Syllabus for the Academic Year – 2024-25

Department: MCA **Semester: I**

Subject Name: Database Management System

Subject Code: 24MCA11 **L-T-P-C: 3-2-0-4**

Course Objectives:

Sl.No	Course Objectives
1	Apply the basic concepts of database management in designing the database for the given problem.
2	Design entity-relationship diagrams to the given problem to develop database application with appropriate fields and validations.
3	Formulate SQL queries in Oracle to the given problem.
4	Apply normalization techniques to improve the database design to the given problem.

Course Outcomes:

Course Outcome	Descriptions
CO1	Apply the basic concepts of Relational Database design on different applications.
CO2	Use DBMS tools to construct tables, queries.
CO3	Identify, formulate and solve real time database application.
CO4	Analyze transaction management and database administration techniques.

UNIT	Description	Hours
I	**Introduction to DBMS:** Characteristics of Database approach, Actors on the Scene, Workers behind the scene, Advantages of using DBMS approach, A Brief History of Database Applications, Data models, schemas and instances, Three-schema architecture and data independence, Database languages and interfaces, the database system environment, Centralized and client-server architectures, Classification of Database Management systems.	12
II	**Relational Database:** Structure of Relational Databases, Database Schema, Keys, Relational Query Languages, Relational Operations. Entity-Relationship Model: Conceptual Database using high level conceptual data models for Database Design, A Sample Database Application, Entity types, Entity sets Attributes and Keys Relationship types, Relationship Sets.	10
III	**Functional Dependencies:** About Functional Dependencies, Normal Forms based on Primary key.	10
IV	**SQL:** SQL data definition and data types, specifying constraints in SQL, basic retrieval queries in SQL, Insert, update and delete statements in SQL, aggregate functions in SQL, group by and having clauses, views in SQL.	10
V	**Introduction to transaction processing:** Transaction and system concepts, desirable properties of transactions, transaction support in SQL. Concurrency control techniques: two- phase locking techniques.	10

Question Paper Pattern:

The question paper will have eight questions.

- **Each full question consists of 20 marks.**
- **Each full question will have sub questions covering all the topics under a unit.**
- **The students will have to answer 5 full questions.**

Text Books:

Sl. No.	Author	Text Book Title	Publisher	Volume /Issue	Year of Edition
1	Elmasri,Navathe	Fundamentals of Database Systems	Addison - Wesley	5	2011
2	Silberschatz, Korth and Sudharshan	Data base System Concepts	Tata McGraw Hill	6	2011

Reference Books:

Sl. No.	Author	Text Book Title	Publisher	Volume/ Issue	Year of Edition
1	C.J. Date, A.Kannan, S. Swamynatham	An Introductionto Database Systems	-	8	-

Syllabus for the Academic Year – 2024-25

Department: MCA **Semester: I**

Subject Name: Data Structures and Algorithms

Subject Code: 24MCA12 **L-T-P-C: 3-0-0-3**

Course Objectives:

Sl.No	Course Objectives
1	Demonstrate different data structures, its operations using C programming.
2	Analyze the performance of Stack, Queue, Lists, Trees, Searching and Sorting techniques.
3	Implement some applications of data structures in a high level language such as C/C++ and design and apply appropriate data structures for solving computingproblems.
4	Compute the efficiency of algorithms in terms of asymptotic notations for the given problem

Course Outcomes:

Course Outcome	Descriptions
CO1	Acquire knowledge of various types of data structures, operations,algorithms, Sorting and searching operations
CO2	Analyze the performance of stack, queue, lists, searching and sorting techniques
CO3	Implement all the applications of data structures in a high-level language
CO4	Develop algorithms using iterative/recursive approach compute the efficiency of algorithms in terms of asymptotic notations

UNIT	Description	Hours
I	**Classification of Data Structures:** Primitive and Non- Primitive, Linear and Nonlinear; Data structure Operations, Stack: Definition, Representation, Operations and Applications: Polish and reverse polish expressions, Infix to postfix conversion, evaluation of postfix expression, infix to prefix, postfix to infix conversion.	**8**
II	**Recursion:** Factorial, GCD, Fibonacci sequence, Tower of Hanoi. Queue: Definition, Representation, Queue Variants: Circular Queue, Priority Queue, Double Ended Queue; Applications of Queues, Programming Examples.	**8**
III	**Linked List:** Limitations of array implementation, Memory Management: Static (Stack) and Dynamic (Heap) Memory Allocation, Memory management functions. Definition, Representation, Operations: getnode () and Freenode () operations, Types: Singly Linked List. Linked list as a data Structure, Inserting and removing nodes from a list, Linked implementations of stacks, Header nodes, Programming Examples.	**8**
IV	**Analysis And Design Of Algorithms:** Introduction, Fundamentals of the Analysis of Algorithm Efficiency Notion of Algorithm, Fundamentals of Algorithmic Problem Solving, Important Problem Types, Analysis Framework, Asymptotic Notations and Basic efficiency classes, Mathematical analysis of Recursive and Non-recursive algorithms.	**8**
V	**Sorting and Searching:** Brute Force-Selection Sort and Bubble Sort, Sequential Search, Exhaustive search and String Matching. Divide-and-Conquer: Merge sort, Quick sort, Binary Search, Binary tree Traversals and related properties. Depth First Search and Breadth First Search, Topological sorting. Greedy Technique: Prim's Algorithm, Kruskal's Algorithm.	**7**

Question Paper Pattern:

The question paper will have eight questions.

- **Each full question consists of 20 marks.**
- **Each full question will have sub questions covering all the topics under a unit.**
- **The students will have to answer 5 full questions.**

Text Books:

Sl. No.	Author	Text Book Title	Publisher	Volume/ Issue	Year of Edition
1	Anany Levitin	Introduction to the Design and Analysis of Algorithms	Pearson Education	2nd edition	-
2	Yedidyah Langsam, Moshe J. Augenstein, Aaron M Tenanbanum	Data Structures Using Cand C++	Pearson Education Asia	-	2002

Reference Books:

Sl. No.	Author	Text Book Title	Publisher	Volume/ Issue	Year of Edition
1	Balaguruswamy	Programming in ANSI C	McGraw Hill	-	-
2	Glenn W. Rowe	Introduction to Data Structure and Algorithms with C++	-	-	-
3	Vinu. V. Das	Principles of Data Structures using C & C++	New Age International	-	2006
4	Balaguruswamy	Data Structures Using C	McGraw Hill Education	-	-

SRI SIDDHARTHA INSTITUTE OF TECHNOLOGY- TUMAKURU
(A constituent College of Siddhartha Academy of Higher Education, Tumakuru)

Syllabus for the Academic Year – 2024 - 2025

Department: MCA **Semester: I**

Subject Name: Advanced Web Programming

Subject Code: 24MCA13 **L-T-P-C: 3-0-0-3**

Course Objectives:

Sl. No	Course Objectives
1	Understand the role and importance of CSS3 in web development and Get familiar with basic JavaScript syntax and how to include JavaScript in HTML documents.
2	Demonstrate the ability to write conditional logic for decision-making in scripts and Identify and include the necessary Bootstrap files in a project.
3	Understand the fundamentals of Bootstrap's grid system for creating responsive layouts and learn to use jQuery selectors to efficiently target HTML elements.
4	Understand the fundamentals of AngularJS and its role in modern web development and Explore the architecture and components of Ajax-based applications.

Course Outcomes:

Course Outcome	Descriptions
CO1	Apply the knowledge in developing XHTML documents using JavaScript and CSS.
CO2	Apply to use conditional statements (if, else if, else) to control the flow of execution in JavaScript and Gain proficiency in creating a basic HTML template structure using Bootstrap.
CO3	Design Bootstrap with HTML to design responsive and visually appealing websites by proficiently employing its grid system, typography, forms, buttons, images, and icons. Apply the key concepts of JQuery.
CO4	Gain proficiency in using AngularJS directives to extend HTML with new attributes and behaviors. Identity and integrate Ajax functionality into Rails applications.

Self-Study:

An Overview of HTML, XHTML, HTML5, Cascading Style Sheet.

UNIT	Description	Hours
I	**CSS3**: Introduction, CSS selectors, display types and alignment of div, text effects, 2D transforms, 3D transforms. **JavaScript:** JS Introduction, JS Statements, JS Comments, JS Variables, JS Operators, JS Data types, JS Functions, Pattern matching using regular expression.	8
II	JS Conditions, JS Switch, JS Looping Statements- For, While, JS Break, JS Objects, String, String Methods, Date formats, Set & Get methods, JS Array. **Bootstrap:** File Structure, Basic HTML Template, Global Styles, Default Grid system	8
III	**Bootstrap** Offsetting Columns, Nesting Columns, Container Layouts, Typography, Lists, Tables, Optional Table Classes, Table Row Classes, Forms, Buttons, and Images. **JQuery**: Syntax,selectors,events,JQueryHTML,JQueryEffects.	8
IV	**Angular JS**: Introduction to AngularJS, Directives, Expressions, Controllers, Filters, Services, Events, Forms, Validations, Examples.	8
V	**Ajax**: Introduction to Ajax – Overview of Ajax, the basics of Ajax, Rails with Ajax, Asynchronous vs Synchronous, Error handling.	7

Question Paper Pattern:
The question paper will have eight questions.
- **Each full question consists of 20 marks.**
- **Each full question will have sub questions covering all the topics under a unit.**
- **The students will have to answer 5 full questions.**

Text Books:

Sl.No.	Author	Text Book title	Publisher	Volume / Issue	Year of Edition
1	Robert W.Sebesta	Programming the World Wide Web	Pearson education	4th Edition	2012
2	Bear Bibeault, Yehuda Katz	jQuery in Action	Dream Tech India	3rd Edition	2008

Reference Books:

Sl. No.	Author	Text Book title	Publisher	Volume / Issue	Year of Edition
1		Angular JS	-	-	-
2	Snig by Packet-open source	Bootstrap essentials	-	-	-
3	Jake Spurlock	Bootstrap: Responsive Web Development	O'Reilly Media	-	2014
4	Joyce Farrell, Michal Ekedhal, Xue Bai	Joyce Farrell, Michal Ekedhal, Xue Bai	Thomson	-	2010

Syllabus for the Academic Year – 2024 – 2025

Department: MCA **Semester: I**

Subject Name: Mathematical Foundation for Computer Applications

Subject Code: 24MCA14 **L-T-P-C: 3-0-0-3**

Course Objectives:

Sl. No.	Course Objectives
1	Apply the fundamentals of set theory and matrices for the given problem.
2	Understand and apply the mathematical logic to many techniques in information technology.
3	Realize different types of relation and functions for the given case study and formulate the problem using relation and function. Apply decision making concept for the given case study and list the different applications of discrete mathematical concepts in computer science.
4	Model the given problem and design the strategy by applying the concepts of graph theory using given problem.

Course Outcomes:

Course Outcome	Descriptions
CO1	Use the logical notation to define and reason about fundamental Mathematical concepts such as sets.
CO2	Able to apply mathematical logic to solve problems.
CO3	Able to do the relation and function for simple combinatorial processes
CO4	Ability to apply various graph theory concepts in real world problems.

