PSGR
Krishnammal College for Women

DEPARTMENT OF DATA ANALYTICS (PG)

CHOICE BASED CREDIT SYSTEM (CBCS) &
LEARNING OUTCOMES- BASED CURRICULUM FRAMEWORK (LOCF)

MASTER OF SCIENCE IN DATA ANALYTICS

2025 - 2027 BATCH

PROGRAMME LEARNING OUTCOMES

PLO1: Demonstrate understanding of the core concepts of analytics to discover data-driven insights

PLO2: Illustrate higher degree of technical skills that enable business decision making

PLO3: Apply analytical and managerial skills to enhance employment potential

PLO4: Exhibit holistic development with emphasis on values and ethics

PROGRAMME SPECIFIC OUTCOME

Graduates will be able to

PSO1: Demonstrate understanding of concepts in data science, statistical concepts and probability.

PSO2: Identify and analyze complex issues reaching substantiated conclusions using the techniques in data science.

PSO3: Design and propose innovative solutions for complex problems that meet the specified business needs.

PSO4: Ability to understand the industry requirements and to have sound knowledge about the professional skills required for data science.

PSO5: Create, select and apply appropriate techniques, tools, resources in data science for prediction and modeling of complex activities with an understanding of the limitation.

PSO6: Communicate effectively on complex tasks in profession as well as with society at large, such as, being able to comprehend and write effective reports, make effective presentations and provide as well as receive clear instructions.

PSO7: Apply ethical principles in research and commit to professional ethics and responsibilities.

PSO8: Recognize the need for lifelong learning and have the ability to engage in independent learning keeping in mind the rapid technological changes.

PSGR Krishnammal College for Women

MASTER OF SCIENCE IN DATA ANALYTICS

CHOICE BASED CREDIT SYSTEM (CBCS) & LEARNING OUTCOMES-BASED CURRICULUM FRAMEWORK (LOCF) SYLLABUS & SCHEME OF EXAMINATION

2025 - 2027 BATCH - SEMESTER I

Semester	Course Code	Title of the Course	Course Type	Instruction Hours / Week	Contact Hours	Tutorial Hours	Duration of Examination	Examination Marks			Credits
								CA	ESE	Total	
I	MDA2301	DescriptiveStatistics	CC	4	58	2	3	25	75	100	4
I	MDA2502	Foundations of Data Science	CC	4	58	2	3	25	75	100	4
I	MDA2303	Linear Algebra	CC	4	58	2	3	25	75	100	4
I	MDA2504	Data Structures	CC	4	58	2	3	25	75	100	4
I	MDA2505	Web Programming	CC	4	58	2	3	25	75	100	4
I	MDA25P1	Data Structures Lab	CC	5	75	-	3	25	75	100	3
I	MDA25P2	Web Programming Lab	CC	5	75	-	3	25	75	100	3
I - III	17MONL1	Online Course	ACC	-	-	-	-	-	-	-	-

CC-Core Courses **ACC-Additional Credit Course**

Examination System

Pattern:

Semester system will be followed. A semester consists of a minimum of 90 working days excluding the days of conduct of ESE. There will be Continuous Internal Assessment (CA) to evaluate the performance of students in each course and the End Semester Examination will be held at the end of every semester.

Weightage assigned to various components of Continuous Internal Assessment

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**

CA Question Paper Pattern and distribution of marks – (First 3 Units)

Core and Elective Courses

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

End Semester Examination – Question Paper Pattern and Distribution of Marks

Core and Elective Courses

ESE 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

Total: 75 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.

Criteria for Attendance:

91-100% attendance : 3 Marks
81-90% attendance : 2 Marks
75-80% attendance : 1 Marks

Course Code	Course Title	Category	L	T	P	Credit
MDA2301	DESCRIPTIVE STATISTICS	Theory	58	2	-	4

Preamble

The course introduces the measures of central tendency and dispersion. It also provides thestudents with systematic knowledge in correlation, regression and outlier analysis in R Programming.

