D.K.M. COLLEGE FOR WOMEN (AUTONOMOUS)

VELLORE-1

(REACCREDITED BY NAAC WITH 'A' GRADE)

DEPARTMENT OF COMPUTER SCIENCE AND APPLICATIONS

UG-B.Sc DATA SCIENCE DEGREE

TEMPLATE AND SYLLABUS

2024-2025

1. Introduction

B.Sc. Data Science

Data Science is a vast field comprising many topics of Statistics, Mathematics, and IT. A Data Science course syllabus for beginners covers basic and advanced concepts of data analytics, machine learning, statistics, and programming languages like Python or R. It also teaches students how to interpret large datasets and identify patterns to create predictive models. Data Science has come a long way. Data Scientists were once referred to as 'business problem solvers' who knew how to make sense of incoherent data clusters. Fast-forward to the present, Data Scientists are the most important resources for any business looking to thrive in this mad rush. They are now the 'wizards of all problem solvers'.

The course is enabled to include several interdisciplinary areas like: programming languages, algorithms, operating systems, databases, machine learning, data mining, business intelligence, big data, probability and statistics, data optimization, statistical simulation and data analysis, management decision analysis, decision models and predictive analysis. Data Science has gained paramount importance in the computer science domain. The need for scientists who understand data in all its aspects will continue to grow strongly. Students graduating from the program will have significantly more depth and breadth in the broad area of Data Science and receive all the information they need to work with various kinds of data and statistical data. The program is designed so that students have in-depth knowledge of the many approaches, aptitudes, methodologies, and instruments needed to deal with corporate data. Students receive instruction in the abilities needed to find the needed solutions and assist in making significant judgments.

This is the primary reason the syllabus of Data Science courses includes concepts that touch base on cloud computing, big data, natural language processing, and data sentiment analysis. The future of Data Science is estimated to bring opportunities in various areas of banking, finance, insurance, entertainment, telecommunication, automobile, etc. A data scientist will help grow an organization by assisting them in making better decisions. Data science has become important due to recent technology disruptions. Most fundamental is Moore's Law which has driven an exponential growth in computing, storage, and communications per rupee over the past 50 years. This rate of growth shows no signs of abating. Consequently, today we have the Internet of Things: a plethora of sensors costing 10s of rupees or less, a global Internet with almost limitless bandwidth, and enormous storage in global clouds. The present era is full of technological advances in almost all spectrum of life and we are flooded with enormous amount of data. There is an increasing demand of capturing, analyzing, and synthesizing this large amount of data

sets in a number of application domains to better understand various phenomena and to convert the information available in the data into actionable strategies such as new scientific discoveries, business applications, policy making, and healthcare etc.

Data science is the area where applications of various tools and techniques from the disciplines of applied statistics, mathematics and computer science are used to get greater insight and to make better and informed decisions for various purposes by analyzing a large amount of data. Consequently, the study of data science as a discipline has become essential to cater the growing need for professionals and researchers to deal with the future challenges.

B.SC. DATA SCIENCE

Programme Educational Objectives (PEOs)

PEO1: Attain Academic and Professional Excellence

Build a strong academic foundation and skill set that will enable success in higher education, competitive examinations, teaching, research, industry, and entrepreneurial ventures.

PEO2: Emerge as Empowered Individuals

Develop into confident, self-reliant, and economically independent women capable of applying scientific knowledge to enhance personal growth, family welfare, and community development.

PEO3: Advance Research and Innovation

Demonstrate the ability to investigate real-world challenges and contribute contextually relevant, research-driven, and innovative solutions across scientific disciplines.

PEO4: Uphold Ethical and Cultural Values

Adhere to high ethical standards, respect cultural diversity, and engage responsibly in scientific practices that contribute to a just and inclusive society.

PEO5: Respond to Societal and National Needs

Utilize scientific understanding to support public health, environmental conservation, and technological advancement, fostering inclusive regional and national progress.

PEO6: Exhibit Leadership and Social Responsibility

Lead scientific and community initiatives with integrity, inspire collaborative action, and actively contribute to positive social transformation at local and global levels.

PEO7: Engage in Lifelong and Global Learning

Pursue continuous personal and professional development while staying abreast of global trends, innovations, and interdisciplinary scientific advancements.

Programme Outcomes (POs)

PO1: Comprehend and Apply Scientific Knowledge

Acquire and apply core knowledge from scientific disciplines to understand natural phenomena, solve complex problems, and support innovation across various domains of life and industry.

PO2: Demonstrate Analytical and Critical Thinking

Develop the ability to think critically and analytically by formulating hypotheses, interpreting experimental results, evaluating scientific literature, and drawing evidence-based conclusions.

PO3: Exhibit Technical and Laboratory Competency

Gain proficiency in laboratory techniques, handling of scientific instruments, and use of software tools, while adhering to safety protocols, accuracy, and reproducibility in experimental work.

PO4: Communicate Effectively

Present scientific concepts and findings clearly and coherently through oral presentations, technical writing, and the use of digital tools, adapting to both academic and professional contexts.

PO5: Uphold Ethical Values and Environmental Consciousness

Integrate ethical principles and environmental awareness into scientific practices, promoting sustainable solutions and a sense of accountability towards society and nature.

PO6: Engage in Lifelong Learning

Cultivate an inquisitive mindset and adaptability to emerging scientific advancements, technologies, and interdisciplinary approaches, thereby remaining relevant and competent throughout life.

PO7: Collaborate and Lead in Scientific and Social Contexts

Participate effectively in collaborative scientific projects and community-based activities, demonstrating leadership, decision-making, and commitment to women's empowerment and societal progress.

Ⅲ Programme Specific Outcomes – B.Sc. Data Science

PSO1: Apply Core Concepts of Data Science and Statistics

Demonstrate expertise in probability, statistical inference, regression models, and data transformation for decision-making.

PSO2: Use Tools for Data Analysis and Visualization

Develop data pipelines, dashboards, and visualizations using Python, R, Tableau, and SQL to uncover insights and trends.

