

**DEPARTMENT OF COMPUTER APPLICATIONS**

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**Department of Computer Applications**  
**M.C.A Structure**  
**(2024 Pattern)**

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**JSPM's**  
**RAJARSHI SHAHU COLLEGE OF ENGINEERING**  
**TATHAWADE, PUNE-33**  
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## Department of Computer Applications

### Vision

To progress as a center of brilliance in computing education producing globally proficient professionals contributing to the betterment of the society.

### Mission of Department

1. To educate students in the basic standards of Software Engineering
2. To educate students to become successful professionals
3. To propel students for research and entrepreneurship



Dr.Rinku Dulloo  
Chairman BOS

Dr.Ram Joshi  
Dean Academics

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## Department of Computer Application

### Program Outcomes (POs)

- PO1: Computational Knowledge: Apply knowledge of computing fundamentals and domain knowledge.
- PO2: Problem Analysis: Identify, formulate and solve complex computing problems reaching substantiated conclusions.
- PO3: Development of Solutions: Design and evaluate solutions for complex computing problems with appropriate consideration.
- PO4: Investigations of complex Computing problems: Use research-based knowledge and research methods for analysis and interpretation of data, and synthesis of the information to provide valid conclusions
- PO5: Modern Tool Usage: Create, identify and apply appropriate techniques, resources, and modern computing tools to complex computing activities.
- PO6: Professional Ethics: Understand and commit to professional ethics and cyber regulations for professional computing practices.
- PO7: Life-long Learning: Identify the need and have the ability, to engage in independent learning as a computing professional.
- PO8: Project management and finance: Understand and apply computing, management principles to manage multidisciplinary projects.
- PO9: Communication Efficacy: Communicate effectively with the computing community, and with society.
- PO10: Societal and Environmental Concern: Understand and assess societal, environmental, health, safety, legal, and cultural issues
- PO11: Individual and Team Work: Function effectively in diverse teams and in multidisciplinary environments.
- PO12: Innovation and Entrepreneurship: Identify a timely opportunity and using innovation to pursue that opportunity.

## Department of Computer Applications

### Program Specific Outcomes (PSOs)

Upon successful completion of PG MCA program, the students will attain following program specific outcomes.

#### **PSO1: Professional Skills-**

To provide an opportunity to work effectively with teams and group with better communication skills in written and oral form. Also, to develop an appreciation of ethics and social awareness needed and with this to develop master for successful career and leadership position.

#### **PSO2: Problem-Solving Skills-**

To prepare the students for technical and managerial skills necessary to design and implement computer applications to conduct open ended problem solving and applying critical thinking.

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**PSO3: Professional Career and Entrepreneurship-**

The ability to employ modern computer languages, environments, and platforms in creating innovative career paths to be an entrepreneur, and zest for the higher studies and research and entrepreneurship.

*Highlights of the Syllabus*

Curriculum of PG program for Computer Applications is designed in association with



Academic Experts



Industry/Corporate Experts



Distinguished Alumni

Features of MCA curriculum are designed in association with the **Industry**.



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### Unique features of the curriculum

- The curriculum of MCA is designed in a way such that, students will get knowledge of most trending and “in use” industrial technologies and practices by the time they complete their post-graduation. Keeping this goal in mind updates the curriculum as and when required.
- MCA curriculum is designed to build a strong basic and clear all the fundamental concepts.
- Bridge course is introduced during the induction program for two weeks to learn basic concepts.
- Mini Projects- To understand the importance of working in teams and being part of collective success, we have incorporated Mini projects in each semester where student will work together and implement it.
- Human Values Course- RSCOE focus on the all-around development of our students. This includes refining their technical skills as well as their personal development. Human Values courses will teach them how to handle stressful situations, ethics of a professional and how to give back to the society. This will also motivate them to join the various CSR activities conducted by the company they join and help in achieving the different organizational goals of the company they join.
- Electives offered on emerging technologies. Students can opt any one as per his/her choice.
- Online Professional certification courses are enabled curriculum for all students.
- Language Proficiency courses - English, German and Japanese are introduced in curriculum. Student can opt any one of them.
- In order to make students ready for placement, gateway to industry course is given where basic aptitude and technical concepts are introduced.
- Professional communication skills course help students to develop over all personality and groom them.

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**F. Y. M.C.A**  
**Academic Year -2024-2025 (Semester –I)**

Course Code	Course	Teaching Scheme				Credit C	Examination Scheme				Total Marks	Ownership
		L	T	P	Hr		ISE	MSE	ESE	TW		
MCA241101T	Data Structure with C++	3	-	-	3	3	20	30	50	-	100	MCA Department
MCA241101L	Data Structure with C++	-	-	4	4	2	ICSE:60		40	-	100	MCA Department
MCA241102T	Advance Database Management System	3	-	-	3	3	20	30	50	-	100	MCA Department
MCA241102L	Advance Database Management System	-	-	4	4	2	ICSE:60		40	-	100	MCA Department
MCA241103T	Core Java	3	-	-	3	3	20	30	50	-	100	MCA Department
MCA241103L	Core Java	-	-	4	4	2	ICSE:60		40	-	100	MCA Department
MCA241104T	Computer Networks	3	-	-	3	3	20	30	50	-	100	MCA Department
MCA241105T	Object Design & Agile Development	3	-	-	3	3	20	30	50	-	100	MCA Department
HS241101L	Language Proficiency-I (ENGLISH) ,									-		Humanities
HS241102L	(GERMAN)	-	-	2	2	1	ICSE:30		20		50	
HS241103L	(JAPANESE)											
MCA241106L	MOOC	-	-	2	2	1	ICSE:30		20	-	50	MCA Department
	Bridge Course					Non-credit course						
<b>Total</b>		<b>15</b>	<b>-</b>	<b>16</b>	<b>32</b>	<b>23</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>900</b>	

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**Academic Year -2024-2025 (Semester –II)**

Course Code	Course	Teaching Scheme				Credit C	Examination Scheme				Total Marks	Ownership
		L	T	P	Hr		ISE	MSE	ESE	TW		
MCA241201T	Advance JAVA Programming(Mini Project)	3	-	-	3	3	20	30	50	-	100	MCA Department
MCA241201L	Advance JAVA Programming(Mini Project)	-	-	4	4	2	ICSE:60		40	-	100	MCA Department
MCA241202T	Python Programming	3	-	-	3	3	20	30	50	-	100	MCA Department
MCA241202L	Python Programming	-	-	4	4	2	ICSE:60		40	-	100	MCA Department
MCA241203T	Web Design Technology(Mini Project)	3	-	-	3	3	20	30	50	-	100	MCA Department
MCA241203L	Web Design Technology(Mini Project)	-	-	4	4	2	ICSE:60		40	-	100	MCA Department
MCA241204T	Optimization Technique	3	-	-	3	3	20	30	50	-	100	MCA Department
MCA241205T	Elective-I	3	-	-	3	3	20	30	50	-	100	MCA Department
HS241206L	IKS	-	-	4	4	2	ICSE:60		40	-	100	MCA Department
MCA241207L	Professional communication Skills	-	-	2	2	1	ICSE:30		20	-	50	MCA Department
<b>Total</b>		<b>15</b>	<b>-</b>	<b>18</b>	<b>33</b>	<b>24</b>			<b>470</b>	<b>-</b>	<b>950</b>	

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Professional Elective I		Professional Elective I	
Course Code	Course Name	Cours	Course Name
MCA241205A	Internet Of Things	MCA241205E	Block Chain Technology
MCA241205B	Design and Analysis of Algorithm	MCA241205F	Big Data Analytics
MCA241205C	Cyber Security and Cyber Law	MC A241205G	Entrepreneurship Development
MCA241205D	Dev Ops		

**S. Y. M.C.A**  
**Academic Year -2024-2025 (Semester –III)**

Course Code	Course	Teaching Scheme				Credit C	Examination Scheme				Total Marks	Ownership
		L	T	P	Hr		ISE	MSE	ESE	TW		
MCA242101T	Research Methodology	3	-	-	3	3	20	30	50	-	100	MCA Department
MCA242102T	Elective-II(Mini Project)	3	-	-	3	3	20	30	50	-	100	MCA Department
MCA242102L	Elective-II(Mini Project)	-	-	4	4	2	ICSE:60		40	-	100	MCA Department
MCA242103T	Emerging Software Testing and Tools	3	-	3	3	3	20	30	50	-	100	MCA Department
MCA242103L	Emerging Software Testing and Tools	-	-	2	2	1	ICSE:30		20	-	50	MCA Department
MCA242104T	Principles & practices of Management & Organization Behaviour	3	-	-	3	3	20	30	50	-	100	MCA Department
MCA242105T	Cloud Computing	3	-	-	3	3	20	30	50	-	100	MCA Department
MCA242106L	Research Project	-	-	6	6	6	ICSE:60		40	100	200	MCA Department
HS242107L	Universal Human Values	-	-	2	2	1	ICSE:30	20			50	Humanities
<b>Total</b>		<b>15</b>	<b>-</b>	<b>17</b>	<b>29</b>	<b>25</b>					<b>900</b>	

