SRI MEENAKSHI GOVT. ARTS COLLEGE FOR WOMEN (AUTONOMOUS)

MADURAI – 625 002.

PG AND RESEARCH DEPARTMENT OF COMPUTER SCIENCE

B.Sc. COMPUTER SCIENCE

SYLLABUS TO BE INTRODUCED FROM THE ACADEMIC YEAR 2023 – 2024 (UNDER C.B.C.S)

B.Sc. Computer Science Curriculum Design

First Year

Semester-I-

Sub.Code	Part	List of Courses	Credit	Hours per week (L/T/P)
U231A1/U231H1	Part-I	Language	3	6
U232A1	Part-II	English	3	6
U23CS1	Part-III	Python Programming	5	5
U23CS2P		Python Programming Lab	3	3
U23GS35		Discrete Mathematics -I	4	4
U23GS50P		Programming in C Lab	-	2
U23SES1P	Part-IV	Office Automation Lab	2	2
U23FS1		Problem Solving Techniques	2	2
			22	**30**

Semester-II

Sub.Code	Part	List of Courses	Credit	Hours per week(L/T/P)
U231A2/U231H2	Part-I	Language	3	6
U232A2	Part-II	English	3	6
U23CS3	Part-III	Data Structure and Algorithms using C++	5	5
U23CS4P		Data Structure and Algorithms using C++ Lab	3	3
U23GS50P		Programming in C Lab	2	2
U23GS45		Digital Logic Fundamentals	4	4
U23SES2P	Part-IV	Multimedia Lab	2	2
U23SES3		Multimedia Systems	2	2
			24	**30**

Second Year

Semester-III

Sub.code	Part	List of Courses	Credit	Hours per week(L/T/P
U231A3/U231H3	Part-I	Language	3	6
U232A3	Part-II	English	3	6
U23CS5	Part-III	Microprocessor and Microcontroller	4	5
U23CS6P		Microprocessor and Microcontroller Lab	3	3
U23GS37		Statistical Methods and its Application-I	4	4
U23GS51P		PHP Programming Lab	-	2
U23SES4	Part-IV	Fundamentals of Information Technology	1	1
U23SES5P		Visual Basic Lab	2	2
U23EVS1		Environmental Studies	-	1
			20	**30**

Semester-IV

Sub Code	Part	List of Courses	Credit	Hours per week (L/T/P)
U231A4/U231H4	Part-I	Language	3	6
U232A4	Part-II	English	3	6
U23CS7	Part-III	Java Programming	4	4
U23CS8P		Java Programming Lab	3	3
U23GS51P		PHP Programming Lab	2	2
U23GS47		Resource Management Techniques	4	4
U23SES6P	Part-IV	Web Designing Lab	2	2
U23SES57		Biometrics	2	2
U23EVS1		Environmental Studies	2	1
			25	**30**

Third Year
Semester-V

Sub code	Part	List of Courses	Credit	Hours per week (L/T/P)
U23CS9	Part-III	Software Engineering	5	5
U23CS10		Database Management System	5	5
U23CS11P		Database Management System Lab	3	6
U23SPW		Project with Viva voce	4	4
U23DS19		Data Mining and Warehousing	3	4
U23DS20		Operating System	3	4
U23VE1	Part-IV	Value Education	2	2
U23SIS1		Internship / Industrial Training	2	-
			27	**30**

Semester-VI

Sub code	Part	List of Courses	Credit	Hours per week (L/T/P)
U23CS13	Part-III	Computer Networks	5	6
U23CS14		.NET Programming	5	6
U23CS15P		.NET Programming Lab	3	6
U23DS22		Computer Graphics	3	5
U23DS23		Artificial Intelligence	3	5
U23PCS1P	Part-IV	Image Processing using MATLAB	2	2
U23EAS		Extension Activity	1	
			21	**30**

Total Credits : 140

COURSE STRUCTURE ABSTRACT

FOR ALL B.ScProgrammes

Part	Course	Total No. ofPapers	Hours	Credit	Marks
I	Tamil	4	24	12	400
II	English	4	24	12	400
III	Core Course -Major(CCM)	15	69	60	1500
III	GEC– Elective Course (Allied)	6	24	20	600
III	DSEC –Elective Course	4	18	12	400
III	Internship	1	--	2	100
IV	Skill Enhancement Course (SEC-6 & NM)	7	13	13	700
IV	Foundation Course	1	2	2	100
IV	E.V.S.	1	2	2	100
IV	Value Education	1	2	2	100
IV	Extension Activity/NSS/NCC/SPORTS	1	-	1	100
IV	Professional Competency Skill	1	2	2	100
Total		**46**	**180**	**140**	**4600**

Annexure I

Suggested topics in Core component

1. Programming in C
2. Programming in C Lab
3. Object oriented Programming using C++
4. Object oriented Programming using C++ Lab
5. Mobile Application Development
6. Mobile Application Development Lab
7. Data Analytics using R
8. Data Analytics using R Lab
9. Machine Learning
10. Machine Learning Lab
11. Data Mining and Warehousing
12. Software Metrics
13. Network Security

Suggested topics in Elective Course

Generic Specific

S.NO	CODE	COURSE
1	**U23GS35**	Discrete Mathematics – I
2	**U23GS36**	Discrete Mathematics-II
3	**U23GS37**	Statistical Methods and its Application-I
4	**U23GS38**	Statistical Methods and its Application-II
5	**U23GS39**	Optimization Techniques
6	**U23GS40**	Nano Technology
7	**U23GS41**	Introduction to Linear Algebra
8	**U23GS42**	Graph Theory and its Application
9	**U23GS43**	Financial Accounting
10	**U23GS44**	Cost and Management Accounting

11	**U23GS45**	Digital Logic Fundamentals
12	**U23GS46**	Numerical Methods
13	**U23GS47**	Resource Management Techniques
14	**U23GS48**	Database Management System
15	**U23GS49P**	RDBMS Lab
16	**U23GS50P**	Programming in C lab
17	**U23GS51P**	PHP Programming Lab

Elective course – (EC1- EC8)-Discipline Specific

SNO	**Subject Code**	**Name of the Course**
1	**U23DS01**	Software Metrics
2	**U23DS02**	Natural Language Processing
3	**U23DS03**	Analytics for Service Industry
4	**U23DS04**	Cryptography
5	**U23DS05**	Big Data Analytics
6	**U23DS06**	IOT and its Applications
7	**U23DS07**	Software Project Management
8	**U23DS08**	Image Processing
9	**U23DS09**	Information Security
10	**U23DS10**	Human Computer Interaction
11	**U23DS11**	Fuzzy Logic
12	**U23DS12**	Mobile Adhoc Network
13	**U23DS13**	Computational Intelligence

14	**U23DS14**	Grid Computing
15	**U23DS15**	Cloud Computing
16	**U23DS16**	Artificial Neural Network
17	**U23DS17**	Agile Project Management
18	**U23DS18**	PHP Programming
19	**U23DS19**	Data mining and Warehousing
20	**U23DS20**	Operating System
21	**U23DS21**	Computer Graphics
22	**U23DS22**	Artificial Intelligence

Suggested topics in Skill Enhancement (SEC1-SEC8) Course

Skill Enhancement Course

1. Fundamentals of Information Technology
2. Introduction to HTML Lab
3. Web Designing Lab
4. Software Testing
5. Problem Solving Techniques
6. Understanding Internet
7. Office Automation Lab
8. Quantitative Aptitude
9. Open Source Technologies
10. Multimedia Systems
11. Advanced Excel
12. Biometrics
13. Cyber Forensics
14. Pattern Recognition

15. Enterprise Resource Planning

16. Multimedia Lab

17. Visual Basic Lab

I. QUESTION PAPER PATTERN FOR EXTERNAL EXAMINATION

1. <u>Core, Major Elective and Allied Papers</u>

Section - A	5 compulsory questions (1 question from each unit)	5 X 2 = 10 Marks
Section - B	5 questions to be answered under 'either – or' pattern (2 questions from each unit)	5 X 5 = 25 Marks
Section - C	5 questions to be answered under 'either – or' pattern (2 questions from each unit)	5 X 8 = 40 Marks
	Total	75 Marks

2. Skill Based Elective Papers

Section - A	5 questions to be answered under 'either – or' pattern (2 question from each unit)	5 X 15 =75 Marks
	Total	75 Marks

3. Non Major Elective Papers

Section - A	5 questions to be answered under 'either – or' pattern (2 questions from each unit)	5 X 5 = 25 Marks
Section - B	5 questions to be answered under 'either – or' pattern (2 questions from each unit)	5 X 10 = 50 Marks
	Total	75 Marks

. Value Added Course

Internal - 20

External - 30

Total - 50

I. EVALUATION PATTERN

1. Theory Paper

Internal

Test	20
Quiz/Assignment	5

Total	25

Internal - 25

External - 75

Total - 100

2. Practical Paper

Internal

Record	5
Viva-Voce	5
Internal Practical Exam	15
Total	25

Internal - 25

External - 75

Total - 100

3. Project

Internal Assessment	25
Viva-Voce	75
Total	100

II. **PASSING MINIMUM**

External				Project - Passing Minimum		Internal
Theory - Passing Minimum		Practical - Passing Minimum				Passing Minimum
35% (**27** Marks	Aggregate of **40 Marks in Total**	35% (**21** Marks	Aggregate of **40 Marks in Total**	35% (**28** Marks)	Aggregate of **40 Marks in Total**	**No**

SYLLABUS

First Year (Semester – I)

Subject Code	Subject Name	Category	L	T	P	S	Credits	Marks		
								CIA	External	Total
CC1	Python programming	**Core**	5	-	-	-	5	25	75	100

Learning Objectives	
LO1	To make students understand the concepts of Python programming.
LO2	To apply the OOPs concept in PYTHON programming.
LO3	To impart knowledge on demand and supply concepts
LO4	To make the students learn best practices in PYTHON programming
LO5	To know the costs and profit maximization

UNIT	**Contents**	**No. of Hours**

I	**Basics of Python Programming:** History of Python-Features of Python-Literal-Constants-Variables - Identifiers–Keywords-Built-in Data Types-Output Statements – Input Statements-Comments – Indentation-Operators-Expressions-Type conversions. **Python Arrays:** Defining and Processing Arrays – Array methods.	**15**
II	**Control Statements:** Selection/Conditional Branching statements: if, if-else, nested if and if-elif-else statements. Iterative Statements: while loop, for loop, else suite in loop and nested loops. **Jump Statements:** break, continue and pass statements**.**	**15**
III	**Functions:** Function Definition – Function Call – Variable Scope and its Lifetime-Return Statement. **Function Arguments**: Required Arguments, Keyword Arguments, Default Arguments and Variable Length Arguments- Recursion. **Python Strings:** String operations- Immutable Strings - Built-in String Methods and Functions - String Comparison.**Modules**: import statement- The Python module – dir() function – Modules and Namespace – Defining our own modules.	**15**
IV	**Lists:** Creating a list -Access values in List-Updating values in Lists-Nested lists -Basic list operations-List Methods. Tuples: Creating, Accessing, Updating and Deleting Elements in a tuple – Nested tuples– Difference between lists and tuples. **Dictionaries:** Creating, Accessing, Updating and Deleting Elements in a Dictionary – Dictionary Functions and Methods - Difference between Lists and Dictionaries.	**15**
V	**Python File Handling:** Types of files in Python - Opening and Closing files-Reading and Writing files: write() and writelines() methods- append() method – read() and readlines() methods – with keyword – Splitting words – File methods - File Positions- Renaming and deleting files.	**15**
	TOTAL HOURS	**75**

Course Outcomes		**Programme Outcomes**
CO	On completion of this course, students will	
CO1	● Learn the basics of python, Do simple programs on python, Learn how to use an array.	PO1, PO2, PO3, PO4, PO5, PO6
CO2	● Develop program using selection statement, Work with Looping and jump statements, Do programs on Loops and jump statements.	PO1, PO2, PO3, PO4, PO5, PO6
CO3	Concept of function, function arguments, Implementing the concept strings in various application, Significance of Modules, Work with functions, Strings and modules.	PO1, PO2, PO3, PO4, PO5, PO6
CO4	● Work with List, tuples and dictionary, Write program using list, tuples and dictionary.	PO1, PO2, PO3, PO4, PO5, PO6
CO5	Usage of File handlings in python, Concept of reading and writing files, Do programs using files.	PO1, PO2, PO3, PO4, PO5, PO6

Textbooks	
1	ReemaThareja, “Python Programming using problem solving approach”, First Edition, 2017, Oxford University Press.
2	Dr. R. NageswaraRao, “Core Python Programming”, First Edition, 2017, Dream tech Publishers.
Reference Books	
1.	VamsiKurama, “Python Programming: A Modern Approach”, Pearson Education.
2.	Mark Lutz, ”Learning Python”, Orielly.
3.	Adam Stewarts, “Python Programming”, Online.
4.	Fabio Nelli, “Python Data Analytics”, APress.
5.	Kenneth A. Lambert, “Fundamentals of Python – First Programs”, CENGAGE Publication.
Web Resources	
1.	https://www.programiz.com/python-programming
2.	https://www.guru99.com/python-tutorials.html
3.	https://www.w3schools.com/python/python_intro.asp
4.	https://www.geeksforgeeks.org/python-programming-language/
5.	https://en.wikipedia.org/wiki/Python_(programming_language)

Mapping with Programme Outcomes:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	3	3	3	3
CO 2	3	3	3	3	2	3
CO 3	3	3	3	3	2	2
CO 4	3	3	3	3	2	3
CO 5	3	2	3	3	3	3
Weightage of course contributed to each PSO	15	14	15	15	13	14

S-Strong-3 M-Medium-2 L-Low-1

Subject Code	Subject Name	Category	L	T	P	S	Credits	Marks		
								CIA	External	Total
CC2	**Python Programming Lab**	**Core**	-	-	3	-	3	25	75	100

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.

LAB EXERCISES	**Required Hours**
1. Program using variables, constants, I/O statements in Python. 2. Program using Operators in Python. 3. Program using Conditional Statements. 4. Program using Loops. 5. Program using Jump Statements. 6. Program using Functions. 7. Program using Recursion. 8. Program using Arrays. 9. Program using Strings. 10. Program using Modules. 11. Program using Lists. 12. Program using Tuples. 13. Program using Dictionaries. 14. Program for File Handling.	**75**

Course Outcomes	
On completion of this course, students will	
CO1	Demonstrate the understanding of syntax and semantics of PYTHON language
CO2	Identify the problem and solve using PYTHON programming techniques.
CO3	Identify suitable programming constructs for problem solving.
CO4	Analyze various concepts of PYTHON language to solve the problem in an efficient way.
CO5	Develop a PYTHON program for a given problem and test for its correctness.