PSO3: Design Predictive and Prescriptive Models

Apply machine learning algorithms to forecast outcomes and optimize processes in business, health, and science domains.

PSO4: Address Data Ethics and Privacy Concerns

Adhere to legal and ethical standards in data collection, usage, sharing, and algorithmic transparency.

PSO5: Prepare for Higher Studies and Data-Driven Careers

Equip for roles in data analytics, business intelligence, and postgraduate study in data science, AI, or informatics.

PSO6: Leverage Data for Social Impact

Use community-level datasets to analyze disparities and suggest interventions in education, health, and rural governance.

PSO7: Adapt to Dynamic Tech Environments

Remain agile in learning new tools, platforms, and cloud-based ecosystems for scalable data science solutions.

Choice Based Credit System (CBCS), Learning Outcomes Based Curriculum Framework (LOCF) Guideline Based Credit and Hours Distribution System

B.Sc. Data Science Curriculum Design

First Year

Semester-I

Part	List of Courses	Credit	Hours per week (L/T/P)	CIA	Uni. Exam	Total
Part-I	Language – Tamil	3	6	25	75	100
Part-II	English	3	6	25	75	100
Part-III	CC1 - Python Programming	5	5	25	75	100
	CC2 - Practical : Python Programming Lab	5	5	25	75	100
	Elective Course - EC1 1. Numerical Methods – I 2. Discrete Mathematics - I	3	4	25	75	100
Part-IV	Skill Enhancement Course- SEC-1 (Non Major Elective)- Fundamentals of Information Technology	2	2	25	75	100
	Foundation Course FC - Problem Solving Techniques	2	2	25	75	100
		23	**30**	**175**	**525**	**700**

Semester-II

Part	List of Courses	Credit	Hours per week(L/T/P)	CIA	Uni. Exam	Total
Part-I	Language -Tamil	3	6	25	75	100
Part-II	English	3	6	25	75	100
Part-III	CC3 - Data Structure and Algorithms	5	5	25	75	100
	CC4 - Practical: Data Structure and Algorithms Lab	5	5	25	75	100
	Elective Course - EC2 1. Numerical Methods – II 2. Discrete Mathematics - II	3	4	25	75	100
Part-IV	Skill Enhancement Course- SEC-2 (Non Major Elective) – Office Automation	2	2	25	75	100
	Skill Enhancement Course – SEC-3 Introduction to HTML	2	2	25	75	100
		23	**30**	**175**	**525**	**700**

Second Year

Semester-III

Part	List of Courses	Credit	Hours per week(L/T/P)	CIA	Uni. Exam	Total
Part-I	Language - Tamil	3	6	25	75	100
Part-II	English	3	6	25	75	100
Part-III	CC5- Data Science	5	5	25	75	100
	CC6 - Practical: Data Science Lab	5	5	25	75	100
	Elective Course – EC3 1. Operations Research 2. Mathematical Statistics - I	3	4	25	75	100
Part-IV	Skill Enhancement Course -SEC-4 (Entrepreneurial Based) – Understanding Internet	1	1	25	75	100
	Skill Enhancement Course -SEC-5 – Multimedia Systems	2	2	25	75	100
	Environmental Studies	-	1	-	-	-
		22	**30**	**175**	**525**	**700**

Semester-IV

Part	List of Courses	Credit	Hours per week (L/T/P)	CIA	Uni. Exam	Total
Part-I	Language - Tamil	3	6	25	75	100
Part-II	English	3	6	25	75	100
Part-III	CC7 – Object Oriented Programming with Java	5	5	25	75	100
	CC8 - Practical: Object Oriented Programming with Java Lab	5	5	25	75	100
	Elective Course - EC4 1. Introduction to Linear algebra 2. Mathematical Statistics - II	3	3	25	75	100
Part-IV	Skill Enhancement Course – SEC-6 - Quantitative Aptitude	2	2	25	75	100
	Skill Enhancement Course - SEC-7 – PHP Programming	2	2	25	75	100
	Environmental Studies	2	1	25	75	100
		25	**30**	**200**	**600**	**800**

Third Year

Semester-V

Part	List of Courses	Credit	Hours per week (L/T/P)	CIA	Uni. Exam	Total
Part-III	CC9 - Relational Database Management System	4	5	25	75	100
	CC10 - Machine Learning	4	5	25	75	100
	CC11 - Practical: RDBMS Lab using ORACLE	4	5	25	75	100
	Elective Course – EC5 1. Operating System 2. Computing Intelligence	3	4	25	75	100
	Elective Course – EC6 1. Computer Networks 2. Information Security	3	4	25	75	100
	CC12 - Core /Project with Viva voce	4	5	25	75	100
Part-IV	Value Education	2	2	25	75	100
	Internship / Industrial Training (Summer vacation at the end of IV semester activity)	2		25	75	100
		26	**30**	**200**	**600**	**800**

Semester-VI

Part	List of Courses	Credit	Hours per week (L/T/P)	CIA	Uni. Exam	Total
Part-III	CC13 - IoT and Cloud Technologies	4	6	25	75	100
	CC14 - . Artificial Intelligence	4	6	25	75	100
	CC15 - Practical: . IoT and Cloud Technologies Lab	4	6	25	75	100
	Elective Course – EC7 1. Software engineering 2. Cryptography	3	5	25	75	100
	Elective Course – EC8 1. Big Data Analytics 2. Grid Computing	3	5	25	75	100
Part-IV	Professional Competency Skill Enhancement Course SEC8	2	2	25	75	100
Part -V	Extension Activity	1	-	-	-	100
		21	**30**	**150**	**450**	**700**

Total Credits: 140

TOTAL CREDITS

B.Sc DATA SCIENCE

Part	Subject	Papers	Credit	Total credits	Marks	Total Marks
I	Language	4	3	12	100	400
II	English	4	3	12	100	400
III	Elective EC	8	3	24	100	800
III	Core theory	8	4x5=20 4x4=16	36	100	800
	Core Practicals	6	4x5=20 2x4=08	28	100	600
III	Project	1	4	4	100	100
IV	EVS	1	2	2	100	100
IV	VE	1	2	2	100	100
IV	Skill Enhancement Course	7	6x2=12 1x1=1	13	100	700
IV	Foundation Course	1	2	2	100	100
IV	Professional Competency Skill	1	2	2	100	100
IV	Internship	1	1	2	100	100
V	Extension activity	1	1	1	100	100
Total				**140**		**4400**