UNIT	Description	Hours
I	**Set Theory and Matrices:** Sets, Operations on sets, Cardinality of sets, inclusion-exclusion principle, pigeonhole principle, matrices, finding Eigen values and Eigen vectors.	8
II	**Mathematical Logic:** Propositional Logic, Applications of Propositional Logic, Propositional Equivalences Predicates and Quantifiers, Nested Quantifiers, Rules of Inference Introduction to Proofs.	8
III	**Relations:** Relations and Their Properties, n-array Relations and Their Application, Representing Relations, Closures of Relations, Equivalence Relations, Partial Orderings.	8
IV	**Functions:** Function definition, Types of function-One to one, on to and one to one correspondence. Sterling number of second kind.	8
V	**Graph Theory:** Graphs and Graphs models, Graph Terminology and Special Types of Graphs, Representing Graphs and Graph Isomorphism, Connectivity, Euler and Hamilton Paths, Shortest-Path Problems, Planar Graphs, Graph Coloring.	7

Question paper Pattern:

The question paper will have eight questions.

- **Each full question consists of 20 marks.**
- **Each full question will have sub questions covering all the topics under a unit.**
- **The students will have to answer 5 full questions.**

Text Books:

Sl.No.	Author	Text Book title	Publisher	Volume / Issue	Year of Edition
1	Kenneth H Rosen	Discrete Mathematics and its Applications	McGraw Hill publications	7th edition	
2	Bernard Kolam	Discrete Mathematical structures	Prentice Hall of India Pvt.Ltd	8th Edition	

Reference Books:

Sl.No.	Author	Text Book title	Publisher	Volume / Issue	Yearof Edition
1	Dr. D S Chandrasekharaiah	Discrete Mathematical Structures	Prims Book Pvt.Ltd	6th Edition	2020
2	J.K Sharma	Discrete Mathematics	Mac Millian Publishers,India	3rd Edition	2

Syllabus for the Academic Year – 2024-2025

Department: MCA **Semester: I**

Subject Name: UNIX AND Shell Programming

Subject Code: 24MCA15 **L-T-P-C: 2-0-2-3**

Course Objectives:

Sl. No.	Course Objectives
1	Understand the basic concepts of UNIX Architecture, File system and basic commands.
2	Understand the basic file system commands, concepts of Shell programming.
3	Understand the concepts UNIX API's and process control.
4	Understand the concepts of process accounting, User identification and different IPC mechanisms.

Course Outcomes:

Course Outcome	Descriptions
CO1	Ability to understand the Unix Operating System and the working of the built in commands available in Unix.
CO2	Analyze the working of the user defined commands and will be able change the permissions associated with files.
CO3	Understanding the concept of Shell and the different usage of the commands in shell.
CO4	Ability to program in AWK language.

UNIT	Description	Hours
I	**Introduction of UNIX:** Introduction, History, Architecture, Basic commands ls, cat,cal, date, calendar, who, printf, tty, sty, uname, passwd, echo, tput, bc, script, spell and ispell, UNIX File System: The file, what's in a filename? The parent-child relationship, pwd, theHome directory, absolute pathnames, using absolute pathnames for a command, cd, mkdir,rmdir, Relative pathnames, The UNIX file system.	8
II	**Introduction to Shell:** Introduction to Shell Scripting, Shell Scripts, read, Command Line Arguments, Exit Status of a Command, The Logical Operators && and ||, exit, if, and case conditions, expr, sleep and wait,while, until, for, $, @, redirection.	8
III	**Basic File Attributes and Process:** Is – l, the –d option, File Permissions, chmod, Security and File Permission, users and groups,security level, changing permission, user masks, changing ownership and group, File Attributes.More file attributes: hard link, symbolic link, umask, find. Process basics, PS, internal and external commands, running jobs in background, nice, at andbatch, cron, time commands.	8
IV	**Simple Filters:** Pr, head, tail, cut, paste, sort, uniq, tr commands, Filters using Regular Expression : grep&sedgrep, Regular Expression, egrep, fgrep, sed instruction, Line Addressing, Inserting andChanging Text, Context addressing, writing selected lines to a file, the –f option, Substitution,Properties of Regular Expressions.	8
V	**Awk-Advanced Filters:** Simple awk Filtering, Splitting a Line into Fields, printf, the Logical and Relational Operators,Number Processing, Variables, The –f option, BEGIN and END positional Parameters, get line,Built-in variables, Arrays, Functions.	7

List of Experiments:

SL.NO	Descriptions
1.	Write a shell script that takes a valid directory name as an argument and recursively descend all the subdirectories, finds the maximum length of any file in that hierarchy and writes this maximum value to the standard output.
2.	Write a shell script that accepts a path name and creates all the components in that path name as directories. For example, if the script is named mpc, then the command mpc a/b/c/d should create directories a, a/b, a/b/c, a/b/c/d

3.	Write a shell script that accepts two file names as arguments, checks if the permissions for these files are identical and if the permissions are identical, output common permissions and otherwise output each file name followed by its permissions.
4.	Write shell script to implement terminal locking (similar to the lock command). It should prompt the user for a password. After accepting the password entered by the user, it must prompt again for the matching password as confirmation and if match occurs, it must lock the keyword until a matching password is entered again by the user, Note that the script must be written to disregard BREAK, control-D. No time limit need be implemented for the lock duration.
5.	Write a shell script that accept one or more filenames as argument and convert all of them to uppercase, provided they exist in current directory.
6.	Write a shell script that displays all the links to a file specified as the first argument to the script. The second argument, which is optional, can be used to specify in which the search is to begin. If this second argument is not present, the search is to begin in current working directory. In either case, the starting directory as well as all its subdirectories at all levels must be searched. The script need not include any error checking.
7.	Write a shell script to find a file/s that matches a pattern given as command line argument in the home directory, display the contents of the file and copy the file into the directory ~/mydir
8.	Write a shell script to list all the files in a directory whose filename is at least 10 characters. (use expr command to check the lenght)
9.	Write a shell script that accept a list of filenames as its argument, count and report occurrence of each word that is present in the first argument file on other argument files.
10.	Write an awk script to delete duplicated line from a text file. The order of the original lines must remain unchanged.
11.	Write an awk script to find out total number of books sold in each discipline as well as total book sold using associate array down table as given below. Electrical 34 Mechanical 67 Electrical 80 Computer Science 43 Mechanical 65 Civil 98 Computer Science 64

12.	Write an awk script to compute gross salary of an employee accordingly to rule given below. If basic salary is < 10000 then HRA=15% of basic & DA=45% of basic If basic salary is >=10000 then HRA=20% of basic & DA=50% of basic.

Question Paper Pattern:
The question paper will have eight questions.
- **Each full question consists of 20 marks.**
- **Each full question will have sub questions covering all the topics under a unit.**
- **The students will have to answer 5 full questions.**

Text Books:

Sl.No.	Author	Text Book title	Publisher	Volume / Issue	Year of Edition
1	Sumitabh Das	Unix Concepts And Applications	Tata McGraw Hill	4	-
2	Kenneth Rosen Douglas Host Rachel Klee Richard Rosinski	The Complete Reference Unix	McGraw Hill Education	2	-

Reference Books:

Sl.No.	Author	Text Book title	Publisher	Volume /Issue	Year of Edition
1	Roger S Pressman	Software Engineering-A Practitioners Approach	McGraw-Hill	6th Editi on	2010
2	Hans Van Vliet	Software Engineering Principles And Practices	Wiley–India	3rd Edition	2010

Syllabus for the Academic Year – 2024 – 2025

Department: MCA **Semester: I**

Subject Name: Research Methodology and IPR

Subject Code: 24MCA16 **L-T-P-C: 3-0-0-3**

Course Objectives:

Sl.No.	Course Objectives
1	Understand basic concepts of research and its methodologies.
2	To gain overview of a range of quantitative and qualitative approaches to data analysis.
3	To Accurately collect, analyze and report data
4	Be aware of the ethical principles of research, report writing and ethical challenges

Course Outcomes:

Course Outcome	Descriptions
CO1	Explain various research objectives and concepts of qualitative and quantitative research problems and report writing.
CO2	Apply appropriate method for data collection, process the complex data and prepare a report.
CO3	Analyze the real word data with quantitative techniques and interpret the results.
CO4	Formulate research methodology for real world problems.

UNIT	Description	Hours
I	**Introduction:** Objective of Research; Definition and Motivation; Types of Research; Research Approaches, Steps in Research Process; Criteria of Good Research; Ethics in Research. Research Formulation and Literature Review: Problem Definition and Formulation; Literature Review; Characteristics of Good Research Question; Literature Review Process.	8
II	**Data Collection:** Primary and Secondary Data; Primary and Secondary Data Sources; Data Collection Methods;Data Processing; Classification of Data.Data Analysis-Statistical Analysis; Multivariate Analysis; Correlation Analysis; Regression Analysis; Principle Component Analysis; Sampling	8
III	**Research Design:** Need for Research Design; Features of a Good Design; Types of Research Designs; Induction and Deduction. Hypothesis Formulation and Testing-Hypothesis; Important Terms; Types of Research Hypothesis; Hypothesis Testing; Z- Test; t-Test; f-Test; Making a Decision; Types of Errors; ROC Graphics.	8
IV	**Test Procedures:** Parametric and Non Parametric Tests; ANOVA; Mann-Whitney Test; Kruskal-Wallis Test; Chi-Square Test; Multi-Variate Analysis.Presentation of the Research Work- Business Report; Technical Report; Research Report; General Tips for Writing Report; Presentation of Data; Oral Presentation; Bibliography and References; Intellectual Property Rights; Open- Access Initiatives; Plagiarism.	8
V	**Patents:** Law of Patents, Patent Searches, Ownership, Transfer Patentability Design Patents- Double Patenting – Patent Searching – Patent Application Process – Prosecuting the Application, Post-issuance Actions, Term and Maintenance of Patents. Ownership Rights – Sole and Joint Inventors – Inventions Made by Employees and Independent Contractors – Assignment of Patent Rights – Licensing of Patent Rights – Invention Developers and Promoters. Patent Infringement, New Developments and International Patent Law-Direct Infringement - Inducement to Infringe – Contributory Infringement – First Sale Doctrine – Claims Interpretation – Defenses to Infringement – Remedies for Infringement – Resolving an Infringement Dispute – Patent Infringement Litigation. New Developments in Patent Law	7

Question Paper Pattern:

The question paper will have eight questions.

