

MAZHARUL ULOOM COLLEGE (AUTONOMOUS)

(Established & Managed by the Ambur Muslim Educational Society)

Accredited by NAAC with Grade _A_ CGPA 3.23 in Cycle 3

Affiliated to Thiruvalluvar University, Vellore

Ambur 635802 (Tirupattur District)



COURSE STRUCTURE & SYLLABUS (For the students admitted from year 2025-2026 onwards)

Programme: B.Sc.

Course: Computer Science

Program Outcomes (POs)	
PO Code	Program Outcome Statement
PO1	Disciplinary Knowledge : Acquire detailed knowledge and expertise in all the disciplines of the subject
PO2	Communication Skills: Ability to express thoughts and ideas effectively in writing, listening and confidently communicate with others using appropriate media.
PO3	Critical Thinking: Students will develop aptitude , Integrate skills of analysis, critiquing, application and creativity.
PO4	Analytical Reasoning: Familiarize to evaluate the reliability and relevance of evidence, collect, analyze and interpret data.
PO5	Problem Solving: Capacity to extrapolate the learned competencies to solve different kinds of non-familiar problems.
PO6	Information/digital literacy: Capability to use ICT in a variety of learning situations, demonstrate ability to access, evaluate, and use a variety of relevant information sources; and use appropriate software for analysis of data.
PO7	Lifelong Learning: Engage in lifelong learning and work on career enhancement and adapt to changing personal, professional and societal needs.

Program Specific Outcomes (POs)	
PSO Code	Program Specific Outcome Statement
PSO1	Understand the programming concepts and methodology & the functionality of hardware and software aspects of computer systems.
PSO2	Analyze and formulate ideas for theoretical and practical conceptualization of programming language of the computer domain.
PSO3	Identify complex problems and design sustainable solutions incorporating digital technology to compete with global demand.
PSO4	Analyze the phases of project development and contribute to the design and development of software with technical expertise leading to career advancement
PSO5	Acquire knowledge to deliver strategies with professional standard for collaborative environment using scientific reasoning through computing skills as an application developer or an entrepreneur.

Level	Definition	Key Actions
K1 : Remembering	Ability to recall or recognize facts, terms, basic concepts, or answers without necessarily understanding them.	Retrieve, Memorize, Repeat, Define, Identify, Recognize
K2 : Understanding	Comprehending the meaning of information, interpreting or translating knowledge into your own words.	Explain, Describe, Summarize, Interpret, Paraphrase
K3 : Applying	Using knowledge in new situations, such as solving problems or applying theories to real-world situations.	Use, Demonstrate, Implement, Calculate, Practice
K4 : Analyzing	Breaking information into parts to explore understandings and relationships; identifying motives or causes.	Compare, Contrast, Categorize, Distinguish, Examine, Organize
K5 : Evaluating	Making judgments based on criteria and standards, often involving checking and critiquing.	Judge, Critique, Justify, Assess, Prioritize, Recommend
K6 : Creating	Putting elements together to form a new coherent whole or original product.	Design, Develop, Invent, Compose, Construct, Generate

Sem-I	Credit	Hrs	Sem-II	Credit	Hrs	Sem-III	Credit	Hrs	Sem-IV	Credit	Hrs	Sem-V	Credit	Hrs	Sem-VI	Credit	Hrs
Part 1. Language –Tamil	3	6	Part..1. Language –Tamil	3	6	Part..1. Language – Tamil	3	6	Part..1. Language –Tamil	3	6	5.1 Core Course –CC IX	4	5	6.1Core Course – CCXIII	4	6
Part.2 English	3	6	Part..2 English	3	6	Part..2 English	3	6	Part..2 English	3	6	5.2 Core Course –CC X	4	5	6.2Core Course – CC XIV	4	6
1.3Core Course–CC I	5	6	2..3Core Course–CC III	5	5	3.3Core Course–CC V	4	4	4.3Core Course–CC VII Core Industry Module	4	4	5.3.Core Course CC - XI	4	5	6.3Core Course – CCXV	4	6
1.4Core Course–CC II	5	5	2.4Core Course–CC IV	5	5	3.4Core Course–CC VI	4	4	4.4Core Course–CC VIII	4	4	5.4.Core Course –/ Project with viva-voce CC-XII	4	5	6.4 Elective -VII Generic/ Discipline Specific	3	5
1.5 Elective I Generic/ DisciplineSpecific	3	5	2.5 Elective II Generic/ DisciplineSpecific	3	6	3.5 ElectiveIII Generic/ Discipline Specific	5	5	4.5 Elective IV Generic/ DisciplineSpecific	3	6	5.5 Elective V Generic/ Discipline Specific	3	4	6.5 Elective VIII Generic/ Discipline Specific	3	5
1.6Skill Enhancement Course SEC-1	2	2	2.6Skill Enhancement Course SEC-2	2	2	3.6 Skill EnhancementCourse SEC-4, (Entrepreneurial Skill)	1	1	4.6Skill Enhancement Course SEC-6	2	2	5.6 Elective VI Generic/ Discipline Specific	3	4	6.6 Extension Activity	1	-
1.7 Skill Enhancement - (Foundation Course)	2	2	2.7Skill Enhancement Course–SEC-3	2	2	3.7 Skill EnhancementCourse SEC-5	2	2	4.7Skill Enhancement Course SEC-7	2	2	5.7 Value Education	2	2	6.7 Professional Competency Skill	2	2
						3.8E.V.S.	2	2				5.8 Summer Internship /Industrial Training	2				
	23	32		23	32		24	30		23	30		26	30		21	30

Total–140Credits

Total–140Credits

Sem	Course Code	Part	Course Category	Course Title	Ins. Hrs/ Week	Credit	Marks		Total
							CIA	ESE	
Semester III		I	Language – I (Tamil / Urdu)	Tamil –III / Urdu – III	6	3	25	75	100
		II	English – I	English –III	6	3	25	75	100
		III	Core – V	CC5 – Python Programming	4	4	25	75	100
		III	Core – VI	CC6 - Python Programming Lab	4	4	25	75	100
		III	Elective – III	a)Statistical Methods and their Applications – I	5	5	25	75	100
				b) Resource Management Techniques-I					
		IV	Skill Enhancement Course(SEC) – IV	SEC- 4: Office Automation Lab	1	1	25	75	100
		IV	Skill Enhancement Course(SEC) – V	SEC-5: Cyber Security	2	2	25	75	100
		IV	Compulsory	Environmental Studies	2	2	25	75	100
	Total				30	24	800		800
Semester IV		I	Language – II (Tamil / Urdu)	Tamil –IV / Urdu – IV	6	3	25	75	100
		II	English – II	English –IV	6	3	25	75	100
		III	Core – VII	CC7 –Java Programming	4	4	25	75	100
		III	Core – VIII	CC8 - Practical: Java Programming Lab	4	4	25	75	100
		IV	Elective – IV A)	a)Statistical Methods and their Applications – II	4	3	25	75	100
				b) Resource Management Techniques-II					
		IV	Elective-IV B)	a) Practical - Statistical Methods and their Applications-I & II	2	2	25	75	75
				b) Practical-Resource Management Techniques-I & II					
		IV	Skill Enhancement Course(SEC) – VI	SEC -6 : Web Designing Lab	2	2	25	75	100
		IV	Skill Enhancement Course(SEC) – VII	SEC-7 : Introduction to Data Science	2	2	25	75	100
	Total				30	23	800		800

Semester III

Semester	Course Code	Course Category	Hours / Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
III	25BCS31	Core – V	4	4	25	75	100
Course Title		Python Programming					

Learning Objectives	
LO1	To make students to understand the fundamentals of Python and arrays concepts.
LO2	Understanding the concepts of control statements and Python strings.
LO3	To impart knowledge on functions, function arguments and List operations
LO4	To implement the concepts of using tuple and dictionaries in python programs
LO5	To learn how to handle files in Python and also learn to write python programs using the packages NumPy, Pandas, matplotlib etc.

