PSGR Krishnammal College for Women

College of Excellence, **nirf** 2023-4th Rank
Autonomous and Affiliated to Bharathiar University
Reaccredited with A++ grade by NAAC, An ISO 9001: 2015 Certified Institution
Peelamedu, Coimbatore-641004

DEPARTMENT OF COMPUTER SCIENCE (PG)

CHOICE BASED CREDIT SYSTEM (CBCS) & LEARNING OUTCOME BASED CURRICULAR FRAMEWORK (LOCF)

MASTER OF SCIENCE (COMPUTER SCIENCE)
2024 - 2026 BATCH
(Semester I)

M.Sc Computer Science

Programme Outcomes

After completion of the programme, the student will be able to

PO1 : Demonstrate broad knowledge in core areas of computer science, current and emerging technologies in IT

PO2: Apply higher degree of technical skills in problem solving and application development

PO3 : Gain analytical and managerial skills to enhance employment potential

PO4 : Acquire holistic development with strong emphasis on values and ethics

Programme Specific Outcomes

The students at the time of graduation will

PSO1: Identify and formulate complex problems to achieve solutions using concepts of algorithms, advanced networks, database management systems, artificial intelligence and machine learning

PSO2 : Design solutions for complex problems and design processes that meet the specific needs of the society.

PSO3: Create and apply appropriate techniques, resources and tools including prediction and modeling to multifaceted activities

PSO4: Apply programming and technical skills to solve real-life complex problems and hence enhance employability

PSO5: Analyse research methods including interpretation of data and synthesis of the information to provide valid conclusions.

PSO6: Demonstrate skills as an individual and as a member or leader in diverse teams

PSO7: Recognize the need for life-long learning and pursue a career as a researcher or software engineer.

PSO8: Apply ethical principles and contribute effectively to the welfare of the society

PSGR
Krishnammal College for Women
GRG
KCW
CELEBRATING WOMEN
SINCE 1963

Programme & Branch: M.Sc. Computer Science
Curriculum and Scheme of Examination (2024 - 2026 Batch and onwards)
Semester I

Semester	Subject Code	Title of Paper	Instruction hours/week	Contact hours	Tutorial hours	Duration of Examination	Examination Marks			Credits
							CIA	ESE	Total	
I	MCS2401	Paper 1: Design and Analysis of Algorithms	4	58	2	3	25	75	100	4
I	MCS2402	Paper 2: Network Security	4	58	2	3	25	75	100	4
I	MCS2403	Paper 3: Modern Operating Systems	4	58	2	3	25	75	100	4
I	MCS2404	Paper 4: Data Mining Techniques and Tools	4	58	2	3	25	75	100	4
I	MCS2405	Paper 5: Digital Image Processing	4	58	2	3	25	75	100	4
I	MCS24P1	Lab 1: Data Mining Techniques and Tools Lab	5	75	-	3	25	75	100	3
I	MCS23P2	Lab 2: Full Stack Development Lab	5	75	-	3	25	75	100	3
III	17MONL1	Online course	-	-	-	-	-	-	-	-

CA Question from each unit comprising of
One question with a weightage of 2 Marks :2 x 3 = 6
One question with a weightage of 5 Marks (Internal Choice at the same CLO level) :5 x 3=15
One question with a weightage of 8 Marks (Internal Choice at the same CLO level) :8 x 3 =24

Total :45 Marks

ESE Question Paper Pattern:
Question from each unit comprising of
One question with a weightage of 2 Marks: 2 x 5=10
One question with a weightage of 5 Marks (Internal Choice at the same CLO level): 5 x 5=25
One question with a weightage of 8 Marks (Internal Choice at the same CLO level): 8 x 5 =40

Continuous Internal Assessment Pattern
Theory
- CIA Test: 5 marks (conducted for 45 marks after 50 days)
- Model Exam: 7 marks (Conducted for 75 marks after 85 days (Each Unit 15 Marks))
- Seminar/Assignment/Quiz: 5 marks
- Class Participation: 5 marks
- Attendance: 3 marks
  Total: 25 Marks

Practical Lab
- Performance: 7 marks
- Regularity: 5 marks
- Model Exam: 10 marks
- Attendance: 3 marks
  Total: 25 marks

ESE Practical Pattern
The End Semester Examination will be conducted for a maximum of 75 marks respectively with a maximum 15 marks for the record and other submissions if any.