- **Each full question consists of 20 marks.**
- **Each full question will have sub questions covering all the topics under a unit.**
- **The students will have to answer 5 full questions.**

Master of Computer Applications

Text Books:

Sl.No	Author	Text Book title	Publisher	Volume / Issue	Year of Edition
1	Kothari C R	Research Methodology Methods	New age International		2013
2	Levin R I	Statistics for Management	Pearson Education		

Reference Books:

Sl No	Author	Text Book title	Publisher	Volume / Issue	Year of Edition
1	Krishnaswami K N	Management Research Methodology	Pearson Education		
2	Richard Stim	Intellectual Property – Copyrigh	WPO Publication		2008

Syllabus for the Academic Year – 2024 - 2025

Department: MCA **Semester: I**

Subject Name: DBMS with Mini Project Laboratory

Subject Code: 24MCA17 **L-T-P-C: 0-0-2-1**

Course Objectives:

Sl.No.	Course Objectives
1	To explain basic database concepts, applications, data models, schemas and instances and to demonstrate the use of constraints and relational algebra operations.
2	Describe the basics of SQL and construct queriesusing SQL.
3	To emphasize the importance of normalization indatabases.
4	To facilitate students in Database design and to familiarize issues of concurrency control and transactionmanagement.

Course Outcomes:

Course Outcome	Descriptions
CO1	Design entity-relationship diagrams to solve simple database applications.
CO2	Implement a database schema for a given problem domain and formulateSQL queries in Oracle.
CO3	Apply normalization techniques to improve the database design.

PART – A

Sl. No.	Description
	Instructions for the Exercises: 1. Draw ER diagram based on given scenario with various Constraints. 2. Create Relational Database Schema based on the above scenario using Mapping Rules. 3. Perform the given queries using any RDBMS Environment. 4. Suitable tuples have to be entered so that queries are executed correctly. The results of the queries may be displayed directly.
1.	**Create the following tables with properly specifying Primary keys, Foreign keys and solve the following queries:** **BRANCH (Branchid, Branchname, HOD) STUDENT (USN, Name, Address, Branchid, sem)** **BOOK (Bookid, Bookname, Authorid, Publisher, Branchid)** **AUTHOR (Authorid, Authorname, Country, age) BORROW (USN, Bookid, Borrowed_Date)** **Queries:** a. List the details of Students who are all studying in 2nd sem MCA. b. List the students who are not borrowed any books. c. Display the USN, Student name, Branch_name, Book_name, Author_name, d. Books_Borrowed_Date of 2nd sem MCA Students who borrowed books? e. Display the number of books written by each Author. f. Display the student details who borrowed more than two books. Display the student details who borrowed books of more than one Author.
2.	**Design an ER-diagram for the following scenario, Convert the same into a relational model and then solve the following queries.** Consider a Cricket Tournament "ABC CUP" organized by an organization. In the tournament there are many teams are contesting each having a Teamid, Team_Name, City, a coach. Each team is uniquely identified by using Teamid. A team can have many Players and a captain. Each player is uniquely identified by Playerid, having a Name, and multiple phone numbers, age. A player represents only one team. There are many Stadiums to conduct matches. Each stadium is identified using Stadiumid, having a stadium_name, Address (involves city, area_name, pincode).A team can play many matches. Each match played between the two teams in the scheduled date and time in the predefined Stadium. Each match is identified uniquely by using Matchid. Each match won by any of the one team that also wants to record in the database. For each match man_of_the match award given to a player. **Queries:** a. Display the youngest player (in terms of age) Name, Team name, age in which he belongs of the tournament. b. List the details of the stadium where the maximum number of matches were played. c. List the details of the player who is not a captain but got the man_of _match award at least in two matches. d. Display the Team details who won the maximum matches. Display the team name where all its own matches played in the same stadium.
3.	**Consider the following Scenario and design an ER-Diagram, map the designed ER-diagram into Relational model.** Consider an organization "ABC" having many employees. An employee works for one department. Each employee identified by using Empid, having Name, address (described as House_no, city, district, state,

	pin code) and more than one phone numbers. Department identified by using Dno, having Dname, Dlocation. Each Department is having a manager. Each department is having manyemployees. There are many projects; each project is controlled by the department. Each Project uniquely identified by Pno, having Project_name, Project_location. An employee works on many Projects. Number of hours per week worked on each project by an Employee also needs to be recorded in the database. A project is worked by many employees. Each employee supervised by the supervisor. Employee is having many dependents. Dependents having the dependent_name, gender, age, address. Dependents are identified by Empid. **T1(Empid, Emp_Name, city, district, state, pin_code, phoneno, Dno, Dname, Dlocation, Dept_mgr_id, Pno, Project_name, Project_location, Number_of_Hours,Supervisor_Empid, Dependent_name, gender, address)** **Deduce the above Relation T1 into the 3NF and then solve the following queries:** **Queries:** a. Display the details of the employees who are working on both the projects having project_no 5 and 10. b. Display the details of employees having atleast two dependents. c. Display the project name on which more number of employees is working. d. Retrieve the employees who do not have any dependents. e. Display the Employee details whose total number of hours per week working on various projects is maximum than all other employees. Create a view to display the number of employees working in each department.
4.	**Design an ER-diagram for the following scenario, Convert the same into a relational model, normalize Relations into a suitable Normal form and then solve the following queries.** A country can have many Tourist places. Each Tourist place is identified by using tourist_place_id, having a name, belongs to a state, Number of kilometers away from the capital city of that state, history. There are many Tourists visits tourist places every year. Each tourist is identified uniquely by using Tourist_id, having a Name, age, Country and multiple emailids. A tourist visits many Tourist places; it is also required to record the visted_date in the database. A tourist can visit a Tourist place many times at different dates. A Tourist place can be visited by manytourists either in the same date or at different dates. **Queries:** a. List the state name which is having maximum number of tourist places. b. List details of Tourist place where maximum number of tourists visited. c. List the details of tourists visited all tourist places of the state “KARNATAKA”. Display the details of the tourists visited at least one tourist place of the state, but visited all states tourist places. Display the details of the tourist place visited by the tourists of all country

PART – B

Develop an application using database and create front end using any programming language by an individual or in a team of 2 and must submit a brief mini project report (25-30 pages).

Question Paper Pattern:

- **In Practical examination student has to execute one question out of 4 questions from Part A. This is evaluated for 30 Marks.**
- **A team of maximum two students must demonstrate the project individually (Part B). This is evaluated for 20 Marks.**

Master of Computer Applications

Syllabus for the Academic Year – 2024-2025

Department: MCA **Semester: I**

Subject Name: Data Structures Laboratory

Subject Code: 24MCA18 **L-T-P-C: 0-0-2-1**

Course Objectives:

Sl.No	Course Objectives
1	To impart the basic concepts of data structures andalgorithms.
2	To understand concepts about searching andsorting techniques.
3	To understand basic concepts about stacks, queues, lists, trees and graphs.
4	To understand about writing algorithms and step bystep approach in solving problems.

Course Outcomes:

Course Outcome	Descriptions
CO1	Perform various sorting and searching techniques.
CO2	Implement various types of data structures, operations and algorithms.
CO3	Work with Stacks, Queues, Linked Lists, and Trees.
CO4	Design and apply appropriate data structures for solving computing problems.

Sl.No	Description
1	Write a C program to implement the following searching techniques: a. Linear Search. b. Binary Search.
2	Write a C program to implement the following sorting algorithms using user defined functions: a. Bubble sort (Ascending order). b. Selection sort (Descending order).
3	Write a C Program implement STACK with the following operations: a. Push an Element onto Stack. b. Pop an Element from Stack.
4	Implement a Program in C for evaluating a Postfix Expression.
5	Write a program to simulate the working of a singly linked list providing the following operations: a. Insert an element. b. Delete from the beginning/end. c. Display the elements.
6	Obtain the Topological ordering of vertices in a given graph.
7	Check whether a given graph is connected or not using DFS method.
8	Find Minimum Cost Spanning Tree of a given undirected graph using Kruskal's algorithm.

Question paper Pattern:

- **In the practical Examination student has to execute one program froma lot of all the 8 questions.**
- **Change of program is not permitted in the Practical Examination.**

Syllabus for the Academic Year – 2024-2025

Department: MCA **Semester: I**

Subject Name: Advanced Web Programming Laboratory

Subject Code: 24MCA19 **L-T-P-C: 0-0-2-1**

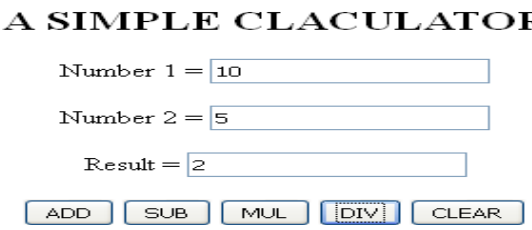
Course Objectives:

Sl.No.	Course Objectives
1	The course provides the basic principles server-side scripting language, such as PHP, Use PHP to access a MySQL database.
2	The course briefly covers development of XHTML documents using java script.
3	Design and implement static, interactive, dynamic, and secure web applications.
4	Build platform independent dynamic web applications using JavaScript, JQuery.

Course Outcomes:

Course Outcomes	Descriptions
CO1	Apply PHP to improve accessibility of a web document. Build web applications using PHP, and use MySQL as the underlying database server.
CO2	Developing web pages: Using HTML5, XHTML, and Cascading Style Sheets
CO3	Analyze a web page and identify its elements and attributes.
CO4	Develop a dynamic web pages using JavaScript (client side programming).

PART – A

Sl. No	Description
1	Write a PHP program to insert name and age information entered by the user into a table created using MySQL and to display the current contents of this table.
2	Develop and demonstrate, a HTML document that collects the USN (the valid format is : Two digits followed by three upper-case characters followed by two digits (no embedded spaces are allowed) from the user. Use JavaScript that validates the content of the document. Suitable messages should be displayed in the alert if errors are detected in the input data. Use CSS and event handlers to make your document appealing. Modify the above program to get the current semester also (restricted to be a number from 1 to 4).
3	Develop and demonstrate, using JavaScript script, a XHTML document that contains three short paragraphs of text, stacked on top of each other, with only enough of each showing so that the mouse cursor can be placed over some part of them. When the cursor is placed over the exposed part of any paragraph, it should rise to the top to become completely visible.
4	Develop a simple calculator to perform arithmetic (addition, subtraction, multiplication and division) operations on given two numbers. Use an HTML tag that allows the user to input two numbers and to display the result of arithmetic operation. Write suitable HTML and JavaScript and CSS to your simple calculator. The following figure show sample document display. 
5	Develop using JQuery to Limit character input in the text area including count
6	Develop using JQuery to animate an element, by changing its height and width.
7	Based on check box, disable/enable the form submit button using JQuery.

PART – B

1	Develop a web application project using the languages and concepts learnt in the theory and exercises listed in part A with a good look and feel effects. You can use any web technologies and frameworks and databases.
2	The team must submit a brief project report (25-30 pages) that must include the following: a. Introduction b. Requirement Analysis

	c. Software Requirement Specification d. Analysis and Design e. Implementation f. Testing g. Conclusion

Note: CIE Marks Distribution - Part A carries 30 Marks and Part B carries 20 Marks.