Mapping with Programme Outcomes:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	3	3	3	3
CO 2	3	3	1	3	2	3
CO 3	3	3	3	3	2	2
CO 4	3	3	3	3	2	3
CO 5	3	2	3	3	3	3
Weightage of course contributed to each PSO	15	15	13	15	13	14

Subject Code	Subject Name	Category	L	T	P	S	Credits	Marks		
								CIA	External	Total
GEC1	Discrete Mathematics – I	**Elect**	4	-	-		4	25	75	100

Learning Objectives	
LO1	To understand the mathematical concepts like set theory, logics, number theory, combinatory and relations.
LO2	To Explain the Relations concepts and their properties
LO3	To know the Applications of recurrence relations
LO4	To understand the Graphs and Graphs models
LO5	To explain the Matrices concepts

UNIT	Contents	No. Of. Hours
I	***SET THEORY*** Introduction- set and Its Element – Set Description (Roster, Set Builder and cardinal number method) Types of Sets- Set Operations and Laws of set Theory. Partition of sets. Minsets-Countable and un Countable set. Algebra of sets andDuality	**12**
II	***MATHEMATICAL LOGIC*** Basic Logic and Proof, logical operations – Logic Propositional equivalence, Predicates and Quantities, Tautology-Contradiction-Methods of proofs(Direct and Indirect)- Function- Definition-Notation- Types of Function- Composition of Functions-	**12**

III	***NUMBER THEORY*** The Integers and Division, Integers and Algorithms,(Multiplication, Addition and Division-Sequences and Summations, Recursive algorithms, Program correctness	**12**
IV	***COMBINATORICS*:** The basics of counting, the pigeonhole principle, Permutations and Combinations, Binomial coefficients, Generalized permutations and combinations	**12**
V	***RELATIONS*** Relations – Relations and their properties, Representing Relations, Closures of relations, Equivalence relations, Partial orderings-Recurrence Relations Binary Relations.	**12**

Total hours		**60**
Course Outcomes		**Programme Outcomes**
CO	On completion of this course, students will	
CO1	To understand the mathematical concepts like set theory, logics, number theory, combinatory and relations.	PO1, PO2, PO3, PO4, PO5, PO6
CO2	To understand different mathematical logics and functions	PO1, PO2, PO3, PO4, PO5, PO6
CO3	To Understanding the different form of number theory	PO1, PO2, PO3, PO4, PO5, PO6
CO4	To gain knowledge on set theory	PO1, PO2, PO3, PO4, PO5, PO6
CO5	Able to understand Relations and its applications	PO1, PO2, PO3, PO4, PO5, PO6

Textbooks

1	Discrete Mathematics and its applications, Seventh Edition, Kenneth.H.Rosen, McGrawHill Publishing Company, 2012.
2.	Discrete Mathematics, M Venkatraman, N Sridharan and N Chandrasekaran, The National Publishing Company, 2009
3.	J.K Sharma “DISCRETE MATHEMATICS” 3 rd Edition Macmillan Reprint2011

Reference Books

1.	Modern Algebra - S.Arumugam and A. Thangapandi Isaac,

	Scitechpublications 2005.
2.	Invitation to Graph Theory-S.Arumugam and S.Ramachandran, Scitech Publications,2005, Chennai.
3.	Discrete Mathematical Structures with applications to Computer Science - Tremblay and Manohar, McGraw Hill,1997.
Web Resources	
1.	Web resources from NDL Library, E-content from open-source libraries

Mapping with Programme Outcomes:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	3	3	3	3
CO 2	3	3	1	3	2	3
CO 3	3	3	3	3	2	2
CO 4	3	3	3	3	2	3
CO 5	3	2	3	3	3	3
Weightage of course contributed to each PSO	15	15	13	15	13	14

S-Strong-3 M-Medium-2 L-Low-1

Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
GEC2(P)	PROGRAMMING IN C LAB	Core	-	-	2	-	-	2	-	-	-

Course Objective	
LO1	To familiarize the students with the Programming basics and the fundamentals of C, Datatypes in C, Mathematical and logical operations.
LO2	To understand the concept using if statements and loops
LO3	This unit covers the concept of Arrays and Functions
LO4	This unit covers the concept of Structurs and unions and Preprocessors
LO5	To understand the concept of implementing pointers and files

UNIT	List of Excercises	No. of Hours	Course Objectives
I	**Unit I : Variables, Data types, Constants and Operators** 1.Evaluation of expression ex: ((x+y) ^2 * (x+z))/w 2.Temperature conversion problem (Fahrenheit to Celsius) 3.Program to convert days to months and days (Ex: 364 days = 12 months and 4 days) 4.Solution of quadratic equation 5.Salesman salary (Given: Basic Salary, Bonus for every item sold, commission on the total monthly sales)	12	
II	**Unit II: Decision making Statements** 6.Maximum of three numbers 7.Calculate Square root of five numbers (using gototatement) 8.Pay-Bill Calculation for different levels of employee (Switch statement) 9. Fibonacci series 10.Floyds Triangle 11.Pascal's Triangle	12	
III	**Unit III: Arrays, Functions and Strings** 12.Prime numbers in an array 13.Sorting data (Ascending and Descending) 14.Matrix Addition and Subtraction 15.Matrix Multiplication 16.Function with no arguments and no return values 17.Function that convert lower case letters to upper case	12	

	18. Factorial using recursion. 19.Perform String Operations using Switch Case.	
IV	**Unit IV : Structures and Macros** 20.Structure that describes a Hotel (name, address, grade, avg room rent, number of rooms) Perform some operations (list of hotels of a given grade etc.) 21. Using Pointers in Structures. 22.Cricket team details using Union. 23.Write a macro that calculates the max and min of two numbers 24.Nested macro to calculate Cube of a number.	12
V	**Unit V : Pointers and Files** 25.Evaluation of Pointer expressions 26.Function to exchange two pointer values 27.Creation, insertion and deletion in a linked list 28.Program to read a file and print the data. 29.Program to receive a file name and a line of text as command line arguments and write the text to the file 30. Program to copy the content of one file to another file.	12
	Total	**60**

Course Outcomes		**Programme Outcome**
CO	On completion of this course, students will	
1	Remember the program structure of C with its syntax and semantics	PO1,PO3,PO5
2	Understand the programming principles in C (data types, operators, branching and looping, arrays, functions, structures, pointers and files)	PO2,PO3,PO6
3	Apply the programming principles learnt in real-time problems	PO3,PO4
4	Analyze the various methods of solving a problem and choose the best method	PO4,PO5,PO6
5	Code, debug and test the programs with appropriate test cases	PO4,PO6

Text Book

1	E. Balagurusamy, Programming in ANSI C, Fifth Edition, Tata McGraw-Hill, 2010.
Reference Books	
1.	Byron Gottfried, Schaum's Outline Programming with C, Fourth Edition, Tata McGraw-Hill, 2018.
2.	Kernighan and Ritchie, The C Programming Language, Second Edition, Prentice Hall, 1998
3.	YashavantKanetkar, Let Us C, Eighteenth Edition, BPB Publications,2021
Web Resources	
1.	https://codeforwin.org/
2.	https://www.geeksforgeeks.org/c-programming-language/
3.	http://en.cppreference.com/w/c
4.	http://learn-c.org/
5.	https://www.cprogramming.com/

Mapping with Programme Outcomes:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	3	3	3	3
CO 2	2	3	3	3	3	3
CO 3	3	3	2	3	3	2
CO 4	3	3	3	3	3	3
CO 5	3	3	3	3	3	3
Weight age of course contributed to each PSO	14	15	14	15	15	14

S-Strong-3 M-Medium-2 L-Low-1

Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
SEC-1	OFFICE AUTOMATION	Skill Enha. Course (SEC)	-	-	2	-	2	2	25	75	100

Learning Objectives	
LO1	Understand the basics of computer systems and its components.
LO2	Understand and apply the basic concepts of a word processing package.
LO3	Understand and apply the basic concepts of electronic spreadsheet software.
LO4	Understand and apply the basic concepts of database management system.
LO5	Understand and create a presentation using PowerPoint tool.

UNIT	Contents	No. of Hours
I	**Introductory concepts:** Memory unit– CPU-Input Devices: Key board, Mouse and Scanner.Outputdevices:Monitor,Printer.IntroductiontoOperatingsystems&itsfeatures:DOS– UNIX–Windows. IntroductiontoProgrammingLanguages.	6
II	**Word Processing:** Open, Save and close word document; Editing text – tools, formatting, bullets;SpellChecker - Document formatting – Paragraph alignment, indentation, headers and footers,numbering;printing–Preview,options,merge.	6
III	**Spreadsheets:**Excel–opening,enteringtextanddata,formatting,navigating;Formulas–entering,handlingand copying;Charts–creating,formatting and printing,analysistables,preparationoffinancialstatements,introductionto dataanalytics.	6
IV	**Database Concepts:** The concept of data base management system; Data field, records, and files,Sorting and indexing data; Searching records. Designing queries, and reports; Linking of datafiles; Understanding Programming environment in DBMS; Developing menu drive applicationsinquerylanguage(MS–Access).	6

V	**Power point:** Introduction to Power point - Features – Understanding slide typecasting &viewingslides – creating slide shows. Applying special object – including objects & pictures – Slidetransition–Animationeffects,audioinclusion,timers.	6
	Total	**30**

Course Outcomes		**Programme Outcomes**
CO	On completion of this course, students will	
CO1	Possess the knowledge on the basics of computers and its components	PO1,PO2,PO3,PO6,PO8
CO2	Gain knowledge on Creating Documents, spreadsheet and presentation.	PO1,PO2,PO3,PO6
CO3	Learn the concepts of Database and implement the Query in Database.	PO3,PO5,PO7
CO4	Demonstrate the understanding of different automation tools.	PO3,PO4,PO5,PO7
CO5	Utilize the automation tools for documentation, calculation and presentation purpose.	PO4,PO6,PO7,PO8
Text Book		
1	PeterNorton,"IntroductiontoComputers"–TataMcGraw-Hill.	
Reference Books		
1.	Jennifer Ackerman Kettel, Guy Hat-Davis, Curt Simmons, "Microsoft 2003", Tata McGrawHill.	
Web Resources		
1.	https://www.udemy.com/course/office-automation-certificate-course/	
2.	https://www.javatpoint.com/automation-tools	

Mapping with Programme Outcomes:

MAPPING TABLE						
CO/ PSO	**PSO 1**	**PSO 2**	**PSO 3**	**PSO 4**	**PSO 5**	**PSO 6**
CO1	**3**	**2**	**2**	**3**	**3**	**3**
CO2	**3**	**3**	**3**	**3**	**3**	**3**
CO3	**3**	**3**	**3**	**3**	**3**	**3**
CO4	**3**	**3**	**3**	**3**	**3**	**3**
CO5	**3**	**3**	**3**	**3**	**3**	**3**

Weightage of course contributed to each PSO	15	14	14	15	15	15

S-Strong-3 M-Medium-2 L-Low-1

Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
FC	**Problem Solving Techniques**	FC	2	-	-	-	2	2	25	75	100

Learning Objectives	
LO1	Familiarize with writing of algorithms, fundamentals of C and philosophy of problem solving.
LO2	Implement different programming constructs and decomposition of problems into functions.
LO3	Use data flow diagram, Pseudo code to implement solutions.
LO4	Define and use of arrays with simple applications
LO5	Understand about operating system and their uses

UNIT	Contents	No. Of. Hours
I	**Introduction:** History, characteristics and limitations of Computer. Hardware/Anatomy of Computer: CPU, Memory, Secondary storage devices, Input Devices and Output devices. Types of Computers: PC, Workstation, Minicomputer, Main frame and Supercomputer. Software: System software and Application software. **Programming Languages:** Machine language, Assembly language, High-level language,4 GL and 5GL-Features of good programming language. Translators: Interpreters and Compilers.	**6**
II	**Data:** Data types, Input, Processing of data, Arithmetic Operators, Hierarchy of operations and Output. Different phases in Program Development Cycle (PDC).**Structured Programming: Algorithm:** Features of good algorithm, Benefits and drawbacks of algorithm. **Flowcharts:** Advantages and limitations of flowcharts, when to use flowcharts, flowchart symbols and types of flowcharts.**Pseudocode:** Writing a pseudocode. Coding, documenting and testing a program: Comment lines and types of errors. **Program design:** Modular Programming.	**6**
III	**Selection Structures:** Relational and Logical Operators -Selecting from Several Alternatives – Applications of Selection Structures.	**6**

	Repetition Structures: Counter Controlled Loops –Nested Loops– Applications of Repetition Structures.	
IV	**Data:** Numeric Data and Character Based Data. **Arrays:** One Dimensional Array - Two Dimensional Arrays – Strings as Arrays of Characters.	**6**
V	**Data Flow Diagrams:** Definition, DFD symbols and types of DFDs. **Program Modules:** Subprograms-Value and Reference parameters-Scope of a variable - Functions – Recursion. **Files:** File Basics-Creating and reading a sequential file- Modifying Sequential Files.	**6**
	TOTAL HOURS	**30**

Course Outcomes		**Programme Outcomes**
CO	On completion of this course, students will	
CO1	• Study the basic knowledge of Computers. Analyze the programming languages.	PO1, PO2, PO3, PO4, PO5, PO6
CO2	Study the data types and arithmetic operations. Know about the algorithms. Develop program using flow chart and pseudocode.	PO1, PO2, PO3, PO4, PO5, PO6
CO3	Determine the various operators. Explain about the structures. Illustrate the concept of Loops	PO1, PO2, PO3, PO4, PO5, PO6
CO4	Study about Numeric data and character-based data. Analyze about Arrays.	PO1, PO2, PO3, PO4, PO5, PO6
CO5	Explain about DFD Illustrate program modules. Creating and reading Files	PO1, PO2, PO3, PO4, PO5, PO6

Textbooks

1	**Stewart Venit,** "Introduction to Programming: Concepts and Design", Fourth Edition, 2010, Dream Tech Publishers.

Web Resources

1.	https://www.codesansar.com/computer-basics/problem-solving-using-computer.htm
2.	http://www.nptel.iitm.ac.in/video.php?subjectId=106102067
3.	http://utubersity.com/?page_id=876

Mapping with Programme Outcomes:

CO/PSO	**PSO 1**	**PSO 2**	**PSO 3**	**PSO 4**	**PSO 5**	**PSO 6**
CO 1	3	3	3	3	3	3
CO 2	3	3	3	3	3	3

CO 3	3	2	3	3	3	3
CO 4	3	3	2	3	3	3
CO 5	3	3	3	3	3	2
Weightage of course contributed to each PSO	15	14	14	15	15	14

S-Strong-3 M-Medium-2 L-Low-1

First Year (Semester – II)

Title of the Course/ Paper	**Subject Name**	**Category**	**L**	**T**	**P**	**S**	**Credits**	**Inst. Hours**	**Marks**		
									CIA	**External**	**Total**
CC3	**DATA STRUCTURES AND ALGORITHMS**	Core	5	-	-	-	5	5	25	75	100

Learning Objectives		
LO1	To understand the concepts of ADTs	
LO2	To learn linear data structures-lists, stacks, queues	
LO3	To learn Tree structures and application of trees	
LO4	To learn graph strutures and and application of graphs	
LO5	To understand various sorting and searching	
UNIT	**Contents**	**No. of Hours**
I	Abstract Data Types (ADTs)- List ADT-array-based implementation-linked list implementationsingly linked lists-circular linked lists-doubly-linked lists-applications of lists-Polynomial Manipulation- All operations-Insertion-Deletion-Merge-Traversal	15
II	Stack ADT-Operations- Applications- Evaluating arithmetic expressions – Conversion of infix topostfix expression-Queue ADT-Operations-Circular Queue- Priority Queue- deQueueapplications of queues.	15
III	Tree ADT-tree traversals-Binary Tree ADT-expression trees-applications of trees-binary search tree ADT- Threaded Binary Trees-AVL Trees-B-Tree- B+ Tree – Heap-Applications of heap.	15
IV	Definition- Representation of Graph- Types of graph-Breadth first traversal – Depth first traversal-Topological sort- Bi-connectivity – Cut vertex- Euler circuits-Applications of graphs.	15

V	Searching- Linear search-Binary search-Sorting-Bubble sort-Selection sort-Insertion sort-Shell sort-Radix sort-Hashing-Hash functions-Separate chaining- Open Addressing-RehashingExtendible Hashing	15
	Total	**75**

Course Outcomes		**Programmeme Outcome**
CO	On completion of this course, students will	
CO1	Understand the concept of Dynamic memory management, data types, algorithms, Big O notation	PO1,PO6
CO2	Understand basic data structures such as arrays, linked lists, stacks and queues	PO2
CO3	Describe the hash function and concepts of collision and its resolution methods	PO2,PO4
CO4	Solve problem involving graphs, trees and heaps	PO4,PO6
CO5	Apply Algorithm for solving problems like sorting, searching, insertion and deletion of data	PO5,PO6

Text Book	
1	1. Mark Allen Weiss, "Data Structures and Algorithm Analysis in C++", Pearson Education 2014, 4th Edition.
2	ReemaThareja, "Data Structures Using C", Oxford Universities Press 2014, 2nd Edition
Reference Books	
1.	Thomas H.Cormen,ChalesE.Leiserson,RonaldL.Rivest, Clifford Stein, "Introduction to Algorithms", McGraw Hill 2009, 3rd Edition.
2.	Aho, Hopcroft and Ullman, "Data Structures and Algorithms", Pearson Education 2003
Web Resources	
1.	https://www.programiz.com/dsa
2.	https://www.geeksforgeeks.org/learn-data-structures-and-algorithms-dsa-tutorial/