Course Learning Outcomes

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

CLO Number	CLO Statement	Knowledge Level
CLO1	Demonstrate the basic concepts of statistics	**K2**
CLO2	Apply the concepts of correlation, regression	**K3**
CLO3	Identify the methods for different measures of central tendency, dispersion	**K4**
CLO4	Evaluate the methods for representation of data.	**K5**
CLO5	Construct various plots, outliers for regression, diagnostics	**K6**

Mapping with Programme Learning Outcomes

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

S- Strong; M-Medium

UNIT I **(12 Hrs)**

Introduction: **Nature and scope of Statistics, limitations of statistics** - Types of data: Concept of population and sample, primary and secondary data, quantitative and qualitative data, discrete and continuous data, cross-sectional and time series data. **Scales of measurement: Nominal, Ordinal, Ratio and Interval.** Case Studies using Statistical Methods in Excel.

UNIT II **(12 Hrs)**

Tabulation of Data- Difference between Classification and Tabulation – Parts of Tabulation – Rules for Tabulation – Types of Tables Diagrammatic representations: - Line diagram, bar diagram, pie diagram and sub-divided bar diagram, **Frequency distribution and cumulative frequency distribution and their graphical representations, Frequency polygon, histogram, ogive, frequency curves, stem andleaf displays. Exploring R Basics – R Features – R Basic Data types – R Basic Operators – Data visualization in R.**

UNIT–III **(14 Hrs)**

Univariate data: Different measures of location, dispersion, relative dispersion, **skewness and kurtosis**, Moments, Quintiles and measures based on them – comparison with moment Measures - **Box-plot and detection of outliers. Trimmed mean and Winsorised mean** – Simple problems. Interpretation of Histogram, Box Plot in R - Outliers on Univariate Data in R.

UNIT IV **(11 Hrs)**

Correlation – Scatter diagram – Karl Pearson Coefficient of Correlation -Spearman's Rank coefficient of Correlation - **Rank Correlation Coefficient**-Interpretation of Scatter Plot in R.

UNIT V **(9 Hrs)**

Regression: Introduction – Uses of regression analysis – **regression lines** – **regression equations of Xon Y and Y on X – regression equation in terms of correlation table.**
Visualization plots for Linear Regression in R – Interpretation of Logistic Regression in R.

Text Books

S.No	Authors	Title	Publishers	Year & Edition
1	S.C.Gupta, V.K.Kapoor	Fundamentals of Mathematical Statistics (Unit I : Chapter 1 , Price Michael(2018) , Excel 2019 In Easy Steps, Chapter 8 (123 - 133,135))	Sultan Chand &Sons, Tata MCGraw Hill	2019, 3rd Revised Edn
2	R.S.N. Pillai & Bhagavathi	Statistics Theory and Practice (Unit II : Chapter 6: Pg 54 – 73,Chapter 7, Chapter 8: 100-112)(Unit IV :Chapter 12: Pg 396 -420)	S. Chand Publishing Company Pvt Ltd	2019, 8th Edn
3	R.Wilcox	Basic Statistics (Unit III: 2.1-2.5)	Oxford University Press	2009, 1st Edn
4	S.P.Gupta	Statistical Methods (Unit V: Chapter 11)	Sultan Chand and Sons	2021, 46th Edn
5	V.Bhuvaneswari	Data Analytics with RProgramming (Unit II :3-.2,3.7-3.8, 4.3 Unit III: 4.4, 4.6, 9.2.1, Unit IV: 4.7,4.11, Unit V:6.3,6.9)	Scitech Publications Pvt Ltd	2018, 1st Edn

Reference Books

S.No	Authors	Title	Publishers	Year & Edition
1	Murray R Spiegel and Larry J Stephens	Statistics	Schaum'sOutline	2008, 4th Edn
2	R.S.N. Pillai	Statistics	S. Chand Publishing Company Pvt Ltd	1992, 8th Edn
3	1. https://www.indiabix.com/data-interpretation/questions-and-answers/ 2. https://www.mathsisfun.com/data/pictographs.html			

Pedagogy

Lectures, Demonstrations, Simulation exercises

Course Designers:

1. Dr. T.A.Albinaa
2. Dr. N.Radha

Learning Methodology

S.No.	Learning Methodology	Percentage
1	Participatory Learning	30%
2	Experiential Learning	30%
3	Problem-based Learning	40%

Course Code	Course Title	Category	L	T	P	Credit
MDA2502	FOUNDATIONS OF DATA SCIENCE	Theory	58	2	-	4

Preamble

This course introduces the essential knowledge about foundations of data science with python. It provides various steps involved in the data science process and core python with advanced concepts like regular expressions, exception handling, multithreading. It also introduces the python libraries that are most commonly used for data analysis.