Question paper Pattern:

1. **In Practical examination student has to execute one question out of 7 questions from Part A. This is evaluated for 30 Marks.**
2. **A team of maximum two students must demonstrate the project individually (Part B). This is evaluated for 20 Marks.**

Syllabus for the Academic Year – 2024 - 2025

Department: MCA **Semester: I**

Subject Name: Basics of Programming

Subject Code: 24MCA20 **L-T-P-C: 0-0-0-0**

Course Objectives:

Sl.No	Course Objectives
1	Basic programming concepts of C
2	Knowledge of C programming constructs like arrays, pointers , structures etc.
3	Basic concepts of Computer Organization
4	Basic concepts of Operating systems

Course Outcomes:

Course Outcome	Descriptions
CO1	Understand the basic concepts of programming, digital logic, organization, and operating system
CO2	Demonstrate the principles of logical programming and operating system management
CO3	Apply and analyse the programming and logical skills to real world problems
CO4	Evaluate and compare the methods, solutions and algorithms of basics of programming

UNIT	Description	Hours
I	C Programming: Decision making, control structures and arrays: C Structure, Data Types, Input Output Statements, Decision making with if statement, simple if statement, the if-else statement, nesting of if-else statements, the else-if ladder, the switch statement, the?: operator, the go to statement, the break statement, programming examples The while statement, the do…while statement, for statement, nested loops, jumps in loops, the continue statement, programming examples. One dimensional and two-dimensional arrays, declaration and initialization of arrays, reading, writing and manipulation of above types of arrays	5
II	Structures: Defining a structure, declaring structure variables, accessing structure members, structure initialization, copying and comparing structure variables, Operations on individual members, array of structures, structures within structures, structures and functions, Unions, size of structures	5
III	Pointers: Pointers in C, Declaring and accessing pointers in C, Pointer arithmetic, Functions, Call by value, Call by reference, Pointer as function arguments, recursion, passing arrays to functions, passing strings to functions, Functions returning pointers, Pointers to functions, Programming Examples.	6
IV	Digital Logic: Binary Systems and Combinational Logic Digital Computers and Digital Systems, Binary Numbers, Number Base Conversion, Octal and Hexadecimal Numbers, subtraction using r's and r-1 complements, Binary Code, Binary Logic, Digital Logic Gates Computer Organization: Basic Operational Concepts, Software, Performance, Multiprocessing and Multi computers, Machine Instruction: Memory Locations and Addresses, Memory Operations, Instructions and Instruction Sequencing, Addressing Modes, Interrupts	5
V	Operating System: Operating-System Structure, Operating-System Operations, Overview of - Process Management, Memory Management, Storage Management, Protection and Security, Distributed Systems CPU Scheduling: Basic Concepts of CPU scheduling, Scheduling Algorithms-FCFS, SJF, Round Robin, Priority Scheduling	5

Question paper Pattern:

- **Non-credit course offered to Non-Computer Science background students only.**
- **No SEE Examination for this bridge course**

Text Books:

Sl.No	Author	Text Book title	Publisher	Volume / Issue	Year of Edition
1	Herbert Schild	C: The Complete Reference	McGraw Hill Education	-	July 2017
2	Yashwant Kanetkar	Let us C	BPB Publications	-	18th Edition

3	M.Morris Mano	Digital Logic and Computer Design	Pearson	-	2016
4	Abraham Silberschatz, Peter Baer Galvin, Greg Gagne	Operating System Concepts,	Wiley India Pvt. Limited	-	9th Edition

Syllabus for the Academic Year – 2024-2025

Department: MCA **Semester: II**

Subject Name: Advanced Java Programming

Subject Code: 24MCA21 **L-T-P-C: 3-2-0-4**

Course Objectives:

Sl.No.	Course Objectives
1	Programming using Java language.
2	Knowledge of object-oriented paradigm in the Java Programming language.
3	Apply the concept of Servlet, JSP to create web applications.
4	Build Database connection for the web applications.

Course Outcomes:

Course Outcomes	Descriptions
CO1	Learn integrated development environment to write, compile, run, and test simple object-oriented Java programs.
CO2	Understand the usage of Packages, Interfaces, Exceptions and Multithreading in building efficient applications.
CO3	Create web applications using Servlets and JSP.
CO4	Build Database connections.

Prerequisite:

Java Programming Fundamentals: The Java Language, The Key Attributes of Object-Oriented Programming, The Java Development Kit, A First Simple Program, The Java Keywords, Identifies in Java, The Java Class Libraries. Introducing Data Types and Operators Java's Primitive Types, Literals, A Closer Look at Variables, The Scope and Lifetime of Variables, operators, Shorthand Assignments, Type conversion in Assignments, Using Cast. Program Control Statements Input characters from the Keyword, if statement, Nested ifs, if-else-if Ladder, Switch Statement, Nested switch statements, for Loop, Enhanced for Loop, While Loop, do-while Loop, Use break, Use continue, Nested Loops.

UNIT	Description	Hours
I	A Closer Look at Methods and Classes: Controlling Access to Class Members, Pass Objects to Methods, How Arguments are passed, Returning Objects, Method Overloading, Overloading Constructors, Recursion, Understanding Static, Introducing Nested and Inner Classes. Inheritance: Inheritance Basics, Member Access and Inheritance, Constructors and Inheritance, Using super to Call Superclass constructors, Using super to Access Superclass Members, Creating a Multilevel Hierarchy, When are Constructors Executed, Superclass References and Subclass Objects, Method Overriding, Overridden Methods support polymorphism, Why Overridden Methods, Using Abstract Classes, Using final, The Object Class.	11
II	Interfaces: Interface Fundamentals, Creating an Interface, Implementing an Interface, Using Interface References, Implementing Multiple Interfaces, Constants in Interfaces, Interfaces can be extended, Nested Interfaces. Packages: Package Fundamentals, Packages and Member Access, Importing Packages, Static Import. ExceptionHandling:TheExceptionHierarchy,ExceptionHandlingFundamentals, The Consequences of an Uncaught Exception, Exceptions Enable you to handle errors gracefully, using Multiple catch clauses, Catching subclass Exceptions, try blocks can be nested, Throwing an Exception, A Closer look at Throwable, using finally, using throws, Java's Built- in Exceptions, Creating Exception Subclass.	11
III	Servlet: Structure, Servlet packaging, HTML Building utilities, Lifecycle, Single Thread Model Interface, Handling Client request: Form Data, HTTP Request Headers. Generating Server Response: HTTP Status Codes, HTTP Response Headers, Handling Cookies, Session Tracking.	10
IV	Introduction to JSP: Overview of JSP: JSP Technology, Need of JSP, Benefits of JSP, Advantages of JSP, Basic Syntax, Invoking Java code with JSP Scripting Elements, Creating Template Text, Invoking Java Code form JSP, Limiting Java Code in JSP, Using JSP Expressions, Comparing	10

	Servlets and JSP, Writing Scriptlets. For Example: Using Scriptlets to make parts of JSP Conditional, Using declarations, Declaration Examples.	
V	Structure of generated Servlets and Java Beans: Controlling the structure of generated Servlets: The JSP Page directive, Import Attribute, Session Attribute, is Elignore attribute, Buffer and Autoflush Attribute, Info Attribute, errorPage, and iserrorPage Attributes, is Thread Safe Attribute, extends Attribute, language Attribute. Talking to Database: Immediate Solutions, Essential JDBC program, using Prepared Statement Object. JDBC in Action: Result sets, Batch updates, Basic JDBC data types, Advanced JDBC data types, and immediate solutions.	**10**

Question paper Pattern:

The question paper will have eight questions.

- **Each full question consists of 20 marks.**
- **Each full question will have sub questions covering all the topics under a unit.**
- **The students will have to answer 5 full questions.**

Text Books:

Sl.No	Author	Text Book title	Publisher	Volume / Issue	Year of Edition
1	HerbertSchildt , DaleSkrien	Java Fundamentals, A comprehensive Introduction	Tata McGrawHill		2013
2	Marty Hall, Larry Brown	Core Servlets and Java server pages	Core Technologies.	1/2	-
3	Kogent Inc.	Java 6 Programming Black Book	Dream techpress	-	2012

Reference Books:

Sl. No.	Author	Text Book title	Publisher	Volume / Issue	Year of Edition
1	Hari Mohan Pandey	Java Programming	Pearson Education		2012
2	KoGenT	Java6 Programming ,BlackBook	Dreamtech Press		2012
3	CayHortsmann	Java2Essentials ,	Wiley	2nd edition	

Syllabus for the Academic Year – 2024–25

Department: MCA **Semester: II**

Subject Name: Data Analytics Using Python

Subject Code: 24MCA22 **L-T-P-C: 3 -0- 0 - 3**

Course Objectives:

Sl.No.	Course Objectives
1	Demonstrate basic data analytics principles and techniques.
2	Apply control structures to the given problems.
3	Apply the concepts of inheritance and overloading for agiven problem.
4	Perform essential operations using Numpy and Pandas

Course Outcomes:

Course Outcome	Descriptions
CO1	Data and carry out predictive modeling and analytics to support businessdecision-making.
CO2	Interpret and communicate data insights to any audience effectively.
CO3	Discern when to implement relational versus document oriented databasestructures.
CO4	Execute real-time analytical methods on streaming datasets to react quicklyto customer needs.

UNIT	Description	Hours
I	**Python Basic Concepts and Programming:** Keywords, Statements and Expressions, Variables, Operators, Precedence and Associativity, Data Types, Indentation, Comments, Reading Input, Print Output, Type Conversions, The type( ) Function and Is Operator, Control Flow Statements, The if Decision Control Flow Statement, The if…else Decision Control Flow Statement, The if…elif…else Decision Control Statement, Nested if Statement, The while Loop, The for Loop, The continue and break Statements, Built-In Functions, Commonly Used Modules, Function Definition and Calling the Function, The return Statement and void Function, Scope and Lifetime of Variables, Default Parameters, Keyword Arguments, *args and **kwargs, Command Line Arguments.	8
II	**Python Collection Objects, Classes:** Strings- Creating and Storing Strings, Basic String Operations, Accessing Characters in String by Index Number, String Slicing and Joining, String Methods, Formatting Strings, Lists- Creating Lists, Basic List Operations, Indexing and Slicing in Lists, Built-In Functions Usedon Lists, List Methods. Sets, Tuples and Dictionaries. Files: reading and writing files. Class Definition – Constructors – Inheritance – Overloading.	8
III	**Introduction to Numpy and Pandas:** Numpy-Understanding datatypes in python, basics of NumPy arrays, computation on NumPy arrays: universal functions. (refer chapter 2 from python data science handbook) Pandas-Introducing to pandas data structures, essential functionality, summarizing and computing descriptive statistics, handling missing data. (refer chapter 5 from python for data Analysis)	8
IV	**Data Loading and Data Wrangling:** Reading and writing data in text format, interacting with databases, combining and merging data sets, reshaping and pivoting, data transformation, string manipulation (refer chapter 6 and 7 from python for data Analysis.	8
V	**Visualization with Matplotlib and Seaborn:** General Matplotlib tips, simple line plots, simple scatter plots, visualizing errors, density and contour plots, histograms, binning, and density, customizing plot legends and colorbars, customizing matplotlib, visualization with seaborn. (refer chapter 4 from python data science handbook)	7

Question paper Pattern:

The question paper will have eight questions.