Python Programming

Subject Code	SubjectName	Category	L	T	P	S	Credits	Marks		
								CIA	External	Total
CC1	PYTHONPROGRAMMING		5	-	-	-	5	25	75	100

Course Objectives		
CO1	To make students understand the concepts of Python programming.	
CO2	To apply the OOPs concept in PYTHON programming.	
CO3	To impart knowledge on demand and supply concepts	
CO4	To make the students learn best practices in PYTHON programming	
CO5	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 –	**15**

	Modules and Namespace–Defining our own modules.		
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 write lines() 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

	Text books
1	Reema Thareja,‖Python Programming using problem solving approach‖,First Edition, 2017,Oxford University Press.
2	Dr. R. Nageswara Rao ‖Core Python Programming ‖,First Edition,2017,Dreamtech Publishers.

	Reference Books
1.	Vamsi Kurama,‖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 ‖,A Press.

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	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	2	2	3	3	3
CO2	3	2	2	3	2	3
CO3	3	2	2	3	2	2
CO4	3	2	2	3	2	3
CO5	3	2	2	3	3	3
Weightage of course contributed to each PSO	15	10	10	15	13	14

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

Python Programming Lab

Subject Code	Subject Name	Category	L	T	P	S	Credits	CIA	External	Total
								Marks		
CC2	PYTHON PROGRAMMING LAB		-	-	5	-	5	25	75	100

Course Objectives:

1. Be able to design and program Python applications.
2. Be able to create loops and decision statements in Python.
3. Be able to work with functions and pass arguments in Python.
4. Be able to build and package Python modules for reusability.
5. 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
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	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2	2	2	2	3	2
CO2	2	1	3	2	-	2
CO3	3	3	1	1	1	2
CO4	2	3	3	1	-	1
CO5	3	2	3	1	1	-
Weightage of course contributed to each PSO	12	11	12	7	5	7

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

Fundamentals of Information Technology

Subject Code		Subject Name	Category	L	T	P	S	Credits	Marks		
									CIA	External	Total
		FUNDAMENTALS OF INFORMATION TECHNOLOGY	SEC –I NME	2	-	-	-	2	25	75	100

	Learning Objectives	
CO1	Understand basic concepts and terminology of information technology.	
CO2	Have a basic understanding of personal computers and their operation	
CO3	Be able to identify data storage and its usage	
CO4	Get great knowledge of software and its functionalities	
CO5	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. Kavitha Murugeshan (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.	Bhardwaj Sushil Puneet 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

Problem Solving Techniques

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

	Learning Objectives
CO1	Familiarize with writing of algorithms, fundamentals of C and philosophy of problem solving.
CO2	Implement different programming constructs and decomposition of problems into functions.
CO3	Use data flow diagram, Pseudo code to implement solutions.
CO4	Define and use of arrays with simple applications
CO5	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. **Repetition Structures:** Counter Controlled Loops – Nested Loops– Applications of Repetition Structures.	**6**
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

Semester II

Data Structures and Algorithms

Subject Code	Subject Name	Category	L	T	P	S	Credits	Marks		
								CIA	External	Total
	DATA STRUCTURES AND ALGORITHMS	CC III	5	-	-		5	25	75	100

	Learning Objectives
CO1	Understand the meaning asymptotic time complexity analysis and various data structures
CO2	To enhancing the problem solving skills and thinking skills
CO3	To write efficient algorithms and Programs
CO4	To make the students learn best practices in PYTHON programming
CO5	To understand how to handle the files in Data Structure

UNIT	Contents	No. Of. Hours
I	**Arrays and ordered Lists** Abstract data types – asymptotic notations – complexity analysis- Linked lists: Singly linked list – doubly linked lists - Circular linked list, General lists- stacks – Queues – Circular Queues – Evaluation of expressions	**15**
II	**Trees and Graphs** Trees – Binary Trees – Binary Tree Traversal – Binary Tree Representations – Binary Search Trees - threaded Binary Trees - Application of trees (Sets). Representation of Graphs – Graph implementation – graph Traversals - Minimum Cost Spanning Trees – Shortest Path Problems-Application of graphs	**15**
III	**Searching and Sorting** Sorting – Bubble Sort, Insertion Sort, Quick Sort, Merge Sort, Selection Sort. Searching – Linear search, Binary search	**15**
IV	**Greedy Method and Dynamic programming** Greedy Method: Knapsack problem– Job Sequencing with deadlines – Optimal storage on tapes. General method – Multistage Graph Forward Method– All pairs shortest path – Single source shortest path – Search Techniques for Graphs – DFS – Connected Components – Bi-Connected Components	**15**
V	**Backtracking** General Method – 8-Queen‟s – Sum Of Subsets – Graph Colouring – Hamiltonian Cycles – Branch And Bound: General Method – Travelling Sales Person Problem	**15**
	TOTAL HOURS	**75**

Course Outcomes		Programme Outcomes
CO	On completion of this course, students will	
CO1	To understand the asymptotic notations and analysis of time and space complexity. To understand the concepts of Linked List, Stack and Queue.	PO1, PO2, PO3, PO4, PO5, PO6

CO2	To understand the Concepts of Trees and Graphs. Perform traversal operations on Trees and Graphs. To enable the applications of Trees and Graphs.	PO1, PO2, PO3, PO4, PO5, PO6
CO3	To apply searching and sorting techniques	PO1, PO2, PO3, PO4, PO5, PO6
CO4	To understand the concepts of Greedy Method To apply searching techniques.	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	Seymour Lipshutz(2011),Schaum"s Outlines - Data Structures with C, Tata McGraw Hill publications.
2	Ellis Horowitz and SartajSahni (2010), Fundamentals of Computer Algorithms, Galgotia Publications Pvt., Ltd.
3	Dr. K. Nagesware Rao, Dr. Shaik Akbar, ImmadiMurali Krishna, Problem Solving and Python Programming(2018)

Reference Books

1.	Gregory L.Heileman(1996), Data Structures, Algorithms and Object-Oriented Programming, McGraw Hill International Edition, Singapore.
2.	A.V.Aho, J.D. Ullman, J.E.Hopcraft(2000). Data Structures and Algorithms, Addison Wesley Publication.
3.	Ellis Horowitz and SartajSahni, Sanguthevar Raja sekaran (2010) ,Fundamentals of Computer Algorithms, Galgotia Publications Pvt.Ltd.