Prerequisite

- Basic understanding of Open source software
- Database concepts

Course Learning Outcomes

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

CLO Number	CLO Statement	Knowledge Level
CLO1	Understand data classification, process of big data technology, user roles and skills in data science and its tools.	K2
CLO2	Apply the fundamental concepts, tools and techniques of data science in 360 view of Customer.	K3
CLO3	Analyze the methodologies of data science and its tools.	K4
CLO4	Evaluate the utilities and functionalities of Python	K5
CLO5	Design solutions for data analytics problems using Python.	K6

Mapping with Programme Learning Outcomes

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

S- Strong; M-Medium

UNIT I **(12 Hrs)**

Evolution of Data: - Data Perspectives - Components of IT - Business Process – Landscape – Introduction about Data Science – Introduction - Data Types- Numeric - Categorical data– Graphical - Classifications of Data - Dimensions of Data-– Understanding data: Introduction – Type of Data: Numeric – Categorical – Graphical – High Dimensional Data — Data Classification –-Data Formats: Structured, Semi-Structured and Un-Structured – Data Sources: Time Series – Transactional Data – Biological Data – Spatial Data – Social Network.

UNIT II **(12 Hrs)**

Introduction to Data Science - **A Discipline -Data Science vs Statistics, Data Science vs Mathematics**, Data Science vs Programming Language, Data Science vs Database, Data Science vs Machine Learning. Data Analytics -Types of Variables -Describing Data with Tables and Graphs – Describing Data with Averages – Describing Variability, **Manipulating arrays: indexing, slicing, and reshaping -** Working with statistical toolbox.

UNIT III **(11 Hrs)**

Relation: Data Science, Analytics and Big Data Analytics.Data Science Components –Big datatechnology - Data Science user - roles and skills **- Data Science use cases.- Data indexing and selection** – Data cleaning and preprocessing - Aggregation and summarization - Data ingestion: export/import data from various file formats (CSV, Excel,etc.).

UNIT IV **(11 Hrs)**

Digital Data-an Imprint: Evolution of Big Data –What is Big Data –Sources of Big Data**. Characteristics of Big Data 6Vs –Big Data Myths** –Data Discovery-Traditional Approach. Python Libraries:Basics of Numpy arrays –aggregations –computations on arrays –comparisons, masks, boolean logic – fancy indexing – structured arrays – Data manipulation with Pandas – data indexing and selection – operating on data – missing data – Hierarchical indexing – combining datasets – aggregation and grouping

UNIT V **(12 Hrs)**

Introduction: Importing Matplotlib – Line plots – Scatter plots – visualizing errors – density and contour plots – Histograms – legends – colors – subplots – text and annotation – customization – three dimensional plotting – Geographic Data with Basemap – Visualization with Seaborn. Introduction to NLTK-Installing NLTK and downloading necessary Resources-Basic NLTK functionalities and data structures-Tokenization and Text Preprocessing: **Text cleaning and normalization techniques** - Exploring NLTK for text processing applications like sentiment analysis

Text Books

S.No	Authors	Title	Publishers	Year & Edition
1	Dr. P. Pavan Kumar, P. Suresh Babu, Aditya Tandon, and Dr. Suneet Joshi	Foundation of Data Science	Diap Publishers	2024, 1 st Edn
2	Wesley J.Chun	Core Python Programming Application Programming	Pearson Education Publication, United States	2016, 3rd Edn

Reference Books

S.No	Authors	Title	Publishers	Year & Edition
1	Ulrich Matter	Big Data Analytics: A Guide to Data Science Practitioners Making the Transition to Big Data	Chapman & Hall Publication	2023, 1st Edn
2	Mark Lutz	Programming Python	O'Reilly Media	2010, 4th Edn
3	Wes McKinney	Python for Data Analysis: Data Wrangling with pandas, NumPy, and Jupyter	Grayscale Indian Edition	2022, 3rd Edn
4	Alberto Boschetti, Luca Massaron	Python Data Science Essentials	Packt Publishing	2016, 2nd Edn