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Professional Elective II		Professional Elective II	
Course Code	Course Name	Course	Course Name
MCA242102A	Advance Development Technology	MCA242102D	Framework – Springboot
MCA242102B	Mobile Application Development	MCA242102E	Framework – React JS
MCA242102C	Artificial Intelligence and Machine Learning	MCA242102F	Data Science

**S. Y. M.C.A**  
**Academic Year -2024-2025 (Semester –IV)**

Course Code	Course	Teaching Scheme				Credit	Examination Scheme				Total Marks	Ownership
		L	T	P	Hr		C	ISE	MSE	ESE		
MCA242201	Self-Learning Course		-	-	-	2	ICSE:60		40		100	MCA Department
MCA242202	Industrial Internship		-	-	-	12	ICSE:200		200		400	MCA Department
<b>Total</b>		-	-	-	-	14					500	

	Total marks	Credits
<b>Sem I</b>	900	23
<b>Sem II</b>	950	24
<b>Sem III</b>	900	25
<b>Sem IV</b>	500	14
<b>Total</b>	<b>3250</b>	<b>86</b>

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**Abbreviations:**

**L** – Lecture, **T** – Tutorial, **P** – Practical, **Hr** – Hours, **C** – Credits, **TuT** – Tutorial, **ISE** – In Semester Evaluation, **MSE** – Mid Semester Evaluation, **ESE** – End Semester Evaluation

**Notes:**

For Theory courses: There shall be MSE, ISE and ESE. The ESE is a separate head of passing.

For Lab courses: There shall be continuous assessment (ISCE consists of ISE and MSE). The ESE is a separate head of passing.

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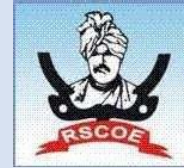
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F. Y. MCA

Academic Year – 2024-2025 Semester -I

[MCA241101T]: Data Structure with C++

<b>Teaching Scheme:</b> TH: - 03 Hours/Week	<b>Credit</b> TH: 03	<b>Examination Scheme:</b> In Sem. Evaluation : 20 Marks Mid Sem. Exam : 30 Marks End Sem. Exam : 50 Marks Total : 100 Marks
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**Course Prerequisites: C programming and Fundamental Data Structure**

**Course Objective:**

1. To develop programming skill and to solve engineering related problems using Object Oriented Programming Concepts.
2. To acquire the knowledge fundamentals of various data structures and algorithms.
3. To understand and analyze various Searching and Sorting techniques to solve the problems.

**Course Outcome:**

After successful completion of the course, students will able to:

- CO1: Understand the foundational concepts of Object-Oriented Programming (OOP), such as classes, objects, inheritance, and polymorphism, and how they enhance code modularity and reusability.
- CO2: Demonstrate the ability to create and manipulate objects in C++ by implementing constructors, destructors, and member functions effectively.
- CO3: Implement operator overloading and inheritance hierarchies, including virtual functions, to achieve polymorphism and dynamic binding in C++ applications.
- CO4: Understand and manage file I/O operations and exception handling mechanisms to write robust and error-handling C++ programs .
- CO5: Implement linear and non-linear data structures, such as stacks, queues, linked lists, and binary search trees, using C++ to solve complex computational problems .

**Course Contents**

UNIT-I	Introduction to OOPs concept and programming in C++	08 Hours
Object and Classes, Features of Object Oriented Programming, Data abstraction and encapsulation, Inheritance, Polymorphism, Dynamic Binding, Resilience to change, Reusability of Code, Modularity of Code, Data Types in C++, Operator and Expression Decision making and Branching Statement strings representation, string manipulation. Modular programming: Classes, Object and Methods: Class Fundamentals, Declaring and Creating object, Accessing class, members and methods. Subclasses, scope of the function. Object initialization and Clean up: Constructor, parameterized Constructor, Constructor Overloading, Destructors order of construction and destruction, Static Member with constructors and destructors.		

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UNIT-II	Polymorphism & Inheritance	08 Hours
<p>Introduction, overloadable operators, unary operator overloading, operator keyword, binary operator overloading, concatenation of strings, comparison operator, assignment operator overloading, overloading of new and delete data conversion.</p> <p>Virtual Functions: Need for virtual functions, pointer to derived class objects, abstract classes, dynamic binding, virtual destructor, friend function</p> <p>Inheritance: Defining a subclass, forms of inheritance, inheritance and member accessibility, constructor and destructor in derived class, overloaded member functions, Multilevel inheritance, Multiple Inheritance, Hybrid Inheritance, Hierarchical inheritance.</p>		
UNIT-III	File I/O Streams and Exception handling	06 Hours
<p>Files: Stream Classes, Character Stream, Byte Stream, Using Stream I/O, Serialization Exception handling: Exception Handling Fundamentals, The try Block, the catch Exception Handler The try/throw/catch sequence, Uncaught Exception</p>		
UNIT-IV	Linear Data Structure	06 Hours
<p>Data Structure, Implementation of Data Structure, Fundamentals of Arrays and linked lists, Basics and implementation of Stacks, Queues.</p>		
UNIT-V	Non-Linear Data Structure	06 Hours
<p>Binary Tree, Binary Tree Representation, Binary Search Tree (BST), Creating a BST, Binary Search Tree Traversal, Preorder, post order, In-order Traversal, AVL tree, introduction to B+, B* tree, Graph, Adjacency Matrix Adjacency List.</p>		
UNIT-VI	Searching techniques	04 Hours
<p>Searching: Linear search and Binary search</p>		
<p><b>Text Books:</b>  <b>T1:</b> Object-Oriented Programming with C++, E. Balaguruswamy Tata McGraw Hill 4th Edition 2002  <b>T2:</b> Data Structures Using C ++ by Malik D S</p>		
<p><b>Reference Books:</b>  <b>R1.</b> Mastering, C++, T. Rajkumar, K.R Venugopal, T Ravikumar Tata McGraw Hill 1stEdition 2012.  <b>R2.</b> C++ Complete Reference, Herbert Schildt, Tata McGraw Hill, 4th Edition 2003.  <b>R3.</b> C++ and Object-Oriented Programming Paradigm, Debasish Jana, PHI, 3rd Edition, 2005  <b>R4.</b> Data Structures Using C ++ by Malik D S  <b>R5.</b> Practical Approach to Data Structures by Hanumanthappa  <b>R6.</b> Data Structure Using C++ by Kasiviswanath N.</p>		

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F. Y. MCA  
 Academic Year 2024-2025 Semester -I  
 [MCA241101L]: Data Structure with C++

<b>Teaching Scheme:</b> PR: - 04 Hours/Week	<b>Credit</b> PR: 02	<b>Examination Scheme:</b> I C S E : 60 Marks End Sem. Exam : 40 Marks Total : 100 Marks
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**Guidelines for Assessment**

Continuous assessment of laboratory work is done based on overall performance and Laboratory assignments performance of student. Each Laboratory assignment assessment will assign grade/marks based on parameters with appropriate weightage. Suggested parameters for overall assessment as well as each Laboratory assignment assessment include- timely completion, performance, innovation, efficient codes, punctuality and neatness.

**Course Objective:**

1. Introduce students to the principles of Object-Oriented Programming (OOP) using C++, emphasizing the design and implementation of modular, reusable code.
2. Familiarize students with file handling, I/O operations, and exception handling to develop robust and efficient programs.
3. Enable students to implement and manipulate fundamental data structures such as arrays, linked lists, stacks, queues, and trees using C++.
4. Develop the ability to implement and analyze searching and sorting algorithms, and apply them to large datasets in practical applications.

**Course Outcome:**

After successful completion of the course, students will able to:

CO1: Demonstrate the ability to design and implement C++ programs using fundamental OOP concepts like classes, objects, constructors, and destructors

CO2: Implement operator overloading, inheritance hierarchies, and polymorphism to create efficient and flexible C++ programs.

CO3: Apply file I/O operations and exception handling techniques in practical applications to handle data streams and ensure program reliability

CO4: Understand and implement linear and non-linear data structures (e.g., stacks, queues, linked lists, binary trees) in C++ for solving computational problems

CO5: Develop and analyze search techniques (e.g., linear and binary search) and sorting algorithms in C++, demonstrating efficiency in handling data structures

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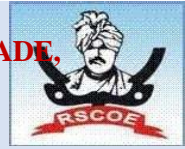
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**List of Laboratory Assignments/Experiments (to be covered)**

1	Fundamental Programming with Classes, Object and Methods using C++
2	Programming with Object initialization and Clean up
3	Implementation of virtual function, friend function
4	Demonstration of Inheritance concepts.
5	Use of input output streams using file handling.
6	Implementation of Data Structure using Arrays
7	Data Structure Implementation by linked lists
8	Basics and implementation of Stacks and Queues,
9	Implementation of advance data structure concept trees and graphs
10	Programming with Searching techniques

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**F. Y. MCA**

**Academic Year – 2024-2025 Semester-I**

**[MCA241102T]: Advance Database Management System**

<b>Teaching Scheme:</b> TH: - 03 Hours/Week	<b>Credit</b> TH: 03	<b>Examination Scheme:</b> In Sem. Evaluation : 20 Marks Mid Sem. Exam : 30 Marks End Sem. Exam : 50 Marks Total : 100 Marks
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**Course Objective:**

1. Creation of Database and functions of Database Management System.
2. Database models, SQL and database operations, this creates a strong foundation for application database design.
3. Making aware of current databases used in industry.