- **Each full question consists of 20 marks.**
- **Each full question will have sub questions covering all the topics under a unit.**
- **The students will have to answer 5 full questions.**

Text Books:

Sl.No	Author	Text Book title	Publisher	Volume / Issue	Year of Edition
1	Allen B. Downey	Think Python: How to think like a Computer Scientist	Shroff/O'Reilly Publishers	2nd edition	2016
2	Mark Lutz	Programming Python	O'Reilly Media	4th edition	2010
3	Jake Vander plas	Python Data Science Handbook: Essential tools for working with data	O'Reilly Publishers	1st Edition	-
4	Wes Mc Kinney	Python for Data Analysis	O'Reilly Media,	-	2012

Reference Books:

Sl.No	Author	Text Book title	Publisher	Volume / Issue	Year of Edition
1	Tim Hall and J-P Stacey	Python 3 for Absolute Beginners	Apress	1st edition	2009
2	Magnus Lie Hetland	Beginning Python: From Novice to Professional	Apress	2nd Edition	2005
3	Shai Vaingast,	Beginning Python Visualization Crafting Visual Transformation Scripts	Apress	2nd edition	2014

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Syllabus for the Academic Year – 2024 - 2025

Department: MCA **Semester: II**

Subject Name: Computer Networks

Subject Code: 24MCA23 **L-T-P-C: 3 - 0 - 0 - 3**

Course Objectives:

Sl.No.	Course Objectives
1	Understanding the various types of computer networksand topologies.
2	Demonstrate the TCP/IP and OSI reference models comparison with merits and demerits.
3	To explore the various layers of OSI Model and TCP/IPmodel.
4	Understanding various routing algorithms.

Course Outcomes:

Course Outcome	Descriptions
CO1	Students could understand and explore the basics of Computer Networksand Various Protocols.
CO2	Apply different techniques to ensure the reliable and secured communication in wired and wireless communication.
CO3	Apply the concepts to administrate a network and flow of information.
CO4	Design network topology for wired and wireless components and Identifythe issues of congestion control with solution.

UNIT	Description	Hours
I	Applications, Requirements, Network Architecture, Implementing Network Software, Performance.	8
II	Perspectives on Connecting, Encoding (NRZ, NRZI, Manchester, 4B/5B), Framing, Error Detection, Reliable Transmission, Ethernet and Multiple Access Networks (802.3),Wireless.	8
III	Internetworking and Advanced Internetworking Switching and Bridging,	8
IV	Basic Internetworking (IP), Routing, The Global Internet, Routing among Mobile Devices.	8
V	End-to-End Protocols and Congestion Control, Simple Demultiplexer (UDP),Reliable Byte Stream (TCP).	7

Question paper Pattern:
The question paper will have eight questions.
- **Each full question consists of 20 marks.**
- **Each full question will have sub questions covering all the topics under a unit.**
- **The students will have to answer 5 full questions.**

Text Books:

Sl.No	Author	Text Book title	Publisher	Volume / Issue	Year of Edition
1	Larry L Peterson andBruce S Davie	Computer Networks ASystems Approach	MKP	5 Edition	2012

Reference Books:

Sl.No.	Author	Text Book title	Publisher	Volume / Issue	Year of Edition
1	James F. Kurose, Keith W. Ross	Computer Networking – ATop-Down Approach Featuring the Internet	Pearson Education	5th Edition	2009
2	Nader. F. Mir	Computer and Communication Networks	Pearson Prentice Hall Publishers	Edition: 1	2010

Syllabus for the Academic Year – 2024-2025

Department: MCA **Semester: II**

Subject Name: Software Engineering

Subject Code: 24MCA24 **L-T-P-C: 3-0-0-3**

Course Objectives:

Sl.No.	Course Objectives
1	Provide a clear understanding of Software Engineering, Software Product Development Phases and its applications in real world.
2	Expose to recent trends in Software Engineering like extreme programming and evolutionary methods.
3	Use of Component Based Software Engineering.
4	Learn testing techniques, viz. black box and white boxtesting, testing tools and methodology and analyze modeling techniques.

Course Outcomes:

Course Outcome	Descriptions
CO1	Categorize problems based on their characteristics and practical importance.
CO2	Apply the correct process models for software development. Formulate aproblem as per the testing techniques.
CO3	Apply the techniques, skills, and modern engineering tools necessary forEngineering practice.
CO4	Apply new Generation of Software Engineering Technology to Meet Current and Future Industrial Challenges of Emerging Software Trends.

UNIT	Description	Hours
I	Introduction: Professional Software Development Attributes of good software, software engineering diversity, IEEE/ACM code of software engineering ethics, case studies. Software Process & Agile Software Development Software Process models: waterfall, incremental development, reuses oriented, Process activities; Coping with change, The rational Unified process.	8
II	Agile methods, Plan-driven and agile Development, Extreme Programming, Agile project management, Scaling agile methods. Requirements Engineering: Functional and non-functional requirements, the software requirements document, Requirements specification, Requirements engineering processes, Requirement elicitation and analysis. Component-based software engineering Components and component model, CBSE process, Component composition.	8
III	System Modeling, Architectural Design: Context models, Interaction models, Structural models, Behavioral models.	8
IV	Design and implementation: Distributed Software engineering Distributed system issues, Client-server computing, Architectural patterns for distributed systems, Software as a service.	8
V	Planning a software Project: Process planning, Effort estimation, Project scheduling and staffing, Software configuration management plan, Quality plan, Risk Management, Project monitoring plan. Software Testing: Testing fundamentals, Black-box testing, White-box testing, Testing process.	7

Question paper Pattern:

The question paper will have eight questions.

- **Each full question consists of 20 marks.**
- **Each full question will have sub questions covering all the topics under a unit.**
- **The students will have to answer 5 full questions.**

Text Books:

Sl.No	Author	Text Book title	Publisher	Volume/ Issue	Year of Edition
1	Ian Sommerville	Software Engineering	Person Education Ltd	9th edition	2011
2	Pankaj Jalote	Software Engineering	Wiley India PvtLtd	-	2010

Reference Books:

Sl.No.	Author	Text Book title	Publisher	Volume / Issue	Year of Edition
1	Roger S Pressman	Software Engineering-A Practitioners approach	McGraw-Hill	6th Edition	2010
2	Hans Van Vliet	Software Engineering Principles and Practices	Wiley–India	3rd Edition	2010

Syllabus for the Academic Year – 2023 - 2024

Department: MCA **Semester: II**

Subject Name: Artificial Intelligence

Subject Code: 24MCA251 **L-T-P-C: 3 -0 -0- 3**

Course Objectives:

Sl.No	Course Objectives
1	Identify problems that are amenable to solution by AI methods.
2	Identify appropriate AI methods to solve a given problem.
3	Formalize a given problem in the language/framework of different AI methods.
4	Design and carry out an empirical evaluation of different algorithms on problem formalization, and state the conclusions that the evaluation supports.

Course Outcomes:

Course Outcome	Descriptions
CO1	Acquire knowledge of Uncertainty and Problem solving techniques, Symbolic knowledge representation to specify domains and Reasoning tasks of a situated software agent
CO2	Comprehend on different logical systems for inference over formal domain representations and trace on particular inference algorithm working on a given problem specification
CO3	Apply and Analyse AI technique to any given concrete problem
CO4	Interpret and Implement non-trivial AI techniques in a relatively large system

UNIT	Description	Hours
I	Introduction to AI and production systems: Introduction to AI-Problem formulation, Problem Definition -Production systems, Control strategies, Search strategies. Problem characteristics, Production system characteristics -Specialized productions system- Problem solving methods – Problem graphs, Matching, Indexing and Heuristic functions -Hill Climbing-Depth first and Breath first, Constraints satisfaction – Related algorithms, Measure of performance and analysis of search algorithms.	8
II	Representation of knowledge: Game playing – Knowledge representation, Knowledge representation using Predicate logic, Introduction to predicate calculus, Resolution, Use of predicate calculus, Knowledge representation using other logic-Structured representation of knowledge.	8
III	Knowledge inference: Knowledge representation -Production based system, Frame based system. Inference – Backward chaining, Forward chaining, Rule value approach, Fuzzy reasoning – Certainty factors, Bayesian Theory- Bayesian Network-Dempster – Shafer theory.	8
IV	Planning and machine learning: Basic plan generation systems – Strips -Advanced plan generation systems – K strips - Strategic explanations -Why, Why not and how explanations. Learning- Machine learning, adaptiveLearning.	8
V	Expert systems: Architecture of expert systems, Roles of expert systems – Knowledge Acquisition – Meta knowledge, Heuristics. Typical expert systems – MYCIN, DART, XOON, Expert systems shells.	8

Question paper Pattern:

The question paper will have eight questions.

- **Each full question consists of 20 marks.**
- **Each full question will have sub questions covering all the topicsunder a unit.**
- **The students will have to answer 5 full questions.**

Text Books:

Sl.No	Author	Text Book title	Publisher	Volume / Issue	Year of Edition
1	Kevin Nightand Elaine Rich, NairB	Artificial Intelligence (SIE) Chapters: I, II, VI& V	McGrawHil	_	2008
2	Dan W. Patterson	Introduction to AI and ES Chapters:III	Pearson Education	_	2007

Reference Books:

Sl.No	Author	Text Book title	Publisher	Volume / Issue	Year of Edition
1	Peter Jackson	Introduction to Expert Systems	Pearson Education	3	2007
2	Stuart Russel and Peter Norvig	AI – A Modern Approach	Pearson Education	2	2007
3	Deepak Khemani	Artificial Intelligence	Tata McGraw Hill Education	_	2013

Syllabus for the Academic Year – 2024-2025

Department: MCA **Semester: II**

Subject Name: Soft Computing

Subject Code: 24MCA252 **L-T-P-C: 3-0-0-3**

Course Objectives:

Sl.No.	Course Objectives
1.	Know the concepts of machine intelligence
2.	Understand fuzzy logic concepts
3.	Understand the fundamentals of ANNS and unsupervised learning.
4.	Understand the concepts of evolutionary computing

Course Outcomes:

Course Outcome	Descriptions
CO1	Know the importance of soft computing and intelligent systems.
CO2	Conceptualize and parameterize various problems to be solved through basic soft computing techniques.
CO3	Know the basic concepts of Neural Networks.
CO4	Know the impact of evolutionary computing

UNIT	Description	Hours
I	Introduction- Intelligent systems-machine intelligence, meaning of intelligence, dynamics of intelligence, intelligent machines, knowledge-based systems-architecture of knowledge based systems, development of expert systems, processing, soft computing	8
II	Fundamentals of fuzzy logic systems, fuzzy sets, fuzzy logic operations, generalized fuzzy operations, implications, some definitions, fuzziness and fuzzy resolution, fuzzy relations, composition and inference, extension principle.	8
III	Connectionist modeling and neural networks, learning and acquisition knowledge, features of artificial neural networks, neural network activation functions, learning algorithms, fundamentals of connectionist modeling.	8
IV	Major classes of neural networks, the multiplayer perceptron, radial basis function networks, Kohonen‟s self-organizing network.	8
V	Evolutionary computing, overview, genetic algorithms and optimization, the schema theorem, genetic algorithm operators, selection, crossover, mutation, mode of operations in GA, steps for implementing Gas.	7

Question paper Pattern:

The question paper will have eight questions.