Mapping with Programme Outcomes:

CO/PSO	**PSO 1**	**PSO 2**	**PSO 3**	**PSO 4**	**PSO 5**	**PSO 6**
CO 1	3	3	3	3	3	3
CO 2	3	3	1	3	3	3
CO 3	3	3	3	2	3	2
CO 4	3	2	3	2	3	3
CO 5	3	3	3	3	3	3
Weightage of course contributed to each PSO	15	14	13	13	15	14

S-Strong-3 M-Medium-2 L-Low-1

Title of the Course/ Paper	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
CC4	**DATA STRUCTURES AND ALGORITHMS LAB** [Note: Practicals may be offered through C / C++ / Python]	Core	-	-	3	-	3	3	25	75	100
Learning Objectives											
LO1	To understand the concepts of ADTs										
LO2	To learn linear data structures-lists, stacks, queues										
LO3	To learn Tree structures and application of trees										
LO4	To learn graph strutures and and application of graphs										
LO5	To understand various sorting and searching										
Sl. No	**Contents**										**No. of Hours**
1.	Write a program to implement the List ADT using arrays and linked lists.										**75**
2.	Write a programs to implement the following using a singly linked list. ● Stack ADT ● Queue ADT										
3.	Write a program that reads an infix expression, converts the expression to postfix form and then evaluates the postfix expression (use stack ADT).										
4.	Write a program to implement priority queue ADT.										
5.	Write a program to perform the following operations: ● Insert an element into a binary search tree. ● Delete an element from a binary search tree. ● Search for a key element in a binary search tree.										
6.	Write a program to perform the following operations ● Insertion into an AVL-tree ● Deletion from an AVL-tree										

7.	Write a programs for the implementation of BFS and DFS for a given graph.	
8	Write a programs for implementing the following searching methods: ● Linear search ● Binary search.	
9.	Write a programs for implementing the following sorting methods: ● Bubble sort ● Selection sort ● Insertion sort ● Radix sort.	
	Total	**75**

Course Outcomes		**Programmem Outcome**
CO	On completion of this course, students will	
1	Understand the concept of Dynamic memory management, data types, algorithms, Big O notation	PO1,PO4,PO5
2	Understand basic data structures such as arrays, linked lists, stacks and queues	PO1, PO4,PO6
3	Describe the hash function and concepts of collision and its resolution methods	PO1,PO3,PO6
4	Solve problem involving graphs, trees and heaps	PO3,PO4
5	Apply Algorithm for solving problems like sorting, searching, insertion and deletion of data	PO1,PO5,PO6
Text Book		
1	Mark Allen Weiss, “Data Structures and Algorithm Analysis in C++”, Pearson Education 2014, 4th Edition.	
2	ReemaThareja, “Data Structures Using C”, Oxford Universities Press 2014, 2nd Edition	
Reference Books		
1	Thomas H.Cormen,ChalesE.Leiserson,RonaldL.Rivest, Clifford Stein, “Introduction to Algorithms”, McGraw Hill 2009, 3rd Edition	
2.	Aho, Hopcroft and Ullman, “Data Structures and Algorithms”, Pearson Education 2003	
Web Resources		
1.	https://www.programiz.com/dsa	
2.	https://www.geeksforgeeks.org/learn-data-structures-and-algorithms-dsa-tutorial/	

Mapping with Programme Outcomes:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6

CO 1	3	3	3	3	3	3
CO 2	3	3	1	3	2	3
CO 3	3	3	3	3	2	3
CO 4	3	3	3	3	2	3
CO 5	3	2	3	3	3	3
Weightage of course contributed to each PSO	15	15	13	15	13	15

S-Strong-3 M-Medium-2 L-Low-1

Subject Code	**Subject Name**	**Category**	**L**	**T**	**P**	**S**	**Credits**	**Inst. Hours**	**Marks**		
									CIA	**External**	**Total**
GEC2(P)	**PROGRAMMING IN C LAB**	Elective	-	-	2	-	2	2	25	75	100

Course Objective			
LO1	To familiarize the students with the Programming basics and the fundamentals of C, Datatypes in C, Mathematical and logical operations.		
LO2	To understand the concept using if statements and loops		
LO3	This unit covers the concept of Arrays and Functions		
LO4	This unit covers the concept of Structurs and unions and Preprocessors		
LO5	To understand the concept of implementing pointers and files		
UNIT	**List of Excercises**	**No. of Hours**	**Course Objectives**

I	**Unit I : Variables, Data types, Constants and Operators** 1.Evaluation of expression ex: ((x+y) ^2 * (x+z))/w 2.Temperature conversion problem (Fahrenheit to Celsius) 3.Program to convert days to months and days (Ex: 364 days = 12 months and 4 days) 4.Solution of quadratic equation 5.Salesman salary (Given: Basic Salary, Bonus for every item sold, commission on the total monthly sales)	12
II	**Unit II: Decision making Statements** 6.Maximum of three numbers 7.Calculate Square root of five numbers (using gototatement) 8.Pay-Bill Calculation for different levels of employee (Switch statement) 9. Fibonacci series 10.Floyds Triangle 11.Pascal's Triangle	12
III	**Unit III: Arrays, Functions and Strings** 12.Prime numbers in an array 13.Sorting data (Ascending and Descending) 14.Matrix Addition and Subtraction 15.Matrix Multiplication 16.Function with no arguments and no return values 17.Function that convert lower case letters to upper case 18. Factorial using recursion. 19.Perform String Operations using Switch Case.	12
IV	**Unit IV : Structures and Macros** 20.Structure that describes a Hotel (name, address, grade, avg room rent, number of rooms) Perform some operations (list of hotels of a given grade etc.) 21. Using Pointers in Structures. 22.Cricket team details using Union. 23.Write a macro that calculates the max and min of two numbers 24.Nested macro to calculate Cube of a number.	12

V	**Unit V : Pointers and Files** 25.Evaluation of Pointer expressions 26.Function to exchange two pointer values 27.Creation, insertion and deletion in a linked list 28.Program to read a file and print the data. 29.Program to receive a file name and a line of text as command line arguments and write the text to the file 30. Program to copy the content of one file to another file.	12
	Total	**60**

Course Outcomes		**Programme Outcome**
CO	On completion of this course, students will	
1	Remember the program structure of C with its syntax and semantics	PO1,PO3,PO5
2	Understand the programming principles in C (data types, operators, branching and looping, arrays, functions, structures, pointers and files)	PO2,PO3,PO6
3	Apply the programming principles learnt in real-time problems	PO3,PO4
4	Analyze the various methods of solving a problem and choose the best method	PO4,PO5,PO6
5	Code, debug and test the programs with appropriate test cases	PO4,PO6

Text Book	
1	E. Balagurusamy, Programming in ANSI C, Fifth Edition, Tata McGraw-Hill, 2010.

Reference Books	
1.	Byron Gottfried, Schaum's Outline Programming with C, Fourth Edition, Tata McGraw-Hill, 2018.
2.	Kernighan and Ritchie, The C Programming Language, Second Edition, Prentice Hall, 1998

3.	YashavantKanetkar, Let Us C, Eighteenth Edition, BPB Publications,2021
Web Resources	
1.	https://codeforwin.org/
2.	https://www.geeksforgeeks.org/c-programming-language/
3.	http://en.cppreference.com/w/c
4.	http://learn-c.org/
5.	https://www.cprogramming.com/

Mapping with Programme Outcomes:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	3	3	3	3
CO 2	2	3	3	3	3	3
CO 3	3	3	2	3	3	2
CO 4	3	3	3	3	3	3
CO 5	3	3	3	3	3	3
Weight age of course contributed to each PSO	14	15	14	15	15	14

S-Strong-3 M-Medium-2 L-Low-1

Subject Code	Subject Name	Category	L	T	P	S	Credits	Marks		
								CIA	External	Total
GEC3(T)	Digital Logic Fundamentals	**Elect**	4	-	-		4	25	75	100
Learning Objectives										
LO1	It aims to train the student to the basic concepts of Digital Logic Fundamentals									
LO2	To impart the in-depth knowledge of logic gates, Boolean algebra , combinational circuits and sequential circuits.									
LO3	To explain the concept of Combinational Logic and counters									
LO4	To introduce the concepts of Flip-Flops, Registers									
LO5	To explain the Asynchronous and Synchronous Counters									
UNIT	**Contents**									**No. Of. Hours**

I	Number Systems and Codes: Number System–Base Conversion – Binary Codes – Code Conversion. Digital Logic: Logic Gates – Truth Tables – Universal Gates.	**12**
II	Boolean Algebra: Laws and Theorems – SOP, POS Methods – Simplification ofBooleanFunctions–UsingTheorems,K-Map,Prime–ImplicantMethod– Binary Arithmetic: Binary Addition – Subtraction – Various Representations of Binary Numbers–Arithmetic Building Blocks–Adder–Subtractor.	**12**
III	Combinational Logic: Multiplexers – Demultiplexers – Decoders – Encoders –Code Converters–Parity Generators and Checkers.	**12**
IV	Sequential Logic:RS, JK, D,and TFlip-Flops–Master-Slave Flip-Flops. Registers:Shift Registers–Types of Shift Registers.	**12**
V	Counters: Asynchronous and Synchronous Counters - Ripple, Mod, Up-Down Counters– Ring Counters. Memory: Basic Terms and Ideas –Types of ROMs –Types of RAMs.	**12**
Total hours		**60**

Course Outcomes		**Programme Outcomes**
CO	On completion of this course, students will	
CO1	Identify the logic gates and their functionality.	PO1, PO2, PO3, PO4, PO5, PO6
CO2	Perform number conversions from one system to another system	PO1, PO2, PO3, PO4, PO5, PO6
CO3	Understand the functions of combinational circuits	PO1, PO2, PO3, PO4, PO5, PO6
CO4	Perform number conversions	PO1, PO2, PO3, PO4, PO5, PO6
CO5	Perform Counter design and learn its operations	PO1, PO2, PO3, PO4, PO5, PO6

Textbooks

1	V.RajaramanandT.Radhakrishnan,*Digital Computer Design*, Prentice HallofIndia,2001
2	D.P.LeachandA.P.Malvino,*DigitalPrinciplesandApplications*–TMH–FifthEdition–2002
3	M.MorisMano,*DigitalLogicandComputerDesign*,PHI,2001
4	T.C.Bartee,*DigitalComputerFundamentals*,6thEdition,TataMcGrawHill,1991

Web Resources

1.	Web resources from NDL Library, E-content from open-source libraries

Mapping with Programme Outcomes:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	3	3	3	3
CO 2	3	3	1	3	2	3
CO 3	3	3	3	3	2	2
CO 4	3	3	3	3	2	3
CO 5	3	2	3	3	3	3
Weightage of course contributed to each PSO	15	15	13	15	13	14

S-Strong-3 M-Medium-2 L-Low-1

Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
SEC2(P)	**MULTIMEDIA LAB**	Sec	-	-	2	-	2	2	25	75	100

Course Objective	
LO1	To understand the basic functionalities of pagemaker
LO2	To Learningand working with coral DRAW
LO3	To Learningand understanding the concept of the flash
LO4	Learning and understanding the concept of the Photoshop
LO5	To design an image

UNIT	List of Excercises	No. of Hours	Course Objectives
I	Editing Text ,Formatting Text ,Tracking – Kerning ,Leading ,Importing Style		
II	Drawing Basic Geometric Figures , Saving a file – Closing a file Opening and Exiting CorelDRAW9/10 ,Views – The View Manager Drawing and Selecting: Getting familiar with the toolbar Getting started with the project		

	Working with text: The text tool – Getting started with the Book Cover	
III	Basic tools used in Flash.Develop a Flash application using motion tween. Develop a Flash application using shape tween. Develop a Flash application for ball bouncing using motion guide path.	
IV	Getting started with Photoshop 6/7,Opening existing file, Guidelines for working with tool bar Creating a new file. Working with images and colors: Bitmap and vector images	
V	Opening recently used files,Image size ,Editing Photographs for own Album Editing Images ,Color Modes	
	Total	**60**

Course Outcomes		**Programme Outcome**
CO	On completion of this course, students will	
CO	On completion of this course, students will	
CO1	understand the concepts, importance, application and the process of developing multimedia	PO1
CO2	to have basic knowledge and understanding about image related processings	PO1, PO2
CO3	To understand the framework of frames and bit images to animations	PO4, PO6
CO4	Speaks about the multimedia projects and stages of requirement in phases of project.	PO4, PO5, PO6
CO5	Understanding the concept of cost involved in multimedia planning, designing, and producing	PO3, PO6

Textbooks

1	TayVaughan,"Multimedia:MakingItWork",8thEdition,Osborne/McGraw-Hill,2001.

Reference Book

1.	RalfSteinmetz&KlaraNahrstedt"MultimediaComputing,Communication&Applications",PearsonEducation,2012.

Web Resources

1.	https://www.geeksforgeeks.org/multimedia-systems-with-features-or-characteristics/

Mapping with Programme Outcomes:

CO/ PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO1	2	2	3	3	3	2
CO2	2	3	2	3	2	1
CO3	1	2	3	3	3	2
CO4	3	2	2	2	1	2
CO5	2	3	1	3	3	3
Weightage of course contributed to each PSO	10	12	11	14	12	10

Strong-3 M-Medium-2 L-Low-1

Subject Code	Subject Name	Category	L	T	P	S	Credits	Marks		
								CIA	External	Total
SEC-3	Multimedia Systems	Skill Enhancement Course	-	-	2		2	25	75	100

Learning Objectives	
LO1	Understand the definition of Multimedia
LO2	To study about the Image File Formats, SoundsAudio File Formats
LO3	Understand the concepts of Animation and Digital Video Containers
LO4	To study about the Stage of Multimedia Project
LO5	Understand the concept of Ownership of Content Created for Project Acquiring Talent

UNIT	Contents	No. Of. Hours
I	Multimedia Definition-Use Of Multimedia-Delivering Multimedia- Text: About Fonts and Faces - Using Text in Multimedia.	6
II	Computers and Text Font Editing and Design Tools-Hypermedia and Hypertext. Images: Plan Approach - Organize Tools - Configure Computer Workspace -Making Still Images - Color - Image File Formats.	6
III	Sound: The Power of Sound -DigitalAudio-MidiAudio-Midivs.DigitalAudio-MultimediaSystemSoundsAudio File Formats -Vaughan's Law of Multimedia Minimums - Adding Sound to Multimedia Project	6
IV	Animation: The Power of Motion-Principles of Animation-Animation by Computer - Making Animations that Work.	6

V	Video: Using Video - Working with Video and Displays-Digital Video Containers-Obtaining Video Clips -Shooting and Editing Video	6
Total hours		**30**
Course Outcomes		**Programme Outcomes**
CO	On completion of this course, students will	
CO1	understand the concepts, importance, application and the process of developing multimedia	PO1
CO2	to have basic knowledge and understanding about image related processings	PO1, PO2
CO3	To understand the framework of frames and bit images to animations	PO4, PO6
CO4	Speaks about the multimedia projects and stages of requirement in phases of project.	PO4, PO5, PO6
CO5	Understanding the concept of cost involved in multimedia planning, designing, and producing	PO3, PO6
Textbooks		
1	TayVaughan,"Multimedia:MakingItWork",8thEdition,Osborne/McGraw-Hill,2001.	
Reference Book		
1.	RalfSteinmetz&KlaraNahrstedt"MultimediaComputing,Communication&Applications",PearsonEducation,2012.	
Web Resources		
1.	https://www.geeksforgeeks.org/multimedia-systems-with-features-or-characteristics/	

Mapping with Programme Outcomes:

CO/ PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO1	**2**	**2**	**3**	**3**	**3**	**2**
CO2	**2**	**3**	**2**	**3**	**2**	**1**
CO3	**1**	**2**	**3**	**3**	**3**	**2**
CO4	**3**	**2**	**2**	**2**	**1**	**2**
CO5	**2**	**3**	**1**	**3**	**3**	**3**
Weightage of course contributed to each PSO	**10**	**12**	**11**	**14**	**12**	**10**

Strong-3 M-Medium-2 L-Low-1

Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
CC5(T)	**Microprocessor and Microcontroller**	Core	5	-	-	-	4	5	25	75	100

Learning Objectives	
LO1	To introduce the internal organization of Intel 8085 Microprocessor.
LO2	To know about various instruction sets and classifictions
LO3	To enable the students to write assembly language programs using 8085.
LO4	To interface the peripheral devices to 8085 using Interrrupt controller and DMA interface.
LO5	To provide real-life applications using microcontroller.