Web Resources

1.	https://www.tutorialspoint.com/data_structures_algorithms/index.htm
2.	https://www.programiz.com/dsa
3.	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	3	3	3	3
CO 3	3	3	3	3	1	3
CO 4	3	3	3	3	3	3
CO 5	3	3	3	3	3	2
Weightage of course contributed to each PSO	15	15	15	15	13	14

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

Data Structures and Algorithms Lab

Subject Code	Subject Name	Category	L	T	P	S	Credits	Marks		
								CIA	External	Total
	DATA STRUCTURES AND ALGORITHMS LAB	**CC IV**	-	-	5		5	25	75	100

Course Objectives

To predict the performance of different algorithms in order to guide design decisions, provide theoretical estimation for the required resources of an algorithm to solve a specific computational problem

LIST OF PROGRAMS	Required Hour
1. Perform stack operations 2. Perform queue operations 3. Perform tree traversal operations 4. Search an element in an array using linear search. 5. Search an element in an array using binary search 6. Sort the given set of elements using Merge Sort. 7. Sort the given set of elements using Quick sort. 8. Search the Kth smallest element using Selection Sort 9. Find the Optimal solution for the given Knapsack Problem using Greedy Method. 10. Find all pairs shortest path for the given Graph using Dynamic Programming method 11. Find the Single source shortest path for the given Travelling Salesman problem using Dynamic Programming method 12. Find all possible solution for an N Queen problem using backtracking method 13. Find all possible Hamiltonian Cycle for the given graph using backtracking method	**75**

Course Outcomes	
CO	On completion of this course, students will
CO1	To understand the concepts of Linked List, Stack and Queue.
CO2	Concepts of Trees and Graphs. Perform traversal operations on Trees and Graphs. To enable the applications of Trees and Graphs.
CO3	To apply searching and sorting techniques
CO4	To determine the concepts of Greedy Method To apply searching techniques.
CO5	Usage of File handlings in python, Concept of reading and writing files, Do programs using files.

Learning Resources:

- **Recommended Texts**

  1. Ellis Horowitz , Sartaj Sahni, Susan Anderson Freed, Second Edition , "Fundamentals of Data in C", Universities Press

  2. E. Horowitz, S. Sahni and S. Rajasekaran,   Second Edition ,"Fundamentals of Computer Algorithms " Universities Press

- **Reference Books**

  1.   Seymour Lipschutz ,"Data Structures with C", First Edition, Schaum's outline series in computers, Tata McGraw Hill.

  2.   .2. R.Krishnamoorthy and G.Indirani Kumaravel, Data Structures using C, Tata McGrawHill – 2008.

  3.   A.K.Sharma, Data Structures using C , Pearson Education India,2011.

  4.   G. Brassard and P. Bratley, "Fundamentals of Algorithms", PHI, New Delhi, 1997.

  5.   A.V. Aho, J.E. Hopcroft, J.D. Ullmann,, "The design and analysis of Computer

  6.   Algorithms", Addison Wesley, Boston, 1974

  7.   Thomas H. Cormen, C.E. Leiserson, R L.Rivest and C. Stein, Introduction to Algorithms, Third edition, MIT Press, 2009

  8.   Sanjoy Dasgupta, C.Papadimitriou and U.Vazirani , Algorithms , Tata McGraw-Hill, 2008.

Course Outcomes	
CO	On completion of this course, students will
CO1	Implement data structures using C
CO2	Implement various types of linked lists and their applications
CO3	Implement Tree Traversals
CO4	Implement various algorithms in C
CO5	Implement different sorting and searching algorithms

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

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

OFFICE AUTOMATION

Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	CIA	External	Total
									Marks		
	OFFICE AUTOMATION	Specific Elective	2	-	-	-	2	2	25	75	100

	Course Objective
CO1	Understand the basics of computer systems and its components.
CO2	Understand and apply the basic concepts of a word processing package.
CO3	Understand and apply the basic concepts of electronic spreadsheet software.
CO4	Understand and apply the basic concepts of database management system.
CO5	Understand and create a presentation using PowerPoint tool.

UNIT	Details	No. of Hours
I	**Introductory concepts:** Memory unit– CPU-Input Devices: Key board, Mouse and Scanner. Output devices: Monitor, Printer. Introduction to Operating systems & its features: DOS– UNIX–Windows .Introduction to Programming Languages.	6
II	**Word Processing:** Open, Save and close word document; Editing text – tools, formatting, bullets; Spell Checker-Document formatting–Paragraph alignment, indentation, headers and footers, numbering ;printing –Preview, options, merge.	6
III	**Spreadsheets:** Excel opening, entering text and data, formatting, navigating; Formulas–entering, handling and copying; Charts–creating, formatting and printing, analysis tables, preparation of financial statements, introduction to data analytics.	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 data files; Understanding Programming environment in DBMS; Developing menu drive applications in query language(MS–Access).	6
V	**Power point:** Introduction to Power point - Features – Understanding slide type casting & viewing slides–creating slideshows. Applying special object – including objects & pictures – Slide transition–Animation effects, audio inclusion, timers.	6
	Total	**30**

	Course Outcomes	Programme Outcomes
CO	On completion of this course, students will	
1	Possess the knowledge on the basics of computers and its components	PO1,PO2,PO3,PO6,PO8
2	Gain knowledge on Creating Documents, spreadsheet and presentation.	PO1,PO2,PO3,PO6

3	Learn the concepts of Database and implement the Query In Database.	PO3,PO5,PO7
4	Demonstrate the understanding of different automation tools.	PO3,PO4,PO5,PO7
5	Utilize the automation tools for documentation, calculation and presentation purpose.	PO4,PO6,PO7,PO8

Text Book		
1	Peter Norton,‒Introduction to Computers‖–Tata McGraw-Hill.	