**Course Outcome:**

After successful completion of the course, students will able to:

- CO1.** Develop conceptual schema of database using conceptual model. Implement logical scheme of database.
- CO2.** Create and manage database with all integrity constraints. Perform various DDL and DML operations.
- CO3.** Refine the scheme of database by applying normal forms.
- CO4.** Implement the transaction management protocols and crash recovery algorithms. Create views, procedures, functions and triggers on databases.
- CO5.** Implementation of crash recovery and backup by using various previliages
- CO6.** Create and manage NoSQL database, perform basic operations.

**Course Contents**

UNIT-I	Introduction to Database Management System	7 Hours
Database system applications, Database system vs file system, data abstraction, database users, Database system structure, Database design and ER diagram, ER design – Entities, attributes Entity sets, Relationship sets, additional features of ER model.		
UNIT-II	Relational model	8 Hours
Integrity constraints, Database languages, DDL,DML,Basic form of SQL query, Querying relational data , logical database design, views, Destroying and creating tables/views, queries, sub queries, nested queries, null values, relational algebra- selection, projection, renaming, join examples.		
UNIT-III	Normalization	8 Hours

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Comparison of File Organizations, types with examples, problems caused by redundancy, decomposition ,reasoning about FDS – FIRST, SECOND,THIRD Normal forms , BCNF Lossless decomposition.

<b>UNIT-IV</b>	<b>Graph based database</b>	<b>6 Hours</b>
Graph based database: What is graph based database, comparison of relational and graph based database.GraphDB vs. NOsql. Overview of open source graph database like Neo4g etc. APIs and graph query- programming languages. Databases on the Web and Semi Structured Data: Introduction, Structure of XML Data.		
<b>UNIT-V</b>	<b>Object Oriented Database</b>	<b>5 Hours</b>
. Object oriented data base: Overview of Object–Oriented Concepts. Object Identity, Object Structure, and Type Constructors, Encapsulation of Operations, Methods, and Persistence, Type Hierarchies and Inheritance, Type extents and Queries, Complex Objects; Database Schema.		
<b>UNIT-VI</b>	<b>Parallel Databases</b>	<b>4 Hours</b>
Parallel databases: introduction, Parallel database architecture, speedup, scale-up I/O parallelism, Interquery and Intra-query parallelism, Inter-operational and Intra-operational parallelism, parallel query evaluation, Design of parallel systems, Implementation issues of Parallel query evaluation, Design of parallel systems, Comparison of Inter-query and Intra-query parallelism		

**Text Books:**

- T1.** AviSilberschatz, Henry F. Korth, S. Sudarshan, Database System Concepts, Sixth Edition  
**T2.** Introduction to Database Systems, C,J Date, 8/e , Pearson, 2008.

**Reference Books:**

- R1.** Alexis Leon, Mathews Leon, (leon press), Database Management System.  
**R2.** Database Management Systems, :Raghurama Krishnan and Johannes Geherke, TMH 3rd.  
**R3.** Database System Concepts, Avi Silberschatz, Henry F. Korth, S. Sudarshan, 5/e.  
**R4.** Database Management Systems, Elmsari Navathe, 5/e,Pearson,2005  
**R5.** Database Management Systems, Majumdar, Bhattacharyya, TMH, 96  
**R6.** Data base System Concepts, Peter ROB, Coronel , Cengage.

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**F. Y. MCA**  
**Academic Year – 2024-2025 Semester-I**

**[MCA241102L]: Advance Database Management System**

<b>Teaching Scheme:</b> <b>PR: -04 Hours/Week</b>	<b>Credit</b> <b>PR: 02</b>	<b>Examination Scheme:</b> <b>ICSE : 60 Marks</b> <b>End Sem. Exam : 40 Marks</b> <b>Total Marks : 100 Marks</b>
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**Course Objective:**

1. Creation of database .
2. To explore the relational database and implement CRUD Operation using SQL.
3. To gain a knowledge of No-SQL databases.
4. To enhance schema design skills .
5. To gain knowledge of object oriented database.

**Course Outcome:**

After successful completion of the course, students will able to:

- CO1 Apply Demonstrate Basics of database concepts.
- CO2 Apply Demonstrate CRUD Operation using SQL.
- CO3 Apply Demonstrate database concepts using MYSQL .
- CO4 Apply Demonstrate database concepts using Neo4j
- CO5 Apply Demonstrate Object oriented database concepts.

**Guidelines for Assessment**

Continuous assessment of laboratory work is done based on overall performance and Laboratory assignments performance of student. Each Laboratory assignment assessment will assign grade/marks based on parameters with appropriate weightage. Suggested parameters for overall assessment as well as each Laboratory assignment assessment include- timely completion, performance, innovation, efficient codes, punctuality and neatness.

**List of Laboratory Assignments/Experiments (minimum -- to be covered)**

<b>1</b>	Introduction to SQL – DDL, DML, DTL basic data types.
<b>2</b>	Create Database, select database, Drop database
<b>3</b>	Create Table, Drop table, Insert Query, Select Query
<b>4</b>	Operators, Expressions, where clause, AND & OR clauses.
<b>5</b>	Update Query/Delete Query, Like clause, Limit Clause

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6	Order By, Group By, With Clause, Having Clause, Distinct keyword
7	Constraints, Joins, Union Clause, NULL Clause, Alias Syntax
8	Alter Command, Truncate Table, Transactions Locks, Sub Queries, Auto increment, Privileges
9	Functions : Date & Time, String, Functions, Aggregate Functions.
10	Synonym: Introduction , Create, Synonym as alias for table & view, drop
11	Sequence: Introduction , alter sequence, drop
12	View: Introduction, types, alter, drop.
13	Index: Introduction, types, alter, drop.
14	Queries, Sub Queries and nested queries. Basic operations on open source NoSQL database
15	Primary introduction to DBA- User create, alter user, Grant, Revoke
16	Introduction to graphs based query language using neo4j, implementation of graph queries.
17	MySQL database - creation and manipulation.
18	Creation of ER model.
19	Implement the database using MySQL and manipulate tables.
20	Converting the ER model to schema diagram.
21	Object oriented database and queries

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**MCA**  
**Academic Year – 2024-2025 Semester -I**  
**[MCA241103T]: Core JAVA**

<b>Teaching Scheme:</b> TH: -Hours / Week: 03	<b>Credit</b> TH: 03	<b>Examination Scheme:</b> In Sem. Evaluation: 20 Marks Mid Sem. Exam : 30 Marks End Sem. Exam : 50 Marks Total Marks : 100 Marks
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**Course Prerequisites:** Object Oriented Programming

**Course Objective:**

1. To familiarize students with the concepts of OOPs.
2. To enable the students to understand the principles of inheritance and polymorphism; and demonstrates how they relate to the design of abstract classes.
3. To enable the students to understand the core principles of the Java Language and use AWT and Swing tools to produce well designed, effective applications.
4. Students will be able to develop Multithreaded application using multithreading and collection framework.

**Course Outcome:**

**After successful completion of the course, students will able to:**

- CO1: The concept of Object-Oriented Programming to map and solve simple real world problem  
 CO2: To design and develop robust, efficient Java applications using packages and interfaces  
 CO3: To design and develop robust, efficient and scalable Java applications using exception handling.  
 CO4: To develop Web application using Graphical User Interface AWT and Swing.  
 CO5: To design and develop robust multithreaded and scalable Java applications using multithreading.  
 CO6: To design and develop robust and efficient Java applications using collection Framework.

**Course Contents**

UNIT-I	Object oriented thinking and Java Basics	07 Hours
Need for oop paradigm, summary of oop concepts, History of Java, Java buzzwords, data types, variables, scope and life time of variables, arrays, operators, expressions, control statements, type conversion and casting, simple java program, concepts of classes, objects, constructors, methods, access control, this keyword, using final with variables, garbage collection, overloading methods and constructors, nested and inner classes, exploring string class.		