UNIT	Contents	No. of Hours
I	Digital Computers - Microcomputer Organization-Computer languages –Microprocessor Architecture and its operations – Microprocessor initiated operations and 8085 Bus organization – Internal Data operations and 8085 registers - Peripheral or External initiated operations.	15
II	8085 Microprocessor – Pinout and Signals – Functional block diagram - 8085 Instruction Set and Classifications.	15
III	BCD to Binary and Binary to BCD conversions - ASCII to BCD and BCD to ASCII conversions - Binary to ASCII and ASCII to Binary conversions. BCD Arithmetic - BCD addition and Subtraction - Multibyte Addition and Subtraction - Multiplication and Division.	15
IV	The 8085 Interrupts – RIM AND SIM instructions-8259 Programmable Interrupt Controller-Direct Memory Access (DMA) and 8257 DMA controller.	15
V	Introduction to Microcontroller - Microcontroller Vs Microprocessor - 8051 Microcontroller architecture - 8051 pin description. Timers and	15

	Counters – Operating Modes- Control Registers. Interrupts – Interrupts in 8051 - Interrupts Control Register – Execution of interrupt.	
	Total	**75**

Course Outcomes		**ProgrammemeOutcome**
CO	On completion of this course, students will	
CO1	Remember the Basic binary codes and their conversions. Binary concepts are used in Microprocessor programming and provide a good understanding of the architecture of 8085o introduce the internal organization of Intel 8085 Microprocessor..	PO1
CO2	Understanding the 8085 instruction set and their classifications, enables the students to write the programs easily on their own using different logic	PO1,PO2
CO3	Applying different types of instructions to convert binary codes and analyzing the outcome. The instruction set is applied to develop programs on multibyte arithmetic operations.	PO4,PO6
CO4	Analyze how peripheral devices are connected to 8085 using Interrupts and DMA controller.	PO4,PO5,PO6
CO5	An exposure to create real time applications using microcontroller.	PO3,PO6

Text Book	
1	R. S. Gaonkar- "Microprocessor Architecture- Programming and Applications with 8085"- 5th Edition- Penram International Publications,2009. [For unit I to unit IV]
2	Soumitra Kumar Mandal -“Microprocessors and Microcontrollers – Architectures, Programming and Interfacing using 8085, 8086, 8051”, Tata McGraw Hill Education Private Limited. [for unit V].
Reference Books	
1.	Mathur- “Introduction to Microprocessor”- 3rd Edition- Tata McGraw-Hill -1993.

2.	Raj Kamal - "Microcontrollers: Architecture, Programming, Interfacing and System Design", Pearson Education, 2005.
3.	Krishna Kant, "Microprocessors and Microcontrollers – Architectures, Programming and System Design 8085, 8086, 8051, 8096", PHI, 2008
Web Resources	
1.	E-content from open source libraries
2.	https://www.bing.com/, https://theopennotes.in/

Mapping with Programme Outcomes:

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	2	2	2	2
CO2	3	3	3	2	3	2
CO3	3	3	3	3	3	2
CO4	3	3	3	3	3	2
CO5	3	3	3	2	3	2
Weightage of course contributed to each PSO	15	15	14	12	14	10

S-Strong-3 M-Medium-2 L-Low-1

Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
CC6(P)	**Microprocessor and microcontroller Lab**	Core	-	-	3	-	3	3	25	75	100
Learning Objectives											
LO1	To introduce the internal organization of Intel 8085 Microprocessor.										
LO2	To know about various instruction sets and classifictions										
LO3	To enable the students to write assembly language programs using 8085.										
LO4	To interface the peripheral devices to 8085 using Interrrupt controller and DMA interface.										
LO5	To provide real-life applications using microcontroller.										

	Details	No. of Hours
	List of Exercises:	
	Addition and Subtraction 1. 8 - bit addition 2. 16 - bit addition 3. 8 - bit subtraction 4. BCD subtraction II. Multiplication and Division 1. 8 - bit multiplication 2. BCD multiplication 3. 8 - bit division III. Sorting and Searching 1. Searching for an element in an array. 2. Sorting in Ascending and Descending order. 3. Finding the largest and smallest elements in an array. 4. Reversing array elements. 5. Block move. IV. Code Conversion 1. BCD to Hex and Hex to BCD 2. Binary to ASCII and ASCII to binary 3. ASCII to BCD and BCD to ASCII V. Simple programs on 8051 Microcontroller 1. Addition 2. Subtraction 3. Multiplication 4. Division 5. Interfacing Experiments using 8051 1. Realisation of Boolean Expression through ports. 2. Time delay generation using subroutines. 3. Display LEDs through ports	60
	Total	**60**

Course Outcomes	**Programmeme Outcome**

CO	On completion of this course, students will	
CO1	Remember the Basic binary codes and their conversions. Binary concepts are used in Microprocessor programming and provide a good understanding of the architecture of 8085o introduce the internal organization of Intel 8085 Microprocessor..	PO1
CO2	Understanding the 8085 instruction set and their classifications, enables the students to write the programs easily on their own using different logic	PO1,PO2
CO3	Applying different types of instructions to convert binary codes and analyzing the outcome. The instruction set is applied to develop programs on multibyte arithmetic operations.	PO4,PO6
CO4	Analyze how peripheral devices are connected to 8085 using Interrupts and DMA controller.	PO4,PO5,PO6
CO5	An exposure to create real time applications using microcontroller.	PO3,PO5
Text Book		
1	R. S. Gaonkar- "Microprocessor Architecture- Programming and Applications with 8085"- 5th Edition- Penram International Publications,2009. [For unit I to unit IV]	
2	Soumitra Kumar Mandal -"Microprocessors and Microcontrollers – Architectures, Programming and Interfacing using 8085, 8086, 8051", Tata McGraw Hill Education Private Limited. [for unit V].	
Reference Books		
1.	Mathur- "Introduction to Microprocessor"- 3rd Edition- Tata McGraw-Hill -1993.	
2.	Raj Kamal - "Microcontrollers: Architecture, Programming, Interfacing and System Design", Pearson Education, 2005.	
3.	Krishna Kant, "Microprocessors and Microcontrollers – Architectures, Programming and System Design 8085, 8086, 8051, 8096", PHI, 2008	
Web Resources		
1.	E-content from open source libraries	
2.	https://www.bing.com/	

Mapping with Programme Outcomes:

CO/ PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO1	3	2	2	3	3	2
CO2	3	3	2	3	3	2
CO3	3	3	3	3	3	2
CO4	3	3	2	3	3	2
CO5	3	3	2	3	3	2
Weightage of course contributed to each PSO	15	14	11	15	15	10

S-Strong-3 M-Medium-2 L-Low-1

Subject Code	Subject Name	Category	L	T	P	S	Credits	Marks		
								CIA	External	Total
GEC4(T)	Statistical Methods and its Application-I	Elect	4	-	-		4	25	75	100

Learning Objectives		
LO1	To make understand the fundamentals of Statistics.	
LO2	Define the principal concepts about probability.	
LO3	To explain the Coefficient of Variation	
LO4	To understand the concept of Conditional Probability	
LO5	Explain the concept of a random variable and the probability distributions.	
UNIT	**Contents**	**No. Of. Hours**
I	Introduction to statistics – primary and secondary data – classification, tabulation and Diagrammatic Representation of statistical data – Bar-charts, Pie-diagrams' – Graphical Representation of data – Histograms, Frequency polygon, Ogives.	**12**
II	Measures of dispersion – characteristics – coefficient of dispersion - Coefficient of variation – Moments – skewness and kurtosis – Pearson's coefficient of skewness - Bowley's coefficient of Skewness – Coefficient of skewnessbased upon moments.	**12**
III	Simple correlation – Karl Pearson's coefficient of correlation – correlation	**12**

	coefficient for A bivariate frequency distribution – Rank correlation – Regression – lines of regression – Properties of regression coefficient.	
IV	Events and sets – sample space – concept of probability – addition and multiplications Theorem on probability – conditional probability and independence of evens – Baye's Theorem – concept of random variable – Mathematical Expectation.	**12**
V	Concept of sampling distributions – standard error – Tests of significance basedont, Chi-squareandFdistributionswithrespect to mean,variance.	**12**
Total hours		**60**

Course Outcomes		**Programme Outcomes**
CO	On completion of this course, students will	
CO1	Summarize the concepts of statistical methods	PO1, PO2, PO3, PO4, PO5, PO6
CO2	Analyse the different Statistical measures of data	PO1, PO2, PO3, PO4, PO5, PO6
CO3	Derive the marginal and conditional distributions of random variables, translate realworld problems into probability models	PO1, PO2, PO3, PO4, PO5, PO6
CO4	To understanding the concepts of Probability of an event	PO1, PO2, PO3, PO4, PO5, PO6
CO5	Understand basic probability axioms and rules and the moments of discrete and continuous random variables as well as be familiar with common named discrete and continuous random variables	PO1, PO2, PO3, PO4, PO5, PO6

Textbooks

1	Statistical Methods, S.P.Gupta, Sultan Chand and sons Publications,4th Edition 2011

Reference Books

1.	Statistics, Dr. S.Arumugam and A.ThangapandiIssac, New Gamma Publication house, 2002.
2.	KishorS. Trivedi - Probability and statistics with reliability queuing and Computer Science Applications - Prentice Hall of India (P) Ltd., New Delhi -1997

3.	Discrete Mathematics - Seymour Lipschutz, Marc Lars Lipson Schaum's Outlines- by, 3rd Edition., Tata McGraw Hill, Education Pvt. Ltd., New Delhi. 5th Reprint, 2012
Web Resources	
1.	Web resources from NDL Library, E-content from open-source libraries

Mapping with Programme Outcomes:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	3	3	3	3
CO 2	3	3	1	3	2	3
CO 3	3	3	3	3	2	2
CO 4	3	3	3	3	2	3
CO 5	3	2	3	3	3	3
Weightage of course contributed to each PSO	15	15	13	15	13	14

S-Strong-3 M-Medium-2 L-Low-1

Subject Code	Subject Name	Category	L	T	P	S	Credits	Marks		
								CIA	External	Total
GEC5(P)	**PHP Programming Lab**	**Core**	-	-	2	-	-	-	-	-
Learning Objectives										
LO1	**To learn about Database Applications and the Web**									
LO2	To learn about PHP scripting Language									
LO3	To learn about PHP OOPs concept									
LO4	To learn about Querying Database									
LO5	To learn about PHP reporting									
LAB EXERCISES										**Required Hours**

1. Write a PHP Coding for: i. Create a Times Table ii. Use Include File Concept 2. Write a PHP Coding to handle: i. Global Variable ii. Static Variable 3. Write a PHP Coding for: i. Pass by Reference ii. Handling Default Parameter 4. Write a PHP Coding to handle Array Functions: i. Counting number of elements ii. Finding Min, and Max iii. Explode and Implode iv. Sorting v. Cm to inch calculation for all array element 5. Write a PHP Coding to handle String Functions: i. Padding ii. Change Case iii. Trimming iv. Finding the Positions of Characters v. Handling Substring vi. Handling String Replace 6. Write a PHP Coding for handling Constructor. 7. Write a PHP Coding for handling Destructor 8. Write a PHP Coding for handling Private Member Function. 9. Write a PHP Coding for handling Static Member Variables. 10. Write a PHP Coding for handling Inheritance. 11. Write a PHP Coding for Exception handling. 12. Write a PHP Coding to connect PHP with MYSQL using PEAR. 13. Write a PHP Coding for database connectivity (PHP & MYSQL). 14. Write a PHP Coding for database connectivity (PHP & MYSQL) with error handling. 15. Write a PHP Coding for database connectivity (PHP & MYSQL) and format the output. 16. Write a PHP Coding for database connectivity (PHP & MYSQL) using template concept. 17. Write a PHP Coding to pass parameter to PHP using HTML forms, Hyperlinks, and Browser.	**75**
Course Outcomes	
On completion of this course, students will	

CO1	● Learn the PHP Three tier Architecture, PHP Scripting language , Condition and Branches , Loops basics of computer, Construct the structure of the required things in computer, learn how to use it.
CO2	● Develop PHP scripting Language
CO3	Concept of Oops, SQL ,MySQL Queries
CO4	● Work with Querying Database, Processing User Input, PEAR Overview, Core Components, Packages, Writing to Web databases
CO5	Usage of Operating system in information technology which really acts as a interpreter between software and hardware.

Mapping with Programme Outcomes:

MAPPING TABLE						
CO/ PSO	**PSO 1**	**PSO 2**	**PSO 3**	**PSO 4**	**PSO 5**	**PSO 6**
CO1	**3**	**2**	**2**	**3**	**3**	**3**
CO2	**3**	**3**	**3**	**3**	**3**	**3**
CO3	**3**	**3**	**3**	**3**	**3**	**3**
CO4	**3**	**3**	**3**	**3**	**3**	**3**
CO5	**3**	**3**	**3**	**3**	**3**	**3**
Weightage of course contributed to each PSO	**15**	**14**	**14**	**15**	**15**	**15**

S-Strong-3 M-Medium-2 L-Low-1

Subject Code	**Subject Name**	**Category**	**L**	**T**	**P**	**S**	**Inst. hours**	**Credits**	**Marks**		
									CIA	**External**	**Total**
SEC-4	**Fundamentals of Information Technology**	Skill Enha. Course (SEC)	1	-	-	-	1	1	25	75	100

Learning Objectives		
LO1		Understand basic concepts and terminology of information technology.
LO2		Have a basic understanding of personal computers and their operation
LO3		Be able to identify data storage and its usage
LO4		Get great knowledge of software and its functionalities
LO5		Understand about operating system and their uses
UNIT		**Contents** **No. Of. Hours**

I		**Introduction to Computers:** Introduction, Definition, .Characteristics of computer, Evolution of Computer, Block Diagram Of a computer, Generations of Computer, Classification Of Computers, Applications of Computer, Capabilities and limitations of computer	**6**
II		**Basic Computer Organization:** Role of I/O devices in a computer system. Input Units: Keyboard, Terminals and its types. Pointing Devices, Scanners and its types, Voice Recognition Systems, Vision Input System, Touch Screen, Output Units: Monitors and its types. Printers: Impact Printers and its types. Non Impact Printers and its types, Plotters, types of plotters, Sound cards, Speakers.	**6**
III		**Storage Fundamentals:** Primary Vs Secondary Storage, Data storage & retrieval methods. Primary Storage: RAM ROM, PROM, EPROM, EEPROM. Secondary Storage: Magnetic Tapes, Magnetic Disks. Cartridge tape, hard disks, Floppy disks Optical Disks, Compact Disks, Zip Drive, Flash Drives	**6**
IV		**Software:** Software and its needs, Types of S/W. System Software: Operating System, Utility Programs Programming Language: Machine Language, Assembly Language, High Level Language their advantages & disadvantages. Application S/W and its types: Word Processing, Spread Sheets Presentation, Graphics, DBMS s/w	**6**
V		**Operating System:** Functions, Measuring System Performance, Assemblers, Compilers and Interpreters.Batch Processing, Multiprogramming, Multi Tasking, Multiprocessing, Time Sharing, DOS, Windows, Unix/Linux.	**6**
		TOTAL HOURS	**30**

	Course Outcomes	**Programme Outcomes**
CO	On completion of this course, students will	
● CO1	● Learn the basics of computer, Construct the structure of the required things in computer, learn how to use it.	PO1, PO2, PO3, PO4, PO5, PO6
● CO2	● Develop organizational structure using for the devices present currently under input or output unit.	PO1, PO2, PO3, PO4, PO5, PO6
CO3	Concept of storing data in computer using two header namely RAM and ROM with different types of ROM with advancement in storage basis.	PO1, PO2, PO3, PO4, PO5, PO6
● CO4	● Work with different software, Write program in the software and applications of software.	PO1, PO2, PO3, PO4, PO5, PO6
CO5	Usage of Operating system in information technology which really acts as a interpreter between software and hardware.	PO1, PO2, PO3, PO4, PO5, PO6

Textbooks

1		Anoop Mathew, S. KavithaMurugeshan (2009), " Fundamental of Information Technology", Majestic Books.
2		Alexis Leon, Mathews Leon," Fundamental of Information Technology", 2nd Edition.
3		S. K Bansal, "Fundamental of Information Technology".