Reference Books		
1.	Jennifer Ackerman Kettel,Guy Hat-Davis,Curt Simmons,‒Microsoft2003‖,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:

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2	2	2	3	3	1
CO2	3	1	2	3	3	3
CO3	3	2	1	2	1	3
CO4	3	3	2	2	2	1
CO5	2	2	1	3	1	3
Weightage of course Contributed to each PSO	13	10	8	13	10	11

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

Introduction To HTML

Subject Code	Subject Name	Category	L	T	P	S	Credits	Marks		
								CIA	External	Total
	INTRODUCTION TO HTML	Specific Elective	2	-	-		2	25	75	100

Learning Objectives	
CO1	Insert a graphic within a webpage.
CO2	Create a link within a webpage.
CO3	Create a table within a webpage.
CO4	Insert heading levels within a webpage.
CO5	Insert ordered and unordered lists within a webpage. Create a webpage.

UNIT	Contents	No. Of. Hours
I	Introduction: Web Basics: What is Internet–Web browsers–What is Webpage –HTML Basics: Understanding tags.	6
II	Tags for Document structure(HTML, Head, Body Tag).Block level text elements: Headings paragraph(<p>tag)–Font style elements:(bold, italic, font, small, strong ,strike, big tags)	6
III	Lists: Types of lists: Ordered, Unordered–Nesting Lists –Other tags: Marquee, HR, BR-Using Images–Creating Hyperlinks.	6
IV	Tables: Creating basic Table, Table elements, Caption–Table and cell alignment–Row span, Col span –Cell padding.	6
V	Frames: Frame set–Targeted Links–No frame–Forms: Input, Text area, Select, Option.	6
	TOTAL HOURS	**30**

Course Outcomes		Programme Outcomes
CO	On completion of this course, students will	
CO1	Knows the basic concept in HTML Concept of resources in HTML	PO1, PO2, PO3,PO4,PO5,PO6
CO2	Knows Design concept. Concept of Meta Data Understand the concept of save the files.	PO1, PO2, PO3,PO4,PO5,PO6
CO3	Understand the page formatting. Concept of list	PO1, PO2, PO3,PO4,PO5,PO6
CO4	Creating Links. Know the concept of creating link to email address	PO1, PO2,PO3, PO4,PO5,PO6
CO5	Concept of adding images Understand the table creation.	PO1, PO2,PO3, PO4,PO5,PO6

Text books	
1	‒Mastering HTML5 and CSS3 Made Easy ‖,Teach U CompInc.,2014.
2	**Thomas Michaud, "Foundations of Web Design: Introduction to HTML & CSS"**

Web Resources	
1.	https://www.teachucomp.com/samples/html/5/manuals/Mastering-HTML5-CSS3.pdf
2.	https://www.w3schools.com/html/default.asp

Mapping with Programme Outcomes:

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	3	3	3	3
CO2	3	3	2	3	3	3
CO3	2	3	3	3	3	3
CO4	3	3	3	3	3	3
CO5	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

Data Science

Subject Code	Subject Name	Category	L	T	P	S	Credits	Marks		
								CIA	External	Total
	DATA SCIENCE	CCV	5	-	-		5	25	75	100
Course Objectives									

	Course Objectives
CO1	To understand the basic concepts of Data Science
CO2	To understand the principles of algorithms, flowchart and source code
CO3	To acquire a solid foundation in Python.
CO4	To visualize data using plots in python
CO5	To understand and handle database and visualize.

UNIT	Contents	No. Of. Hours
I	**Introduction to Data Science** Introduction: Data Science - Big Data and Data Science hype – getting past the hype – Datafication - Current landscape of perspectives - Skill sets needed - Statistical Inference - Exploratory Data Analysis and the Data Science Process - Basic tools (plots, graphs and summary statistics) of EDA – Applications of Data Science - Data Science in Business - Business Intelligence vs Data Science – Data Analytics Life Cycle - Machine Learning	**15**
II	**Introduction to Python** Features of Python - How to Run Python – Identifiers- Reserved Keywords- Variables - Comments in Python - Indentation in Python - Multi-Line Statements- Input, Output and Import Functions- Operators. Data Types and Operations: Numbers -Strings -List -Tuple - Set -Dictionary - Mutable and Immutable Objects - Data Type Conversion. Flow Control: Decision Making-Loops-Nested Loops-Control Statements- Types of Loops-List Comprehensions-Set Comprehensions-Dictionary Comprehensions-Nested Dictionaries.	**15**
III	**Functions** Function Definition - Function Calling - Function Arguments - Anonymous Functions (Lambda Functions) - Recursive Functions - Modules and Packages: Built-in Modules - Creating Modules - import Statement- Namespaces and Scope - The dir() function - The reload() function -Packages in Python - Date and Time Modules – Numpy Libraries and Data Manipulation Using Pandas	**15**
IV	**File Handling and Object Oriented Programming** Opening a File-Closing a File - Writing to a File - Reading from a File - File Methods - Renaming a File - Deleting a File - Directories in Python. Regular Expressions. Class Definition - Creating Objects - Built-in Attribute Methods - Built-in Class Attributes - Destructors in Python - Encapsulation - Data Hiding – Inheritance-Method Overriding – Polymorphism - Exception Handling	**15**
V	**Database Programming and Visualizations** Connecting to a Database - Creating Tables - INSERT Operation - UPDATE Operation - DELETE Operation - READ Operation - Transaction Control -Disconnecting from a Database - Exception Handling in Databases - GUI Programming - CGI Programming- Data Visualizations using Matplotlib – histograms, bar charts, pie charts.	**15**

