, S.Ranganatham, M.V.S.S.N.Prasad	MATHEMATICAL METHODS	S.CHAND	4th Edition-2009
2.	Joe L. Mott, AbrahamKandel, 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

COURSE CODE : MAT T63 **PAPER –VIII (ELECTIVE)**

TITLE OF THE PAPER: MATRIX COMPUTATION AND DISCRETE MATHEMATICS
Time: 3hrs. **Max. Marks: 75**

Answer any **TEN** choosing atleast **THREE** from each section. **10 x 7.5 = 75 M.**

SECTION – A

1. Solve the following system by the method of Factorization (LU Decomposition)

$x+3y+8z=4; x+4y+3z=-2; x+3y+4z=1$ (CO1, L2)

2. (a) Solve the equations $x+y+z=6; 3x+3y+4z=20; 2x+y+3z=13$ using partial pivoting Gaussian elimination method.

(b). Identify the Nature of the Quadratic form $2x^2+y^2-3z^2+12xy-4xz-8yz$. (CO1, L2)

3. Fit a second-degree polynomial to the following data by the method of least squares:

X	10	12	15	23	20
Y	14	17	23	25	21

(CO1, L2)

4. 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 2, L1)

5. Prove that $[(p\wedge\sim q)\rightarrow r]\rightarrow[p\rightarrow(q\vee r)]$ is a tautology. (CO2, L1)

6. 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. (CO2, L1)

SECTION – B

7. 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? (CO3, L2)

8. 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? (CO3, L2)

9. 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? (CO3, L2)

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, L3)

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 $\sum m(0,2,8,12,13).$ (CO5 , L3)

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