- **Each full question consists of 20 marks.**
- **Each full question will have sub questions covering all the topics under a unit.**
- **The students will have to answer 5 full questions.**

Text Books:

Sl. No.	Author	Text Book title	Publisher	Volume /Issue	Year of Edition
1	Karry F.O And Silva C.D.,	Soft Computing and Intelligent Systems (Chapters: 1, 2, 4, 5, 8)	Pearson Education	-	-

Reference Books:

Sl. No.	Author	Text Book Title	Publisher	Volume /Issue	Year of Edition
1	Shivanandam Deepa	Principles of Soft Computing	Wiley India Ltd	-	-

Syllabus for the Academic Year – 2024-25

Department: MCA **Semester: II**

Subject Name: Augmented Reality and Virtual Reality

Subject Code: 24MCA253 **L-T-P-C: 3 -0- 0 - 3**

Course Objectives:

Sl.No.	Course Objectives
1	Gain the knowledge of Virtual Reality concepts and its implication.
2	Understand the Input-Output interactions in Virtual Reality
3	Understand role of Computer Graphics in Virtual reality
4	Gain the knowledge of Architecture of Augmented Reality

Course Outcomes:

Course Outcome	Descriptions
CO1	Apply Virtual Reality concepts and its implications.
CO2	Illustrate the Input-Output interactions in Virtual Reality
CO3	Utilize UNITY tool to build applications.
CO4	Illustrate the role of modeling in Virtual Reality and Exemplify Architecture of Augmented Reality

UNIT	Description	Hours
I	**Introduction to Virtual Reality:** History of Virtual Reality, Types of Virtual Reality, Three I's of Virtual Reality, Architecture / Components of Virtual Reality, Applications of Virtual Reality Common Issues of Human Communication Media.	8
II	**Input Devices:** Trackers: Three-Dimensional Position Trackers: Tracker Performance Parameters, Mechanical Trackers, Magnetic Trackers, Optical Trackers, Gesture Interfaces – The Pinch Glove, The 5DT Data Glove, The Cyber glove.	8
III	**Output Devices:** Graphic Displays The human visual system, Personal Graphics Displays, Sound Displays The human auditory system, Haptic Feedback – The Human Haptic System, Tactile Feedback Interfaces, Force Feedback Interfaces. **Programming with Unity:** Unity Basics, Manipulating the Scene, Code blocks and Methods, Debugging Conditional and looping statements. Working with objects, Working with Scripts, Player movement, Camera Movement. **Further Learning for Unity:** The Asset Store	8
IV	**Computing Architectures for VR:** The Rendering Pipeline – The Graphics Rendering Pipeline, The Haptics Rendering Pipeline **Modeling:** Geometric Modeling – Visual Object Shape, Object Visual Appearance; Kinematics Modeling – Homogeneous Transformation Matrices, Object Position; Physical Modeling – Collision Detection, Surface Deformation, Force Smoothing and Mapping, Haptic Texturing; Behavior Modeling; Principles of touch feedback and force feedback;	8
V	**Introduction to Augmented Reality:** Definition and scope, technology and features of augmented reality, difference between AR and VR, Challenges with AR, Augmented reality methods, Mixed Reality, Applications of AR & MR Computer **Vision for Augmented Reality:** Marker-based tracking, Marker-less tracking	7

Question paper Pattern:

The question paper will have eight questions.

- **Each full question consists of 20 marks.**
- **Each full question will have sub questions covering all the topics under a unit.**
- **The students will have to answer 5 full questions.**

Text Books:

Sl.No.	Author	Text Book title	Publisher	Volume / Issue	Year of Edition
1	Bur dea, G. C. and P. Coffet.	Virtual Reality Technology, Second Edition.	Wiley-IEEE Press,	-	2003/ 2006
2	Alan B. Craig,	Understanding Augmented Reality, Concepts and Applications	Morgan Kaufmann	-	2013

Reference Books:

Sl.No.	Author	Text Book title	Publisher	Volume / Issue	Year of Edition
1	Sherman, William R. and Alan B. Craig.	Understanding Virtual Reality – Interface, Application, and Design	Morgan Kaufmann,	-	2002
2	Fei GAO.	Design and Development of Virtual Reality Application System,	Tsinghua Press	-	March 2012
3	William R. Sherman, Alan B., Craig	"Understanding Virtual Reality"	Morgan Kaufmann Publishers.	-	2003
4	Dieter Schmalstieg Tobias Höllerer	"Augmented Reality Principles and Practice"	Pearson Education, Inc.	-	2016
5	Casey Hardman	"Game Programming with Unity and C#" https://doi.org/10.1007/978-1-4842-5656-5	-	-	2020

Syllabus for the Academic Year – 2024 - 2025

Department: MCA **Semester: II**

Subject Name: Digital Marketing

Subject Code: 24MCA254 **L-T-P-C: 3-0-0-3**

Course Objectives:

Sl.No.	Course Objectives
1	Identify the importance of the digital marketing for marketing success, to manage customer relationships across all digital channels
2	Able to do Web site and SEO optimization and to develop a digital marketing plan.
3	Create Google AdWords campaigns, social media planning and
4	Acquire basic knowledge of Google Analytics for measuring effects of digital marketing

Course Outcomes:

Course Outcome	Descriptions
CO1	Understand the key concepts related to digital-marketing
CO2	Demonstrate the use of different electronic media for designing marketing activities.
CO3	Analyze role of social media marketing for the given problem and technical solutions to overcome social media threats.
CO4	Estimate the key concepts related to digital-marketing for the given case.

UNIT	Description	Hours
I	**Digital Marketing:** Introduction to Digital Marketing. Traditional Vs. Digital Marketing, Technology behind Digital Marketing, Characteristics of Digital Marketing, Digital Marketing Strategy, Understanding Digital Consumer**.**	8
II	**Online Advertising:** Introduction, Objective, Where to Advertise, Online Ad Format, Search Engine Ad, Network Advertising, Affiliate Programs, Landing Pages	8
III	**Email Marketing:** Introduction, Types of Email, Email Marketing Campaign Process, Email marketing Tools, Advantages and Disadvantages, Opt-in Email Advertising, Email tracking	8
IV	**Social Media Marketing (SMM):** What is Social Media Marketing, Seven Myths of SMM, Characteristics of Successful Social Media Marketer, Social Media Marketing plan, Social Media marketing Tools, Publishing Blogs, Podcast and Webinars, Social Media Monitoring, Social Media: Facebook, Twitter.	8
V	**Search Engine Optimization (SEO):** Understanding SEO, Search Engine Optimization Process – Goals, On-Page Optimization, Off-Page Optimization and Analyze, Search Engine Result Process (SERP), SEO Tools.	7

Question paper Pattern:

The question paper will have eight questions.

- **Each full question consists of 20 marks.**
- **Each full question will have sub questions covering all the topics under a unit.**
- **The students will have to answer 5 full questions.**

Text Books:

Sl. No.	Author	Text Book title	Publisher	Volume / Issue	Year of Edition
1	"Seema Gupta	Digital Marketing	Mc-Graw Hill	1st Edition	2017
2	Puneet Singh Bhatia	Fundamentals of Digital Marketing	Pearson	1st Edition	2017

Reference Books:

Sl. No.	Author	Text Book title	Publisher	Volume / Issue	Year of Edition
1	Ian Dodson	The Art of Digital Marketing	Wiley		

2	Dr. Shailendra Singh Chauhan, Dr. Pooja Bhatia, Dr. Ved Prakash.	Digital and Social Media Marketing	Mahi Publications		

SRI SIDDHARTHA INSTITUTE OF TECHNOLOGY- TUMAKURU
(A constituent College of Siddhartha Academy of Higher Education, Tumakuru)

Syllabus for the Academic Year – 2024 - 2025

Department: MCA **Semester: II**

Subject Name: Machine Learning

Subject Code: 24MCA261 **L-T-P-C: 2–0–2–3**

Course Objectives:

Sl.NO.	Course Objectives
1	Understand machine learning concepts and introduce the Find-S algorithm as a basic concept learning algorithm.
2	Identify appropriate problems with solutions and datasets for decision tree learning.
3	Identify problems that are well-suited for neural network solutions and understand their practical applications.
4	To understand how Bayesian methods can update beliefs in the context of learning concepts, Implement instance-based learning techniques for regression and classification tasks.

Course Outcomes:

Course Outcome	Descriptions
CO1	Demonstrate learning problems effectively, considering data availability, problem complexity, and feasibility of machine learning approaches.
CO2	Recognize problem domains suitable for decision tree learning, such as classification and regression tasks.
CO3	Understand the representation of neural networks, including layers, neurons, weights, biases, and activation functions.
CO4	Apply Bayesian methods to infer and update beliefs based on data. Evaluate and compare hypotheses and learning algorithms using statistical methods.

UNIT	Description	Hours
I	Introduction: Well posed learning problems, designing a Learning system, Perspective and Issues in Machine Learning. Concept Learning: Concept learning task, Find-S algorithm, Candidate Elimination algorithm.	8
II	Decision Tree Learning: Decision tree representation, Appropriate problems for decisiontree learning, Basic decision tree learning algorithm, hypothesis space search in decision tree learning, Issues in decision tree learning.	8
III	Artificial Neural Networks: Introduction, Neural Network representation, appropriate problems, Perceptrons, Back propagation algorithm.	8
IV	Bayesian Learning: Introduction, Bayes theorem, Bayes theorem and concept learning, ML and LS error hypothesis, NaiveBayes classifier.	8
V	Evaluating Hypothesis: Estimating hypothesis accuracy, General approach for deriving confidence intervals, Comparing learning algorithms. Instance Based Learning: locally weighted regression, radial basis function, cased-based reasoning, Reinforcement Learning: Introduction, Learning Task.	7

List of experiments:

Sl.No	Description
1	Implement and demonstrate the FIND-S algorithm for finding the most specific hypothesis based on a given set of training data samples. Read the training data from .CSV file.
2	Implement and demonstrate the working of the decision tree based ID3 algorithm. Use an appropriate data set for building the decision tree, find the accuracy and apply this knowledge to classify a new sample. Read the training data from a .CSV file. Python ML library classes can be used for this problem. Compute the various performance metrics of the classifier
3	Implement and demonstrate the working of an ensemble technique based on decision tree. Use an appropriate data set. Read the training data from a .CSV file. Python ML library classes can be used for this problem. Compute the various performance metrics of the classifier.
4	Demonstrate the working of an Artificial Neural Network by implementing the back propagation algorithm. Use an appropriate dataset. Read the training data from .CSV file. Python ML library classes can be used for this problem. Compute the various performance metrics of the classifier.