Reference Books		
1.		BhardwajSushilPuneet Kumar, “Fundamental of Information Technology”
2.		GG WILKINSON, “Fundamentals of Information Technology”, Wiley-Blackwell
3.		A Ravichandran , “Fundamentals of Information Technology”, Khanna Book Publishing
Web Resources		
1.		https://testbook.com/learn/computer-fundamentals
2.		https://www.tutorialsmate.com/2020/04/computer-fundamentals-tutorial.html
3.		https://www.javatpoint.com/computer-fundamentals-tutorial
4.		https://www.tutorialspoint.com/computer_fundamentals/index.htm
5.		https://www.nios.ac.in/media/documents/sec229new/Lesson1.pdf

Mapping with Programme Outcomes:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	3	3	3	3
CO 2	3	3	3	3	3	3
CO 3	3	3	3	3	3	3
CO 4	3	3	3	3	2	3
CO 5	3	3	2	3	3	2
Weightage of course contributed to each PSO	15	15	14	15	14	14

S-Strong-3 M-Medium-2 L-Low-1

Subject Code	Subject Name	Category	L	T	P	S	Credits	Marks		
								CIA	External	Total
SEC-5	**VISUAL BASIC LAB**	Skill Enha. Course (SEC)	-	-	2		2	25	75	100

Learning Objectives	
LO1	Develop VB application to handle menu options
LO2	VB application to handle mouse event
LO3	VB application to connect with database
LO4	VB application with DLL
LO5	Create a real time application with VB.

UNIT	Contents	No. Of. Hours

1.Develop VB Application for Creation of Scientific Calculator. 2. Develop VB Application to handle the MDI with Menu options 3. Develop VB Application to handle frame control. 4. Develop VB Application to handle Mouse event and list box. 5. Develop VB Application to Create the Menu options and Tool bar (images). 6. Develop VB Application using the Modules and class concept. 7. Develop VB Application to loading the picture through ActiveX Document[Use Driver, Dir and File List Box Components] 8. Develop VB Application to create DLL. 9. Develop VB Application to handle DLL using API Viewer 10. Develop VB Application for the following: i. to access the native database and perform the following operations for a Student Database (ie) Insert a Record, Modify the Records, View the records and delete the records by DML operations. 11. Develop VB Application for the following: i. Develop VB Application to access the (Oracle or Access) database and perform the following using DDL operations (ie) Creation, Modification, Display and View the Table. 12. Develop VB code for any application(Railway, Airline, Library etc..)	**30**
TOTAL HOURS	**30**

Course Outcomes		**Programme Outcomes**
CO	On completion of this course, students will	
CO1	● Knows the basic concept in VB Concept of resources in VB	PO1, PO2, PO3, PO4, PO5, PO6
CO2	Knows Design concept. Concept of GUI based events Understand the concept of DDL operations.	PO1, PO2, PO3, PO4, PO5, PO6
CO3	Understand the Connection to the DATABASE. Concept of list	PO1, PO2, PO3, PO4, PO5, PO6
CO4	Creating Menu Editor	PO1, PO2, PO3, PO4, PO5, PO6
CO5	Concept of adding images Understand the table creation.	PO1, PO2, PO3, PO4, PO5, PO6

Textbooks

1	Microsoft Visual Basic 2010 Step by StepBy Michael Halvorson · 2010
2	Visual Basic 2015 in 24 Hours, Sams Teach YourselfBy James Foxall · 2015

Mapping with Programme Outcomes:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	3	3	3	3
CO 2	3	3	2	3	3	3
CO 3	2	3	3	3	3	3
CO 4	3	3	3	3	3	3
CO 5	3	3	3	2	3	3
Weightage of course contributed to each PSO	14	15	14	14	15	15

S-Strong-3 M-Medium-2 L-Low-1

SEMESTER – IV

Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	Ext	Total
CC7	**Java Programming**	Core	4	-	-	-	4	4	25	75	100

Learning Objectives	
LO1	To provide fundamental knowledge of object-oriented programming
LO2	To equip the student with programming knowledge in Core Java from the basics up.
LO3	To enable the students to use AWT controls, Event Handling and Swing for GUI.
LO4	To provide fundamental knowledge of object-oriented programming.
LO5	To equip the student with programming knowledge in Core Java from the basics up.

UNIT	Contents	No. of Hours
I	**Introduction:**ReviewofObjectOrientedconcepts - HistoryofJava - Javabuzzwords - JVMarchitecture - Datatypes - Variables - Scope and life timeofvariables - arrays - operators - controlstatements - type conversion and casting - simple java program - constructors - methods - Static block - Static Data - StaticMethodStringandStringBufferClasses.	15
II	**Inheritance**: Basic concepts - Types of inheritance - Member access rules - Usage of this and Super key word - Method Overloading - Method overriding - Abstract classes	15

	- Dynamic method dispatch - Usage of final keyword. **Packages**:Definition-AccessProtection -ImportingPackages. **Interfaces**:Definition–Implementation–Extending Interfaces. **Exception Handling**: *try – catch- throw - throws – finally* – Built-inexceptions - Creating own Exception classes.	
III	**Multithreaded Programming**: Thread Class - Runnable interface –Synchronization–Using synchronizedmethods– Using synchronized statement-InterthreadCommunication –Deadlock. **I/O Streams:** Concepts of streams - Stream classes- Byte and Character stream - Reading console Input and Writing Console output - File Handling.	15
IV	**AWT Controls:** The AWT class hierarchy - user interface components- Labels - Button - Text Components - Check Box - Check Box Group - Choice - List Box - Panels – Scroll Pane - Menu - Scroll Bar. Working with Frame class - Colour - Fonts and layout managers. **Event Handling:** Events - Event sources - Event Listeners - Event Delegation Model (EDM) - Handling Mouse and Keyboard Events - Adapter classes - Inner classes	15
V	**Swing:** Introduction to Swing - Hierarchy of swing components. Containers - Top level containers - JFrame - JWindow - JDialog - JPanel - JButton - JToggleButton - JCheckBox - JRadioButton - JLabel,JTextField - JTextArea - JList - JComboBox - JScrollPane.	15
	Total	**75**

Course Outcomes		
Course Outcomes	On completion of this course, students will;	
CO1	Understand the basic Object-oriented concepts.Implement the basic constructs of Core Java.	PO1, PO2, PO6
CO2	Implement inheritance, packages, interfaces and exception handling of Core Java.	PO2, PO3, PO8
CO3	Implement multi-threading and I/O Streams of Core Java	PO1, PO3, PO5
CO4	Implement AWT and Event handling.	PO2, PO6

CO5	Use Swing to create GUI.	PO1, PO3, PO6
Text Books:		
1.	Herbert Schildt, The Complete Reference, Tata McGraw Hill, New Delhi, 7th Edition, 2010	
2.	Gary Cornell, *Core Java 2 Volume I – Fundamentals,* Addison Wesley, 1999	
References :		
1.	Head First Java, O'Rielly Publications,	
2.	Y. Daniel Liang, *Introduction to Java Programming*, 7th Edition, Pearson Education India, 2010	
Web Resources		
1.	https://javabeginnerstutorial.com/core-java-tutorial	
2.	http://docs.oracle.com/javase/tutorial/	
3.	https://www.coursera.org/	

Mapping with Programme Outcomes:

S-Strong-3 M-Medium-2 L-Low-1

CO/ PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO1	**3**	**3**	**3**	**3**	**3**	**2**
CO2	**3**	**3**	**3**	**2**	**2**	**3**
CO3	**2**	**2**	**1**	**3**	**3**	**3**
CO4	**3**	**3**	**3**	**3**	**3**	**2**
CO5	**3**	**3**	**3**	**3**	**3**	**1**
Weightage of course contributed to each PSO	**14**	**14**	**13**	**14**	**14**	**11**

Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
CC8	**Java Programming Lab**	Core	-	-	3	-	3	3	25	75	100
Learning Objectives											

LO1	To provide fundamental knowledge of object-oriented programming.
LO2	To equip the student with programming knowledge in Core Java from the basics up.
LO3	To enable the students to know about Event Handling .
LO4	To enable the students to use String Concepts.
LO5	To equip the student with programming knowledge in to creat GUI using AWT controls.
EXERCISE	**Details**

1	Write a Java program that prompts the user for an integer and then prints out all the prime numbers up to that Integer	
2	Write a Java program to multiply two given matrices.	
3	Write a Java program that displays the number of characters, lines and words in a text	
4	Generate random numbers between two given limits using Random class and print messages according to the range of the value generated.	
5	Write a program to do String Manipulation using CharacterArray and perform the following string operations: a. String length b. Finding a character at a particular position c. Concatenating two strings	
6	Write a program to perform the following string operations using String class: a. String Concatenation b. Search a substring c. To extract substring from given string	
7	Write a program to perform string operations using String Buffer class: a. Length of a string b. Reverse a string c. Delete a substring from the given string	
8	Write a java program that implements a 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.	
9	Write a threading program which uses the same method asynchronously to print the numbers 1to10 using Thread1 and to print 90 to100 using Thread2.	60

10	Write a program to demonstrate the use of following exceptions. a. Arithmetic Exception b. Number Format Exception c. ArrayIndexOutofBoundException d. NegativeArraySizeException	
11	Write a Java program that reads on file name from the user, then displays information about whether the file exists, whether the file is readable, whether the file is writable, the type of file and the length of the file in bytes	
12	Write a program to accept a text and change its size and font. Include bold italic options. Use frames and controls.	
13	Write a Java program that handles all mouse events and shows the event name at the center of the window when a mouse event is fired. (Use adapter classes).	
14	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.	
15	Write a Java program that simulates a traffic light. The program lets the user select one of three lights: red, yellow, or green with radio buttons. On selecting a button, an appropriate message with “stop” or “ready” or “go” should appear above the buttons in a selected color. Initially there is no message shown.	
	Total	**60**

Course Outcomes		**Programme Outcome**
CO	On completion of this course, students will	
1	Understand the basic Object-oriented concepts.Implement the basic constructs of Core Java.	PO1

2	Implement inheritance, packages, interfaces and exception handling of Core Java.	PO1, PO2
3	Implement multi-threading and I/O Streams of Core Java	PO4, PO6
4	Implement AWT and Event handling.	PO4, PO5, PO6
5	Use Swing to create GUI.	PO3, PO6
Text Book		
1	Herbert Schildt, The Complete Reference, Tata McGraw Hill, New Delhi, 7th Edition, 2010.	
2.	Gary Cornell, *Core Java 2 Volume I – Fundamentals,* Addison Wesley, 1999.	
Reference Books		
1.	Head First Java, O'Rielly Publications,	
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	

Mapping with Programme Outcomes:

CO/ PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO1	**3**	**3**	**3**	**3**	**3**	**2**
CO2	**3**	**3**	**3**	**2**	**2**	**3**
CO3	**2**	**2**	**1**	**3**	**3**	**3**
CO4	**3**	**3**	**3**	**3**	**3**	**2**
CO5	**3**	**3**	**3**	**3**	**3**	**2**

Weightage of course contributed to each PSO	14	14	13	14	14	12

S-Strong M-Medium L-Low

Subject Code	Subject Name	Category	L	T	P	S	Credits	Marks		
								CIA	External	Total
GEC5(P)	**PHP Programming Lab**	**Core**	-	-	2	-	-	-	-	-

Learning Objectives

LO1	To provide the necessary knowledge on basics of PHP.
LO2	To design and develop dynamic, database-driven web applications using PHP version.
LO3	To get an experience on various web application development techniques.
LO4	To learn the necessary concepts for working with the files using PHP.
LO5	To get a knowledge on OOPS with PHP.

LAB EXERCISES	**Required Hours**
18. Write a PHP Coding for: iii. Create a Times Table iv. Use Include File Concept 19. Write a PHP Coding to handle: iii. Global Variable iv. Static Variable 20. Write a PHP Coding for: iii. Pass by Reference iv. Handling Default Parameter 21. Write a PHP Coding to handle Array Functions: vi. Counting number of elements vii. Finding Min, and Max viii. Explode and Implode ix. Sorting x. Cm to inch calculation for all array element 22. Write a PHP Coding to handle String Functions: vii. Padding viii. Change Case ix. Trimming x. Finding the Positions of Characters xi. Handling Substring xii. Handling String Replace	**75**

23. Write a PHP Coding for handling Constructor. 24. Write a PHP Coding for handling Destructor 25. Write a PHP Coding for handling Private Member Function. 26. Write a PHP Coding for handling Static Member Variables. 27. Write a PHP Coding for handling Inheritance. 28. Write a PHP Coding for Exception handling. 29. Write a PHP Coding to connect PHP with MYSQL using PEAR. 30. Write a PHP Coding for database connectivity (PHP & MYSQL). 31. Write a PHP Coding for database connectivity (PHP & MYSQL) with error handling. 32. Write a PHP Coding for database connectivity (PHP & MYSQL) and format the output. 33. Write a PHP Coding for database connectivity (PHP & MYSQL) using template concept. 34. Write a PHP Coding to pass parameter to PHP using HTML forms, Hyperlinks, and Browser.	

Course Outcomes		**Programme Outcomes**
CO	On completion of this course, students will	
CO1	Write PHP scripts to handle HTML forms	PO1,PO4,PO6
CO2	Write regular expressions including modifiers, operators, and metacharacters.	PO2,PO5,PO7.
CO3	Create PHP Program using the concept of array.	PO3,PO4,PO5.
CO4	Create PHP programs that use various PHP library functions	PO2,PO3,PO5
CO5	Manipulate files and directories.	PO3,PO5,PO6.
Text Book		
1	Head First PHP & MySQL: A Brain-Friendly Guide- 2009-Lynn mighley and Michael Morrison.	
2	The Joy of PHP: A Beginner's Guide to Programming Interactive Web Applications with PHP and MySQL- Alan Forbes	
Reference Books		
1.	PHP: The Complete Reference-Steven Holzner.	
2.	DT Editorial Services (Author), "*HTML 5 Black Book (Covers CSS3, JavaScript, XML, XHTML, AJAX, PHP, jQuery)*", Paperback 2016, 2nd Edition.	
Web Resources		
1.	Opensource digital libraries: PHP Programming	
2.	https://www.w3schools.com/php/default.asp	

Mapping with Programme Outcomes:

MAPPING TABLE						
CO/ PSO	**PSO 1**	**PSO 2**	**PSO 3**	**PSO 4**	**PSO 5**	**PSO 6**
CO1	**3**	**2**	**2**	**3**	**3**	**3**
CO2	**3**	**3**	**3**	**3**	**3**	**3**
CO3	**3**	**3**	**3**	**3**	**3**	**3**
CO4	**3**	**3**	**3**	**3**	**3**	**3**
CO5	**3**	**3**	**3**	**3**	**3**	**3**
Weightage of course contributed to each PSO	**15**	**14**	**14**	**15**	**15**	**15**

S-Strong-3 M-Medium-2 L-Low-1

Subject Code	**Subject Name**	**Category**	**L**	**T**	**P**	**S**	**Credits**	**Marks**		
								CIA	**External**	**Total**
GEC 6	**Resource Management Techniques**	**Elect**	4	-	-		4	25	75	100

Learning Objectives	
LO1	To introduce the concepts of OR
LO2	To explain the Linear Programming Problem
LO3	To illustrate the Simplex Method
LO4	To know the Duality Theorems
LO5	To understanding the Methods for finding IBFS for the Transportation Problems

UNIT	**Contents**	**No. Of. Hours**
I	Development of OR: Definition of OR – Modeling - Characteristics and Phases - Tools, Techniques & Methods - scope of OR.	**12**
II	Linear Programming Problem: Formulation - Slack & surplus variables - Graphical solution of LPP.	**12**
III	Simplex Method: Computational Procedure - Big-M method - Concept of duality in LPP - Definition of primal dual problems - General rules for converting any primal into its dual.	**12**

IV	Duality Theorems: (without proof) Primal dual correspondence - Duality and Simplex method - Mathematical formulation of assignment problem - Method for solving assignment problem.	**12**
V	Mathematical formulation of Transportation Problem: Methods for finding IBFS for the Transportation Problems.	**12**
Total hours		**60**
Course Outcomes		**Programme Outcomes**
CO	On completion of this course, students will	
CO1	To understanding the concepts of Development of OR	PO1, PO2, PO3, PO4, PO5, PO6
CO2	develop linear programming (LP) models for shortest path, maximum flow, minimal spanning tree, critical path, minimum cost flow, and transshipment problems	PO1, PO2, PO3, PO4, PO5, PO6
CO3	Solve the problems of Simplex Method	PO1, PO2, PO3, PO4, PO5, PO6
CO4	To study the Duality Theorems	PO1, PO2, PO3, PO4, PO5, PO6
CO5	Finding initial basic feasible and optimal solution of the Transportation problems	PO1, PO2, PO3, PO4, PO5, PO6
Textbooks		
1	Operations Research, S.D.Sharma, KedarNath Ram Nath& Co Unit I : Chapter-1(1.1, 1.2, 1.4,1.,1.8,1.9,1.10,1.11) Unit II : Chapter-3 (3.1, 3.2, 3.3, 3.3.1, 3.3.2, 3.3.3, 3.3.4, 3.4,3.5) Unit III : Chapter-5 (5.1, 5.2, 5.2.1, 5.3,5.4,5.5.4) Chapter- 7 (7.1,7.2,7.3,7.4) Unit IV : Chapter-7 (7.5) (Statements only); 7.6, 7.7 Chapter 11(11.2,11.3,11.4) Unit V : Chapter-12 (12.2 to 12.8)	
Reference Books		
1.	Operation Research, Nita H.Shah, Ravi M.Gor and Hardiksoni,PrenticeHall of India Pvt. Ltd., New Delhi 2008.	