Pedagogy

Lectures, Demonstration and Case Studies

Course Designers:

1. Dr. S.Sasikala
2. Dr. K.Gandhimathi

Learning Methodology

S.No.	Learning Methodology	Percentage
1	Participatory Learning	30%
2	Experiential Learning	30%
3	Problem-based Learning	40%

Course Code	Course Title	Category	L	T	P	Credit
MDA2303	**LINEAR ALGEBRA**	Theory	**58**	**2**	**-**	**4**

Preamble

The course introduces the principles underlying linear equations and vector spaces. It also provides the concepts of Eigen values, Eigen vectors and Positive Definite Matrices in Scilab.

Course Learning Outcomes

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

CLO Number	CLO Statement	Knowledge Level
CLO1	Demonstrate competence with the basic ideas of linear Algebra including the concepts of vector spaces, Determinants, Eigen values and Eigenvectors and positive definite matrices	K2
CLO2	The ability to understand the principles of Linear Algebra	K3
CLO3	Apply properties of linear spaces to specific mathematical structures	K4
CLO4	Compose clear and accurate proofs using the concepts of linear Algebra	K5
CLO5	Appreciate the significance of vector spaces and positive definite matrices	K6

Mapping with Programme Learning Outcomes

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

S- Strong; M-Medium

UNIT I **(12 Hrs)**

The Geometry of Linear Equations- An Example of Gaussian Elimination- Matrix Notation and Matrix Multiplication - **Triangular Factors and Row Exchanges**- Inverses and Transposes – Implementation of basic matrix operations(Sum, Multiplication, Square root, Cube, Inverse, Transpose, Rank, Fibonacci) in scilab.

UNIT II **(11 Hrs)**

Vector Spaces: **Vector Spaces and Subspaces** – Solving Ax=0 and Ax=b - Linear Independence, Basis, and Dimension- The Four Fundamental Subspaces- **Graphs and Networks**- Linear Transformations, Implementation of vector space and subspace, Linear independency, to find the reduced row echelon formof a matrix in Scilab.

UNIT III **(11 Hrs)**

Determinants: Introduction- **Properties of the Determinant**- Formulas for the Determinant- Applications of Determinants – Implementation of determinants, Properties - associative, commutative anddistributive property in a matrix using Scilab.

UNIT IV **(12 Hrs)**

Eigenvalues and Eigenvectors: Introduction- Diagonalization of a Matrix. - Difference Equations and Powers A^k- Differential Equations and e^{At} - **Complex Matrices- Similarity Transformations –** Implementation of Eigenvalues and eigenvectors, solving equations by Gauss elimination, Gauss Jordan Method and Gauss Siedel in Scilab.

UNIT V **(12 Hrs)**

Positive Definite Matrices: Minima, Maxima, and Saddle Points - Tests for Positive Definiteness- **Singular Value Decomposition, Minimum Principles**, The Finite Element Method, Implementation of Minima, Maxima, Saddle Points and plot the function of the derivatives in Scilab.

Text Books

S.No	Authors	Title	Publishers	Year & Edition
1	Gilbert Strang	Linear Algebra and Its Application	Academic Press	2020, 4th Edn

Reference Books

S.No	Authors	Title	Publishers	Year & Edition
1	David C. Lay, Steven R. Lay, Judi J. McDonald	Linear Algebra and Its Applications	Pearson Education	2016, 6th Edn
2	Peter D. Lax	Linear Algebra and Its Applications	Wiley Publication	2014, 2nd Edn

Pedagogy

Lectures, Demonstration and Case Studies

Course Designers:

1. Dr. T.Brindha
2. Dr. T.A.Albinaa

Learning Methodology

S.No.	Learning Methodology	Percentage
1	Participatory Learning	40%
2	Experiential Learning	40%
3	Problem-based Learning	20%

Course Code	Course Title	Category	L	T	P	Credit
MDA2504	DATA STRUCTURES	Theory	58	2	-	4

Preamble

This course covers the various data structures, including arrays, structures, stacks and queues. It includessorting and searching techniques and effective search methods. This course also deals with graph data structures.