SYLLABUS				
Unit	Contents	COs	Cognitive Level	Hours
I	Fundamentals of Python Programming: Features of Python- Variables- Constants- Identifiers-Key words-Comments- Built-in Data Types- Input and Output Statements- Operators – Expressions. Arrays in Python: Defining arrays –Accessing array elements- Array methods.	CO1	K1,K2,K3	12
II	Control Statement: Conditional Control Statements – if, if..else, nested if, if..elif.,else statements. Lopping Statements: while loop, for loop, else suite and Nested Loops. Jump Statement: break, continue, and pass statements. Python Strings: String Operations- Immutable Strings- Build String methods and functions.	CO2	K1,K2, K3	12
III	Functions: Defining functions, calling functions, variable scope, return statement. Function arguments: required, keyword, default and variable length arguments. List: Creating, Accessing, and Updating elements in List- Nested List -Basic list operations –List methods.	CO3	K1,K2,K3, K6	12
IV	Tuple: Creating, Accessing, updating and deleting elements in tuple- Nested Tuples-. Dictionary: Creating, Accessing, Updating and Deleting elements in Dictionary – Dictionary functions and Methods – Differences between Tuples and Dictionaries.	CO4	K1,K2, K3,K4, K6	12
V	Python File Handling: Types of files in Python – Opening and Closing files- Reading and Writing files: write (), writelines (), append methods – read () and readlines () methods. Python Packages: Simple programs using the built-in functions of packages: NumPy, Pandas, Matplotlib etc.	CO5	K1,K2, K3,K4. K6	12

Recommended Text Books:
1. Ashok Kamthane et.al, Programming and Problem Solving with Python, 2nd Edition, TMH 2. Reema Tareja, –Python Programming using Problem Solving approach, First Edition, 2017, Oxford University Press.

Reference Books:	
1. Python Programming, Dr.P.Rizwan Ahmed, Margham Publications, First Edition 2024	
Web Resource(s):	
1. https://www.w3schools.com/Python/Python_intro.asp 2. https://www.programiz.com/Python_programming 3. https://www.geeksforgeeks.org/python-programming-language/	

Course Outcomes		
Upon successful completion of this course, the student will be able to:		
CO No.	CO Statement	Cognitive Level (K-Level)
CO1	Learn fundamentals of Python, can write simple programs, and Learn how to use arrays.	K1,K2,K3
CO2	Learn conditional statements, looping statements, Jump statements and usage of strings. Using all these concepts to develop python programs.	K1,K2,K3
CO3	Concepts of functions, function arguments, list operations and implementing these concepts using python programs	K1,K2,K3, K6
CO4	Implementing the concepts of tuple and dictionary operations.	K1,K2,K3,K4, K6
CO5	Learning the concepts of file handling. Simple programs using the built-in functions of packages: NumPy, pandas, matplotlib etc.	K1,K2,K3,K4. K6

Relationship Matrix:

Course Outcomes (COs)	Program Outcomes (POs)							Program Specific Outcomes(PSOs)					Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	3	1	2	2	2	3	1	3	2	1	1	1	2.00
CO2	3	2	2	2	3	3	1	3	2	2	1	1	2.08
CO3	3	2	3	2	3	2	1	2	3	2	2	1	2.17
CO4	2	1	2	3	2	2	1	2	2	2	2	1	1.83
CO5	2	2	2	3	2	3	2	1	2	3	3	2	2.25
	Mean Overall Score												2.06
	Correlation												High

3 – Strong, 2- Medium, 1- Low

Mean Overall Score	Correlation
<=1	Low
>1 & <=2	Medium
>2 & <=3	High

Semester	Course Code	Course Category	Hours / Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
III	25BPCS35	Core – VI	4	4	25	75	100
Course Title		Python Programming Lab					

Learning Objectives	
LO1	Be able to design and program Python applications.
LO2	Be able to create loops and decision statements in Python.
LO3	Be able to work with functions and pass arguments in Python.
LO4	Be able to build and package Python modules for reusability.
LO5	Be able to read and write files in Python.

SYLLABUS				
S.No	List of Exercise			Hours
1.	Program using variables, constants, I/O statements in Python.	CO1 –CO5	Cognitive Level K1 – K6	60
2.	Program using Operators in Python.			
3.	Program using Conditional / Loops / Jump Statements.			
4.	Program using Functions.			
5.	Program using Arrays.			
6.	Program using Strings.			
7.	Program using Lists			
8.	Program using Tuples.			
9.	Program using Dictionaries.			
10.	Program for File Handling.			
11.	Program for using NumPy and Pandas.			
12.	Program using matplotlib			

Text Book:
1. Ashok Kamthane et.al, Programming and Problem Solving with Python, 2 nd Edition, TMH 2. Dr.P.Rizwan Ahmed, Python Programming, Margham Publications, 2024
Reference Books:
1. Reema Thareja, –Python Programming using problem solving approach, First Edition, 2017, Oxford University Press.

2. Vamsi Kurama, –Python Programming: A Modern Approach, Pearson Education.
3. Kenneth A. Lambert, –Fundamentals of Python – First Programs, CENGAGE Publication

Web Resource:

- <https://www.programiz.com/python-programming>
- <https://www.guru99.com/python-tutorials.html>
- https://www.w3schools.com/python/python_intro.asp
- <https://www.geeksforgeeks.org/python-programming-language/>
- [https://en.wikipedia.org/wiki/Python_\(programming_language\)](https://en.wikipedia.org/wiki/Python_(programming_language))

Course Outcomes

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

CO No.	CO Statement	Cognitive Level (K-Level)
CO1	Demonstrate the understanding of syntax and semantics of PYTHON language	K1,K2
CO2	Identify the problem and solve using PYTHON programming techniques.	K1,K2,K3
CO3	Identify suitable programming constructs for problem solving.	K3,K4,K5
CO4	Analyze various concepts of PYTHON language to solve the problem in an efficient way.	K3,K4,K5,K6
CO5	Develop a PYTHON program for a given problem and test for its correctness.	K3,K4,K5,K6

Relationship Matrix:

Course Outcomes (COs)	Program Outcomes (POs)							Program Specific Outcomes(PSOs)					Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	3	1	2	1	2	2	1	3	3	1	1	1	1.8
CO2	3	2	3	2	3	2	1	3	3	2	2	1	2.3
CO3	3	2	3	3	3	2	1	3	3	2	2	1	2.4
CO4	3	1	3	3	3	2	1	3	3	3	2	1	2.3
CO5	3	2	3	3	3	3	2	3	3	3	3	2	2.8
Mean Overall Score													2.32
Correlation													High

3 – Strong, 2- Medium, 1- Low

Mean Overall Score	Correlation
<=1	Low
>1 & <=2	Medium
>2 & <=3	High

Semester	Course Code	Course Category	Hours / Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
III		Elective - III	5	5	25	75	100
Course Title		Statistical Methods and their Applications – I					

Learning Objectives	
LO1	Understand scope of statistics and methods of data classification, tabulation, and graphical presentation.
LO2	Compute and interpret measures of central tendency and positional measures.
LO3	Calculate and compare measures of dispersion.
LO4	Measure and interpret skewness and kurtosis of distributions.
LO5	Analyze correlation and regression between variables.