Open book exam
CIA Test Pattern: 4 (4 out of 6) x 15 Marks = 60 Marks

Cyber Security II:
Quiz: 60 Marks

Case Study: 20 Marks

Poster: 20 Marks

PG-IDC and Special Course:

Section A: 5 questions (Internal choice): 25 marks
Section B: 5 questions (Internal choice): 75 marks

Total: 100 marks

MCS2401	DESIGN AND ANALYSIS OF ALGORITHMS	Category	L	T	P	Credit
		Theory	58	2	-	4

Preamble

This course covers the fundamental techniques for designing and analyzing algorithms, including asymptotic analysis, Trees, graphs, divide and conquer algorithms and recurrences. It also presents effective search methods, graph algorithms and randomized algorithms

Prerequisite

Data structures and algorithms

Course Learning Outcomes

 Upon the successful completion of the course, students will be able to

CLO Number	CLO Statement	Knowledge Level
CLO1	Understand the performance of algorithms using analysis techniques.	**K2**
CLO2	Apply appropriate algorithms and data structures for various applications.	**K3**
CLO3	Analyze the computational complexity of various algorithms and estimate their worst-case and average-case behavior.	**K4**
CLO4	Evaluate the analysis of algorithm efficiency using different notations.	**K5**
CLO5	Design, implement, and evaluate an algorithm to meet desired needs.	**K6**

Mapping with Programme Learning Outcomes

CLOs	PLO1	PLO2	PLO3	PLO4
CLO1	S	M	S	S
CLO2	S	S	S	M
CLO3	S	S	M	S
CLO4	M	L	S	L
CLO5	S	S	M	S

S- Strong; M-Medium; L-Low

Syllabus

UNIT I   (11 Hrs)

Basic concepts in Algorithmic Analysis:Introduction- Historical Background - Introduction to Sorting**- Merging Two Sorted -Selection Sort - Insertion Sort**-Bubble Sort-**Merge Sort-Quick Sort-**Bottom-up Merge Sorting- **Time Complexity- Space Complexity**- How to Estimate the Running Time of an Algorithm Worst-Case and Average-**Case Analysis- Amortized Analysis.**

UNIT II   (11 Hrs)

Data Structures: Introduction- Linked Lists- Trees- Binary Trees. Heaps data structures: Introduction- Heaps- Divide and Conquer: Binary Search – Hash Table -Time complexity-Max-Min Problem-Tower of Hanoi- The Divide-and-Conquer Paradigm**- Selection: Finding the Median and the kth Smallest.**

UNIT III   (11 Hrs)

AVL trees: Definition – Height – Searching – insertion and deletion of elements -**AVL rotations – Analysis.** Red black trees: Definition – Searching – **insertion and deletion of elements** – Algorithms and their time complexities. Splay trees: Definition – **Steps in Splaying** – Analysis - Multi-way Search trees: Indexed Sequential Access – M-way Search trees – B-Tree – Searching - Time Complexity for searching- **insertion and deletion.**

UNIT IV   (11 Hrs)

Dynamic Programming: Introduction- The Longest Common Subsequent Problem- The Dynamic Programming Paradigm- The All-Pairs Shortest Path Problem- **Travelling sales Person problem** - The Knapsack Problem**.** Greedy Approach: Introduction- The Shortest Path Problem- **Minimum Cost Spanning Trees (Kruskal's Algorithm)- Minimum Cost Spanning Trees (Prim's Algorithm) and its time complexity.**

UNIT V   (12 Hrs)

Graph Traversal: Introduction-Depth First search-**Applications of DFS** -Breadth - First search-**Applications of BFS** - Complexity of Problems: NP-complete Problems:- Introduction- The Class P-The Class NP-**NP-complete Problems**.Backtracking: Introduction -**The 8- Queens Problem- Sum of Subset Problem – Graph Coloring – Hamiltonian Cycles.**

Text Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS	YEAR OF PUBLICATION /EDITION
1.	Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran	Computer Algorithms	University Press Publications	**2019,** 4/e
2.	M. H. Alsuwaiyel	Algorithms Design Techniques and Analysis	World Scientific Publishing Co. Pvt. Ltd	2016,Revised Edition

Reference Book

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS	YEAR OF PUBLICATION /EDITION
1.	Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran	Fundamentals of Computer Algorithms	University Press Publications	2019, 2/e

Pedagogy: Lectures, Group Discussions, Case studies

Course Designers

1. Dr. S. Lakshmi Priya
2. Dr. S. Poongodi

MCS2402	NETWORK SECURITY	Category	L	T	P	Credit
		Theory	58	2	-	4

Preamble

This course presents the fundamental concepts of cryptography and network security. It focuses on web security, IP security and system security. It also deals with the practical applications of network security.