		TOTAL HOURS	75

Course Outcomes		Programme Outcomes
CO	On completion of this course, students will	
CO1	To explain the basic concepts of data science and its application	PO1, PO2, PO3, PO4, PO5, PO6
CO2	To explain the Features of Python To demonstrate Control Statements and Looping Statements	PO1, PO2, PO3, PO4, PO5, PO6
CO3	To understand Python Functions To create and illustrate Numpy Libraries To perform Data Manipulation using Pandas.	PO1, PO2, PO3, PO4, PO5, PO6
CO4	To understand the File Concepts Apply Exception Handling Techniques	PO1, PO2, PO3, PO4, PO5, PO6
CO5	To Create and manipulate Database To create Data Visualization using Mat plot lib	PO1, PO2, PO3, PO4, PO5, PO6

Textbooks

1 Doing Data Science, Straight Talk From The Frontline, **Cathy O'Neil and Rachel Schutt, O'Reilly** (2014)

2 Big Data Analytics, paperback 2nd ed., **Seema Acharya, Subhasini Chellappan, Wiley**

3 **Dr. Jeeva Jose (2018) ,**Taming Python By Programming, Khanna Publishers

4 **Jake Vanderplas,** Python Data Science Handbook: Essential Tools for Working with Data 1st Edition.

Reference Books

1. Ljubomir Perkovic(2012),Introduction to Computing Using Python: An Application Development Focus, John Wiley & Sons

2. John V Guttag(2013), Introduction to Computation and Programming Using Python", Revised and expanded Edition, MIT Press.

3 Kenneth A. Lambert(2012), Fundamentals of Python: First Programs, C engage Learning

Mapping with Programme Outcomes:

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

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

Data Science LAB

Subject Code	Subject Name	Category	L	T	P	S	Credits	CIA	External	Total
	DATA SCIENCE LAB	**CC VI**	-	-	5		5	25	75	100

OBJECTIVES:
To build websites and software, automate tasks, and conduct data analysis. Open Source and Community Development.

	Required Hours
LIST OF PROGRAMS 1. Demonstrate the working of "id" and "type" functions. 2. Find all prime numbers within a given range. 3. Print n terms of Fibonacci series using iteration. 4. Demonstrate use of slicing in string. 5. Compute the frequency of the words from the input. The output should output after sorting the key alphanumerically. 6. Write a program that accepts a comma separated sequence of words as input and prints the words in a comma-separated sequence after sorting them alphabetically. 7. Demonstrate use of list & related functions. 8. Demonstrate use of Dictionary & related functions. 9. Demonstrate use of tuple & related functions. 10. Implement stack using list. 11. Implement queue using list. 12. Read and write from a file. 13. Copy a file. 14. Demonstrate working of classes and objects. 15. Demonstrate class method & static method. 16. Demonstrate constructors. 17. Demonstrate inheritance. 18. Demonstrate aggregation/composition. 19. Create a small GUI application for insert, update and delete in a table. 20. Bar charts, histograms and pie charts	**60**

Mapping with Programme Outcomes:

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

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

Understanding Internet

Subject Code	Subject Name	Category	L	T	P	S	Credits	CIA	External	Total
									Marks	
	UNDERSTANDING INTERNET	Skill Enhancement Course	1	-	-		1	25	75	100

	Course Objectives
CO1	Knowledge of Internet medium
CO2	Internet as a mass medium
CO3	Features of Internet Technology,
CO4	Internet as source of infotainment
CO5	Study of internet audiences and about cybercrime

UNIT	Contents	No. Of. Hours
I	The emergence of internet as a mass medium–the world of world wide web'.	6
II	Features of internet as a technology.	6
III	Internet as a source of infotainment–classification based on content and style.	6
IV	Demographic and psychographic descriptions of internet audiences'–effect Of internet on the values and life-styles.	6
V	Present issues such as cybercrime and future possibilities.	6
	TOTAL HOURS	**30**

Course Outcomes		Programme Outcomes
CO	On completion of this course, students will	
CO1	Knows the basic concept in internet Concept of mass medium and world wide web	PO1, PO2, PO3,PO4,PO5,PO6
CO2	Knows the concept of internet as a technology.	PO1, PO2, PO3,PO4,PO5,PO6
CO3	Understand the concept of infotainment and classification based on content And style	PO1, PO2,PO3, PO4,PO5,PO6
CO4	Can be able to know about Demographic and psychographic description of internet	PO1, PO2,PO3, PO4,PO5,PO6
CO5	Understand the concept of cybercrime and future possibilities	PO1, PO2, PO3,PO4,PO5,PO6

	Textbooks
1	01.Barnouw,E and Krishnaswamy S [1990] Indian Film. NewYork, OUP.
2	Kumar, Keval [1999] Mass Communication in India. Mumbai, Jaico.
3	**Srivastava, KM [1992] Media Issues. Sterling Publishers Pvt Ltd.**

	ReferenceBook
1	Acharya, RN [1987] Television in India. Manas Publications, New Delhi.

Mapping with Programme Outcomes:

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	1	2	2	1	3	1
CO2	3	2	2	3	1	3
CO3	3	2	3	1	1	3
CO4	3	3	2	2	2	1
CO5	3	2	1	3	3	3
Weightage of course contributed to each PSO	13	11	10	10	10	11

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

Multimedia Systems

Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
	MULTIMEDIA SYSTEMS	Skill Enhanceme nt Course	2	-	-	-	2	2	25	75	100

	Course Objective
CO1	Understand the definition of Multimedia
CO2	To study about the Image File Formats, Sounds Audio File Formats
CO3	Understand the concepts of Animation and Digital Video Containers
CO4	To study about the Stage of Multimedia Project
CO5	Understand the concept of Ownership of Content Created for Project Acquiring Talent