2.	Operation Research, R.Sivarethinamohan, Tata McGraw Hill, 2005.
3.	Operations Research – An Introduction by HamdyA.Taha. Ninth Edition, Dorling Kindersley Pvt. Ltd., Noida, India, 2012
Web Resources	
1.	Web resources from NDL Library, E-content from open-source libraries

Mapping with Programme Outcomes:

MAPPING TABLE						
CO/ PSO	**PSO 1**	**PSO 2**	**PSO 3**	**PSO 4**	**PSO 5**	**PSO 6**
CO1	**3**	**2**	**2**	**3**	**3**	**3**
CO2	**3**	**3**	**3**	**3**	**3**	**3**
CO3	**3**	**3**	**3**	**3**	**3**	**3**
CO4	**3**	**3**	**3**	**3**	**3**	**3**
CO5	**3**	**3**	**3**	**3**	**3**	**3**
Weightage of course contributed to each PSO	**15**	**14**	**14**	**15**	**15**	**15**

S-Strong-3 M-Medium-2 L-Low-1

Subject Code	**Subject Name**	**Category**	**L**	**T**	**P**	**S**	**Credits**	**Marks**		
								CIA	**External**	**Total**
SEC-6	**WEB DESIGNING LAB**	**SEC**	-	-	2		2	25	75	100

Learning Objectives		
LO1	Understand the basics of HTML and its components	
LO2	To study about the Graphics in HTML	
LO3	Understand and apply the concepts of XML and DHTML	
LO4	Understand the concept of JavaScript	
LO5	To identify and understand the goals and objectives of the Ajax	
UNIT	**Contents**	**No. Of. Hours**
I	Script using HTML tags, page structure, adding comments working with texts, paragraphs and line break.	**12**

	Emphasizing test, heading and horizontal rules list-font size, face and color,alignment links-tables-frames.	
II	Forms& Images Using Html: Graphics image maps, GIF animation, adding multimedia Data collection with html forms textbox password, list box, combo box, text area Tools for building web page front page.	**12**
III	XML & DHTML: Cascading style sheet (CSS	**12**
IV	Dynamic HTML: Document object model (DCOM) Accessing HTML & CSS through DCOM Dynamic content styles & positioning Event bubbling-data binding. JavaScript: Client-side scripting	**12**
V	Advance script, JavaScript and objects, JavaScript own objects, the DOM and web browser environments, forms and validations.	**12**
Total hours		**60**

Course Outcomes		**Programme Outcome**
CO	On completion of this course, students will	
1	Develop working knowledge of HTML	PO1, PO3, PO6, PO8
2	Ability to Develop and publish Web pages using Hypertext Markup Language (HTML).	PO1,PO2,PO3,PO6
3	Ability to optimize page styles and layout with Cascading Style Sheets (CSS).	PO3, PO5
4	Ability to develop a java script	PO1, PO2, PO3, PO7
5	An ability to develop web application using Ajax.	P02, PO6, PO7
Text Book		
1	Pankaj Sharma, “Web Technology”, SkKataria& Sons Bangalore 2011.	
2	Mike Mcgrath, “Java Script”, Dream Tech Press 2006, 1st Edition.	
3	Achyut S Godbole&AtulKahate, “Web Technologies”, 2002, 2nd Edition.	
Reference Books		
1.	Laura Lemay, RafeColburn , Jennifer Kyrnin, “Mastering HTML, CSS &Javascript Web Publishing”, 2016.	
2.	DT Editorial Services (Author), “HTML 5 Black Book (Covers CSS3, JavaScript, XML, XHTML, AJAX, PHP, jQuery)”, Paperback 2016, 2nd Edition.	
Web Resources		
1.	NPTEL & MOOC courses titled Web Design and Development.	
2.	https://www.geeksforgeeks.org	

Mapping with Programme Outcomes:

CO/ PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO1	3	3	3	3	3	2
CO2	3	3	3	2	2	3
CO3	2	2	1	3	3	3
CO4	3	3	3	3	3	2
CO5	3	3	3	3	3	2
Weightage of course contributed to each PSO	14	14	13	14	14	12

Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
SEC 7	**Biometrics**	Specific Elective	2	-	-	-	2	2	25	75	100

Learning Objectives	
LO1	Identify the various biometric technologies.
LO2	Design of biometric recognition.
LO3	Develop simple applications for privacy
LO4	Understand the need of biometric in the society
LO5	Understand the scope of biometric techniques

UNIT	contents	No. of Hours
I	**Introduction**: What is Biometrics, History, Types of biometric Traits, General architecture of biometric systems, Basic working of biometric matching, Biometric system error and performance measures, Design of biometric system, Applications of biometrics, Biometrics versus traditional authentication methods. **Face Biometrics:** Introduction, Background of Face Recognition, Design of Face Recognition System,	6

	Neural Network for Face Recognition, Face Detection in Video Sequences, Challenges in Face Biometrics, .7 Face Recognition Methods, Advantages and Disadvantages.	
II	**Retina and Iris Biometrics:** Introduction, Performance of Biometrics, Design of Retina Biometrics, Design of Iris Recognition System, Iris Segmentation Method , Determination of Iris Region, Determination of Iris Region, Applications of Iris Biometrics, Advantages and Disadvantages **Vein and Fingerprint Biometrics:** Introduction, Biometrics Using Vein Pattern of Palm, Fingerprint Biometrics, Fingerprint Recognition System, Minutiae Extraction, Fingerprint Indexing, Experimental Results, Advantages and Disadvantages.	6
III	**Privacy Enhancement Using Biometrics:** Introduction, Privacy Concerns Associated with Biometric Deployments, Identity and Privacy, Privacy Concerns, Biometrics with Privacy Enhancement, Comparison of Various Biometrics in Terms of Privacy, Soft Biometrics. **Multimodal Biometrics:** Introduction to Multimodal Biometrics , Basic Architecture of Multimodal Biometrics, Multimodal Biometrics Using Face and Ear, Characteristics and Advantages of Multimodal Biometrics, Characteristics and Advantages of Multimodal Biometrics.	6
IV	**Watermarking Techniques:** Introduction, Data Hiding Methods, Basic Framework of Watermarking, Classification of Watermarking, Applications of Watermarking, Attacks on Watermarks, Performance Evaluation, Characteristics of Watermarks, General Watermarking Process, Image Watermarking Techniques, Watermarking Algorithm, Experimental Results, Effect of Attacks on Watermarking Techniques, Attacks on Spatial Domain Watermarking.	6
V	**Scope and Future:** Scope and Future Market of Biometrics, Biometric Technologies, Applications of Biometrics, Biometrics and Information Technology Infrastructure, Role of Biometrics in Enterprise Security, Role of Biometrics in Border Security, Smart Card Technology and Biometrics, Radio Frequency Identification (RFID) Biometrics, DNA Biometrics, Comparative Study of Various Biometric Techniques. **Biometric Standards:** Introduction, Standard Development Organizations, Application Programming Interface (API), Information Security and Biometric Standards, Biometric Template Interoperability.	6
	Total	**30**

Course Outcomes		
Course Outcomes	On completion of this course, students will;	
CO1	To understand the basic concepts and the functionality of the Biometrics, Face Biometrics, Types, Architecture and Applications.	PO1, PO3, PO6, PO8
CO2	To know the concepts Retina and Iris Biometrics and Vein and Fingerprint Biometrics.	PO1,PO2,PO3,PO6
CO3	To analyse the Privacy Enhancement and Multimodal Biometrics.	PO3, PO5
CO4	To get analyticalidea on Watrmarking Techniques	PO1, PO2, PO3, PO7
CO5	To Gain knowledge on Future scope of Biometrics,and Study of various Biometric Techniques.	PO2, PO6, PO7
Recommended Text		

1.	Biometrics: Concepts and Applications by G.R Sinha and SandeepB.Patil , Wiley, 2013
References Books	
1.	Guide to Biometrics by Ruud M. Bolle , SharathPankanti, Nalinik.Ratha, Andrew W.Senior, Jonathan H. Connell , Springer 2009
2.	Introduction to Biometrics by Anil k. Jain, Arun A. Ross, KarthikNandakumar
3.	Hand book of Biometrics by Anil K. Jain, Patrick Flynn, ArunA.Ross.
Web Resources	
1.	https://www.tutorialspoint.com/biometrics/index.htm
2.	https://www.javatpoint.com/biometrics-tutorial
3.	https://www.thalesgroup.com/en/markets/digital-identity-and-security/government/inspired/biometrics

Mapping with Programme Outcomes:

MAPPING TABLE						
CO/ PSO	**PSO 1**	**PSO 2**	**PSO 3**	**PSO 4**	**PSO 5**	**PSO 6**
CO1	**3**	**1**	**2**	**2**	**2**	**2**
CO2	**2**	**3**	**2**	**3**	**3**	**1**
CO3	**2**	**2**	**2**	**3**	**3**	**2**
CO4	**3**	**2**	**1**	**3**	**3**	**2**
CO5	**3**	**3**	**2**	**3**	**3**	**3**
Weightage of course contributed to each PSO	**13**	**11**	**9**	**14**	**14**	**10**

Strong-3M-Medium-2 L-Low-1

SEMESTER – V

Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
CC9	**Software Engineering**	Core	5	-	-	-	4	5	25	75	100

Learning Objectives	
LO1	Gain basic knowledge of analysis and design of systems
LO2	Ability to apply software engineering principles and techniques
LO3	Model a reliable and cost-effective software system
LO4	Ability to design an effective model of the system
LO5	Perform Testing at various levels and produce an efficient system.

UNIT	Contents	No. of Hours	Course Objectives
I	**Introduction**: The software engineering discipline, programs vs. software products, why study software engineering, emergence of software engineering, Notable changes in software development practices, computer systems engineering. **Software Life Cycle Models**: Why use a life cycle model, Classical waterfall model, iterative waterfall model, prototyping model, evolutionary model, spiral model, comparison of different life cycle models.	15	
II	**Requirements Analysis and Specification:** Requirements gathering and analysis, Software requirements specification (SRS) **Software Design**: Good software design, cohesion and coupling, neat arrangement, software design approaches, object- oriented vs function-oriented design	15	
III	**Function-Oriented Software Design:** Overview of SA/SD methodology, structured analysis, data flow diagrams (DFD's), structured design, detailed design.**User-Interface design:** Characteristics of a good interface; basic concepts;	15	

	types of user interfaces; component based GUI development, a user interface methodology.	
IV	**Coding and Testing:** Coding; code review; testing; testing in the large vs testing in the small; unit testing; black-box testing; white-box testing; debugging; program analysis tools; integration testing; system testing; some general issues associated with testing.**Software Reliability and Quality Management:** Software reliability; statistical testing; software quality; software quality management system; SEI capability maturity model; personal software process.	15
V	**Computer Aided Software Engineering:** CASE and its scope; CASE environment; CASE support in software life cycle; other characteristics of CASE tools; towards second generation CASE tool; architecture of a CASE environment. **Software Maintenance:** Characteristic of software maintenance; software reverse engineering; software maintenance process models; estimation of maintenance cost.	15
	Total	**75**
Course Outcomes		
Course Outcomes	On completion of this course, students will;	
CO1	Gain basic knowledge of analysis and design of systems	PO1
CO2	Ability to apply software engineering principles and techniques	PO1, PO2
CO3	Model a reliable and cost-effective software system	PO4, PO6
CO4	Ability to design an effective model of the system	PO4, PO5, PO6
CO5	Perform Testing at various levels and produce an efficient system.	PO3, PO6
Text Books		

1.	Rajib Mall, Fundamentals of Software Engineering, Fifth Edition, Prentice-Hall of India, 2018
References Books	
1.	Richard Fairley, Software Engineering Concepts, Tata McGraw-Hill publishing company Ltd, Edition 1997
2.	Roger S. Pressman, Software Engineering, Seventh Edition, McGraw-Hill.
3.	James A. Senn, Analysis & Design of Information Systems, Second Edition, McGraw-Hill International Editions.