Prerequisite

● Number Theory
● Computer Networks

Course Learning Outcomes

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

CLO Number	CLO Statement	Knowledge Level
CLO1	Understand the basics of Cryptography and Network Security	K2
CLO2	Apply Cryptography theories, Algorithms and Techniques to Build Protection Mechanisms	K3
CLO3	Analyze Cryptographic methods and algorithms for the secure storage and movement of data	K4
CLO4	Evaluate the security of the in-built cryptosystems and threats in network security	K5
CLO5	Develop cryptographic algorithms and authentication schemes for information security and authorization.	K6

Mapping with Programme Learning Outcomes

CLOs	PLO1	PLO2	PLO3	PLO4
CLO1	S	S	M	L
CLO2	S	S	M	S
CLO3	S	S	L	S
CLO4	S	S	S	S
CLO5	S	S	S	S

S- Strong; M-Medium; L-Low

Syllabus
UNIT I   (11 Hrs)
Computer and Network Security Concepts: Computer Security Concepts, **OSI Security Architecture, Security Attacks, Security Services, Security Mechanisms,** Model for Network Security.   Classical Encryption Techniques: Symmetric Cipher Model,Substitution TechniquesTransposition Techniques, Rotor Machines, **Steganography**.

UNIT II   (11 Hrs)
Block Ciphers and the DES: Traditional Block Cipher Structure, DES, DES Example**, Strength of DES, Block Cipher Design Principles**. Advanced Encryption Standards: AES Structure,

Transformation Function, Key Expansion, Avalanche Effect. Random Bit Generation and Stream Ciphers: **Stream Ciphers**, **RC4.**Public Key cryptography and RSA: **Principles of Public–Key Cryptosystems,** RSA Algorithm.

UNIT III (12 Hrs)

Diffie-Hellman Key exchange, Elliptic Curve Cryptography. **Cryptographic Hash Functions: Applications of Cryptographic Hash Functions, Secure Hash Algorithm (SHA).** Message Authentication Codes: Message Authentication Requirements, Message Authentication Functions, Requirements for Message Authentication Codes, Security of MACs.

UNIT IV (12 Hrs)

Digital Signatures: Introduction, Elgamal and Schnorr Digital Signature Scheme. Transport-Level Security: Web Security Considerations, Transport Layer Security, HTTPS.**Electronic Mail Security: Internet Mail Architecture, Email Formats, S/MIME, Pretty Good Privacy**

UNIT V (12 Hrs)

IP Security: Overview, Policy, Encapsulating Security Payload. Intruders: Intruders, Intrusion Detection, Password Management. **Malicious Software: Types, Viruses, Virus Countermeasures, Distributed Denial of Service Attacks. Firewalls: The Need for Firewalls, Firewall Characteristics, Types of Firewalls.**

Text Book

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS	YEAR OF PUBLICATION /EDITION
1.	William Stallings	Cryptography and Network Security	Pearson India Education	2022, 8/e

Reference Book

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS	YEAR OF PUBLICATION/EDITION
1.	Atul Kahate	Cryptography and Network Security	McGraw-Hill	2022, 4/e
2.	Bruice Schneier	Applied Cryptography – Principles, Algorithm and Source in C	Wiley India Pvt. Ltd, New Delhi	2008,2/e

Pedagogy: Lectures, Demonstrations, Case Studies

Course Designers
1. Dr. R. Kowsalya
2. Dr. M. Sasikala

MCS2403	MODERN OPERATING SYSTEMS	Category	L	T	P	Credit
		Theory	58	2	-	4

Preamble
This course introduces the architecture of various modern operating systems. It also includes techniques such as processes and threads, security threats, RTOS, Linux and various types of OS.