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<b>UNIT-II</b>	<b>Inheritance, Packages &amp; Interfaces</b>	<b>06 Hours</b>
<p>Inheritance: Hierarchical abstractions, Base class object, subclass, subtype, substitutability, forms of inheritance- specialization, specification, construction, extension, limitation, combination, benefits of inheritance, costs of inheritance. Member access rules, super uses, using final with inheritance and methods, polymorphism- method overriding, abstract classes, the Object class.</p> <p>Packages: Defining, Creating and Accessing a Package, Understanding CLASSPATH, importing packages. Interfaces: differences between classes and interfaces, defining an interface, implementing interface, applying interfaces, variables in interface and extending interfaces.</p>		
<b>UNIT-III</b>	<b>Exception handling</b>	<b>05 Hours</b>
<p>Exception handling: Concepts of exception handling, benefits of exception handling, Termination or presumptive models, exception hierarchy, usage of try, catch, throw, throws and finally, built in exceptions, creating own exception sub classes. String handling,</p>		
<b>UNIT-IV</b>	<b>Event Handling &amp; Swing</b>	<b>07 Hours</b>
<p>Event Handling: Events, Event sources, Event classes, Event Listeners, Delegation event model, handling mouse and keyboard events.</p> <p>Swing: Introduction, limitations of AWT, components, containers, exploring swing-JApplet, JFrame and JComponent, Icons and Labels, text fields, buttons – The JButton class, Check boxes, Radio buttons, Combo boxes, Tabbed Panes, Scroll Panes, Trees, and Tables. Handling menus, graphics, layout manager – layout manager types – border, grid, flow, card .</p>		
<b>UNIT-V</b>	<b>Multithreading</b>	<b>05 Hours</b>
<p>Multithreading: Differences between multi-threading and multitasking, thread life cycle, creating threads, thread priorities, synchronizing threads, inter-thread communication, thread groups.</p>		
<b>UNIT-VI</b>	<b>Java Collection Framework</b>	<b>8 Hours</b>
<p>Collections Overview: The Collection Interfaces</p> <ol style="list-style-type: none"> <li>a. Collection Interface, List Interface, Set Interface,</li> <li>b. Sorted Set Interface</li> <li>c. The Collection Classes</li> <li>d. Array List Class, Linked List Class, Hash Set Class, Tree Set Class</li> <li>e. Accessing a Collection via an Iterator The Map Interfaces</li> <li>f. Map Interface, Sorted Map Interface</li> <li>g. The Map Classes</li> <li>h. Hash Map, Tree Map The Legacy Interfaces</li> <li>i. Enumeration Interface</li> <li>j. The Legacy Classes Vector, Stack Hash table</li> </ol>		

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**Text Books:**

**T1.** Programming with Java, A Primer E. Balguruswami, McGraw-Hill, 4th Ed.

**T2.** Object oriented programming with java, Essentials and applications, McGraw Hill publications

**Reference Books:**

**R1.** Just Java by Peter Van der Linden

**R2.** OOP with Java An ultimate Tutorial by Jaffry A Borrer,

**R3.** Java 6 Programming Black Book By Kogent Solution Inc, dreamTech Pub

**R4.** Core Java 2 Volume - I Cay S Horstmann, Fary Cornell, Sun Microsystems Press

**R5.** Core Java 2 Volume - II Cay S Horstmann, Fary Cornell, Sun Microsystems Press

**R6.** Rajkumar Buyya, S Thamarai Selvi, Xingchen Chu

**R7.** A programmer's Guide to java SCJP certification, Pearson, Khalid A. Mughal, Rolf W.A Rasmussen

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**MCA**  
**Academic Year – 2024-2025 Semester -I**  
**[MCA241103L]: Core JAVA**

<b>Teaching Scheme:</b>  <b>TH: -Hours / Week: 04</b>	<b>Credit</b>  <b>TH: 02</b>	<b>Examination Scheme:</b>  <b>ICSE : 60 Marks</b> <b>End Sem. Exam: 40 Marks</b>  <b>Total : 100 Marks:</b>
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**Course Objectives:**

1. To implement foundation of Object Oriented Concepts
2. To implement Exception Handling Mechanism
3. To design and develop web application using Swing and AWT
4. To implement Collection Framework

**Course Outcome:**

- CO1 : Demonstrate fundamental concepts of Java.  
 CO2: Design and implement classes and objects in Java, applying principles of inheritance, polymorphism, encapsulation, and abstraction.  
 CO3: Design and implement classes and object in java applying multithreading concept and collection Framework.  
 CO4: Develop web applications using Swing.


**Guidelines for Assessment**

Continuous assessment of laboratory work is done based on overall performance and Laboratory assignments performance of student. Each Laboratory assignment assessment will assign grade/marks based on parameters with appropriate weightage. Suggested parameters for overall assessment as well as each Laboratory assignment assessment include- timely completion, performance, innovation, efficient codes, punctuality and neatness.

**List of Laboratory Assignments/Experiments (minimum to be covered)**

1. Fundamental JAVA Programming assignments based on class,
2. Implementation of various Inheritance types.
3. Abstraction feature demonstration,
4. Achieving the functionality of Encapsulation.
5. Demonstrate the feature of Dynamic binding,
6. Polymorphism feature implementation,
7. Handling the feature of streams related to I/O systems,

  
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F. Y. MCA  
 Academic Year 2024-2025 Semester-I  
 [MCA241104T]: Computer Networks

<b>Teaching Scheme:</b> TH: - 03 Hours/Week	<b>Credit</b> TH: 03	<b>Examination Scheme:</b> In Sem. Evaluation : 20 Marks Mid Sem. Exam : 30 Marks End Sem. Exam : 50 Marks Total : 100 Marks
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- Course Objective:**
- To get familiar with basics of networking concepts, functions of various layers in networking architecture.
  - To know the basics of transmission techniques and media used in networking environments.
  - To Understand the components used in networking and different protocols.
  - It explains about DNS and network management protocols.
  - To acquire the knowledge about network security.

**Course Outcome:**  
 On completion of the course, student will be able to–  
 CO1: Describe the basic knowledge of transmission media, modes, network topologies and working of various layers in ISO/OSI, TCP/IP reference model .  
 CO2: Compare different network architectures.  
 CO3: Implements concepts of IP addressing , sub-netting and routing mechanism.  
 CO4: Describe basics concepts DNS, DHCP and Transport layer protocols.  
 CO5: Compares various network security mechanism/ protocols..

<b>Course Contents</b>		
<b>UNIT-I</b>	<b>Introduction</b>	<b>7 Hours</b>
Need of computer communication, Goals of communication system/Networking, Transmission Modes, Transmission Media: Guided: Twisted Pair, Coaxial and Fiber-Optic Cables, Unguided Media: Radio, VHF, Micro Waves and Satellite, Topologies: Star, Mesh, Bus etc., Multichannel Data Communication: Message, Circuits, Packets (Connection Oriented vs Connectionless Services) Components of LAN, WAN, MAN, Multiplexing: FDM, TDM, WDM, Protocol Layering: ISO/OSI Reference Model		
<b>UNIT-II</b>	<b>Common Network Architecture</b>	<b>5 Hours</b>
X.25 Networks, Ethernet (Standard and Fast): frame format and specifications, Wireless LAN's – 802.11x, 802.3 Bluetooth etc.		
<b>UNIT-III</b>	<b>IP Addressing and Routing</b>	<b>7 Hours</b>

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IPv4 addresses – Network and Host part, Network Masks, Network addresses and Broadcast addresses, Sub-net Masking, Super Net Masking, Numerical based on IP Address, Address Classes, IPv4 Structure, IP Routing concept, Routing Table, IPv6 Structure.

<b>UNIT-IV</b>	<b>Transport Layer Services</b>	<b>5 Hours</b>
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Transport Services, Elements of Transport Protocols, Connection Management, TCP and UDP Protocols

<b>UNIT-V</b>	<b>Application Layer</b>	<b>7 Hours</b>
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DNS and DNS Servers, Electronic Mail: Architecture and Services, Message Format, MIME, Message transfer, SMTP, Mail Gateways, FTP, WWW: Introduction, Static and Dynamic web pages, www pages and browsing, HTTP request and response, Basics of DHCP

<b>UNIT-VI</b>	<b>Network Security</b>	<b>5 Hours</b>
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Threat: Active and Passive Attacks, Cryptography: Symmetric and Asymmetric Key Cryptography, Digital Signature, Firewall

**Note:** Demo of Microsoft Windows, Network Configurations, Install and Configure Network Cabling, Troubleshoot Networks, Cloud Concepts: Various Services of Cloud.