Mapping with Programme Outcomes:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO1	3	2	3	2	2	3
CO2	3	2	2	2	1	2
CO3	3	3	3	2	3	2
CO4	3	3	3	2	2	2
CO5	3	3	3	2	2	2
Weightage of course contribute d to each PO/PSO	15	13	14	10	10	11

S-Strong-3 M-Medium-2 L-Low-1

Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
CC10	**Database Management System**	Core	5	-	-	-	4	5	25	75	100
Learning Objectives											
LO1	To enable the students to learn the designing of data base systems, foundation on the relational model of data and normal forms.										
LO2	To understood the concepts of data base management system, design simple Database models										

LO3	To learn and understand to write queries using SQL, PL/SQL.	
LO4	To enable the students to learn the designing of data base systems, foundation on the relational model of data and normal forms.	
LO5	To understood the concepts of data base management system, design simple Database models	
UNIT	**Contents**	**No. of Hours**
I	**Database Concepts:**Database Systems - Data vs Information - Introducing the database -File system - Problems with file system – Database systems. Data models - Importance - Basic Building Blocks - Business rules - Evolution of Data models - Degrees of Data Abstraction	15
II	**Design Concepts:** Relational database model - logical view of data-keys -Integrity rules - relational set operators - data dictionary and the system catalog - relationships -data redundancy revisited -indexes - codd's rules. Entity relationship model - ER diagram	15
III	**Normalization of Database Tables**: Database tables and Normalization – The Need for Normalization –The Normalization Process – Higher level Normal Form. **Introduction to SQL**: Data Definition Commands – Data Manipulation Commands – SELECT Queries – Additional Data Definition Commands – Additional SELECT Query Keywords – Joining Database Tables.	15

IV	**Advanced SQL**:Relational SET Operators: UNION – UNION ALL – INTERSECT - MINUS.SQL Join Operators: Cross Join – Natural Join – Join USING Clause – JOIN ON Clause – Outer Join.**Sub Queries and Correlated Queries**: WHERE – IN – HAVING – ANY and ALL – FROM. SQL Functions: Date and Time Function – Numeric Function – String Function – Conversion Function	15
V	**PL/SQL**:A Programming Language: History – Fundamentals – Block Structure – Comments – Data Types – Other Data Types – Variable Declaration – Assignment operation –Arithmetic operators.**Control Structures and Embedded SQL**: Control Structures – Nested Blocks – SQL in PL/SQL – Data Manipulation – Transaction Control statements. **PL/SQL Cursors and Exceptions**: Cursors – Implicit Cursors, Explicit Cursors and Attributes – Cursor FOR loops – SELECT…FOR UPDATE – WHERE CURRENT OF clause – Cursor with Parameters – Cursor Variables – Exceptions – Types of Exceptions.	15
	Total	**75**

Course Outcomes		**Programme Outcomes**
CO	On completion of this course, students will	
CO1	Understand the various basic concepts of Data Base System. Difference between file system and DBMS and compare various data models.	PO1
CO2	Define the integrity constraints. Understand the basic concepts of Relational Data Model, Entity-Relationship Model.	PO1, PO2
CO3	Design database schema considering normalization and relationships within database. Understand and construct database using Structured Query Language. Attain a good practical skill of managing and retrieving of data using Data Manipulation Language (DML)	PO4, PO6

CO4	Classify the different functions and various join operations and enhance the knowledge of handling multiple tables.	PO4, PO5, PO6
CO5	Learn to design Data base operations and implement using PL/SQL programs. Learn basics of PL/SQL and develop programs using Cursors, Exceptions	PO3, PO5
Text Book		
1	Coronel, Morris, Rob, "Database Systems, Design, Implementation and Management", Ninth Edition	
2	Nilesh Shah, "Database Systems Using Oracle", 2nd edition, Pearson Education India, 2016	
Reference Books		
1.	Abraham Silberschatz, Henry F.Korth and S.Sudarshan,“Database System Concepts”, McGraw Hill International Publication ,VI Edition	
2.	Shio Kumar Singh , “Database Systems “,Pearson publications ,II Edition	
Web Resources		
1.	Web resources from NDL Library, E-content from open-source libraries	

Mapping with Programme Outcomes:

CO/ PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO1	**3**	**2**	**1**	**2**	**1**	**2**
CO2	**3**	**3**	**2**	**2**	**3**	**3**
CO3	**3**	**3**	**2**	**3**	**3**	**2**
CO4	**3**	**2**	**3**	**2**	**2**	**3**
CO5	**3**	**2**	**2**	**2**	**3**	**3**
Weightage of course contributed to each PSO	**15**	**12**	**10**	**11**	**12**	**13**

S-Strong-3 M-Medium-2 L-Low-1

Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
CC11	**Database Management System lab**	Core	-	-	5	-	4	5	25	75	100

Learning Objectives	
LO1	To enable the students to learn the designing of data base systems, foundation on the relational model of data and normal forms.
LO2	To understood the concepts of data base management system, design simple Database models
LO3	To learn and understand to write queries using SQL, PL/SQL.
LO4	To enable the students to learn the designing of data base systems, foundation on the relational model of data and normal forms.
LO5	To understood the concepts of data base management system, design simple Database models

	List of Exercises:	**No. of Hours**	**Course Objective**
II	***I. SQL*** 1. DDLCOMMANDS 2. DMLCOMMANDS 3. TCLCOMMANDS ***II. PL/SQL*** 4. FIBONACCI SERIES 5. FACTORIAL 6. STRING REVERSE 7. SUM OF SERIES 8. TRIGGER ***III. CURSOR***		75

	9. STUDENT MARK ANALYSIS USING CURSOR ***IV. APPLICATION*** 10. LIBRARY MANAGEMENTSYSTEM 11. STUDENT MARK ANALYSIS		
	Total		**75**

Course Outcomes		**Programme Outcomes**
CO	On completion of this course, students will	
CO1	Understand the various basic concepts of Data Base System. Difference between file system and DBMS and compare various data models.	PO1
CO2	Define the integrity constraints. Understand the basic concepts of Relational Data Model, Entity-Relationship Model.	PO1, PO2
CO3	Design database schema considering normalization and relationships within database. Understand and construct database using Structured Query Language. Attain a good practical skill of managing and retrieving of data using Data Manipulation Language (DML)	PO4, PO6
CO4	Classify the different functions and various join operations and enhance the knowledge of handling multiple tables.	PO4, PO5, PO6
CO5	Learn to design Data base operations and implement using PL/SQL programs. Learn basics of PL/SQL and develop programs using Cursors, Exceptions	PO3, PO4

Text Book

1	Coronel, Morris, Rob, "Database Systems, Design, Implementation and Management", Ninth Edition
2	Nilesh Shah, "Database Systems Using Oracle", 2nd edition, Pearson Education India, 2016

Reference Books

1.	Abraham Silberschatz, Henry F.Korth and S.Sudarshan,“Database System Concepts”, McGraw Hill International Publication ,VI Edition
2.	Shio Kumar Singh , “Database Systems “,Pearson publications ,II Edition

Web Resources

1.	Web resources from NDL Library, E-content from open-source libraries

Mapping with Programme Outcomes:

CO/ PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO1	3	2	3	3	3	2
CO2	3	3	1	2	2	2
CO3	2	2	3	3	3	3
CO4	2	2	3	3	3	1
CO5	2	3	3	3	3	3
Weightage of course contributedto each PSO	12	12	13	14	14	11

S-Strong-3 M-Medium-2 L-Low-1

Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
DSEC1	Operating Systems	Elective	4	-	-	-	3	4	25	75	100
Learning Objectives											
LO1	Understanding the design of the Operating System										
LO2	Imparting knowledge on CPU scheduling, Process and Memory Management.										
LO3	To code specialized programs for managing overall resources and operations of the computer.										
LO4	Explain theJob and processor scheduling										
LO5	To understand the Virtual Memory organization										
UNIT	**Contents**										**No. of Hours**

I	**Introduction**: operating system, history (1990s to 2000 and beyond), distributed computing, parallel computation. **Process concepts:** definition of process, process states-Life cycle of a process, process management- process state transitions, process control block(PCB), process operations , suspend and resume, context switching, Interrupts -Interrupt processing, interrupt classes, Inter process communication-signals, message passing.	12
II	**Asynchronous concurrent processes:** mutual exclusion- critical section, mutual exclusion primitives, implementing mutual exclusion primitives, Peterson's algorithm,software solutions to the mutual Exclusion Problem-, n-thread mutual exclusion- Lamports Bakery Algorithm. Semaphores – Mutual exclusion with Semaphores, thread synchronization with semaphores, counting semaphores, implementing semaphores. **Concurrent programming:** monitors, message passing	12
III	**Deadlock and indefinite postponement:** Resource concepts, four necessary conditions for deadlock, deadlock prevention, deadlock avoidance and Dijkstra's Banker's algorithm, deadlock detection, deadlock recovery	12
IV	**Job and processor scheduling:** scheduling levels, scheduling objectives, scheduling criteria, preemptive vs non-preemptive scheduling, interval timer or interrupting clock, priorities, scheduling algorithms- FIFO scheduling, RR scheduling, quantum size, SJF scheduling, SRT scheduling, HRN scheduling, multilevel feedback queues, Fair share scheduling	12
V	**Real Memory organization and Management**:**:** Memory organization, Memory management, Memory hierarchy, Memory management strategies, contiguous vs non-contiguous memory allocation, single user contiguous memory allocation, fixed partition multiprogramming, variable partition multiprogramming, Memory swapping	12

	Virtual Memory organization: virtual memory basic concepts, multilevel storage organization, block mapping, paging basic concepts, segmentation, paging/segmentation systems. **Virtual Memory Management:** Demand Paging, Page replacement strategies	
	Total	**60**

Course Outcomes		**Programme Outcome**
CO	On completion of this course, students will	
CO1	Define the fundamentals of OS and identify the concepts relevant to process , process life cycle, Scheduling Algorithms, Deadlock and Memory management	PO1
CO2	know the critical analysis of process involving various algorithms, an exposure to threads and semaphores	PO1, PO2
CO3	Have a complete study about Deadlock and its impact over OS. Knowledge of handling Deadlock with respective algorithms and measures to retrieve from deadlock.	PO4, PO5
CO4	Have complete knowledge of Scheduling Algorithms and its types.	PO4, PO5, PO6
CO5	understand memory organization and management	PO2, PO4

Text Book	
1	H.M. Deitel, Operating Systems, Third Edition, Pearson Education Asia, 2011
Reference Books	
1.	William Stallings, Operating System: Internals and Design Principles, Seventh Edition,

	Prentice-Hall of India, 2012.
2.	A. Silberschatz, and P.B. Galvin., Operating Systems Concepts, Nineth Edition, John Wiley &Sons(ASIA) Pte Ltd.,2012
Web Resources	
1.	Web resources from NDL Library, E-content from open-source libraries

Mapping with Programme Outcomes:

CO/ PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO1	3	2	2	3	3	2
CO2	3	3	2	3	3	2
CO3	3	3	3	3	3	2
CO4	3	3	2	3	3	2
CO5	3	3	2	3	3	2
Weightage of course contributed to each PSO	15	14	11	15	15	10

S-Strong-3 M-Medium-2 L-Low-1

Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
DSEC2	Data mining and warehousing	Core	5	-	-	-	4	5	25	75	100

Learning Objectives	
LO1	To provide the knowledge on Data Mining and Warehousing concepts and techniques
LO2	To study the basic concepts of Data Mining, Architecture and Comparison.
LO3	To study a set of Mining Association Rules, Data Warehouses.
LO4	To study about Classification and Prediction, Classifier Accuracy
LO5	To study the basic concepts of cluster analysis, Cluster Methods

UNIT	Contents	No. of Hours	Course Objectives

I	Introduction: Data mining – Functionalities – Classification – Introduction to Data Warehousing – Data Preprocessing: Preprocessing the Data – Data cleaning – Data Integration and Transformation – Data Reduction	15
II	Data Mining, Primitives, Languages and System Architecture: Data Mining – Primitives – Data Mining Query Language, Architecture of Data mining Systems. Concept Description, Characterization and Comparison: Concept Description, Data Generalization and Summarization, Analytical Characterization, Mining Class Comparison – Statistical Measures.	15
III	Mining Association Rules: Basic Concepts – Single Dimensional Boolean Association Rules From Transaction Databases, Multilevel Association Rules from transaction databases – Multi dimension Association Rules from Relational Database and Data Warehouses.	15
IV	Classification and Prediction: Introduction – Issues – Decision Tree Induction – Bayesian Classification – Classification of Back Propagation. Classification based on Concepts from Association Rule Mining – Other Methods. Prediction – Introduction – Classifier Accuracy	15
V	Cluster Analysis: Introduction – Types of Data in Cluster Analysis, Petitioning Methods – Hierarchical Methods-Density Based Methods – GRID Based Method – Model based Clustering Method	15
	Total	**75**
Course Outcomes		
Course Outcomes	On completion of this course, students will;	
CO1	To understand the basic concepts and the functionality of the various data mining and data warehousing component	PO1, PO3, PO6, PO8
CO2	To know the concepts of Data mining system architectures	PO1,PO2,PO3,PO6
CO3	To analyze the principles of association rules	PO3, PO5
CO4	To get analytical idea on Classification and prediction methods	PO1, PO2, PO3, PO5
CO5	To Gain knowledge on Cluster analysis and its methods.	PO2, PO4, PO6
Text Books (Latest Editions)		
1.	Han and M. Kamber, “Data Mining Concepts and Techniques”, 2001, Harcourt India Pvt. Ltd, New Delhi.	
References Books (Latest editions)		
1.	K.P. Soman, ShyamDiwakar, V. Ajay “Insight into Data Mining Theory and Practice “,Prentice Hall of India Pvt. Ltd, New Delhi	
2.	Parteek Bhatia, ‘Data Mining and Data Warehousing: Principles and Practical Techniques’, Cambridge University Press, 2019	

Web Resources	
1.	https://www.topcoder.com/thrive/articles/data-warehousing-and-data-mining#:~:text=Data%20warehousing%20is%20a%20method,compiled%20in%20the%20data%20warehouse.
2.	https://www.javatpoint.com/data-mining-cluster-vs-data-warehousing
3.	https://www.tutorialspoint.com/Data-Warehousing-and-Data-Mining

Mapping with Programme Outcomes:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO1	3	3	3	3	3	3
CO2	3	3	2	3	2	2
CO3	3	2	3	3	3	2
CO4	3	2	3	2	3	3
CO5	2	3	3	3	3	3
Weightageofcourse contributedtoeach PSO	14	13	14	14	14	13

S-Strong-3 M-Medium-2 L-Low-1

SEMESTER - VI

Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
CC13	Computer Networks	Core	6	-	-	-	5	6	25	75	100

Course Objective		
LO1	To learn the basic concepts of Data communication and Computer network	
LO2	To learn about wireless Transmission	
LO3	To learn about networking and data link layer.	
LO4	To study about Network communication.	
LO5	To learn the concept of Transport layer	
UNIT	**Contents**	**No. of Hours**

I	Introduction – Network Hardware – Software – Reference Models – OSI and TCP/IP Models – Example Networks: Internet, ATM, Ethernet and Wireless LANs - Physical Layer – Theoretical Basis for Data Communication - Guided Transmission Media	18
II	Wireless Transmission - Communication Satellites – Telephone System: Structure, Local Loop, Trunks and Multiplexing and Switching. Data Link Layer: Design Issues – Error Detection and Correction.	18
III	Elementary Data Link Protocols - Sliding Window Protocols – Data Link Layer in the Internet - Medium Access Layer – Channel Allocation Problem – Multiple Access Protocols – Bluetooth.	18
IV	Network Layer - Design Issues - Routing Algorithms - Congestion Control Algorithms – IP Protocol – IP Addresses – Internet Control Protocols.	18
V	Transport Layer - Services - Connection Management - Addressing, Establishing and Releasing a Connection – Simple Transport Protocol – Internet Transporet Protocols (ITP) - Network Security: Cryptography	18
	Total	**90**

Course Outcomes		**Programme Outcome**
CO	On completion of this course, students will	
CO1	To Understand the basics of Computer Network architecture, OSI and TCP/IP reference models	PO1
CO2	To gain knowledge on Telephone systems using wireless network	PO1, PO2
CO3	To understand the concept of MAC	PO4, PO6
CO4	To analyze the characteristics of Routing and Congestion control algorithms	PO4, PO5, PO6
CO5	To understand network security and define various protocols such as FTP, HTTP, Telnet, DNS	PO3, PO4

Text Book

1 A. S. Tanenbaum, “Computer Networks”, 4th Edition, Prentice-Hall of India, 2008.

Reference Books

1. B. A. Forouzan, “Data Communications and Networking”, Tata McGraw Hill, 4th Edition, 2017

2.	F. Halsall, "Data Communications, Computer Networks and Open Systems", Pearson Education, 2008
3.	D. Bertsekas and R. Gallagher, "Data Networks", 2nd Edition, PHI, 2008.
4.	Lamarca, "Communication Networks", Tata McGraw- Hill, 2002
Web Resources	
1.	https://en.wikipedia.org/wiki/Computer_network
2.	https://citationsy.com/styles/computer-networks

Mapping with Programme Outcomes:

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	2	3	2	3
CO2	3	2	2	2	2	2
CO3	3	2	3	3	2	3
CO4	3	2	2	2	2	2
CO5	3	2	2	2	2	3
Weightage of course contributed to each PSO	15	11	11	12	10	13

S-Strong-3 M-Medium-2 L-Low-1

Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
CC14	**.Net Programming**	Core	6	-	-	-	5	6	25	75	100
Course Objective											
C1	To identify and understand the goals and objectives of the .NET framework and ASP.NET with C# language.										
C2	To develop ASP.NET Web application using standardcontrols.										
C3	To implement file handling operations.										
C4	To handles SQL Server Database using ADO.NET.										
C5	Understand the Grid view control and XML classes.										
UNIT	**Contents**							**No. of Hours**			

I	Overview of .NET framework: Common Language Runtime (CLR), Framework Class Library- C# Fundamentals: Primitive types and Variables – Operators - Conditional statements -Looping statements – Creating and using Objects – Arrays – Stringoperations.	18
II	Introduction to ASP.NET - IDE-Languages supported Components -Working with Web Forms – Web form standard controls: Properties and its events – HTML controls -List Controls: Properties and its events.	18
III	Rich Controls: Properties and its events – validation controls: Properties and its events– File Stream classes - File Modes – File Share – Reading and Writing to files – Creating, Moving, Copying and Deletingfiles – File uploading.	18
IV	ADO.NET Overview – Database Connections – Commands – Data Reader - Data Adapter - Data Sets - Data Controlsand its Properties – DataBinding	18
V	Grid View control: Deleting, editing, Sorting and Paging. XML classes – Web form to manipulate XML files - Website Security - Authentication - Authorization – Creating aWeb application.	18
	Total	**90**