Prerequisite
- Operating System
- Distributed OS

Course Learning Outcomes
On successful completion of the course, the students will be able to

CLO Number	CLO Statement	Knowledge Level
CLO1.	Understand the concepts of distributed operating systems.	K2
CLO2.	Apply processes and threads, Scheduling and management within the context of operating systems.	K3
CLO3.	Analyze security threats and vulnerabilities specific to operating systems	K4
CLO4.	Evaluate design principles underlying real-time operating system and its process	K5
CLO5.	Perform administrative tasks on Linux, Android and various types of OS	K6

Mapping with Programme Learning Outcomes

CLOs	PLO1	PLO2	PLO3	PLO4
CLO1.	S	M	M	S
CLO2.	S	S	M	L
CLO3.	S	M	M	S
CLO4.	L	S	L	S
CLO5.	S	S	M	S

S- Strong; M-Medium; L-Low

Syllabus
UNIT I (11 Hrs)

Distributed OS Systems – Network Hardware - Network Services and Protocols-Document Based Middleware – File system based middleware - Object based middleware- Co-ordination based middleware – **Multi computers: User level Communication software** – Remote Procedure call - Distributed shared memory – Multicomputer scheduling – Load Balancing.

UNIT II (11 Hrs)

Processes and Threads: Process model- Process Creation-Process Termination-Process Hierarchies-Process State. **Threads**: Thread usage -Classical Thread Model-Implementing Threads in userspace and kernel. Interprocess communication-semaphores- Message Passing-**Scheduling-Scheduling in Batch systems- Interactive Systems- Real Time Systems-Thread scheduling.** Virtualization and the cloud – History - Requirements for virtualization - Type 1 and Type2 Hypervisors - Techniques for efficient virtualization - Memory Virtualization.

UNIT III   (11 Hrs)
Security Environment: Threats – Attackers - Controlling Access to Resources - Protection Domains - Access control lists – Capabilities - Formal Models of Secure Systems - Multilevel security – Covert Channels - Authentication using a Physical object - Authentication using Biometrics – **Defenses – Code signing – Jailing – Model based intrusion detection – encapsulating mobile code.**

UNIT IV   (12 Hrs)
 Introduction to RTOS: Purpose of Real Time Operating Systems-Process Management-Memory Management-Interrupts Management-**Multitasking-**File System Management-I/O Management-Characteristics of RTOS Kernels-Priority Scheduling**-Inter task Communication and Resource Sharing**-Real Time Signals-**Semaphores**-Message Passing-Shared Memory-Asynchronous I/O-Memory Locking. **Real-Time Embedded Systems**-Real-Time Embedded System Characteristics-System Structure-Real-Time Response-Concurrency-Predictability-safety and Reliability-Hard and Soft Real-Time Embedded Systems.

UNIT V   (12 Hrs)
Linux Overview – Linux Goals-- **Linux Architecture-** Process Management system calls in Linux — Scheduling –Synchronization- Memory Management System calls- Paging – **Input – output system calls - Linux file system: File system calls in Linux** Introduction to Android - History of Android - Design Goals - Android Architecture -Types of OS–Mobile OS-iOS, Web OS- Smart OS- **Embedded OS-Memory Management-** Services Layer- Core OS Layer-File System. Practical Issues-Software Reliability-Software Faults-Reliability Measurement-Security-Challenges.

Text Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS	YEAR OF PUBLICATION /EDITION
1.	Andrew S.Tanenbaum Herbert Bos	Modern Operating Systems	Pearson Education	2023, 5/e
2.	Jiacun Wang	Real-Time Embedded Systems	John Wiley & Sons, Inc.	2017,1/e

Reference Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS	YEAR OF PUBLICATION /EDITION
1.	Shubra Garg	Fundamentals of Distributed Operating Systems	S.K. Kataria & Sons	2022,1/e
2.	Andrew S.Tanenbaum	Distributed Operating System	Pearson Education	2017,10/e

Pedagogy: Lectures, Demonstrations, Group Discussions

Course Designers:
1. Dr. S. Sasikala
2. Dr. R. Kowsalya

MCS2404	DATA MINING TECHNIQUES AND TOOLS	Category	L	T	P	Credit
		Theory	58	2	-	4

Preamble

This course presents the basic concepts of data mining and various data mining techniques like classification, clustering, and association rule mining. The course also introduces various applications of data mining such as text mining, web mining, multimedia mining, and spatial mining.