SYLLABUS		
Unit	Contents	Hours
I	Introduction - scope and limitations of statistical methods - classification of data -Tabulation of data- Diagrammatic and Graphical representation of data – Frequency curve, cumulative frequency curve (Ogive), Lorenz curve.	15
II	Measures of Central Tendency: Arithmetic mean, median, mode, geometric mean and Harmonic mean and their properties, Quartiles and Deciles.	15
III	Measures of Dispersion: Range, Quartile deviation, mean deviation, Standard deviation, combined Standard deviation, and their relative measures	15
IV	Measures of Skewness: Karl Pearson's, Bowley's, and kelly's coefficient of Skewness, kurtosis based on moments.	15
V	Correlation: Karl Pearson - Spearman's Rank correlation - concurrent deviation methods. Regression Analysis: Simple Regression Equations.	15

Text Book(s):
1. Fundamental of Mathematical Statistics-S.C.Gupta&V.K.Kapoor-Sultan Chand
Reference Book(s):
1. Mathematical Statistics – Dr. P.R. Vittal – Margham Publications 2. Statistical Methods-Snedecor G.W.& Cochran W.G.oxford&+DII 3. Elements of Statistics -Mode. E.B.-Prentice Hall 1. Statistical Methods-Dr.S.P.Gupta-Sultan Chand &Sons
Web Resource(s):
1. https://www.simplilearn.com/what-is-statistical-analysis-article

Course Outcomes		
Upon successful completion of this course, the student will be able to:		
CO No.	CO Statement	Cognitive Level (K-Level)
CO1	Explain and present data using statistical methods.	K1, K2, K3
CO2	Apply measures of central tendency in data analysis.	K2, K3
CO3	Evaluate variability using dispersion measures.	K3, K4
CO4	Interpret distribution shape using skewness and kurtosis.	K2, K4
CO5	Determine relationships using correlation and regression techniques.	K3, K4, K5

Relationship Matrix:

Course Outcomes (COs)	Program Outcomes (POs)							Program Specific Outcomes(PSOs)					Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	3	2	2	3	2	3	1	2	2	1	1	1	2.0
CO2	3	1	3	3	3	2	1	2	2	1	1	1	1.9
CO3	3	1	3	3	3	2	1	2	2	2	1	1	2.0
CO4	3	1	3	3	2	2	1	2	3	2	1	1	2.0
CO5	3	2	3	3	3	3	2	2	3	3	2	2	2.6
	Mean Overall Score												2.1
	Correlation												High

3 – Strong, 2- Medium, 1- Low

Mean Overall Score	Correlation
<=1	Low
>1 & <=2	Medium
>2 & <=3	High

Semester	Course Code	Course Category	Hours / Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
III		Elective – III	5	5	25	75	100
Course Title		Resource Management Techniques-I					

Learning Objectives	
LO1	Understand the formulation and solution of Linear Programming Problems using graphical and simplex methods.
LO2	Learn advanced methods of LPP including duality, dual simplex, and two-phase methods.
LO3	Understand the formulation and solution of Transportation Problems using different methods.
LO4	Learn to solve Assignment Problems and Traveling Salesman Problems.
LO5	Understand and solve sequencing problems for optimal scheduling.

SYLLABUS		
Unit	Contents	Hours
I	Linear Programming Problem: Formulation - Graphical Solution-General LPP-Canonical and Standard form - Simplex Algorithm.	15
II	Linear Programming Problem (Cont.): Properties of duality Fundamental theorem of duality Complementary slackness theorem (statement only) - Dual Simplex Method - Two phase Method-Artificial variables Technique.	15
III	Transportation Problem: Formulation - Initial basic feasible solution – NorthWest Corner Rule-Least Cost method - Vogel's Approximation Method - Degeneracy in T.P, Unbalanced T.P, Optimal Solution of T.P - MODI Method.	15
IV	Assignment Problem: Formulation-Hungarian assignment method-Traveling Salesman Problem.	15
V	Sequencing Problem: n jobs through 1 machines-n jobs through 2 machines -n jobs through 3 machines-two jobs through mmachines-n jobs through m machines.	15

Text Book(s):
1. Problems in Operations Research (2000), S. Chand, New Delhi by P.K. Gupta and D.S. Hira
Reference Book(s):
1. Operation Research: An introduction by HamelyA Taha, Ninth Edition, Prentice Hall, New Delhi, 2011. 2. Resource Management Techniques, by V. Sundaresan, K.S. Subramaniya, K. Ganesan, New Revised Edition, AR Publications, Sirkalli, 2002
Web Resource(s):
1. https://www.theopeneducator.com/operations

Course Outcomes		
Upon successful completion of this course, the student will be able to:		
CO No.	CO Statement	Cognitive Level (K-Level)
CO1	Formulate and solve Linear Programming Problems using graphical and simplex methods.	K2, K3
CO2	Apply duality concepts and advanced simplex techniques to solve LPP.	K3, K4
CO3	Solve Transportation Problems and obtain optimal solutions.	K3, K4
CO4	Apply Hungarian method to solve Assignment and Traveling Salesman Problems.	K3, K4
CO5	Solve sequencing problems for optimal job scheduling.	K3, K4, K5

Relationship Matrix:

Course Outcomes (COs)	Program Outcomes (POs)							Program Specific Outcomes(PSOs)					Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	3	1	3	3	3	2	1	2	3	2	1	1	2.1
CO2	3	1	3	3	3	2	1	2	3	2	2	1	2.2

C03	3	1	3	3	3	2	1	2	2	3	2	1	2.2
C04	3	2	3	3	3	2	1	2	2	3	2	1	2.3
C05	3	1	3	3	3	2	1	2	2	3	3	2	2.3
Mean Overall Score													2.22
Correlation													High

3 – Strong, 2- Medium, 1- Low

Mean Overall Score	Correlation
<=1	Low
>1 & <=2	Medium
>2 & <=3	High

Semester	Course Code	Course Category	Hours / Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
III		Skill Enhancement Course- IV	1	1	25	75	100
Course Title		Office Automation Lab					

Learning Objectives	
LO1	To understand the fundamentals of word processing, spreadsheets, and presentation software.
LO2	To develop skills in creating and formatting professional documents, tables, and reports.
LO3	To apply formulas, functions, and data analysis tools in spreadsheet applications.
LO4	To design effective presentations using multimedia, animations, and transitions.
LO5	To enhance practical knowledge in office automation tools for academic and professional use.

SYLLABUS		
Contents	Cognitive Levels	Hours
1. Create a news-paper document with at least 200 words, a. Use margins as, top:1.5, bottom:2, left:2, right:1 inches. b. Use heading –Gandhi Jayantil, font size: 16, font color: red, font face: Arial Black. c. With first letter –dropped (use drop cap option) of the first paragraph containing a picture at the right side d. Use three columns from the second paragraph onwards till the half of the page. e. Then use heading –Computer basics f. Create paragraph using two columns till the end of the page. 2. Create a Mathematical question paper using, at least five equations a. With fractions, exponents, summation function b. With at least one, $m \times n$ matrix c. Basic mathematical and geometric operators. d. Use proper text formatting, page color and page border. 3. Create a flowchart using, a. Proper shapes like ellipse, arrows, rectangle, and parallelogram. b. Use grouping to group all the parts of the flowchart into one single object. 4. Create a table using table menu with, a. At least 5 columns and 10 rows. b. Merge the first row into one cell. c. Merge the second row into one cell, then split the second row into three cells. d. Use proper table border and color. e. Insert proper content into the table with proper text formatting. 5. Create a table using two columns, a. The left column contains all the short-cut keys and right side column contains the function of the short-cut keys.	K1 – K6	12

- b. Insert a left column using layout option. Name the heading as Serial No.