**References:**

- R1. Computer Networks by Andrew S. Tanenbaum 4ed
- R2. Data Communication and Networking by Behroz A. Forouzan, TMH, 4 ed.
- R3. Cryptography and Network Security by Atul Kahate, TMH 2 ed.
- R4. Cryptography and Network Security by William Stalling
- R5. Computer Networks and Internets with Internet Applications by Douglas E. Comer
- R6. Data and Computer Communication by William Stallings 9 ed., Pearson Education, 2007
- R7. Network Security by Ankit Fadi

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**Academic Year – 2024-2025 Semester-I**

**[MCA241105T]: Object Design & Agile Development**

<b>Teaching Scheme:</b> TH: -Hours/Week : 03	<b>Credit</b> TH: 03	<b>Examination Scheme:</b> In Sem. Evaluation :20 Marks Mid Sem. Exam : 30 Marks End Sem. Exam : 50 Marks Total : 100 Marks
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**Course Prerequisites:** Software Engineering Fundamentals

**Course Objective:**

1. Analyze and evaluate system development life cycles and models.
2. Design and develop software requirements specifications and object-oriented models.
3. Explain and apply Agile principles, mindset, and methodologies.
4. Create and interpret behavioral models and architectural models.

**Course Outcome:**  
**After successful completion of the course, students will able to:**

CO1: Define and explain the system development life cycle and models.  
 CO2 : Design and implement object-oriented systems using UML.  
 CO3 : Apply agile principles to develop software solutions.  
 CO4 : Analyze and create behavioral and architectural models for software systems .  
 CO5 : Evaluate and select appropriate software development methodologies .  
 CO6: Develop effective software solutions through collaboration and communication.

**Course Contents**

<b>UNIT-I</b>	<b>System Development Life Cycle and Models</b>	<b>4 Hours</b>
System Development Life Cycle, Different approaches and models for System Development: Prototyping, Spiral (including WIN-WIN Spiral), RAD, Software requirement Specification (SRS), IEEE Format - Case study: SRS, Reverse Engineering, Maintenance.		
<b>UNIT-II</b>	<b>Object Oriented UML</b>	<b>5 Hours</b>
Two views of software Developments: SSAD and OOAD, Rational Unified Process, Four Major phases:- Inception , Elaboration, Construction, Transition, Structural Modeling- Class Diagram, ObjectDiagram Case Study : Class Diagram and Object Diagram.		
<b>UNIT-III</b>	<b>Agile Principles and Mindset</b>	<b>6 Hours</b>
Why use agile, Knowledge work projects are different, Defined versus Empirical Processes, The Agile Mindset, Personal, Team and Organizational Agility, The Agile Triangle, The Agile Manifesto, The FourValue, The Twelve Principles		

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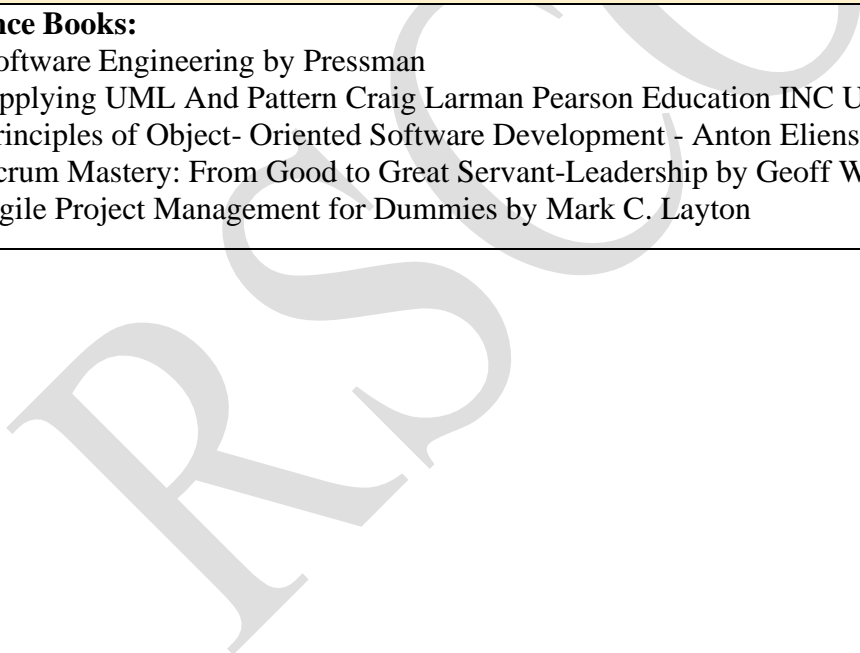
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<b>UNIT-IV</b>	<b>Agile Methodologies</b>	<b>5 Hours</b>
Scrum, Extreme Programming (XP), Lean Product Development, Kanban, Crystal		
<b>UNIT-V</b>	<b>Object Oriented Behavioral Modeling I</b>	<b>8 Hours</b>
Behavioral Modeling- Use Cases and Use Case Diagrams, Interaction Diagrams: Sequence Diagrams Case Study: Use Case diagram, Sequence diagram		
<b>UNIT-VI</b>	<b>Object-Oriented Behavioral Modeling II &amp; Architectural Modeling</b>	<b>8 Hours</b>
Behavioral Modeling- Interaction Diagrams cont: Collaboration Diagrams, Activity Diagrams, State chart Diagram. Architectural Modeling- Components & Component Diagrams, Deployment & Deployment Diagrams. Case Study: State chart diagram, Activity Diagram		
<b>Text Books:</b>		
T1: Software Engineering by Pressman		
T2: Applying UML And Pattern Craig Larman Pearson Education INC UML in Nutshell		
<b>Reference Books:</b>		
R1. Software Engineering by Pressman		
R2. Applying UML And Pattern Craig Larman Pearson Education INC UML in Nutshell		
R3. Principles of Object- Oriented Software Development - Anton Eliens , Addison Wesley		
R4. Scrum Mastery: From Good to Great Servant-Leadership by Geoff Watts		
R5. Agile Project Management for Dummies by Mark C. Layton		



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**F. Y. MCA**  
**Academic Year – 2024-2025 Semester-I**  
**[HS241101L]: Language Proficiency-I (ENGLISH)**

<b>Teaching Scheme:</b> PR: -Hours/Week : 02	<b>Credit</b> PR: 01	<b>Examination Scheme:</b> ICSE : 30 Marks ESE : 20 Marks Total : 50 Marks
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**Course Objective:**

- To enhance the systemic and specific knowledge and skills of the learners in the use of English language by improving their ability to listen, speak, read and write

**Course Outcome:**

**After successful completion of the course, students will able to:**

- CO1: Students will be able to Acquire knowledge of basic and fundamental grammar in English including reading and listening comprehension, writing and speaking skills.
- CO2: Construct different types of sentences using effective and new vocabulary to create good impression.
- CO3: Students will be able to write clearly, precisely and competently in different scenarios.
- CO4: Prepare the students to acquire structure and written expression required for their profession and enable them to acquire proper behavioral skills
- CO5: Students will be able to present themselves well in front of large audience on a variety of situations related to group communication and presentation in a relevant scenario. Moreover, they will get the knack for structured conversation to make their point of views clear to the listeners.

**Course Contents**

UNIT-I	Sentence Structure	05 Hours
Orientation, Parts of speech- Introduction to Noun, Pronoun, Verbs, Adverbs, Adjectives, Prepositions, Conjunctions, Interjections, Use present, past, and future tenses (2-3) with appropriate time markers Recognize present perfect, past perfect and future perfect tenses and their progressive forms Use perfect tenses with increasing accuracy.		
UNIT-II	Fundamentals of Communication (Vocabulary Building)	05 Hours
Vocabulary-Synonyms, Antonyms, Root words, Origin Prepositions- A preposition shows where, when or how the action took place in a sentence. Importance of proper punctuations, Idioms and Phrasal Verbs.		
UNIT-III	Nature and Style of Writing	02 Hours
E-mail Writing and etiquettes, Reading Comprehension-Reading and comprehending passages and figuring out the answers of given questions.		
UNIT-IV	Oral Communication	05 Hours

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Orientation about grooming, Fluency, body language, Non-verbal communication, Expressions, Group Discussion, Debate, Extempore- Orientation and Mock GD, Debate, Extempore rounds.

UNIT-V	Presentation	03 Hours
PPT presentation/ Poster making, group presentations to boost stage confidence and to inculcate team building skills, practice and implement communication skills practices to gain fluency while communicating.		