UNIT	Details	No. of Hours
I	Multimedia Definition-Use Of Multimedia-Delivering Multimedia- Text: About Fonts and Faces-Using Text in Multimedia -Computers and Text Font Editing and Design Tools-Hypermedia and Hypertext.	6
II	Images: Plan Approach-Organize Tools-Configure Computer Workspace –Making Still Images - Color – Image File Formats. Sound: The Power of Sound-Digital Audio –Midi Audio – Midi vs. Digital Audio – Multimedia System Sounds Audio File Formats - Vaughan's Law of Multimedia Minimums-Adding Sound to Multimedia Project	6
III	Animation: The Power of Motion-Principles of Animation – Animation by Computer-Making Animations that Work. Video: Using Video –Working with Video and Displays-Digital Video Containers-Obtaining Video Clips-Shooting and Editing Video	6
IV	Making Multimedia: The Stage of Multimedia Project-The Intangible Needs -The Hardware Needs - The Software Needs- An Authoring Systems Needs-Multimedia Production Team.	6
V	Planning and Costing: The Process of Making Multimedia-Scheduling-Estimating-RFPs and Bid Proposals. Designing and Producing- Content and Talent: Acquiring Content-Ownership of Content Created for Project-Acquiring Talent	6
	Total	**30**

Course Outcomes		Programme Outcomes
CO	On completion of this course, students will	
1	understand the concepts, importance, application and the process of developing multimedia	PO1
2	To have basic knowledge and understanding about image related processing	PO1,PO2
3	To understand the framework offrames and bit images to animations	PO4,PO6
4	Speaks about the multimedia projects and stages of requirement in phases of project.	PO4,PO5,PO6
5	Understanding the concept of cost involved in multimedia planning, designing, and producing	PO3,PO8
Text Book		
1	TayVaughan,"Multimedia:MakingItWork",8thEdition,Osborne/McGraw-Hill, 2001.	
Reference Books		
1.	Ralf Steinmetz & Klara Nahrstedt "Multimedia Computing, Communication & Applications", Pearson Education,2012.	
Web Resources		
1.	https://www.geeksforgeeks.org/multimedia-systems-with-features-or-characteristics/	

Mapping with Programme Outcomes:

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	2	3	3	2	1
CO2	3	2	3	3	2	1
CO3	3	2	3	3	2	1
CO4	3	2	3	3	1	1
CO5	3	3	3	3	1	1
Weightage of course contributed to each PSO	15	11	15	15	8	5

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

Object Oriented Programming with Java

Subject Code	Subject Name	Category	L	T	P	S	Credits	Marks		
								CIA	External	Total
	OBJECT ORIENTED PROGRAMMING WITH JAVA	CC VII	5	-	-		5	25	75	100

Course Objectives	
CO1	Object Oriented Programming with Java.
CO2	Apply the OOPs concept in JAVA programming.
CO3	Become proficient programmers through the java programming language.
CO4	Give insight into real world applications.
CO5	Get the attentions of users in user interface using graphics

UNIT	Contents	No. Of. Hours
I	**Introduction:** Introduction to Java-Features of Java-Object Oriented Concepts-Software Evolution – Software Development, SDLC Models – SDLC steps – Software Testing – Software Quality – Lexical Issues-Data Types – Variables – Arrays – Operators – Control Statements – Classes – Objects –Constructors – Overloading method – Access control – static and fixed methods – Inner classes –Inheritance-Overriding Methods-Using super-Abstract class.	**15**
II	**Packages & Threads:** Packages-Access Protection-Importing Packages-Interfaces-Exception Handling-Throw and Throws- Thread-Synchronization-Messaging- Runnable Interface-Inter thread communication-Deadlock-suspending, resuming and stopping threads-Multithreading	**15**
III	**Input/Output & Collection API:** I/O Streams-File Streams-String Objects-String Buffer-Char Array – Java Utilities-Collections interface – Collection classes-Enumeration – Vector –Stack –Hash tables – String class.	**15**
IV	**Networking:** Networking –Networking basics – java and the Net – Inet Address- TCP/IP Client Sockets –URL- URL Connection – TCP/IP Server Sockets – Datagrams.	**15**
V	**Graphical User Interface in Java:** Working with windows using AWT Classes – Class Hierarchy of Window and Panel –AWT controls – Layout Managers – Menus- Menu bars - Dialog Boxes- File Dialog- Applets-Lifecycle of Applet-Types of Applets-Event handling-Applet tags - JDBC and connecting to Databases – CRUD operations.	**15**
	TOTAL HOURS	**75**

Course Outcomes	Programme Outcomes
CO	On completion of this course, students will	
CO1	Use the syntax and semantics of java programming language and basic concepts of OOP.	PO1, PO2, PO3, PO4, PO5, PO6

CO2	Develop reusable programs using the concepts of inheritance, polymorphism, interfaces and packages	PO1, PO2, PO3, PO4, PO5, PO6
CO3	Apply the concepts of Multithreading and Exception handling to Develop efficient and error free codes.	PO1, PO2, PO3, PO4, PO5, PO6
CO4	Design event driven GUI and web related applications which mimic the real word scenario	PO1, PO2, PO3, PO4, PO5, PO6
CO5	Build the internet-based dynamic applications using the concept of applets	PO1, PO2, PO3, PO4, PO5, PO6

Textbooks

1	**P. Naughton and H. Schildt** (1999), Java 2 (The Complete Reference), Third Edition, Tata McGraw Hill Edition
2	**K.K. Aggarwal &Yogesh Sing** (2008), Software Engineering, Revised Third Edition, New Age International Publishers.

Reference Books

1.	Cay S. Horstmann, Gary Cornell(2012), Core Java 2 Volume I, Fundamentals- Ninth Edition Addision Wesley
2.	K. Arnold and J. Gosling, The Java Programming Language- Second Edition, ACM Press/Addison-Wesley Publishing Co. New York

Web Resources

1.	https://www.w3schools.com/java/java_oop.asp#:~:text=OOP%20provides%20a%20clear%20structure,code%20and%20shorter%20development%20time
2.	https://www.geeksforgeeks.org/object-oriented-programming-oops-concept-in-java/
3.	https://www.javatpoint.com/java-oops-concepts
4.	https://www.coursera.org/learn/object-oriented-java
5.	https://docs.oracle.com/javase/tutorial/java/concepts/index.html

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

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

Object Oriented Programming with Java LAB

Subject Code	Subject Name	Category	L	T	P	S	Credits	Marks		
								CIA	External	Total
	OBJECT ORIENTED PROGRAMMING WITH JAVA LAB	CC VIII	-	-	5		5	25	75	100

Learning Objectives:
1. Use an integrated development environment to write, compile, run, and test simple object-oriented Java programs.
2. Read and make elementary modifications to Java programs that solve real-world problems.
3. Be able to create an application using string concept.
4. Be able to create a program using files in application.
5. Be able to create an Applet to create an application.