Prerequisite

- Database Management Systems
- Probability and Statistics

Course Learning Outcomes

Upon the successful completion of the course, students will be able to

CLO Number	CLO Statement	Knowledge Level
CLO1	Understand data mining techniques, algorithms and data visualization	K2
CLO2	Apply data mining techniques to carry out simple data mining tasks	K3
CLO3	Analyze data mining algorithms appropriate for different data mining applications	K4
CLO4	Evaluate data mining models for solving real world problems	K5
CLO5	Develop predictive models using advanced data mining techniques for various application domains	K6

Mapping with Programme LearningOutcomes

CLOs	PLO1	PLO2	PLO3	PLO4
CLO1	S	S	M	L
CLO2	S	S	M	L
CLO3	S	S	M	L
CLO4	S	S	M	L
CLO5	S	S	M	L

S- Strong; M-Medium; L-Low

Syllabus

UNIT I   **(12 Hrs)**

Introduction: Need for data mining - **Kinds of data** - Patterns for mining: Characterization and Discrimination Associations - Classification and Regression - Cluster Analysis - Outlier Analysis - **Technologies - Applications - Major issues in Data Mining.** Data Preprocessing: Overview - Data cleaning - Data integration - Data reduction - Data Transformation and Discretization.

UNIT II   **(11 Hrs)**
Association rule mining: Apriori algorithm, Mining Frequent Patterns–Associations and correlations – Mining Methods– Mining Various kinds of Association Rules– **Correlation Analysis**– Advanced methods: **Constraint-based Pattern mining,** Mining Sequential pattern

UNIT III   **(12 Hrs)**
Classification: Basic Concepts – Decision tree induction - Bayes Classification Methods – Lazy learners: KNN, Case-based reasoning - **Model evaluation and selection** - classification: advanced methods - Support Vector Machines-**Rule-based classifiers-** Classification with weak supervision- **Techniques to improve classification accuracy**

UNIT IV   **(12Hrs)**
Cluster Analysis-Partitioning Methods: K-Means, K-Medoids - Hierarchical Methods: **Agglomerative, Divisive,** BIRCH, Probabilistic Hierarchical clustering - **Density-based methods: DBSCAN, OPTICS** – Probabilistic model-based clustering: Fuzzy clusters, Probabilistic model-based clusters

UNIT V   **(11Hrs)**
Data Mining Trends and Research Frontiers: Mining Sequence data: Time-series, Symbolic sequences and Biological sequences Mining graphs and networks Visual and audio data mining. Mining sequence patterns in Transactional databases - Spatial Data mining -Text Mining– Mining the World Wide Web.
Data mining application: Financial data analysis Retail and telecommunication-Science and engineering Intrusion detection Recommender systems.

Text Book

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS	YEAR OF PUBLICATION/EDITION
1.	Jiawei Han Jian Pei Hanghang Tong	Data Mining-concepts and techniques	Morgan Kaufmann Publishers, San Francisco.	2023, 4/e

Reference Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS	YEAR OF PUBLICATION/EDITION
1.	Mark A. Hall, Ian H. Witten, Eibe Frank	Data Mining: Practical Machine Learning Tools and Techniques	Morgan Kaufmann Publishers, San Francisco.	2022, 4/e
2.	Pang-Ning Tan, Michael Steinbach, Anuj Karpatne, Vipin Kumar	Introduction to Data Mining	Pearson Education	2021

Pedagogy: Lectures, Group Discussions, Case studies
Course Designers
1. Dr. S. Poongodi
2. Ms. A. Sheela Rini

MCS2405	**DIGITAL IMAGE PROCESSING**	**Category**	**L**	**T**	**P**	**Credit**
		Theory	58	2	-	4

Preamble

This course covers the fundamental techniques to expose simple image enhancement techniques, image segmentation and representation techniques with image compression and recognition methods

Prerequisite

- Basic Mathematics, Programming Skills

Course Learning Outcomes

Upon the successful completion of the course, students will be able to

CLO Number	CLO Statement	Knowledge Level
CLO1	Understand the basics and fundamentals of digital image processing, such as digitization, sampling, quantization, and 2D-transforms.	K2
CLO2	Apply appropriate methods on images using the techniques of smoothing, sharpening and enhancement	K3
CLO3	Analyze the restoration concepts and filtering techniques.	K4
CLO4	Evaluate the basics of segmentation, features extraction, compression and recognition methods for color models	K5
CLO5	Design and implement image compression recognition methods	K6

Mapping with Programme Learning Outcomes

CLOs	PLO1	PLO2	PLO3	PLO4
CLO1	M	S	S	S
CLO2	L	S	S	L
CLO3	S	M	S	S
CLO4	S	L	S	S
CLO5	S	S	M	S

S- Strong; M-Medium; L-Low

Syllabus

UNIT I (11 Hrs)

Digital Image Fundamentals: Fundamental steps in Digital Image Processing – **Components of an image processing system** – **Elements of Visual Perception** – Image Sensing and Acquisition – Image Sampling and Quantization – **Relationships between pixels.**

UNIT II (11 Hrs)

Image Enhancement in Spatial Domain: Histogram processing – Fundamentals of Spatial Filtering – **Smoothing and Sharpening Spatial Filtering**. Image enhancement in Frequency Domain: Basics –Smoothing using low pass frequency domain filters, Sharpening using high pass filters.