**List of Laboratory Assignments/Experiments (to be covered)**

1	Implementation of English including reading and listening comprehension, writing and speaking skills.
2	Defining different types of sentences using effective and new vocabulary to create good impression
3	Writing clearly, precisely and competently in different scenarios
4	Implementation of written expression required for their profession and enable them to acquire proper behavioral skills
5	Self-Introduction, Group Discussion

**Text Books:**

- T1. English for Engineers. Dr.K.Anbazhagan, Dr.B.Cauveri&Dr.M.P.Devika, Cengage Publications. 2016.
- T2. Dhanavel, S.P. English and Communication Skills for Students of Science and Engineering. Units 1-5.Chennai: Orient, .Blackswan Ltd., 2009.
- T3. Raman, Meenakshi and Sangeetha Sharama . Technical Communication-Principles and Practice. Oxford University Press. 2009.
- T4. Day, R A. Scientific English: A Guide for Scientists and Other Professionals. 2nd ed. Hyderabad: Universities Press, 2000

**Reference Books:**

- R1. K.R.Laxminarayanan, English for Technical Communication, Scitech, Sixth Edition, 2008
- R2: William Sanborn Pfeiffer ,T.V.S. Padmaja ,Technical Communication: A Practical Approach, Pearson, Sixth Edition 2012
- R3: A.K.Jain, Praveen Bhatia, A.M.Shaikh, Professional Communication Skills, S. Chand and Co: Fifth edition ,2009
- R4: Ashraf Rizvi ,Effective Technical Communication, Tata McGraw Hills publishing Company 2006
- R5: F.T.Wood,Remedial English Grammar, Macmillan, 2007
- R6: Andrea Rutherford, PhD. Basic Communication Skills for Technology, Pearson Education Asia,2001
- R7: Exercises in Spoken English, Parts 1 and II CIEFL, Hyderabad , Oxford University Press
- R8: Sanjay Kumar, Pushplata, Communication Skills, Oxford University Press, First edition, 2012

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**Dr. Rakesh Jain**  
Director



**F. Y. MCA**  
**Academic Year – 2024-2025 Semester-I**  
**[HS241102L]: Language Proficiency-I (German)**

<b>Teaching Scheme:</b> PR: -Hours/Week : 02	<b>Credit</b> PR: 01	<b>Examination Scheme:</b> ICSE : 30 Marks ESE : 20 Marks Total : 50 Marks
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**Course Objective:**

1. Introduction of Germany, Greetings, phrases, vocabulary,
2. Understanding of numbers till 100
3. Grammar- Introductory Sentence Formation, Articles, Pronouns, Tense, Prepositions, Question Formation

**Course Outcome:**  
**After successful completion of the course, students will able to:**  
 CO1: Students would know the basic information of Germany  
 CO2: Students would be familiar with the pronunciation of German letters and greetings  
 CO3: Students would be able to count till 100  
 CO4: Students would be able to introduce themselves  
 CO5: Students would be able to form basic questions

**Course Contents**

<b>UNIT-I</b>	<b>Start auf Deutsch: (Begin in German)</b>	<b>04 Hours</b>
Deutschland, Deutschsehen und hören, erste Kontakte, Texte: Lied, Postkarte, Wortfelder: internationale Wörter, deutsche Namen		
<b>UNIT-II</b>	<b>Café</b>	<b>04 Hours</b>
Gespräche im Café, Texte: Getränkekarte, Telefonbuch, Rechnungen, Wortfelder: Gespräche im Café, Zahlen bis 100, Strukturwörter		
<b>UNIT-III</b>	<b>Städte, Länder, Sprachen: (Cities, Countries, Languages)</b>	<b>02 Hours</b>
Sehenswürdigkeiten in Europa, Sprachen in Europa, Nachbarsprachen, Texte: Landkarten, ein Statistik, Wortfelder: Himmelsrichtungen, Sprachen		
<b>UNIT-IV</b>	<b>Menschen und Häuser: (People and Houses)</b>	<b>02 Hours</b>

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Orientation about grooming, Fluency, body language, Non-verbal communication, Expressions, Group Discussion, Debate, Extempore- Orientation and Mock GD, Debate, Extempore rounds.

**List of Laboratory Assignments/Experiments (to be covered)**

<b>1</b>	Pronunciations of various words in German
<b>2</b>	Greetings in German
<b>3</b>	Counting up to 100 in German
<b>4</b>	Introducing himself/herself in German
<b>5</b>	Formation of question in German

**Reference Books:**

**R1.** Funk, Kuhn, & Demme. Studio d A1. Deutsch als Fremdsprache. 2011. Goyal Publishers & Distributors Pvt. Ltd. Delhi, India

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**F. Y. MCA**  
**Academic Year – 2024-2025 Semester-I**  
**[HS241103L]: Language Proficiency-I (Japanese)**

<b>Teaching Scheme:</b> PR: -Hours/Week : 02	<b>Credit</b> PR: 01	<b>Examination Scheme:</b> ICSE : 30 Marks ESE : 20 Marks Total : 50 Marks
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**Course Objective:**

1. To meet the needs of ever-growing industry with respect to language support,
2. To get introduced to Japanese society and culture through language

**Course Outcome:**

**After successful completion of the course, students will able to:**

CO1: One will have ability of basic communication

**Course Contents**

<b>UNIT-I</b>	<b>Introduction to Japanese Language</b>	<b>04 Hours</b>
Hiragana basic Script, colors, Days of the week		
<b>UNIT-II</b>	<b>Hiragana</b>	<b>04 Hours</b>
Modified Kana, double consonant, Letters combined with ya, yu, yo Long vowels, Greetings and expression		
<b>UNIT-III</b>	<b>Self-Introduction, Introducing other person</b>	<b>04 Hours</b>
Numbers, Months, Dates, Telephone numbers, Stating one's age.		

**List of Laboratory Assignments/Experiments (to be covered)**

<b>1</b>	Pronunciations of various words in Japanese
<b>2</b>	Greetings in Japanese
<b>3</b>	Counting up to 100 in Japanese
<b>4</b>	Introducing himself/herself in Japanese
<b>5</b>	Formation of question in Japanese

**Reference Books:**

**R1.** Basic Connections: Making Your Japanese Flow by Kakuko Shoji

**R2:** Genki I: An Integrated Course in Elementary Japanese I - Workbook (English and Japanese Edition)  
Eri Banno

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**Academic Year – 2024-2025 Semester-I**  
**[MCA241106L]: Online Professional Training Courses**

<b>Teaching Scheme:</b> PR: -Hours/Week : 02	<b>Credit</b> PR: 01	<b>Examination Scheme:</b> ICSE : 30 Marks ESE : 20 Marks Total : 50 Marks
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**Course Objective:**  
 1. Certification of Students for knowledge and employability skills development.

**Course Outcome:**  
**After successful completion of the course, students will able to:**  
**CO1:** Have a knowledge of different certification platforms/resources  
**CO2:** Getting the Certification from the professional organization such as MOOC/  
 NPTEL/SWAYAM/ Coursera, Udemy, Spoken Tutorials  
**CO3:** Enhance the Employability.


**Course Contents**


**MOOC:**  
 A massive open online course (MOOC) is an online course aimed at unlimited participation and open access via the web. In addition to traditional course materials, such as filmed lectures, readings, and problem sets, many MOOCs provide interactive courses with user forums or social media discussions. The MOOC contains the organization like NPTEL/SWAYAM, Spoken Tutorials, Coursera, Udemy etc. These organizations contain many online courses.


**NPTEL/SWAYAM:**  
 It contains courses from different areas Such as Engineering, Management, Enterprenureship etc and soon. Under Computer engineering it contains courses like Scalable Data Science, Deep Learning, Cloud computing, Introduction to internet of things, Software Testing, Big Data Computing and So on,

**Spoken Tutorials:** It also contains the courses like courses from different areas Such as Engineering, Management etc. Under Computer engineering it contains courses like PHP, gateway, R, CAD etc and soon.

**Coursera:** It contains courses from different areas Such as Engineering, Management, Enterprenureship etc and soon. Under Computer engineering it contains courses like Java, C++, IoT,

  
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Linux, Block chain, Big Data etc.

**Udemy:** It contains courses from different areas Such as Engineering, Management, Enterpreneuship etc and soon. Under Computer engineering it contains courses like Java, C++, IOT, Linux, Block chain, Big Data etc

### Lab Contents

#### Guidelines for Assessment

Students are expected to choose one subject for certification. Self-learning Courses to be done as per the own choice from the different reputed organizations such as MOOC/ NPTEL/SWAYAM/Cousera/Udemy/Spoken Tutorials etc.

#### References:

- R1. <https://www.udemy.com>
- R2. <https://www.coursera.org>
- R3. <https://swayam.gov.in>
- R4. <https://spoken-tutorial.org/accounts/login/>

RSCOE

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**F.Y. MCA**  
**Academic Year – 2024-2025 Semester -II**  
**[MCA241201T]: Advance JAVA**

<b>Teaching Scheme:</b> TH: -Hours/Week : 03	<b>Credit</b> TH: 03	<b>Examination Scheme:</b> In Sem. Evaluation: 20 Marks Mid Sem. Exam : 30 Marks End Sem. Exam : 50 Marks Total : 100 Marks
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**Course Prerequisites: Core JAVA**

**Course Objective:**

1. Students will be able to develop server-side applications with database handling using servlets, JSP, JDBC.
2. Students will be able to develop server-side applications using MVC.

**Course Outcome:**

**After successful completion of the course, students will able to:**

- CO1:** To develop Client Server networking based application
- CO2:** To develop Web application for solving real life problem using Servlet
- CO3:** To develop Web application for solving real life problem using JSP,
- CO4:** To develop Web application for solving real life problem using JDBC
- CO5:** To develop application using Java Beans.
- CO6:** To develop robust web applications using Spring MVC.