6. Create a table –Student result with following conditions.

- The heading must contain, Sl. No., Name, Mark1, Mark2, Mark3, Total, average and result with manual entry.
- Use formulas for total and average.
- Find the name of the students who has secured the highest and lowest marks.
- Round the average to the nearest highest integer and lowest integer (use ceiling and floor function respectively).

7. Do as directed

- Create a notepad file as per the following fields
Slno name th1 th2 th3 th4 th5 total
% grade
- Import this notepad file into excel sheet using „data from text“ option.
- Grade is calculated as,
 - If % $\geq$ 90, then grade A
 - If % $\geq$ 80 and <90, then grade B
 - If % $\geq$ 70 and <80, then grade C
 - If % $\geq$ 60 and <70, then grade D
 - If %<60, then grade F

8. Create a Student Attendance Sheet

- Create a table with Name, Roll No, Total Classes, Attended Classes, and Attendance %.
- Use formula to calculate Attendance %.
- Highlight students with attendance below 75%.

9. Create a Simple Electricity Bill

- Create a table with Consumer Name, Units Consumed, Rate per Unit, and Total Amount.
- Use formula to calculate Total Amount.
- Apply proper formatting and border.

10. Create a power-point presentation with minimum 5 slides.

- The first slide must contain the topic of the presentation and name of the presentation.
- Must contain at least one table.
- Must contain at least 5 bullets, 5 numbers.
- The heading must be, font size:32, font-face: Arial Rounded MT Bold, font-color: blue.
- The body must be, font size: 24, font-face: Comic Sans MS, font-color: green.
- Last slide must contain „thank you“.

11. Create a power-point presentation with minimum 10 slides

- Use word art to write the heading for each slides
- Insert at least one clip-art, one picture
- Insert at least one audio and one video
- Hide at least two slides

12. Create a power-point presentation with minimum 5 slides

- Use custom animation option to animate the text; the text must move left to right one line at a time.
- Use proper transition for the slides.

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Recommend Text Book:

1. Shelly Cashman Series, *Microsoft Office 2019: Introductory*, Cengage Learning, 2019.
2. P.Rizwan Ahmed, *Office Automation*, Margham Publications, Chennai. 2018

Reference Book(s):

1. Charles P. Pfleeger, Shari Lawrence Pfleeger, Jonathan Margulies, *Security in Computing*, 5th Edition, Pearson Education, 2015.
2. Joan Lambert, *Microsoft Word 2019 Step by Step*, Microsoft Press, 2019.
3. Peter Weverka, *Office 2019 All-in-One for Dummies*, Wiley Publications, 2018.

Web Resource(s):

1. <https://support.microsoft.com/en-us/training>
2. <https://learn.microsoft.com/en-in/training/m365/>
3. <https://documentation.libreoffice.org/en/english-documentation/>

Course Outcomes

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

CO No.	CO Statement	Cognitive Level (K-Level)
CO1	Students will be able to create and format documents using advanced features of word processing software.	K1,K2,K3
CO2	Students will be able to prepare spreadsheets using formulas, functions, charts, and data formatting techniques.	K1,K2,K3
CO3	Students will be able to design and manage tables, reports, and data records effectively.	K1,K2,K3
CO4	Students will be able to develop professional presentations with multimedia, animations, and slide effects.	K1,K2,K3
CO5	Students will be able to use office automation tools efficiently for real-world applications and documentation tasks.	K1,K2,K3,K4

Relationship Matrix:

Course Outcomes (COs)	Program Outcomes (POs)							Program Specific Outcomes(PSOs)					Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	2	2	2	1	1	3	1	2	2	1	1	1	1.6
CO2	2	2	3	3	2	3	1	2	2	2	1	1	2.0
CO3	2	2	3	3	2	3	1	2	2	2	2	1	2.1
CO4	2	3	2	2	2	3	1	2	2	2	2	1	2.0
CO5	3	2	3	3	3	3	2	3	2	3	2	2	2.6
Mean Overall Score													2.6
Correlation													High

3 – Strong, 2- Medium, 1- Low

Mean Overall Score	Correlation
<=1	Low
>1 & <=2	Medium
>2 & <=3	High

Semester	Course Code	Course Category	Hours / Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
III		Skill Enhancement Course- V	2	2	25	75	100
Course Title		Cyber Security					

Learning Objectives	
LO1	Students should be able to understand.
LO2	The transformation between threat, risk, attack and vulnerability.
LO3	How threats materialize into attacks.
LO4	To find information about threats, vulnerabilities and attacks.
LO5	To know security planning, risk analysis and also know the usage of IoTs.

SYLLABUS		
Unit	Contents	Hours
I	Introduction -Computer Security - Threats -Harm - Vulnerabilities - Controls - Authenticate Access Control and Cryptography - Web—User Side - Browser Attacks - Web Attacks Targeting Users - Email Attacks	6
II	Security in Operating Systems - Security in the Design of Operating Systems -Rootkit - Network security attack- Threats to Network Communications - Wireless Network Security - Denial of Service	6
III	Cryptography in Network Security - Firewalls - Intrusion Detection and Prevention Systems - Network Management - Databases - Security Requirements of Databases - Reliability and Integrity - Database Disclosure	6
IV	Privacy Concepts -Privacy Principles and Policies -Authentication and Privacy - Data Mining Privacy on the Web - Email Security - Privacy Impacts of Emerging Technologies	6
V	Security Planning - Business Continuity Planning - Handling Incidents - Risk Analysis - Dealing with Disaster - Emerging Technologies - The Internet of Things - Economics - Electronic Voting - Cyber Warfare	6

Recommended Text Book:
1. Charles P. Pfleeger Shari Lawrence Pfleeger Jonathan Margulies, Security in Computing, 5th Edition , Pearson Education , 2015 2. George K.Kostopoulos, Cyber Space and Cyber Security, CRC Press, 2013.
Reference Book:
1. Martti Lehto, Pekka Neittaanmäki, Cyber Security: Analytics, Technology and Automation edited, Springer International Publishing Switzerland 2015 2. Nelson Phillips and Enfinger Stuart, —Computer Forensics and Investigations^l, Cengage Learning, New Delhi, 2009
Web Resource(s):
1. https://csrc.nist.gov 2. https://owasp.org 3. https://www.eccouncil.org

Course Outcomes		
Upon successful completion of this course, the student will be able to:		
CO No.	CO Statement	Cognitive Level (K-Level)
CO1	Understand the broad set of technical, social & Cyber Security.	K1,K2,3
CO2	Understand the security design of operating system.	K1,K2,K3
CO3	Recognize & analyze the importance of Data mining & Big data concepts	K1,K2,K3
CO4	Implement the methods and techniques to develop projects.	K1,K2,K4
CO5	To improve the Problem-solving skills, Research, Innovation/creativity	K1,K2,K3,K5

Relationship Matrix:

Course Outcomes (COs)	Program Outcomes (POs)							Program Specific Outcomes(PSOs)					Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	3	2	2	2	2	3	1	3	2	2	1	1	2.0
CO2	3	1	3	3	2	3	1	3	2	2	2	1	2.2
CO3	3	1	3	3	3	3	1	2	3	3	2	1	2.3
CO4	3	2	3	3	3	3	1	3	3	3	3	2	2.7
CO5	3	2	3	3	3	3	2	3	3	3	3	3	2.8
Mean Overall Score													2.4
Correlation													High