UNIT III (12 Hrs)

Image segmentation and Feature extraction: Fundamentals- Point, Line and Edge detection-Thresholding- Segmentation using region growing and by Region splitting and Merging. Feature extraction: Boundary preprocessing- **Feature descriptors—Region feature descriptors.**

UNIT IV (12 Hrs)

Image Compression: Fundamentals-Huffman Coding-Arithmetic Coding-LZW Coding-Run-length Coding-Symbol-based Coding-Bit-plane Coding-**Block Transform Coding-Predictive Coding.**

UNIT V (12 Hrs)

Image Restoration:Degradation model, Properties, Noise models – Mean Filters – Order Statistics – Adaptive filters – Band reject Filters – Band pass Filters – Notch Filters – Optimum Notch Filtering – Inverse Filtering – Wiener filtering.
Recent trends in Applications: Autonomous vehicles, Augumented reality (AR) and Virtual reality (VR), Medical imaging.

Text Book

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS	YEAR OF PUBLICATION /EDITION
1.	Rafael C. Gonzalez, Richard E. Woods	Digital Image Processing	Pearson Publication	2018, 4/e

Reference Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS	YEAR OF PUBLICATION /EDITION
1.	Sandipan Dey	Hands-On Image Processing with Python	O'Reilly Publications	2018, 2/e
2.	Jayaraman S, Esakkirajan S, Veerakumar T	**Digital Image Processing**	McGraw Hill Publications.	2020.2/e

Pedagogy: Lectures, Group Discussions, Case studies

Course Designers
1. Dr. R. Kowsalya
2. Dr. M. Sasikala

MCS24P1	DATA MINING TECHNIQUES AND TOOLS LAB	Category	L	T	P	Credit
		Practical	-	-	75	3

Preamble

This course provides exercises to implement data mining techniques such as classification, clustering, association rule mining, and regression using data mining tools like R, Python, Knime and Tableau.

Prerequisite

- SQL, Oracle

Course Learning Outcomes

Upon the successful completion of the course, students will be able to

CLO Number	CLO Statement	Knowledge Level
CLO1	Implement the association rule mining, classification, clustering, prediction algorithm.	K3
CLO2	Apply data mining techniques to real world problem	K3
CLO3	Analyze the performance of various classifications, clustering and prediction algorithm.	K4
CLO4	Evaluate the features of data mining tools.	K5
CLO5	Build models using classification, clustering and prediction to solve real world problems using Python, R and Knime.	K6

Mapping with Programme LearningOutcomes

CLOs	PLO1	PLO2	PLO3	PLO4
CLO1	S	S	S	L
CLO2	S	S	S	M
CLO3	S	S	S	M
CLO4	S	S	S	L
CLO5	S	S	S	M

S- Strong; M-Medium; L-Low

Syllabus

- Exercises to implement data exploration and visualization techniques in R, Tableau.
- Exercises to perform preprocessing tasks in Python
- Exercises to implement linear regression & logistic regression
- Exercises to perform classification & clustering
- Exercises to perform association rules & text mining

Pedagogy: Demonstrations

Course Designers

1. Dr. S. Poongodi
2. Dr. R. Kowsalya

List of Exercises

1. Demonstrate the following data preprocessing tasks using Python libraries.
   a) Loading the dataset   b) Identifying the dependent and independent variables
   c) Dealing with missing data
2. Demonstrate the following data preprocessing tasks using Python library
   a) Dealing with categorical data b) Scaling the features c) Splitting dataset into Training and Testing Sets
3. Demonstrate the following similarity measures using python
   a) Pearson's Correlation b) Euclidean Distance) Manhattan Distance
4. Experiment on hierarchal Data Clustering algorithms on weather data set.
5. Write a Python code to perform Clustering using the Birch algorithm.
6. Write a Python code to implement Text Mining for the corpus data.
7. Perform data exploration and visualization of the iris dataset and implement various statistical operations in R.
8. Perform data exploration and visualization of the stock dataset and implement various statistical operations in Tableau.
9. Implement linear regression for the salary dataset to predict salary based on years of experience.
10. Perform classification of the iris dataset using support vector machine (SVM) in R.
11. Build a logistic regression model to a dataset using R.
12. Apply the DBSCAN clustering algorithm to a dataset using R.
13. Perform decision tree classification using Knime.