Prerequisite

- Discrete mathematics.

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 arrays, strings and algorithms for basic operations.	**K2**
CLO2	Apply concept of stacks, queues, linked list and algorithms for basic operations.	**K3**
CLO3	Identify the familiarity with major algorithms and data structures	**K4**
CLO4	Analyze appropriate algorithms and data structures for various applications	**K5**
CLO5	Formulate the computational complexity of various algorithms	**K6**

Mapping with Programme Learning Outcomes

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

S- Strong; M-Medium

UNIT I **(12 Hrs)**

Basics: Data Abstraction - Arrays – **Representation of Multidimensional Arrays-** Dynamic Allocated Arrays – Structures and Unions – Polynomials – Sparse Matrices- Data types:Tuples-Dictionary-Sets - **Strings in python.** Implementation of arrays types,Structures, Unions and strings functions in python.

Use Case: How Data Structure is Used in Machine learning?

UNIT II **(12 Hrs)**

Stacks and Queues: Stacks – Stacks Using Dynamic Arrays - Queues - Circular Queues Using Dynamic Arrays - Evaluation of Expressions **- Multiple Stacks And Queues. Linked Lists:** Singly Linked List and Doubly Linked List– Linked Stack And Queues –**- Additional List Operations -** Implementation of stack, queue, Linked Lists and Evaluation of Expressions using python.

Searching: Introduction - Sequential Search - **Binary Search** – **Analysis. Sorting:** Introduction - Insertion Sort - Selection Sort - Merge Sort - **Quick Sort –** Bubble sort-Shell sort

- **Heaps and Heap Sort - Analysis.** Implementation of Searching and sorting using python.

UNIT III **(11 Hrs)**

Efficient Binary Search Trees: Binary Tree – Traversals - Optimal Binary Search Trees – AVLTrees- **KD Trees.** Implementation of Binary Tree, Tree traversals using python.

UNIT IV **(11 Hrs)**

Graphs: The graph Abstract Data Type- Elementary graph operations- Minimum cost spanning trees- shortest paths and transitive closure- **AOV networks** –**AOE networks.**

UNIT V **(12 Hrs)**

Algorithm: Overview- Algorithm design techniques and Strategies: Recursion - Dynamic programming - Performance analysis: Algorithm complexity- Space complexity - Time complexity - Amortized analysis.

Case Studies using python: Location Identification, Game Development, Google Knowledge Graph, Path Optimization

Text Books

S.No	Authors	Title	Publishers	Year & Edition
1	Dr.Basant Agarwal	Hands-On Data Structuures and Algorithms with Python	Packt Publishing Ltd	2022.3 rd Edn
2	Benjamin Baka	Python Data Structures and Algorithms, Python Data Structures and Algorithms	Packt Publishing	2017, 1st Edn
3	Michael T. Goodrich, Roberto Tamassia, Michael H. Goldwasser	Data Structures and Algorithms in Python,	Wiley	2013. 1st Edn

Reference Books

S.No	Authors	Title	Publishers	Year &Edition
1	John Bullinaria	Data Structures and Algorithms	School of Computer Science University of Birmingham Birmingham, UK	2019, 1st Edn
2	Dr. S. Nithyanantham, Ms. N. P. Shangara Narayanee	Data Structures and Algorithms (Python),	A.R.S. Publications	2021, 1st Edn
3	Web Reference:	https://www.tutorialspoint.com/python_data_structure/python_data_structure_tutorial.pdf		

Pedagogy

Lectures, Demonstration, Group Study and Case Studies

Course Designers

1. Ms. M.Nandhini
2. Dr. S.Sasikala

Learning Methodology

S.No.	Learning Methodology	Percentage
1	Participatory Learning	30 %
2	Experiential Learning	30 %
3	Problem-based Learning	40 %

Course Code	Course Title	Category	L	T	P	Credit
MDA2505	WEB PROGRAMMING	Theory	58	2	-	4

Preamble

This course introduces the fundamentals and advanced concepts of web development, equipping students with hands-on knowledge to build interactive, dynamic and responsive websites and web applications. The course covers client-side and server-side technologies along with a practical focus on real-world use cases.