	Required Hour
Lab Exercises: 1. Program using Class and Object. 2. Program using Constructors. 3. Program using Command-Line Arguments. 4. Program using Random Class. 5. Program using Vectors. 6. Program using String Tokenizer Class. 7. Program using Interface. 8. Program using all forms of Inheritance. 9. Program using String class. 10. Program using String Buffer class. 11. Program using Exception Handling. 12. Implementing Thread based applications 13. Program using Packages. 14. Program using Files. **Applets:** 15. Working with Colors and Fonts. 16. Parameter passing technique. 17. Drawing various shapes using Graphical statements. 18. Usage of AWT components and Listener in suitable applications.	**60**

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

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

Quantitative Aptitude

Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	CIA	External	Total
										Marks	
	QUANTITATIVE APTITUDE	Skill Enhancement Course	2	-	-	-	2	2	25	75	100

	Course Objective
CO1	To understand the basic concepts of numbers
CO2	Understand and apply the concept of percentage, profit & loss
CO3	To study the basic concepts of time and work, interests
CO4	To learn the concepts of permutation, probability, discounts
CO5	To study about the concepts of data representation, graphs

UNIT	Details	No. of Hours
I	Numbers-HCF and LCM of numbers-Decimal fractions-Simplification-Square root and cube roots–Average - problems on Numbers.	6
II	Problems on Ages-Surds and Indices-percentage-profits and loss – ratio and proportion-partnership-Chain rule.	6
III	Time and work-pipes and cisterns-Time and Distance - Problems on trains-Boats and streams-simple interest - Compound interest-Logarithms-Area-Volume and surface area-races and Games of skill.	6
IV	Permutation and combination-probability-True Discount-Bankers Discount–Height and Distances-Oddman out & Series.	6
V	Calendar-Clocks-stocks and shares- Data representation-Tabulation– Bar Graphs- Pie charts-Line graphs.	6
	Total	**30**

Course Outcomes		Programme Outcome
CO	On completion of this course, students will	
1	Understand the concepts, application and the problems of numbers	PO1
2	To have basic knowledge and understanding about percentage, profit & loss related processing	PO1,PO2

3	To understand the concepts of time and work	PO4,PO6
4	Speaks about the concepts of probability, discount	PO4,PO5,PO6
5	Understanding the concept of problem solving involved in stocks& shares, graphs	PO3,PO8

	Text Book
1	Quantitative Aptitude ,R.S.AGGARWAL.,S. Chand & Company Ltd.,

	Reference Books
1.	

	Web Resources
1.	https://www.javatpoint.com/aptitude/quantitative
2.	https://www.toppr.com/guides/quantitative-aptitude/

Mapping with Programme Outcomes:

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2	3	1	2	-	2
CO2	2	2	2	3	3	1
CO3	3	2	2	2	3	3
CO4	3	2	3	2	3	3
CO5	2	3	1	2	3	3
Weightage of course Contributed to each PSO	12	12	9	11	12	12

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

PHP Programming

Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	CIA	External	Total
	PHP PROGRAMMING	Skill Enhancement Course	2				2	2	25	75	100

Course Objective	
CO1	To provide the necessary knowledge on basics of PHP.
CO2	To design and develop dynamic database-driven web applications using PHP version.
CO3	To get an experience on various web application development techniques.
CO4	To learn the necessary concepts for working with the files using PHP.
CO5	To get a knowledge on OOPS with PHP.

UNIT	Details	No. of Hours
I	Introduction to PHP-Basic Knowledge of websites-Introduction of Dynamic Website –Introduction to PHP-Scope of PHP-XAMPP and WAMP Installation	6
II	PHP Programming Basics-Syntax of PHP-Embedding PHP in HTML-Embedding HTML in PHP. Introduction to PHP Variable -Understanding Data Types –Using Operators -Using Conditional Statements -If(), else if() and else if condition Statement.	6
III	Switch() Statements-Using the while()Loop-Using the for() Loop PHP Functions. PHP Functions-Creating an Array-Modifying Array Elements-Processing Arrays with Loops-Grouping Form Selections with Arrays-Using Array Functions.	6
IV	PHP Advanced Concepts –Reading and Writing Files -Reading Data From a File.	6
V	Managing Sessions and Using Session Variables-Destroying a Session-Storing Data in Cookies-Setting Cookies.	6
	Total	**30**

Course Outcomes		Programme Outcomes
CO	On completion of this course, students will	
1	Write PHP scripts to handle HTML forms	PO1, PO4, PO6, PO8.
2	Write regular expressions including modifiers, operators, and meta characters.	PO2, PO5, PO7.
3	Create PHP Program using the concept of array.	PO3, PO6, PO8.
4	Create PHP programs that use various PHP	PO2, PO3, PO5, PO8.

	Library functions	
5	Manipulate files and directories.	PO3, PO5, PO6.

	Text Book
1	**Head First PHP & My SQL: 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),–*HTML5 Black Book (CoversCSS3,JavaScript,XML, XHTML, AJAX, PHP, jQuery)*‖, Paperback 2016,2nd Edition.

	Web Resources
1.	Refer MOOC Courses like NPTEL and SWAYAM
2.	https://www.w3schools.com/php/default.asp

Mapping with Programme Outcomes:

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	**3**	**3**	**1**	**1**	**-**	**1**
CO2	**2**	**-**	**1**	**1**	**2**	**1**
CO3	**3**	**3**	**1**	**1**	**-**	**1**
CO4	**1**	**3**	**2**	**1**	**-**	**1**
CO5	**3**	**2**	**1**	**1**	**-**	**1**
Weightage of course contributed to each PSO	12	11	6	5	2	5

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