3 – Strong, 2- Medium, 1- Low

Mean Overall Score	Correlation
< 1.5	Low
≥ 1.5 and < 2.5	Medium
≥ 2.5 High	High

SEMESTER – IV

Semester	Course Code	Course Category	Hours / Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
IV		Core – VII	4	4	25	75	100
Course Title		Java Programming					

Learning Objectives	
LO1	To provide fundamental knowledge of OOPs, simple java concepts, I/O statements, simple programs
LO2	To enable to understand Class and object, String class and Inheritance
LO3	To learn concepts of packages, Interfaces, Exception handling
LO4	To equip the student with the knowledge of Applets, AWT controls and Graphics classes.
LO5	To make the students to develop programs using Swing components

SYLLABUS		
Unit	Contents	Hours
I	Introduction: Features of Java-Review of Object Oriented Concepts- Data types- variables- arrays – Operators – Control Statement: conditional statements, looping statements. Input and Output Statements: Scanner Class, print(), println() and printf() methods- Simple Java Programs.	12
II	Classes and Object: Creating class, defining data members, defining methods, creating objects. Constructors –Types of constructors-Access control. String classes: String Methods- StringBuffer Classes. Inheritance: Basic concepts – Types of Inheritance – Method overloading – Method overriding.	12
III	Package: System package –User Defined packages. Interface: Defining an Interface, extending interface, implementing interface. Exception Handling: try, catch, throw, throws, finally, Built-in Exceptions. Multithreading: Thread Class- Life cycle of Thread - Runnable interface-Synchronization –Using Synchronized Methods – Using Synchronized statement Inter thread communication.	12
IV	Applets: Creating and Executing an Applet- Life Cycle of an Applet. AWT Controls: Labels-Button-Check Box-Choice –Text Components: TextField, TextArea -List –Scroll Bar. Layout Managers- Color control and Font control. Graphic class: Drawing Lines, Rectangles and Ovals. Filling colors to Rectangles and Ovals. Sample programs.	12
V	Swing: Introduction to Swing – Hierarchy of swing components – JLabel- JTextField - JTextArea – JButton –JCheckBox – JRadioButton- JList -JcomboBox –Jslider – Using Menus and Frames. Developing programs using all these concepts.	12

Recommended Text Books:

1. Gary Cornell, Core Java 2 Volume 1 – Fundamentals , Addison Wesley, 1999

Reference Books:

1. Y.Daniel Liang,, Introduction to Java Programming, 7th Edition, Pearson Education India, 2010.
2. Dr.P.Rizwan Ahmed, Java Programming, 2nd Revised Edition 2012, Margham Publications.

Web Resources:

1. <https://javabeginnerstutorial.com/core-java-tutorial>
2. <https://docs.oracle.com/javase/tutorial/>

Course Outcomes

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

CO No.	CO Statement	Cognitive Level (K-Level)
CO1	Understanding the Object Oriented Concepts and the basic construct of Core Java and implementing in sample programs.	K1, K2,K3
CO2	Implement class and object, constructor, Inheritances and String classes.	K1, K2,K3,
CO3	Implement the concepts of Package, Interface, Exception Handling and Multithreading.	K1, K2,K3, K4
CO4	Implement Applets, AWT controls, Layout Managers, Color and Font Controls, Graphics class.	K1, K2,K3, K5
CO5	Implement the Swing components to create GUI.	K1, K2,K3,K6

Relationship Matrix:

Course Outcomes (COs)	Program Outcomes (POs)							Program Specific Outcomes(PSOs)					Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	3	1	2	2	2	2	1	3	3	1	1	1	1.8
CO2	3	2	3	2	3	2	1	3	3	2	2	1	2.3
CO3	3	2	3	3	3	2	1	3	3	2	2	1	2.4
CO4	3	1	3	3	3	3	1	3	2	3	2	1	2.3
CO5	3	2	3	3	3	3	2	3	3	3	3	2	2.8
Mean Overall Score													2.32
Correlation													High

3 – Strong, 2- Medium, 1- Low

Mean Overall Score	Correlation
<=1	Low
>1 & <=2	Medium
>2 & <=3	High

Semester	Course Code	Course Category	Hours / Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
IV		Core – VIII	4	4	25	75	100
Course Title		Practical: Java Programming Lab					

Learning Objectives

LO1	To make the student to understand the basic Object-oriented concepts. Implement the basic constructs of Core Java.
LO2	Implement inheritance, packages, interfaces and exception handling of Core Java.
LO3	Implement multi-threading and Exception Handling.
LO4	Implement AWT controls, color and font controls, Layout managers and using Graphics classes
LO5	Use Swing to create GUI applications.

SYLLABUS

Sl. No	List of Exercise	COs	Cognitive Level	Hours
1.	Write a Java program that prompts the user for an integer and then prints out all the prime numbers up to that Integer	CO1 – CO5	K1,K2,K3, K4,K5, K6	75
2.	Write a Java program that displays the number of characters, lines and words in a text			
3.	Write a program to do String Manipulation using Character Array and perform the following string operations: a. String length b. Finding a character at a particular position c. Concatenating two strings			
4.	Write a program to implement the concepts of class and object, constructors.			
5.	Write a java program to demonstrate a class inheritance hierarchy. Class P extends object and has two instance variables of the float & string. Class Q extends and has one instance variable of type double. Instantiate class Q. Initialize and display its variables.			
6.	Write a java program that implements concept of multi-thread application that has three threads. First thread generates random integer every 1 second and if the value is even, second thread computes the square of the number and prints. If the value is odd, the third thread will print the value of cube of the number.			
7.	Write a program to demonstrate the use of following exceptions. a. Arithmetic Exception b. Number Format Exception c. Array Index Out of Bound Exception d. Negative Array Size Exception			
8.	Write a program to implement the Layout Managers. a. Flow Layout b. Border Layout c. Grid Layout			
9.	Write a program to implement Graphics class to draw various shapes: Lines, Rectangles, Oval, circle etc			

10.	Write a Java program that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the +, -, *, % operations. Add a text field to display the result. Handle any possible exceptions like divide by zero.			
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Recommended Text Books:

1. Herbert Schildt, The Complete Reference, Tata McGraw Hill, New Delhi, 7th Edition, 2010.
2. Dr.P.Rizwan Ahmed, Java Programming, Margham Publications, Chennai.2021

Reference Books:

1. Gary Cornell, *Core Java 2 Volume I – Fundamentals*, Addison Wesley, 1999.
2. Y. Daniel Liang, *Introduction to Java Programming*, 7th Edition, Pearson Education India, 2010

Web Resources:

1. <https://www.w3schools.com/java/>
2. <http://java.sun.com>
3. <http://www.afu.com/javafaq.html>

Course Outcomes

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

CO No.	CO Statement	Cognitive Level (K-Level)
CO1	Understand the basic Object-oriented concepts. Implement the basic constructs of Core Java.	K1,K2,K3
CO2	Implement inheritance, packages, interfaces and exception handling of Core Java.	K1,K2,K3
CO3	Implement multi-threading and I/O Streams of Core Java	K1,K2,K3, K6
CO4	Implement AWT and Event handling.	K1,K2,K3,K4, K6
CO5	Use Swing to create GUI.	K1,K2,K3,K4. K6

Relationship Matrix:

Course Outcomes (COs)	Program Outcomes (POs)							Program Specific Outcomes(PSOs)					Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	3	2	2	2	2	2	1	3	3	2	1	1	2.0
CO2	3	2	3	3	3	2	1	3	3	2	2	1	2.3
CO3	3	2	3	3	3	3	1	3	3	2	2	1	2.5
CO4	3	2	3	3	3	3	1	3	3	3	2	1	2.6
CO5	3	2	3	3	3	3	2	3	3	3	3	2	2.8
Mean Overall Score													2.44
Correlation													High

3 – Strong, 2- Medium, 1- Low

Mean Overall Score	Correlation
<=1	Low
>1 & <=2	Medium
>2 & <=3	High

Semester	Course Code	Course Category	Hours / Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
IV		Elective – IV A)	4	3	25	75	100
Course Title		Statistical Methods and their Applications- II					

Learning Objectives	
LO1	Understand the basic concepts of probability and apply probability theorems to solve simple problems.
LO2	Learn the concepts of random variables and mathematical expectation and compute mean and variance.
LO3	Understand standard probability distributions and apply them to real-life situations.
LO4	Learn the procedure of hypothesis testing and apply appropriate statistical tests.
LO5	Understand analysis of variance and the basic principles of design of experiments.

SYLLABUS		
Unit	Contents	Hours
I	Probability: Introduction - Sample Space- Events- Classical Definition of Probability-Addition and Multiplication Theorem- Conditional Probability - Baye's Theorem –Simple Problems	18
II	Random Variables: Definition, Discrete Random Variable, Continuous Random Variable, Cumulative Distribution, Properties of Distribution function, Function of Random Variable. Mathematical Expectation: Definitions, Properties and Theorems on Expectation, Variance – Formula for Variance of X – Theorems – Techebechey's Inequality – Simple Problems.	18
III	Standard distributions - Binomial, Poisson, Normal distribution and fitting of these distribution.	18
IV	Test of Hypothesis: Sample and population hypothesis-large and small samples-Procedure for testing of hypothesis-standard Error-critical values-large sample tests for mean and proportions - Small sample proportions tests-paired t-test for Mean, Difference between Means and F-test– Simple Problems.	18
V	Analysis of variance –One and Two way classifications-Basic principle of design of Experiments Randomization, Replication and Local Control – C.R.D., R.B.D. and L.S.D.	18

Recommended Text Books:
1. Fundamental of Mathematical Statistics-S.C.Gupta&V.K.Kapoor-Sultan Chand 2. Statistical methods- Snedecor G.W & Cochran W.G. oxford & DII
Reference Books:
1. Mathematical Statistics – Dr. P.R. Vittal – Margham Publications 2. Statistical Methods-Snedecor G.W.& Cochran W.G.oxford&+DII 3. Elements of Statistics -Mode. E.B.-Prentice Hall 4. Statistical Methods-Dr.S.P.Gupta-Sultan Chand & Sons
Web Resources:
1. https://www.simplilearn.com/what-is-statistical-analysis-article

Course Outcomes
Upon successful completion of this course, the student will be able to:

CO No.	CO Statement	Cognitive Level (K-Level)
CO1	Apply probability concepts and theorems to solve problems.	K2, K3
CO2	Compute expectation and variance of random variables and apply their properties.	K2, K3
CO3	Analyze and fit standard probability distributions.	K3, K4
CO4	Perform hypothesis testing using appropriate statistical tests.	K3, K4, K5
CO5	Apply ANOVA and principles of experimental design in problem solving.	K3, K4

Relationship Matrix:

Course Outcomes (COs)	Program Outcomes (POs)							Program Specific Outcomes(PSOs)					Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	3	1	3	3	2	2	1	2	2	1	1	1	1.8
CO2	3	2	3	3	3	2	1	2	3	2	1	1	2.2
CO3	3	2	3	3	3	3	1	3	3	2	2	1	2.4
CO4	3	2	3	3	3	3	1	3	3	3	2	1	2.5
CO5	3	2	3	3	3	3	2	3	3	3	3	2	2.8
	Mean Overall Score												2.34
	Correlation												

3 – Strong, 2- Medium, 1- Low

Mean Overall Score	Correlation
<=1	Low
>1 & <=2	Medium
>2 & <=3	High

Semester	Course Code	Course Category	Hours / Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
IV		Elective – IV A)	4	3	25	75	100
Course Title		Resource Management Techniques-II					

Learning Objectives	
LO1	Understand decision-making methods under uncertainty and risk using different decision criteria.
LO2	Learn the concepts of game theory and solve two-person zero-sum games using various methods.
LO3	Understand the structure of queuing systems and analyze basic Poisson queue models.
LO4	Learn the principles and formulation of dynamic programming problems.
LO5	Understand project planning and scheduling using CPM and PERT techniques.

SYLLABUS		
Unit	Contents	Hours
I	Decision Theory: Decision making under conditions of uncertainty -minimax criterion - maximin criterion - minimax regret criterion- Hurwicz criterion - Laplace criterion. Decision making under conditions of risk- EMV-EOL simple Problems.	18

II	Game Theory: Characteristics-game models - Two-person zero-sum game with saddle point, without saddle point (Algebraic, arithmetic and matrix methods) - Minimax and Maximin Principles - Dominance Solving 2 x n or m x 2 game by graphical method.	18
III	Queuing Theory: Basic Concepts-Characteristics of Queueing Systems Poisson process and Exponential Distribution - Transient and Steady states-Poisson Queues: (M/M/1); (00/FCFS)-(M/M/1); (N/FCFS).	18
IV	Dynamic Programming: Introduction-distinguishing characteristics-approach formation of DPP-Problems	18
V	Network Analysis: Project-Planning-Scheduling-Controlling Basic Concepts Construction of network-Critical Path Method(CPM)-Programme Evaluation Review Technique (PERT).	18

Recommended Text Books:

1. Problems in Operations Research (2000), S. Chand, New Delhi by P.K. Gupta and D.S. Hira

Reference Books:

1. Operation Research: An introduction by HamelyA Taha, Ninth Edition, Prentice Hall, New Delhi, 2011.
2. Resource Management Techniques, by V. Sundaresan, K.S. Subramaniya, K. Ganesan, New Revised Edition, AR Publications, Sirkalli, 2002

Web Resources:

1. <https://www.theopeneducator.com/operations>

Course Outcomes

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

CO No.	CO Statement	Cognitive Level (K-Level)
CO1	Apply decision criteria to solve problems under uncertainty and risk.	K2, K3
CO2	Analyze and solve two-person zero-sum games using appropriate methods.	K3, K4
CO3	Evaluate performance measures of basic queuing models.	K3, K4
CO4	Formulate and solve problems using dynamic programming techniques.	K3, K4
CO5	Apply CPM and PERT techniques for project planning and control.	K3, K4, K5

Relationship Matrix:

Course Outcomes (COs)	Program Outcomes (POs)							Program Specific Outcomes(PSOs)					Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	3	1	3	3	3	2	1	2	2	2	1	1	2.0
CO2	3	2	3	3	3	2	1	2	3	2	2	1	2.3
CO3	3	1	3	3	3	3	1	2	3	3	2	1	2.3
CO4	3	2	3	3	3	3	1	3	3	3	2	1	2.5
CO5	3	2	3	3	3	3	2	3	3	3	3	2	2.8
	Mean Overall Score												2.38
	Correlation												

3 – Strong, 2- Medium, 1- Low

Mean Overall Score	Correlation
<=1	Low
>1 & <=2	Medium
>2 & <=3	High

Semester	Course Code	Course Category	Hours / Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
IV		Elective –IV B)	2	2	25	75	100
Course Title		Practical - Statistical Methods and their Applications-I & II					

Learning Objectives	
LO1	Understand the methods of collection, classification, and presentation of statistical data using tables, diagrams, and graphs.
LO2	Apply techniques to compute and interpret measures of central tendency and dispersion, including coefficient of variation.
LO3	Analyze relationships between variables using correlation and regression methods.
LO4	Apply theoretical probability distributions and use the method of least squares for curve fitting.
LO5	Perform statistical hypothesis testing using chi-square tests and analyze variance using ANOVA and experimental design methods.