Applications

1. Customer buying patterns using classification methods
2. Credit card Fraud Detection using Supervised algorithm
3. Breast Cancer Prediction using Supervised Algorithm
4. Customer Segmentation using Clustering
5. Loan defaulters Prediction
6. Classification of Iris Dataset

MCS23P2	FULL STACK DEVELOPMENT LAB	Category	L	T	P	Credit
		Practical	-	-	75	3

Preamble

This course provides exercises to create dynamic web application in both client and server side using CSS3, AJAX, Javascript, jQuery, PHP/ MySQL, Angular and React. It enables students to equip themselves as a full stack developer.

Prerequisite

HTML

Course Learning Outcomes

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

CLO Number	CLO Statement	Knowledge Level
CLO1	Understand the concepts of Client-side /Server side web programming	K2
CLO2	Apply the form validation using jQuery	K3
CLO3	Analyze validation concepts using JavaScript	K4
CLO4	Design applications using connectivity with MySQL database	K5
CLO5	Develop dynamic web pages using PHP, MYSQL, CSS, jQuery, JavaScript, Angular and React	K6

Mapping with Programme Learning Outcomes

CLOs	PLO1	PLO2	PLO3	PLO4
CLO1	S	S	S	L
CLO2	M	S	S	M
CLO3	M	S	S	M
CLO4	M	S	S	M
CLO5	L	S	S	L

S- Strong; M-Medium; L-Low

Syllabus

- Exercise to pass information between web pages.
- Exercise to apply string functions to manipulate strings.
- Exercise to implement file operations.
- Exercise to implement the date and time functions.
- Exercise to create menus, styles, and animation using CSS and AJAX.
- Exercise to validate the HTML form fields using Javascript.
- Exercise to handle events and special effects using jQuery and jQuery traversing.
- Exercise to implement explode and implode functions

- Exercise to create database connectivity using PHP and MySQL
- Exercise using Angular
- Exercise using ReactJS

Pedagogy: Demonstrations

Course Designers

1. Mrs. A. Sheela Rini
2. Dr. S. Lakshmi Priya

List of Exercises

1. Build a PHP application enabling users to input text, utilize string functions for operations like substring extraction and case conversion, and display the modified text on a web page for interactive use.
2. Design a PHP program to manage files effectively, allowing tasks such as opening, reading, updating, renaming, and deleting files for a robust file management solution.
3. Develop a PHP script to handle date and time operations, including displaying the current date/time, formatting dates, calculating time differences, and managing time zones, providing extensive functionality for managing date and time effectively.
4. Design a project focusing on implementing jQuery special effects, such as fading, sliding, or animating elements on a web page.
5. Develop a PHP project to create, manipulate, and display the content of a text file using implode() and explode() functions.
6. Create a PHP script that connects to a MySQL database and provides functionalities to manage employee records, including adding, retrieving, updating, and deleting employee information.
7. Develop a JavaScript program to count the number of elements in a registration form.
8. Build a basic calculator that performs arithmetic operations (addition, subtraction, multiplication, division) using JavaScript.
9. Create a JavaScript program to implement form validation.
10. Create a jQuery program to manage various mouse events on elements within a web page.
11. Create a password validation program using ReactJS
12. Design an Angular expression incorporating strings, numbers, and fundamental arithmetic operations.

Applications

1. Develop a PHP project for employee management, enabling data input , and display stored information on a web page.
2. Create a dynamic web application using AJAX to modify content on-the-fly based on user interactions, providing seamless and efficient content updates without page reloads.
3. Develop a web form utilizing AJAX to dynamically suggest options based on user input, enhancing user experience by providing real-time suggestions as they type.
4. Develop a PHP project for managing student details, and implementing database connectivity with MySQL. Ensure functionalities for adding, editing, and deleting student records, as well as retrieving and displaying student information.
5. Develop a project to schedule doctor appointments using ReactJS
6. Build a project to create a voting application using ReactJS
7. Develop a project AngularJS application that displays a list of shopping items. Allow users to add and remove items from the list using directives and controllers.