5	Implement and demonstrate the working of the naïve Bayesian classifier for a sample training dataset sored as a .CSV file. Python ML library classes can be used for this problem. Compute the various performance metrics of the classifier.
6	Implement and demonstrate the working of an ensemble technique based on various classifier. Use an appropriate dataset. Read the training data from .CSV file. Python ML library classes can be used for this problem. Compute the various performance metrics of the classifier.

Question paper Pattern:
The question paper will have eight questions.
- **Each full question consists of 20 marks.**
- **Each full question will have sub questions covering all the topics under a unit.**
- **The students will have to answer 5 full questions.**

Text Books:

Sl.NO.	Author	Text Book title	Publisher	Volume / Issue	Year of Edition
1	Tom M. Mitchell	Machine Learning	McGraw Hill Education	India Edition	2013

Reference Books:

Sl. No.	Author	Text Book title	Publisher	Volume / Issue	Year of Edition
1	Ethem Alpaydın	Introduction to machine learning	MIT press	2	_
2	Stephen Marsland	Machine Learning: An Algorithmic Perspective	-	-	-
3	Christopher M. Bishop	Pattern Recognition and Machine Learning.	_	_	_

Syllabus for the Academic Year – 2024 - 2025

Department: MCA **Semester: II**

Subject Name: Big Data Analytics

Subject Code: 24MCA262 **L-T-P-C: 2–0–2–3**

Course Objectives:

Sl.No.	Course Objectives
1	To learn the need of Big Data and the various challenges involved and to acquire Knowledge about different analytical architectures.
2	To understand Hadoop Architecture and its ecosystems.
3	To Understand Hadoop Ecosystem and acquire knowledge about the NoSQL database, New SQL, MongoDB and Cassandra databases
4	To imbibe the processing of Big Data with advanced architectures like Spark.

Course Outcomes:

Course Outcome	Descriptions
CO1	Demonstrate knowledge of Big Data, Data Analytics, challenges and their solutions in Big Data.
CO2	Analyse Hadoop Framework and eco systems
CO3	Analyse MapReduce and Yarn, Work on NoSQL environment. Work on NewSQL environment, MongoDB and Cassandra.
CO4	Apply the Big Data using Map-reduce programming in Both Hadoop and Spark framework.

UNIT	Description	Hours
I	**Introduction to big data:** Data, Characteristics of data and Types of digital data: Unstructured, Semi-structured and Structured - Sources of data. Big Data Evolution - Definition of big data-Characteristics and Need of big data-Challenges of big data. Big data analytics, Overview of business intelligence.	8
II	**Big data technologies and Databases: Hadoop** – Requirement of Hadoop Framework - Design principle of Hadoop –Comparison with other system SQL and RDBMS- Hadoop Components – Architecture -Hadoop 1 vs Hadoop 2.	8
III	**MapReduce and YARN framework:** Introduction to MapReduce , Processing data with Hadoop using MapReduce, Introduction to YARN, Architecture, Managing Resources and Applications with Hadoop YARN. **Big data technologies and Databases: NoSQL:** Introduction to NoSQL Features and Types- Advantages & Disadvantages -Application of NoSQL.	8
IV	**New SQL:** Overview of New SQL - Comparing SQL, NoSQL and NewSQL. **Mongo DB:** Introduction – Features – Data types – Mongo DB Query language – CRUD operations – Arrays – Functions: Count – Sort – Limit – Skip – Aggregate – Map Reduce. Cursors – Indexes – Mongo Import – Mongo Export. **Cassandra:** Introduction – Features – Data types – CQLSH – Key spaces – CRUD operations – Collections – Counter – TTL – Alter commands – Import and Export – Querying System tables.	8
V	**(Big Data Frame Works for Analytics) Hadoop Frame Work:** Map Reduce Programming: I/O formats, Map side join-Reduce Side Join-Secondary Sorting-Pipelining MapReduce jobs **Spark Frame Work:** Introduction to Apache spark-How spark works, Programming with RDDs: Create RDDspark Operations-Data Frame.	7

List of experiments:

1	Write a program to implement database triggers in PL/SQL by using following schema -employee(e_id, e_name, e_doj, e_salary, e_age, primary key(e_id)) i. Create an employee table and insert any five records. ii.Write row-level trigger for salary changes, Display the relevant message(insert / update / delete operations on employee)
2	Write a program to implement database triggers in PL/SQL by using following schema -employee(e_id, e_name, e_doj, e_salary, e_age, primary key(e_id)) i. Create an employee table and insert any five records. ii.Write row-level trigger for salary changes, Display the relevant message(insert / update / delete operations on employee)
3	Write a program to implement cursor in PL/SQL to display the employee details from the following table. emp (eno,ename,designation,doj,salary, primary key(eno))
4	Write a program to implement Procedure in PL/SQL to display the employee detailsfrom the following table. employee(eno, ename, designation, doj, salary , primary key(eno))
5	Write a program to implement packages in PL/SQL by using following schema. employee (id, name, age, address, salary, primary key (id)); i. Create the package for adding, removing and listing a Employee. ii. Display suitable output

Question paper Pattern:

The question paper will have eight questions.

- **Each full question consists of 20 marks.**
- **Each full question will have sub questions covering all the topics under a unit.**
- **The students will have to answer 5 full questions.**

Text Books:

Sl.No.	Author	Text Book title	Publisher	Volume / Issue	Year of Edition
1	Seema Acharya and Subhashini Chellappan	"Big Data and Analytics"	Wiley India Pvt. Ltd.,	-	2016
2	Tom White,	Hadoop: The Definitive Guide	O"Reilly	4th Edition,	2015

Reference Books:

Sl.No.	Author	Text Book title	Publisher	Volume / Issue	Year of Edition
1	Mike Frampton	Mastering Apache Spark"	Packt Publishing		2015
2	Mohammed Guller	Big Data Analytics with Spark	Apress		2015

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Syllabus for the Academic Year – 2024-2025

Department: MCA **Semester: II**

Subject Name: Cloud Computing

Subject Code: 24MCA263 **L-T-P-C: 2–0–2-3**

Course Objectives:

Sl.No.	Course Objectives
1	Understanding the basic concepts, definitions, and characteristics of cloud computing and distributed systems.
2	Understand the basic concepts, terminologies and architectures of distributed and parallel computing systems.
3	Study different types of virtualization, such as hardware virtualization, software virtualization, network virtualization, storage virtualization, and desktop virtualization.
4	Analyze the characteristics and use cases of IaaS, PaaS, and SaaS. Explore tools like AWS Management Console, Azure Portal, Google Cloud Console, and others.

Course Outcomes:

Course Outcome	Descriptions
CO1	Describe the historical milestones and technological advancements that have shaped cloud computing.
CO2	Differentiate between parallel and distributed computing, understand their unique characteristics and applications.
CO3	Articulate the significance and benefits of Virtualization in modern computing environments.
CO4	Analyze various Service and Deployment Models: Explain the characteristics and use cases of IaaS, PaaS, and SaaS service models, Utilize Cloud Platforms and Tools: AWS, Azure, Google Cloud.

UNIT	Description	Hours
I	Introduction to Cloud Computing: History, The vision of Cloud Computing, Defining a cloud, Cloud computing reference model, Historical developments: Distributed systems, Virtualization, Web 2.0; Service oriented computing; Utility oriented computing.	**8**
II	Architectures for parallel and distributed computing: Parallel Vs Distributed computing, Elements of distributed computing, Technologies for distributed computing.	**8**
III	Virtualization: Introduction, Characteristics of virtualized environments, Taxonomy of virtualization technique, Pros and cons of virtualization, Technology examples: Xen: Para virtualization, VmWare: Full virtualization, Microsoft Hyper – V.	**8**
IV	Cloud computing architecture: Introduction, IaaS, PaaS, SaaS, Types of Clouds: Public, Private, Hybrid and Community clouds, Economics of the cloud, Open challenges.	**8**
V	Cloud Tools and Applications: Aneka PaaS; Open stack: Introduction to open stack; Components of open stack; Amazon web services; Google AppEngine; Microsoft Azure; Scientific applications: Healthcare; Biology; Geo-Science, Business and Consumer applications: ARM & ERP; Productivity; Social networking.	**7**

List of experiments:

Sl.No	Description
1	Install Virtualbox/VMware Workstation with different flavours of linux or windows OS on top of windows7 or8.
2	Install a C compiler in the virtual machine created using virtual box and execute Simple Programs.
3	Install Google App Engine. Create hello world app and other simple web applications using python/java.
4	Use GAE launcher to launch the web applications.
5	Simulate a cloud scenario using Cloud Sim and run a scheduling algorithm that is not present in Cloud Sim.
6	Find a procedure to tansfer the files from one virtual machine to another virtual machine.
7	Find a procedure to launch virtual machine using trystack (Online Openstack DemoVersion)

Question paper Pattern:

The question paper will have eight questions.

- **Each full question consists of 20 marks.**
- **Each full question will have sub questions covering all the topics under a unit.**
- **The students will have to answer 5 full questions.**

Text Books:

Sl.No	Author	Text Book title	Publisher	Volume / Issue	Year of Edition
1	Rjkumar Buyya, Christian Vecchiola, ThamaraiSelci	Mastering Cloud Computing	Tata McGrawHill, New Delhi, India	-	2013

Reference Books:

Sl.No,	Author	Text Book title	Publisher	Volume / Issue	Year of Editio n
1	Judith Hurwitz, R.Bloor, M. Kanfman, F.Halper	Cloud Computingfor Dummies	Wiley India Edition	--	-
2	J.Vette, Toby J. Vette, Robert Elsenpete r	Cloud Computing: APractical Approach	Tata McGra wHill	-	-

Syllabus for the Academic Year–2024-2025

Department: MCA **Semester: II**

Subject Name: Software Testing

Subject Code: 24MCA264 **L-T-P-C: 2–0–2-3**

Course Objectives:

Sl.No.	Course Objectives
1.	To understand the principles of testing.
2.	To identify the need for testing.
3.	To identify testing process.
4.	To describe various types of test and their objectives

Course Outcomes:

Course Outcome	Descriptions
CO1	Identify the need and the importance of software testing as an engineering activity.
CO2	Interpret the concept of testing using different types of testing and testing techniques.
CO3	To understand the different levels of testing.
CO4	To exemplify how to write the test plan and test cases and understand the defect management process

UNIT	Description	Hours
I	Introduction to testing as an engineering activity, The evolving profession of software engineering, the role of process in software quality, testing as a process. Testing fundamentals: Initiating a study of testing, basic definitions, why testing is necessary? What is testing? The psychology of testing? Software quality assurance group, software-testing principles, The Tester's Role in a Software Development Organization.	8
II	The test development life cycle (TDLC), when should testing stop?; Verification strategies; review, walkthrough, inspection Testing types and techniques; white box testing: basis path testing, flow graph notation, cyclomatic complexity, graph matrices, loop testing Black box testing: boundary value analysis, equivalence partitioning, graph based testing methods, error guessing	8
III	Levels of testing; The Need for Levels of Testing, Unit Test, Unit Test Planning, Designing the Unit Tests. The Class as a Testable Unit, Running the Unit tests and Recording results, Integration tests, Designing Integration Tests, Integration Test Planning, System Test – The Different Types, Regression Testing, Alpha, Beta and Acceptance Tests, Web testing: Introduction to web testing, web testing process and techniques, cross browser testing, web browser error messages, Performance testing	8
IV	Test planning: what is test plan; why to plan test? Template for test plan; guidelines for creating the test plan; risk analysis Test design: importance; test design essentials; good test case; test case mistakes; test case template; test design stages.	8
V	Test execution: Objectives; execution considerations; execution activities Defect management: what is defect; defect life cycle; defect management process	7

List of Experiments:

SL.NO	Experiments
1.	Write a program in C to demonstrate the working of following constructs i)if ii)if else iii)while iv)switch v)for
2.	A program written in "C" language for Matrix Multiplication fails‖ Introspect thecauses for its failure and write down the possible reasons for its failure.
3.	Take any system (e.g. ATM system) and study its system

	specifications and report the various bugs.
4.	Write the test cases for any known application (e.g. Banking application)
5.	Create a test plan document for any application (e.g. Library Management System)
6.	Study of any testing tool (e.g. Win runner)
7.	Study of any web testing tool (e.g. Selenium)
8.	Study of any open source-testing tool (e.g. Test Link)

Question paper Pattern:

The question paper will have eight questions.