SYLLABUS		
Unit	Contents	Hours
I	Collection and Presentation of Statistical Data Construction of Uni-variate frequency distribution – Diagrammatic and Graphical Representation of Statistical Data.	6
II	Measures of Central Tendency and Dispersion Computation of Measures of Central Tendency – Computation of Measures of Dispersion (absolute and relative measures) – Coefficient of Variation.	6
III	Correlation and Regression Computation of Karl Pearson's Coefficient of Correlation and Spearman's Rank Correlation Coefficient–Regression equation (two variables only).	6
IV	Theoretical Distributions and Methods of Least Squares Fitting of Binomial, Poisson and Normal Distributions – Test for Goodness of fit – Fitting of a Straight line ($y=a+bx$), Second degree Parabola ($y=a+bx+cx^2$) by the method of least square.	6
V	Test of Large and Small Sample Tests Chi- square test for in dependence of attributes-test. Analysis of Variance: one way and Two way classification, Design of Experiments- C.R.D,R.B.D & L.S.D.	6

Recommended Text Books:
1. Fundamental of Mathematical Statistics-S.C.Gupta&V.K.Kapoor-Sultan Chand 2. Mathematical Statistics – Dr. P.R. Vittal – Margham Publications
Reference Books:
1. Statistical Methods-Snedecor G.W.& Cochran W.G.oxford&+DII 2. Elements of Statistics -Mode. E.B.-Prentice Hall 3. Statistical Methods-Dr.S.P.Gupta-Sultan Chand &Sons
Web Resources:
1. https://www.simplilearn.com/what-is-statistical-analysis-article

Course Outcomes
Upon successful completion of this course, the student will be able to:

CO No.	CO Statement	Cognitive Level (K-Level)
CO1	Organize and present statistical data effectively using tables, diagrams, and graphs.	K2, K3
CO2	Compute and interpret measures of central tendency and dispersion for real-world datasets.	K3, K4
CO3	Analyze the relationship between variables using correlation and regression techniques.	K3, K4
CO4	Apply theoretical distributions and evaluate goodness of fit for statistical models.	K3, K4
CO5	Perform hypothesis testing using chi-square tests and interpret results accurately.	K3, K4, K5

Relationship Matrix:

Course Outcomes (COs)	Program Outcomes (POs)							Program Specific Outcomes(PSOs)					Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	3	3	3	2	1	2	2	2	2	2	2	1	2.08
CO2	3	3	3	3	3	2	1	3	3	2	1	1	2.3
CO3	3	2	2	3	3	3	1	2	3	3	2	1	2.33
CO4	3	2	3	2	3	3	1	3	3	3	2	1	2.41
CO5	3	2	2	3	2	2	2	3	3	3	3	2	2.5
Mean Overall Score													2.32
Correlation													High

3 – Strong, 2- Medium, 1- Low

Mean Overall Score	Correlation
<=1	Low
>1 & <=2	Medium
>2 & <=3	High

Note:

Question Paper Setting:

5 questions are to be set without omitting any unit. All questions carry equal marks. Any 3 questions are answered in 3 hours duration.

Examinations Distribution of Marks

University Examinations (Written Practical) 75 Marks

CIA (Including Practical Record and VIVA) 25 Marks

Total 100Marks

Semester	Course Code	Course Category	Hours / Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
IV		Elective –IV B)	2	2	25	75	100
Course Title		Practical – Resource Management Techniques-I & II					

Learning Objectives	
LO1	Understand and formulate real-world optimization problems using linear programming models.
LO2	Apply mathematical techniques to solve transportation, assignment, and sequencing problems.

LO3	Analyze decision-making situations under uncertainty and risk using quantitative methods.
LO4	Evaluate system performance using queuing models and dynamic programming techniques.
LO5	Apply network models such as CPM and PERT for project planning and scheduling.

SYLLABUS		
Unit	Contents	Hours
I	Linear Programming Problems (LPP) Formulation of LPP – Graphical Solution – General LPP – Canonical and Standard Forms – Simplex Method – Artificial Variables Technique – Two-Phase Method – Duality: Properties and Fundamental Theorem (statement only) – Dual Simplex Method – Complementary Slackness (statement only).	6
II	Transportation and Assignment Models Transportation Problem: Formulation – Initial Basic Feasible Solutions (North-West Corner Rule, Least Cost Method, Vogel's Approximation Method) – Degeneracy and Unbalanced T.P – Optimal Solution using MODI Method. Assignment Problem: Formulation – Hungarian Method – Traveling Salesman Problem (basic concept).	6
III	Decision Theory and Game Theory Decision Making under Uncertainty: Maximin, Minimax, Minimax Regret, Hurwicz, Laplace Criteria. Decision Making under Risk: EMV and EOL (simple problems). Game Theory: Characteristics – Two-person Zero-Sum Games – Saddle Point and Non-Saddle Point Problems – Algebraic, Arithmetic, and Matrix Methods – Dominance Principle – Graphical Method ($2 \times n$ or $m \times 2$ games).	6
IV	Queuing and Dynamic Programming Queuing Theory: Basic Concepts – Queue Characteristics – Poisson Process – Exponential Distribution – Models: $(M/M/1):(\infty/FCFS)$, $(M/M/1):(N/FCFS)$. Dynamic Programming: Introduction – Characteristics – Formulation and Solution of DPP Problems.	6
V	Sequencing and Network Analysis Sequencing Models: n Jobs through 1, 2, and 3 Machines – Two Jobs through m Machines – n Jobs through m Machines. Network Analysis: Project Planning – Scheduling and Controlling – Network Construction – Critical Path Method (CPM) – Programme Evaluation and Review Technique (PERT).	6

Recommended Text Books:
1. Operations Research – Kanti Swarup, P.K. Gupta, Man Mohan, Sultan Chand & Sons, Latest Edition.
2. Operations Research – Hamdy A. Taha, Pearson Education, 10th Edition.
Reference Books:
1. Introduction to Operations Research – Frederick S. Hillier, Gerald J. Lieberman, cGraw-Hill Education, 10th Edition.
2. Operations Research Theory and Applications – J.K. Sharma, Macmillan Publishers India, Latest Edition.
Web Resources:

2. <https://nptel.ac.in/courses/110106062>
3. <https://ocw.mit.edu/courses/15-053-optimization-methods-in-management-science-spring-2013/>
<https://www.geeksforgeeks.org/operations-research/>
4. https://www.tutorialspoint.com/operations_research/index.htm
5. https://en.wikipedia.org/wiki/Operations_research

Course Outcomes

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

CO No.	CO Statement	Cognitive Level (K-Level)
CO1	Formulate and solve linear programming problems using graphical and simplex methods.	K2, K3
CO2	Apply optimization techniques to transportation, assignment, and sequencing problems.	K3, K4
CO3	Analyze decision-making scenarios using decision theory and game theory models.	K3, K4
CO4	Evaluate real-life systems using queuing theory and dynamic programming approaches.	K3, K4
CO5	Apply network analysis techniques (CPM and PERT) for project scheduling and management.	K3, K4, K5