Prerequisite

- Basic knowledge of programming concepts
- Understanding of computer fundamentals

Course Learning Outcomes

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

CLO Number	CLO Statement	Knowledge Level
CLO1	Describe the principles of various languages to create structured, responsive and styled web pages.	K1 & K2
CLO2	Demonstrate the ability to write codes for client-side interactivity.	K2
CLO3	Develop secure and functional server-side web applications.	K3
CLO4	Construct full-stack web applications by integrating front-end and back-end components with appropriate technologies.	K4
CLO5	Evaluate real-world web use cases and select appropriate tools and technologies to implement them.	K5

Mapping with Programme Learning Outcomes

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

S- Strong; M-Medium

UNIT I **(12 Hrs)**

HTML: Introduction – Features - HTML Tags and Attributes - HTML5 Style Guide and Coding Convention - Creating Hyperlinks and Anchors - HTML Form Input Elements – Tables - Local Storage - Debugging and Validating HTML.

Cascading Style Sheet (CSS3): Introduction and Need for CSS – Basic Syntax and Structure Inline Styles – Embedding Style Sheets - Linking External Style Sheets - Manipulating Text - Margins and Padding - Positioning using CSS - Responsive Web Design.

UNIT II **(12 Hrs)**

JavaScript: Overview - Features - Data Types and Variables – Operators – Expressions - Statements Functions – Array.

Object-Oriented Techniques in JavaScript: Classes and Objects: Subclasses and Superclasses - Document Object Model – Constructors - Object Constructor and Prototyping - Date and Math Related Objects - Validation: Types and Importance.

UNIT III **(12 Hrs)**

PHP: Why PHP? - Server-side Scripting - PHP Syntax and Variables – Formatting Form Variables - Super Global Arrays - Comments – Types and Type Conversions - Control Structures: Branching, Looping, Termination.

PHP Functions: Passing Information with PHP, GET, POST - String Functions - Regular Expressions - Number Handling – File Handling – Error Handling , Cookies and HTTP.

UNIT IV **(12 Hrs)**

MySQL: SQL Fundamentals - Complex Joins and Subqueries - Procedures & Functions - Triggers and Events - Normalization - Transactions and Concurrency Control - Handling Large Data Sets and Partitioning.

Working with MySQL: Query Profiling and Benchmarking - Replication and High Availability in MySQL - Backup and Recovery Strategies - MySQL Security - Integration with PHP and Python - Connecting to MySQL with PHP.

UNIT V **(10 Hrs)**

Laravel framework: Features - Database Connectivity - Collecting and Handling user data

Case Studies: HTML with CSS: Design a Personal Portfolio Website, Develop a E-commerce Website - JavaScript with CSS: Interactive Quiz App - Online Student Record Management System - PHP & MySQL: Analytics Dashboards - Designing and Optimizing a Real-World Application Database.

Text Books

S.No.	Authors	Title	Publishers	Year & Edition
1	Alok Ranjan, Abhilasha Sinha, Ranjit Battewad	JavaScript for Modern Web Development: Building a Web Application Using HTML, CSS, and Javascript.	BPB Publications, India	2020, 1st Edn
2	Robin Nixon	Learning PHP, MySQL & JavaScript	O'Reilly Media, Inc.	2021, 6th Edn

Reference Books

S.No.	Authors	Title	Publishers	Year & Edition
1	Brad Traversy	Modern HTML & CSS From The Beginning 2.0	Packt Publishing	2024, 2nd Edn
2	Dr. Sahand Ghavidel	Hands-On Projects with HTML, CSS, and JavaScript	Packt Publishing	2023, 1st Edn
3	Luke Welling, Laura Thomson	PHP and MySQL Web Development	Addison-Wesley	2024, 5th Edn

4	Silvia Botros, Jeremy Tinley	High Performance MySQ: Optimization, Backups, and Replication	O'Reilly Media	2021, 4th Edn

Pedagogy

Lectures, Demonstration, Guest Lecture, Video Lectures

Course Designers:

1. Dr. S. Krishnaveni
2. Dr. S. Sasikala

Learning Methodology

S.No.	Learning Methodology	Percentage
1	Participatory Learning	30%
2	Experiential Learning	40%
3	Problem-based Learning	30%

Course Code	Course Title	Category	L	T	P	Credits
MDA25P1	DATA STRUCTURES LAB	Practical	-	-	75	3

Preamble

This course aims to provide hands-on practice in implementing fundamental data structures such as arrays, linked lists, stacks, queues, trees to enhance problem-solving and programming skills.