Course Outcomes		**Programme Outcome**
CO	On completion of this course, students will	
1	Develop working knowledge of C# programming constructs and the .NET Framework	PO1, PO2, PO6
2	To develop a software to solve real-world problems using ASP.NET	PO2, PO3, PO5
3	To Work On Various Controls Files	PO1, PO3, PO6
4	To create a web application using MicrosoftADO.NET.	PO2, PO6
5	To develop web applications using XML	PO1, PO3, PO6
Text Book		
1	SvetlinNakov,VeselinKolev& Co, Fundamentals of Computer Programming with	

	C#,Faber publication,2019.
2	Mathew, Mac Donald, The Complete Reference ASP.NET, Tata McGraw-Hill,2015.
Reference Books	
1.	Herbert Schildt, The Complete Reference C#.NET, TataMcGraw-Hill,2017.
2.	Kogent Learning Solutions, C# 2012 Programming Covers .NET 4.5 Black Book, Dreamtechpres,2013.
3.	Anne Boehm, Joel Murach, Murach's C# 2015, Mike Murach& Associates Inc.2016.
4.	DenielleOtey, Michael Otey, ADO.NET: The Complete reference, McGrawHill,2008.
5.	Matthew MacDonald, Beginning ASP.NET 4 in C# 2010,APRESS,2010.
Web Resources	
1.	https://www.geeksforgeeks.org/introduction-to-net-framework/
2.	https://www.javatpoint.com/net-framework

Mapping with Programme Outcomes:

CO/ PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO1	**3**	**3**	**3**	**3**	**2**	**3**
CO2	**3**	**2**	**2**	**3**	**3**	**3**
CO3	**3**	**3**	**3**	**2**	**3**	**3**
CO4	**2**	**2**	**1**	**3**	**3**	**2**
CO5	**3**	**3**	**3**	**3**	**3**	**3**
Weightage of course contributed to each PSO	**14**	**13**	**12**	**14**	**14**	**14**

S-Strong-3 M-Medium-2 L-Low-1

Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
CC15	**.Net Programming LAB**	Core	-	-	6	-	3	6	25	75	100
Course Objective											
LO1	To develop ASP.NET Web application using standardcontrols.										
LO2	To create rich database applications usingADO.NET.										

LO3	To implement file handling operations.	
LO4	To implement XML classes.	
LO5	To utilize ASP.NET security features for authenticating the website	
Sl. No	**Programs**	**No. of Hours**
1.	Create an exposure of Web applications and tools	90
2.	Implement the Html Controls	
3.	Implement the Server Controls	
4.	Web application using Web controls.	
5.	Web application using List controls.	
6.	Web Page design using Rich control. Validate user input using Validation controls. Working with Fileconcepts.	
7.	Web application using Data Controls.	
8.	Data binding with Web controls	
9.	Data binding with Data Controls.	
10.	Database application to perform insert, update and delete operations.	
11.	Database application using Data Controls to perform insert, delete, edit, paging and sorting operation.	
12.	Implement the Xml classes.	
13.	Implement Authentication – Authorization.	
14.	Ticket reservation using ASP.NET controls.	
15.	Online examination using ASP.NET controls	
	Total	**90**
Course Outcomes		**Programme Outcome**
CO	On completion of this course, students will	
CO 1	To create web applications and implement various controls	PO1, PO2, PO4
CO2	Create web pages in Rich control.	PO3, PO5
CO3	Develop knowledge about file handling operations	PO1, PO4, PO5
CO4	An ability to design XML classes	PO2, PO4, PO6

CO5	To develop a software to solve real-world problems using ASP.NET	PO1,PO3, PO5, PO6
Text Book		
1	SvetlinNakov, VeselinKolev& Co, Fundamentals of Computer Programming with C#, Faber publication,2019.	
2	Mathew, Mac Donald, The Complete Reference ASP.NET, Tata McGraw-Hill,2015.	
Reference Books		
1.	Herbert Schildt, The Complete Reference C#.NET, TataMcGraw-Hill,2017.	
2.	Kogent Learning Solutions, C# 2012 Programming Covers .NET 4.5 Black Book, Dreamtech pres,2013.	
3.	Anne Boehm, Joel Murach, Murach's C# 2015, Mike Murach& Associates Inc.2016.	
4.	DenielleOtey, Michael Otey, ADO.NET: The Complete reference, McGrawHill,2008.	
5.	Matthew MacDonald, Beginning ASP.NET 4 in C# 2010, APRESS,2010.	
Web Resources		
1.	https://www.geeksforgeeks.org/introduction-to-net-framework/	
2.	https://www.javatpoint.com/net-framework	

Mapping with Programme Outcomes:

CO/ PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO1	**3**	**2**	**1**	**2**	**1**	**2**
CO2	**3**	**3**	**2**	**2**	**3**	**3**
CO3	**3**	**3**	**2**	**3**	**3**	**2**
CO4	**3**	**2**	**3**	**2**	**2**	**3**
CO5	**3**	**2**	**2**	**2**	**3**	**3**
Weightage of course contributed to each PSO	**15**	**12**	**10**	**11**	**12**	**13**

S-Strong-3 M-Medium-2 L-Low-1

Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
DSEC3	**COMPUTER GRAPHICS**	Core	5	-	-	-	3	5	25	75	100

Course Objective		
C1	To learn various concepts of Computer Graphics	
C2	To learn various Line,Circle and Ellipse Drawing Algorithm	
C3	To learn Attributes of Output primitives.	
C4	To learn about Two dimensional transformation.	
C5	To learn various type of Two dimensional Viewing.	
UNIT	**Contents**	**No. of Hours**
I	A Survey of Computer Graphics: Computer-Aided Design – Presentation Graphics Computer Art – Entertainment – Education and Training – Visualization – Image Processing – Graphical User Interfaces. Overview of Graphic Systems: Video Display Devices – Raster Scan Systems - Random Scan Systems – Input Devices – Hard Copy Devices	18
II	Output Primitives: Points and Lines – Line Drawing Algorithms – Circle Generation Algorithms – Ellipse Generating Algorithms - Other Curves-Filled Area primitives	18
III	Attributes of Output Primitives: Line Attributes – Curve Attributes – Color and Gray Scale Levels – Area Fill Attributes – Character Attributes – Bundled Attributes – Inquiry Functions – Anti aliasing.	18
IV	Two-Dimensional Geometric Transformations: Basic Transformations – Matrix Representations – Composite Transformations – Other Transformations – Transformation between Coordinate Systems.	18
V	Two-Dimensional Viewing : The Viewing Pipeline – Viewing Coordinate Reference Frame – Window – to – Viewport Coordinate Transformation – Two-Dimensional Viewing Functions – Clipping Operations – Point Clipping – Cohen Sutherland Line Clipping – Sutherland Hodgeman Polygon Clipping - Curve Clipping – Text Clipping – Exterior Clipping.	18
	Total	**90**

Course Outcomes		Programme Outcome
CO	On completion of this course, students will	
1	Develop working knowledge of C# programming constructs and the .NET Framework	PO1, PO2, PO6
2	To develop a software to solve real-world problems using ASP.NET	PO2, PO3, PO5
3	To Work On Various Controls Files	PO1, PO3, PO6
4	To create a web application using MicrosoftADO.NET.	PO2, PO6
5	To develop web applications using XML	PO1, PO3, PO6
Text Book		

1	1. COMPUTER GRAPHICS – Donald Hearn, M. Pauline Baker, PHI, 2nd Edition, 1994
Reference Books	
1.	Computer Graphics, Multimedia & Animation – Malay K.Pakhira, PHI, New Delhi, 2008.
2.	Fundamentals of Computer Graphics and Multimedia – D.P.Mukherjee, PHI, New Delhi, 1999
Web Resources	
1.	

Mapping with Programme Outcomes:

CO/ PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO1	3	3	3	3	2	3
CO2	3	2	2	3	3	3
CO3	3	3	3	2	3	3
CO4	2	2	1	3	3	2
CO5	3	3	3	3	3	3
Weightage of course contributed to each PSO	14	13	12	14	14	14

S-Strong-3 M-Medium-2 L-Low-1

Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
DSEC4	**Artificial Intelligence**	Elective	5	-	-	-	3	5	25	75	100

Course Objective	
C1	To learn various concepts of AI Techniques.
C2	To learn various Search Algorithm in AI.
C3	To learn probabilistic reasoning and models in AI.
C4	To learn about Markov Decision Process.
C5	To learn various type of Reinforcement learning.

UNIT	Contents	No. of Hours
I	Introduction: Concept of AI, history, current status, scope, agents, environments, Problem Formulations, Review of tree and graph structures, State space representation, Search graph and Search tree	12

II	Search Algorithms : Random search, Search with closed and open list, Depth first and Breadth first search, Heuristic search, Best first search, A* algorithm, Game Search	12
III	Probabilistic Reasoning : Probability, conditional probability, Bayes Rule, Bayesian Networks- representation, construction and inference, temporal model, hidden Markov model.	12
IV	Markov Decision process : MDP formulation, utility theory, utility functions, value iteration, policy iteration and partially observable MDPs.	12
V	Reinforcement Learning : Passive reinforcement learning, direct utility estimation, adaptive dynamic programming, temporal difference learning, active reinforcement learning- Q learning	12
	Total	**60**

Course Outcomes		**Programme Outcome**
CO	On completion of this course, students will	
1	Understand the various concepts of AI Techniques.	PO1
2	Understand various Search Algorithm in AI.	PO1, PO2
3	Understand probabilistic reasoning and models in AI.	PO4, PO6
4	Understand Markov Decision Process.	PO4, PO5, PO6
5	Understand various type of Reinforcement learning Techniques.	PO3, PO4

Text Book	
1	Stuart Russell and Peter Norvig, “Artificial Intelligence: A Modern Approach” , 3rd Edition, Prentice Hall.
	Elaine Rich and Kevin Knight, “Artificial Intelligence”, Tata McGraw Hill
Reference Books	
1.	Trivedi, M.C., “A Classical Approach to Artifical Intelligence”, Khanna Publishing House, Delhi.
2.	SarojKaushik, “Artificial Intelligence”, Cengage Learning India, 2011
3.	David Poole and Alan Mackworth, “Artificial Intelligence: Foundations for Computational Agents”, Cambridge University Press 2010
Web Resources	
1.	https://github.com/dair-ai/ML-Course-Notes
2.	https://web.cs.hacettepe.edu.tr/~erkut/ain311.f21/index.html
3.	https://www.toolify.ai/?gclid=CjwKCAjwvdajBhBEEiwAeMh1U6tlqU1LXlRFbcghLMZVwIC

	m_4PkIRcDRE-VYq_wTDcuaQeq_bCHnhoCcm4QAvD_BwE

Mapping with Programme Outcomes:

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	2	1	2	1	2
CO2	3	3	2	2	3	3
CO3	3	3	2	3	3	2
CO4	3	2	3	2	2	3
CO5	3	2	2	2	3	3
Weightage ofcoursecontributedto eachPSO	15	12	10	11	12	13

S-Strong-3 M-Medium-2 L-Low-1

Subject Code	Subject Name	Category	L	T	P	S	Credits	Marks		
								CIA	External	Total
PCS1	MATLAB Programming Lab	Core	-	-	2	-	2	25	75	100

Learning Objectives	
LO1	To learn fundamentals of digital image processing.
LO2	To learn about various 2D Image transformations
LO3	To learn about various image enhancement processing methods and filters
LO4	To learn about various classification of Image segmentation techniques
LO5	To learn about various image compression techniques

LAB EXERCISES	Required Hours

1.Write a MATLAB program for Basic commands like date, pwd, who, dir 2. Write a MATLAB program for find Largest number in three number using if statement 3. Write a MATLAB program for display prime numbers 1 to 100 using for loop and break. 4. Write a MATLAB program for Sum of Digits using while loop 5. Write a MATLAB program for Unit Converter using Switch 6. Write a MATLAB program for check given string is palindrome or not 7. Write a MATLAB program for display star pattern as like * ** *** **** ***** 8. Write a MATLAB program for compute the value of following function by using 1.Normal method 2.Avoiding inner loop 3.Avoiding both loop $y(n) = 1^3*(1^3+2^3)*(1^3+2^3+3^3)*\ldots*(1^3+2^3+\ldots+n^3)$ 9. Write a MATLAB program for a given matrix to perform the following operations. A = 1 2 3 4 5 6 7 8 0 (a) Display the matrix (b) Get the matrixsize (c) Get the matrixtranspose (d) Inverse matrix (e) Matrix determination(det) 10. Write a MATLAB program for B = [2 2 3; 4 0 6; 8 15] C = [1 1 2; 6 3 5; 1 9 1] To Calculate:	**75**

(a) D = B -C
(b) E = B +C
(c) F=E+2
(d) G=B*C
(e) H=B.*C

11. Write a MATLAB program to

1.Read and display a image

2. Display multi Image in a Single Window

3. Display multi Image in a Separate Window

12. Write a MATLAB program to

1. Resize a image
2. Rotate a image
3. Crop a image

13. Write a MATLAB program for flip an image

14. Write a MATLAB program for convert image color RGB to Gray color

15. Write a MATLAB program for contrast manipulation

16. Write a MATLAB program for histogram for Black and White image

17. Write a MATLAB program for histogram for RGB image

18. Write a MATLAB program for Histogram Equalization

19. Write a MATLAB program for Histogram of original and flipped image

20. Write a MATLAB program for

- Image Addition
- Image Subtraction
- Image Multiply

21.Write a MATLAB program for Deblurring

22. Write a MATLAB program for Color – Dithering

23. Write a MATLAB program for Image Negation.

24. Write a MATLAB program to extract Red, Green, and Blue Component from an Image

25. Write aMatlab program for Edge Detection by using the following Operators.

1. Sobel
2. Prewitt
3. Roberts

26. Write a MATLAB program to draw a 2-D simple plot graph

27. Write a MATLAB program for 2-D plot graph with title, legend, label

28. Write a MATLAB program for 2-D multi plot with color

29. Write MATLAB program for 3-D plot

30. Write a MATLAB program for 3-D multi plot with color

Course Outcomes

On completion of this course, students will		
CO	On completion of this course, students will	
1	Understand the fundamental concepts of digital image processing.	PO1
2	Understand various 2D Image transformations	PO1, PO2
3	Understand image enhancement processing techniques and filters	PO4, PO6
4	Understand the classification of Image segmentation techniques	PO4, PO5, PO6
5	Understand various image compression techniques	PO3, PO5
Text Book		
1	S Jayaraman, S Esakkirajan, T Veerakumar, Digital image processing ,Tata McGraw Hill, 2015	
2	Gonzalez Rafel C, Digital Image Processing, Pearson Education, 2009	
Reference Books		
1.	1. Jain Anil K , Fundamentals of digital image processing: , PHI,1988	
2.	Kenneth R Castleman , Digital image processing:, Pearson Education,2/e,2003	
3.	Pratt William K , Digital Image Processing: , John Wiley,4/e,2007	
Web Resources		
1.	https://kanchiuniv.ac.in/coursematerials/Digital%20image%20processing%20-Vijaya%20Raghavan.pdf	
2.	http://sdeuoc.ac.in/sites/default/files/sde_videos/Digital%20Image%20Processing%203rd%20ed.%20-%20R.%20Gonzalez%2C%20R.%20Woods-ilovepdf-compressed.pdf	
3.	https://dl.acm.org/doi/10.5555/559707	
4.	https://www.ijert.org/image-processing-using-web-2-0-2	

Mapping with Programme Outcomes:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO1	3	2	2	3	2	2
CO2	3	3	2	3	2	2
CO3	3	3	3	3	2	2
CO4	3	3	2	3	2	2
CO5	3	3	2	3	2	2
Weightage ofcoursecontributedtoeachPSO	15	14	11	15	10	10