- **Each full question consists of 20 marks.**
- **Each full question will have sub questions covering all the topics under a unit.**
- **The students will have to answer 5 full questions.**

Text Books:

Sl.No	Author	Text Book title	Publisher	Volume /Issue	Year of Edition
1	Ilene Burnstein	Practical Software Testing	Springer international edition. (Unit-I)	-	-
2	Dorothy graham, Erik vanveenendaal Rex black	Foundations Of Software Testing	ISTQB certification (Level I)	-	-

Reference Books:

Sl. No.	Author	Text Book title	Publisher	Volume /Issue	Year of Edition
1	Boris Beizer	Software System Testing And Quality Assurance	Vannostrandreinhold ,newyork	-	-
2	Gordon schulmeyer	Zero Defect Software	McGraw –hill book co	-	-
3	Watts Humphrey	Managing The Software Process	Addison weselypub.co.inc.	-	-

Syllabus for the Academic Year – 2024-2025

Department: MCA **Semester: II**

Subject Name: Advanced Java Programming Laboratory

Subject Code: 24MCA27 **L-T-P-C: 0-0-2-1**

Course Objectives:

Sl.No.	Course Objectives
1	Acquire knowledge and skill necessary to write javaprograms.
2	Learn the object oriented concepts and its implementation inJava
3	To provide the ability to design console based, GUI basedand web based applications.
4	Able to understand integrated development environment tocreate, debug and run multi-tier.

Course Outcomes:

Course Outcome	Descriptions
CO1	Illustrate the object oriented principles with the help of java programs.
CO2	Apply the concept of Servlet and its life cycle to create web application.
CO3	Apply JSP tags and its services to web application.
CO4	Build Database connection for the web applications.

Sl.No	Description
1	Write a java program to demonstrate Constructor Overloading and Method Overloading.
2	a) Write a java program to demonstrate Inheritance. b) Write a java Program for the implementation of multiple inheritance using interfaces to calculatethe area of a rectangle and triangle.
3	Write a java program which has: a) A Class called Account that creates account with Rs. 500 minimum balance, a deposit() method to deposit amount, a withdraw() method to withdraw amount and also throws LessBalanceException if an account holder tries to withdraw money which makes the balance become less than Rs. 500. b) A Class called Less_Balance_Exception which returns the statement that says withdraw amount (Rs.) is not valid. c) A Class which creates 2 accounts, both account deposit money and one account tries to withdraw more money which generates a Less Balance Exception take appropriate action for the same.
4	Write a java Servlet Program to implement a dynamic HTML using Servlet (username and Password should be accepted using HTML and displayed using a Servlet).
5	Write a java Servlet Program to Auto Web Page Refresh (Consider a webpage which is displaying Date and time or stock market status. For all such type of pages, you would need to refresh your web page regularly; Java Servlet makes this job easy by providing refresh automatically after a given interval).
6	Write a java Servlet Program to implement and demonstrate GET and POST methods (UsingHTTP Servlet Class).
7	Write a java Servlet Program using cookies to remember user preferences.
8	Write a java Servlet program to track Http Session by accepting user name and password usingHTML and display the profile page on successful login.
9	Write a JSP Program which uses jsp: include and jsp: forward action to display a Webpage.
10	Write a JSP program to implement all the attributes of page directive tag.
11	Write a java Program to insert data into Student DATA BASE and retrieve info based onparticular queries (For example update, delete, search etc…).

Question paper Pattern:

In the practical Examination student has to execute one program from a lotof all the 11 questions.

Change of program is not permitted in the Practical Examination.

Master of Computer Applications

Syllabus for the Academic Year – 2024-25

Department: MCA **Semester: II**

Subject Name: Data Analytics Laboratory

Subject Code: 24MCA28 **L-T-P-C: 0-0-2-1**

Course Objectives:

Sl.No	Course Objectives
1	Understand the implementation procedures to perform search/sort on a given data set using python.
2	Demonstrate object-oriented principles.
3	Demonstrate data visualization using Numpy for a given problem.
4	Demonstrate regression model for a given data set.

Course Outcomes:

Course Outcome	Descriptions
CO1	Preparing for data summarization, query, and analysis.
CO2	Applying data modeling techniques to large data sets
CO3	Creating applications for Data analytics
CO4	Building a complete business data analytic solution

PART A

Sl.No	Description
1.	Write a Python program to perform linear search.
2.	Write a Python program to insert an element into a sorted list.
3.	Write a python program using object-oriented programming to demonstrate encapsulation, overloading and inheritance.
4.	Implement a python program to demonstrate: a. Importing Datasets. b. Cleaning the Data. c. Data frame manipulation using Numpy.
5.	Implement a python program to demonstrate the following using NumPy : Array manipulation, Searching, Sorting and splitting. Broad casting and Plotting NumPy arrays.
6.	Implement a python program to demonstrate Data visualization with various Types of Graphs using Numpy.
7.	Write a Python program that creates a m x n integer array and Prints its attributes using matplotlib.
8.	Write a Python program to demonstrate the generation of linear regression models.
9.	Write a Python program to demonstrate the generation of logistic regression models using Python.
10.	Write a Python program to demonstrate Time series analysis with Pandas.

PART B

- Students shall carry out a mini project using python/pandas to demonstrate the data analysis.
- A team of two students must develop the mini project. However during the examination, each student must demonstrate the project individually.
- The team must submit a brief project report (20-25 pages)
  - Introduction
  - Requirement Analysis
  - Software Requirement Specification
  - Analysis and Design,
  - Implementation
  - Testing
- Brief synopsis not more than two pages to be submitted by the team as per the format given. It is recommended that students to do prior art search as part of literature

survey before submitting the synopsis for the Mini/Major projects.

- Rubrics may be used to evaluate the Mini-Project Each student has to execute one program picked from Part-A during the semester end examination. In SEE Part-A and Part-B shall be given 50% weightage each.

Note: CIE Marks Distribution - Part A carries 20 Marks and Part B carries 10 Marks. Viva VOICE 10 Marks

Question paper Pattern:

- **In Practical examination student has to execute one question out of10 questions from Part A. This is evaluated for 20 Marks.**
- **A team of maximum two students must demonstrate the project individually (Part B). This is evaluated for 20 Marks.**
- **Viva Voce for 10 Marks**

Syllabus for the Academic Year – 2024 - 2025

Department: MCA **Semester: II**

Subject Name: Computer Networks Laboratory

Subject Code: 24MCA29 **L-T-P-C: 0-0-2-1**

Course Objectives:

Sl.No	Course Objectives
1	To understand the working principle ofvarious communication protocols.
2	To understand the concept of data transfer between nodes
3	To understand different techniques to ensure the reliable and secured communication in wired and wireless environment.
4	To understand the networking concepts of TCP/IP and Identify the issues of Transport layer to analyse the congestion control mechanism.

Course Outcomes:

Course Outcome	Descriptions
CO1	Apply the basic concepts of networking and to analyse different parameters such as bandwidth, delay, throughput of the networks for the given problem.
CO2	Apply different techniques to ensure the reliable and secured communication in wired and wireless communication.
CO3	Analyze the networking concepts of TCP/IP for wired and wireless components and Identify the issues of Transport layer to analyse the congestion control mechanism.
CO4	Design network topology with different protocols and analyse the performance using NS2 or any other simulator.

Sl.No.	Simulate the following Computer Networks concepts using any network simulators
1	Simulate a three nodes point — to — point network with duplex links between them.
2.	Simulate the network with five nodes n0, n1, n2, n3, n4, forming a star topology. The node n4 is at the center. Node n0 is a TCP source, which transmits packets to node n3 (a TCP sink) through the node n4. Node n1 is another traffic source, and sends UDP packets to node n2 through n4. The duration of the simulation time is 10 seconds.
3	Simulate to study transmission of packets over Ethernet LAN.
4	Write a TCL Script to simulate working of multicasting routing protocol.
5	Simulate the different types of internet traffic such as FTP and TELNET over a wirednetwork.

Question paper Pattern:

In the practical Examination student has to execute one program from a lot of all the 11 questions.

Change of program is not permitted in the Practical Examination.

Syllabus for the Academic Year – 2024-2025

Department: MCA **Semester: II**

Subject Name: Soft Skills

Subject Code: 24MCA30 **L-T-P-C:0-0-0-0**

Course Objectives:

Sl.No.	Course Objectives
1	To make the students aware of the importance of soft skills in the present-day business world and work environment
2	To help students realize as well as develop key soft skills interviewers look for – such as change management, professionalism, inter- and intra-personal skills, adaptability etc.
3	To develop effective resumes (paper-based as well as video)
4	To provide simulated Group Discussion and Personal Interview experience based on the models adopted by reputed companies.
5	To understand professional etiquette to be displayed in workplaces.

Course Outcomes:

Course Outcome	Descriptions
CO1	Display key soft skills expected by recruiters
CO2	Participate in Group Discussions and Personal Interviews effectively
CO3	Create effective resumes that impress interviewers (paper-based as well as video)
CO4	Apply professional etiquette to be displayed in various workplace scenarios

METHODOLOGY

Interactive instructor led session with audio-visual aids / case studies.

UNIT	Description	Hours
I	Importance of Soft skills How to pick up skills faster? Interpersonal and Intrapersonal skill building Professional etiquette	4
II	Change Management Creating a digital footprint Time Management	4
III	Group Discussion –Basics Personal Interview- Basics Building a resume from scratch	4
IV	Group Discussion – Advanced Personal Interview -Advanced	4
V	Resume Writing - Workshop (Drafting a paper-based as well as a video resume) Setting and achieving Targets Introspection Group Discussion – Mock Interview-Mock	4