**Course Contents**

UNIT-I	Networking with Java	06 Hours
Networking basics - Sockets, port- Proxy servers, java.net – networking classes and interfaces Implementing TCP/IP based Server and Client Datagrams – Datagram packet, Datagram server and client URL connections Multithreaded Chat Server Multithreaded socket Programming.		
UNIT-II	Servlet	06 Hours
J2EE Platform: Enterprise Architecture Styles, Containers and Technologies. Servlet overview: The Java web server – your first servlet – servlet chaining – server side includes- Session management – security – HTML forms – using JDBC in servlets.		

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UNIT-III	JSP	06 Hours
JSP: Introduction JSP-Examining MVC and JSP -JSP scripting elements & directives-Working with variables scopes-Error Pages - using Java Beans in JSP.		
UNIT-IV	JDBC	07 Hours
JDBC : Introduction to JDBC, JDBC Drivers, Packages related to JDBC, JDBC Data Sources, Retrieving Meta Information from database and Result set, Distributed Transactions and Row Set objects, Accessing a Database through Servlets and JDBC.		
UNIT-V	JAVA Beans	07 Hours
Java Beans: The software component assembly model- The java beans development kit- developing beans –using infobus - Glasgow developments - Application Builder tool- JAR files-Introspection- Bound Properties-Persistence-customizers - java beans API.		
UNIT-VI	MVC Architecture	06 Hours
What is MVC Architecture in Java. Advantages of MVC Architecture. Implementation of MVC using Java. MVC Architecture Layer. Example on MVC Architecture..		
<b>Text Books:</b>		
T1. Java Complete Reference PatricNaughton, Herbert Schildt, TMH,7th Ed. T2. Java unleashed,; Micheal Morrison		
<b>Reference Books:</b>		
R1. Beginning Java Networking Chad Darby, John Griffin & others R2. Complete Reference- J2EE Jim Keogh, TMH. R3. Inside Servlets Dustine R. Callway, Pearson pub. R4. Developing Java Servlets James Goodwill, Techmedia Pub. R5. Professional JSP Wrox press R6. Complete reference JSP, TMH. R7. Java Server Programming Vol-I Wrox press. R8. JDBC, Servlet and JSP, Black Book, Santosh Kumar K. Dremtech publication R9. Spring and Hibernate, Santosh Kumar K. Mc.Graw Hill Education R10. Spring Persistence with Hibernate, Ahmad Seddighi		

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**Academic Year – 2024-2025 Semester -II**  
**[MCA241201L]: Advance JAVA**

<b>Teaching Scheme:</b> PR: -Hours/Week : 04	<b>Credit</b> PR: 2	<b>Examination Scheme:</b> ICSE : 60 Marks End Sem. Exam : 40 Marks Total : 100 Marks
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<b>Course Prerequisites : Subject Name/Topic Name</b>
<b>Course Objective:</b> To design Client server application 1) To explore use of Java Servlets 2) To design and develop web application using JSP 3) To design a web application using JDBC and MVC


<b>Course Outcome:</b> <b>After successful completion of the course, students will able to:</b> CO1: Design Client Server Chat Application CO2: Develop dynamic web applications using Java Servlets. CO3: Develop dynamic web applications using Java Server Pages. CO4: Establish database connectivity using JDBC, execute SQL queries, handle result sets, and manage database transactions from Java applications. CO5: Develop application using Java Beans. CO6: Use spring MVC framework to build web application
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**Guidelines for Assessment**

Continuous assessment of laboratory work is done based on overall performance and Laboratory assignments performance of student. Each Laboratory assignment assessment will assign grade/marks based on parameters with appropriate weightage. Suggested parameters for overall assessment as well as each Laboratory assignment assessment include- timely completion, performance, innovation, efficient codes, punctuality and neatness.
1. Creation of servlet through the servlet programming concept
2. Develop JSP pages with programming.
3. Develop server side applications with database
4. Implementation of beans will be known.
5. Application of Frameworks will be made easy in web application development.

**Mini Project using JDBC, Servlet MVC**

  
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**F. Y. - MCA**  
**Academic Year – 2024-2025 Semester - II**  
**[MCA241202T]: Python Programming**

<b>Teaching Scheme:</b> TH: - Hours/Week : 03	<b>Credit</b> TH: 3	<b>Examination Scheme:</b> In Sem. Evaluation : 20 Marks Mid Sem. Exam : 30 Marks End Sem. Exam : 50 Marks Total : 100 Marks
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**Course Prerequisites : Subject Name/Topic Name**

**Course Objective:**

1. To learn and apply basic constructs of python such as data, operations, conditions, loops, data types.
2. To understand advance concepts of python and apply it for solving the complex problems.
3. To understand the development of real-world applications using OOP concepts in python.
4. To understand and implement the exception handling mechanism effectively.
5. To understand basic database concepts in python

**Course Outcome:**

**After successful completion of the course, students will able to:**

CO1: Learn and demonstrate the basic constructs of python such as data, operations, conditions, loops, data types.

CO2 Understand and implement the advance concepts of python and apply it for solving the complex problems

CO3: Develop Python programs that incorporate OOPS concept, regular expressions and exception handling mechanism for complex problem-solving and performance enhancement.

CO4: Develop programs that involve file handling, user-defined functions, and modular programming using Python packages.

CO5: Implement database operations and perform data analysis using Python's PostgreSQL integration.

**Course Contents**

UNIT-I	Introduction to Python	5 - Hours
What is Python and history of Python? Unique features of Python, Python-2 and Python-3 differences, First Python Program, Python Identifiers, Keywords and Indentation, Expressions and Statements, Operators and Operands in Python.(Arithmetic, relational and logical operators).Comments and document interlude in Python, Command line arguments, Getting User Input, Python Data Types, What are variables? Python Core objects and Functions, Number and Math's.		
<b>Conditional and Looping Construct-:</b> if - else statement and nested if – else while, for, use of range function in for, Nested loops, break, continue, pass statement, Use of compound expression in conditional constructs		

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<b>UNIT-II</b>	<b>List, Tuples, Dictionaries and Sets</b>	<b>6 Hours</b>
<p><b>List &amp; Tuples in Python</b>          Lists- Lists in Python, List functions and Methods, List Comprehensions and Lambda Expressions  <b>Tuples-</b> immutable concept, Ordered Sets with tuples, tuple functions.  <b>Python Dictionaries and Sets</b>  <b>Python Dictionaries:</b> Concept of key-value pair, creating, initializing and accessing the elements in a dictionary, Dictionary functions &amp; Methods  <b>Sets:</b> Python Sets Examples, Sets operation(Membership, union, intersection, difference, and symmetric difference, set method</p>		
<b>UNIT-III</b>	<b>Input &amp; Output in Python And Functions</b>	<b>7 Hours</b>
<p><b>Input and Output in Python:</b> Reading and writing text files, writing Text Files, Appending to Files and Challenge, Writing Binary Files Manually</p> <p><b>Functions:</b> Python user defined functions, Python packages functions, Defining and calling Function, The anonymous Functions, Python Modules &amp; Packages, Packages Importing * From a Package, Intra-package References, Packages in Multiple Directories, random, time and time module, dir() function, Built-In Function, invoking built in functions, python string and string built in functions.</p>		
<b>UNIT-IV</b>	<b>Python Object Oriented Concepts</b>	<b>7 Hours</b>
<p><b>Python Object Oriented:</b> Overview of OOPs, Creating Classes and Objects, Class and Instance Variables, Accessing attributes, Built-In Class Attributes, Python Scopes and Namespaces, Destroying Objects, inheritance and its types.</p>		
<b>UNIT-V</b>	<b>Python Regular Expressions and Exceptions Handling</b>	<b>7 Hours</b>
<p><b>Python Regular Expressions:</b> What are regular expressions? The match Function, search Function, Matching vs. searching, Search and Replace, Extended Regular Expressions, Wildcard.  <b>Exceptions Handling:</b> What is Exception? Syntax Errors, Handling an exception, Raising Exceptions, try....except...else, try-finally clause, Argument of an Exception, Python Standard Exceptions, User-Defined Exceptions.</p>		
<b>UNIT-VI</b>	<b>Database in Python and Data Analysis</b>	<b>6 Hours</b>
<p><b>PostgreSQL:</b> Python PostgreSQL Database Access, Install the PostgreSQL and other Packages, Create Database Connection, CREATE, INSERT, READ, UPDATE and DELETE Operation, DML and DDL Operation with Databases, Performing Transactions  <b>Numpy:</b> Introduction to numpy, Creating arrays, Using arrays and Scalars, Indexing Arrays, Array Transposition.  <b>Pandas:</b> What is pandas? Where it is used? Series in pandas</p>		

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**Text Books:**

T1. Gowrishankar S, Veena A, "Introduction to Python Programming", 1<sup>st</sup> Edition, CRC Press/Taylor & Francis, 2018. ISBN-13: 978-0815394372