Relationship Matrix:

Course Outcomes (COs)	Program Outcomes (POs)							Program Specific Outcomes(PSOs)					Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	3	3	3	3	2	3	2	2	2	2	2	1	2.3
CO2	3	3	3	3	3	2	1	3	3	2	1	1	2.3
CO3	3	3	3	3	2	2	1	2	2	3	2	1	2.25
CO4	3	2	3	2	3	3	1	2	2	3	2	1	2.25
CO5	3	3	2	3	2	3	3	3	3	3	3	2	2.75
Mean Overall Score													2.37
Correlation													High

3 – Strong, 2- Medium, 1- Low

Mean Overall Score	Correlation
<=1	Low
>1 & <=2	Medium
>2 & <=3	High

Semester	Course Code	Course Category	Hours / Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
IV		SEC- 6	2	2	25	75	100
Course Title		Web Designing Lab					

Learning Objectives

LO1	To understand the fundamentals of web technologies, HTML, CSS, JavaScript, PHP, and MySQL.
LO2	To develop skills in designing and formatting web pages using HTML and CSS.
LO3	To learn client-side scripting techniques using JavaScript for interactive web applications.

LO4	To understand server-side programming concepts using PHP and database connectivity with MySQL.
LO5	To develop practical knowledge in creating dynamic and responsive web applications.

SYLLABUS		
Unit	Contents	Hours
	1. Create a web page using basic HTML tags to display personal information with headings, paragraphs, and text formatting. 2. Design a web page containing ordered lists, unordered lists, hyperlinks, and images. 3. Create a timetable using HTML tables with proper row span and column span. 4. Design a registration form using HTML form elements such as text box, radio button, checkbox, drop-down list, and submit button. 5. Create a web page using CSS to demonstrate different selectors, colors, fonts, borders, margins, and padding. 6. Design a responsive web page layout using Flexbox or CSS Grid with header, navigation menu, content section, and footer. 7. Write a PHP program to perform arithmetic operations using variables and operators. 8. Develop a PHP program to find whether a given number is odd or even using conditional statements. 9. Write a PHP program to display the multiplication table of a given number using loops. 10. Create a PHP program using functions to calculate the factorial of a number. 11. Develop a PHP form validation program to accept student details and display the submitted data. 12. Write a PHP program to connect with MySQL database and perform insert and display operations on a student table.	30

Recommended Text Book:
1. World Wide Web Design with HTML, C.Xavier, 2007, TMH. 2. Dr.P.Rizwan Ahmed, Open Source Programming, Margham Publications, 2022
Reference Book:
1. HTML, CSS, and JavaScript All in One – Robin Nixon 2. Learning PHP, MySQL & JavaScript – Robin Nixon 3. PHP & MySQL: Server-side Web Development – Jon Duckett
Web Resources:
1. https://www.coursera.org 2. https://www.edx.org 3. https://www.freecodecamp.org/

Course Outcomes		
Upon successful completion of this course, the student will be able to:		
CO No.	CO Statement	Cognitive Level (K-Level)
CO1	Students will be able to create structured web pages using HTML elements, forms, tables, and multimedia components.	K1,K2,K3
CO2	Students will be able to apply CSS techniques for designing responsive and visually appealing web pages.	K1, K2, K3,K4
CO3	Students will be able to implement JavaScript for DOM manipulation, event handling, and form validation.	K1,K2,K3
CO4	Students will be able to develop PHP programs using variables, functions, loops, and conditional statements.	K1,K2,K3,K5

CO5	Students will be able to connect PHP applications with MySQL databases and perform basic database operations.	K1,K2,K3,K5, K6
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Relationship Matrix:

Course Outcomes (COs)	Program Outcomes (POs)							Program Specific Outcomes(PSOs)					Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	3	2	2	2	2	3	1	3	2	2	1	1	2.0
CO2	3	2	3	2	2	3	1	3	3	2	1	1	2.2
CO3	3	2	3	3	3	3	1	3	3	2	2	1	2.4
CO4	3	1	3	3	3	3	1	3	3	3	2	1	2.4
CO5	3	2	3	3	3	3	2	3	3	3	3	2	2.8
Mean Overall Score													2.36
Correlation													High

3 – Strong, 2- Medium, 1- Low

Mean Overall Score	Correlation
<=1	Low
>1 & <=2	Medium
>2 & <=3	High

Semester	Course Code	Course Category	Hours / Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
IV		Skill Enhancement Course – (SEC) -7	2	2	25	75	100
Course Title		Introduction to Data Science					

Learning Objectives	
LO1	To learn about basics of Data Science and Big data.
LO2	To learn about overview and building process of Data Science.
LO3	To learn about various Algorithms in Data Science.
LO4	To learn about Hadoop Framework.
LO5	To learn about case study about Data Science.

SYLLABUS		
Unit	Contents	Hours
I	Introduction: Benefits and uses – Facts of data – Data science process – Big data ecosystem and data science.	6
II	The Data science process: Overview – research goals - retrieving data - transformation – Exploratory Data Analysis – Model building .	6
III	Algorithms : Machine learning algorithms – Modeling process – Types – Supervised – Unsupervised - Semi-supervised	6
IV	Introduction to Hadoop : Hadoop framework – Spark – replacing MapReduce– NoSQL – ACID – CAP – BASE – types	6

V	Case Study: Prediction of Disease - Setting research goals - Data retrieval – preparation - exploration - Disease profiling - presentation and automation	6
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Recommended Text Books:

1. Annalyn Ng, Kenneth Soo, –Numsense! Data Science for the Layman: No Math Added!, 2017, 1st Edition.
2. Dr.P.Rizwan Ahmed, Introduction to Data Science, Margham Publications, Chennai, 2025

Reference Books:

1. Cathy O'Neil, Rachel Schutt, –Doing Data Science Straight Talk from the Frontline!, O'Reilly Media 2013
2. Davy Cielen, Arno D. B. Meysman, Mohamed Ali, –Introducing Data Science!, manning publications 2016

Web Resources:

1. <https://www.w3schools.com/datascience/>
2. https://en.wikipedia.org/wiki/Data_science
3. <http://www.cmap.polytechnique.fr/~lepenne/en/post/references/refs/>

Course Outcomes

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

CO No.	CO Statement	Cognitive Level (K-Level)
CO1	Understand the basics in Data Science and Big data.	K1,K2,K3
CO2	Understand overview and building process in Data Science.	K1,K2,K3
CO3	Understand various Algorithms in Data Science.	K1,K2,K3
CO4	Understand Hadoop Framework in Data Science.	K1,K2,K3
CO5	Case study in Data Science.	K1,K2,K3,K4, K6

Relationship Matrix:

Course Outcomes (COs)	Program Outcomes (POs)							Program Specific Outcomes(PSOs)					Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	3	1	2	2	2	3	1	3	2	2	1	1	1.9
CO2	3	2	3	2	3	3	1	3	3	2	2	1	2.3
CO3	3	2	3	3	3	3	1	3	3	3	2	1	2.5
CO4	3	1	3	3	3	3	1	3	3	3	2	2	2.5
CO5	3	2	3	3	3	3	2	3	3	3	3	2	2.8
Mean Overall Score													2.4
Correlation													High

3 – Strong, 2- Medium, 1- Low

Mean Overall Score	Correlation
<=1	Low
>1 & <=2	Medium
>2 & <=3	High