Prerequisite

- Knowledge of fundamental programming concepts

Course Outcomes

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

CLO Number	CLO Statement	Knowledge Level
CLO1	Implement basic data structures such as stacks and queues to perform real-world Problems	**K2**
CLO2	Apply the concepts of linked lists for different situations	**K3**
CLO3	Analyse the performance of searching and sorting algorithms	**K4**
CLO4	Create efficient programs using arrays,tree traversals	**K6**
CLO5	Design and build a GUI application	**K6**

Mapping with Programme Learning Outcomes

CLOs / PLOs	PLO1	PLO2	PLO3	PLO4
CLO1	S	S	S	S
CLO2	S	S	S	S
CLO3	S	S	S	S
CLO4	S	S	S	S
CLO5	S	S	S	S

S- Strong; M-Medium

LIST OF PROGRAMS

- Exercises to implement the concept of stacks
- Exercises to implement the concept of queues
- Exercises to implement concepts of arrays
- Exercises to implement the concepts of linked lists
- Exercises to implement searching concepts
- Exercises to implement sorting concepts
- Exercise to create tree traversal techniques
- Exercise to implement sets, tuples concepts
- Exercise to create dictionary data types
- List of Projects (Topics not limited to)
    1. Library Book Management System
    2. Student Course Registration System

Pedagogy

Demonstrations

Course Designers:

1. Ms.M.Nandhini
2. Dr.S.Krishnaveni

Learning Methodology

S.No	Learning Methodology	Percentage
1	Experiential Learning	50%
2	Problem-based Learning	50%

Course Code	Course Title	Category	L	T	P	Credits
MDA25P2	WEB PROGRAMMING LAB	Practical	-	-	75	3

Preamble

The course is designed to guide the entire process of building dynamic, interactive, and database-driven web applications. It explores both front-end and back-end development, learning how to design beautiful user interfaces and develop robust server-side logic.

Prerequisite

- Creating static web pages using HTML
- Text editors and setup local servers

Course Learning Outcomes

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

CLO Number	CLO Statement	Knowledge Level
CLO1	Understand the web design elements, functions, files, data connections, forms, events.	**K2**
CLO2	Apply web design methods to solve problems	**K3**
CLO3	Analyze the web page design requirements and design web pages.	**K4**
CLO4	Create a web application using HTML,CSS, javascript and Node.js.	**K6**
CLO5	Design and build web application using HTML,CSS, Javascript and Node.js	**K6**

Mapping with Programme Learning Outcomes

CLOs / PLOs	PLO1	PLO2	PLO3	PLO4
CLO1	S	S	S	S
CLO2	S	S	S	S
CLO3	S	S	S	S
CLO4	S	S	S	S
CLO5	S	S	S	S

S- Strong; M-Medium

LIST OF PROGRAMS

- Exercise to create a website using HTML and CSS.
- Exercise to create a webpage using HTML CSS and PHP Script
- Exercise to create a Registration form using PHP & MYSQL
- Exercise to create a web program to upload and download a file from database
- Exercise to create a login form using bootstrap
- Exercise to create DDL in web page using PHP & MYSQL

- Exercise to create a web program for demonstrating DML statements in PHP MYSQL
- Exercise to demonstrate a web application using GET AND POST
- Exercise to create a Program for manipulating Databases and SQL
- Exercise to create a web application with client side validation using Jscript
- Exercise to create a web page with Server side validation using PHP Script
- Exercise to create a simple web page with Laravel Framework

List of Projects using web technologies

- Data Dashboard for Visual Analytics.
- Real-time Chat Application
- Stock Price Analyzer
- Employee Performance Tracker

Pedagogy

Demonstrations

Course Designers:

1. Dr,S.Sasikala
2. Dr.S.Krishnaveni

Learning Methodology

S.No	Learning Methodology	Percentage
1	Participatory Learning	30%
2	Experiential Learning	50%
3	Problem Based Learning	20%