**Reference Books:**

- R1.** Jake VanderPlas, "Python Data Science Handbook: Essential Tools for Working with Data", 1st Edition, O'Reilly Media, 2016. ISBN-13: 978-1491912058
- R2.** Aurelien Geron, "Hands-On Machine Learning with Scikit-Learn and TensorFlow: Concepts, Tools, and Techniques to Build Intelligent Systems", 1st Edition, O'Reilly Media, 2017. ISBN – 13: 978-1491962299.
- R3.** Wesley J Chun, "Core Python Applications Programming", 3rd Edition, Pearson Education India, 2015. ISBN-13: 978-9332555365
- R4.** Miguel Grinberg, "Flask Web Development: Developing Web Applications with Python", 2<sup>nd</sup> Edition, O'Reilly Media, 2018. ISBN-13: 978-1491991732.
- R5.** Learning Python By Mark Lutz, O'Reilly Publication
- R6.** Programming with python, A users Book, Michael Dawson, Cengage Learning
- R7.** Python Essential Reference, David Beazley, Third Edition Edition, O'Reilly Media, 2018. ISBN-13: 978-1491991732.
- R5.** Learning Python By Mark Lutz, O'Reilly Publication
- R6.** Programming with python, A users Book, Michael Dawson, Cengage Learning
- R7.** Python Essential Reference, David Beazley, Third Edition

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**F. Y. - MCA**  
**Academic Year – 2024-2025 SemesterII**  
**[MCA241202L]: Python programming**

<b>Teaching Scheme:</b> PR: -Hours / Week : 04	<b>Credit</b> PR: 2	<b>Examination Scheme:</b> ICSE : 60 Marks End Sem. Exam : 40 Marks Total : 100 Marks
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**Course Objective:**

1. To implement fundamental programming and OOPs concepts using Python
2. To enable students to implement real-world solutions using Python's control flow mechanisms (loops, if-else, nested loops) and error handling.
3. To teach students to handle files and perform input/output operations, and interact with databases using Python
4. To develop the ability to design Python programs using object-oriented principles and regular expressions to handle advanced programming tasks

**Course Outcome:**

**After successful completion of the course, students will able to:**

CO1: Demonstrate Basics of Python and OOPs concepts.

CO2: Implement Python data structures in practical scenarios to manipulate and process data efficiently.

CO3: Develop Python programs that incorporate functions, modules, and packages to create reusable and maintainable code.

CO4: Understand and apply Python's object-oriented programming (OOP) concepts to create and manipulate classes and objects in lab exercises.

CO5: Implement database operations such as CRUD using Python to connect and interact with a PostgreSQL database.

**Guidelines for Assessment**

Continuous assessment of laboratory work is done based on overall performance and Laboratory assignments performance of student. Each Laboratory assignment assessment will assign grade/marks based on parameters with appropriate weightage. Suggested parameters for overall assessment as well as each Laboratory assignment assessment include- timely completion, performance, innovation, efficient codes, punctuality and neatness.

**List of Laboratory Assignments/Experiments (minimum -- to be covered)**

1. Programs on Built-In Function, invoking built in functions, Math Functions

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2. Programs on Creating, initializing and accessing the elements of strings and string operators.
3. Demonstration of List, tuples, dictionary and sets using built in methods.
4. Programs on file operations such as reading and writing to text and binary files.
5. Program demonstration on python functions, modules, packages
6. Programs on object oriented concepts using real time examples.
7. Email, mobile, name and different validations programs using regular expression.
8. Programs on exception handling concepts in python
9. CRUD operations using PostgreSQL database.
10. Demonstration on various data analysis libraries.
11. Mini Project using Python and PostgreSQL database

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**F.Y.MCA**  
**Academic Year – 2024-2025 Semesters- II**  
**[MCA241102T]: WEB TECHNOLOGIES**

<b>Teaching Scheme:</b> TH:-03 Hours/Week	<b>Credit</b> TH:03	<b>Examination Scheme:</b> InSem.Evaluation : 20Marks Mid Sem. Exam : 30 Marks End Sem. Exam : 50 Marks Total : 100 Marks
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**Course Objective:**

1. To impart the design, development and implementation of Dynamic Web Pages.
2. To develop programs for Web using Scripting Languages.
3. To Design and implement dynamic websites with good sense of designing and latest technical aspects.

**Course Outcome:**

After successful completion of the course, students will able to:

- CO1: Student will able to design various term related web designing technology like HTML.
- CO2: Students will be able to apply Cascading Style Sheets on the HTML elements of web pages.
- CO3: Students will be able to Implement interactive and validate web page(s) using JavaScript.
- CO4: Students will be able to implement the event handling, web pages traversing using jQuery
- CO5: Design MVC based application with use of Angular JS concepts like, model, controller, Directives etc.
- CO6: Build Dynamic web site using server-side PHP Programming and Database connectivity.

**Course Contents**

UNIT-I	HTML 5	5 Hours
Introduction to HTML5, What Is HTML5? Features of HTML5, Introduction to Web 2.0 and Web 3.0, What Is The W3C?, What Is The WHATWG?, Getting Started With HTML5, Structure of a Web Page HTML5 DOCTYPE, Page Encoding, New And Updated Elements, New Attributes Deprecated Elements And Attributes, Audio and Video, The State of Web Audio And Video Based On Plug-in, Attributes And Methods, Understanding Audio/Video Events, HTML5 Canvas, Overview Of Graphics In The Browser, Canvas Vs. SVG, Using A Canvas, Forms, Working With Paths, Drawing Straight Lines, Drawing Circles Or Arcs, Drawing Text, Drawing Images, Understanding Transforms, Translation, Rotation, Scaling.		
UNIT-II	CSS3	7 Hours
Introducing CSS3, What is CSS3? , The History of CSS, Selectors and Pseudo Classes, Attribute Selectors, The Target Pseudo-Class, UI Element States Pseudo-Classes, Fonts and Text Effects, Fonts		

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on the Web, Font Services, The @font-face Rule, Colors, Gradients, Background Images, and Masks, Color, The Opacity Property, Backgrounds, Transitions, Transforms and Animations, Transitions and Transforms, Embedding Media, Video Formats, Styling Video.

<b>UNIT-III</b>	<b>JavaScript</b>	<b>7 Hours</b>
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Introduction to JavaScript, Types of Scripts with suitable example, Control and looping structure, Various Operators in JavaScript with Example, Array its Types, Event Handling with Example, Math, Date and String objects with Example, DOM Objects, Form Validation, Dynamic effect using JavaScript.

<b>UNIT-IV</b>	<b>jQuery</b>	<b>7 Hours</b>
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Intro to jQuery , Need of jQuery , Advantages of jQuery , JQuery versions , Features , Retrieving Page Content , Using selectors , Using filters , Child, visibility, and content filters in jquery , Manipulating Page Content , Creating, getting, and setting content , Manipulating attributes , Inserting content , Wrapping, replacing, and removing content, Methods in jQuery 4.5 Events in JQuery, Animation in JQuery , Plugins in JQuery .

<b>UNIT-V</b>	<b>Introduction to AngularJS</b>	<b>7 Hours</b>
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Angular JS introduction, Architecture & Features, AngularJS Expressions: Numbers, Strings, Objects, Arrays, Expressions using {{ }} and ng-bind. MVC architecture (Model, Controller). Directives: Data Binding, ng-init, ng-repeat, ng-app & ng-model directives, custom directives. Scope: \$scope, understanding the scope, \$rootScope.Filters: Adding filters to directives, Currency filter, Array filter, Custom filters.

<b>UNIT-VI</b>	<b>PHP</b>	<b>5Hours</b>
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Installing and Configuring PHP, Introduction , PHP and the Web Server Architecture, PHP Capabilities , PHP and HTTP Environment Variables, PHP Language Core , Variables , Constants , Data Types , Operators , Working with Arrays, Decision Making , Flow Control and Loops, Error Handling and Reporting Considerations, Creating a Dynamic HTML Form with PHP, Database Connectivity with MySql , Connection with MySql Database , Performing basic database operations(DML) Insert, Delete, Update, Select), Using GET, POST, SESSION, and COOKIE Variables

**Text Books:**

- T1.** Complete Reference wrox publication
- T2.** HTML, DHTML CSS AND XML by PBP Publication

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**Reference Books:**

- R1:** 101 UX Principles A definitive Design Guide-Packt Publishing Ltd,Will Grant  
**R2:** Smashing UX Design-Jesmond Allen and James chudley  
**R3. JavaScript Bible, Wiley Pub.**  
**R4. HTML, DHTML, JavaScript, Perl & CGI Ivan Bayross, BPB Pub**  
**R5. Programming the World Wide Web by Robert W. Sebesta**  
**R6. Professional Ajax, 2nd Edition Wrox Press**  
**R7. AngularJS - Brad Green, ShyamSeshadri Learning Python By Mark Lutz,O'Reilly**  
**R8. AngularJS Web Application Development Cookbook-Packt Publishing Ltd, Matt Frisbie**  
**R9. JavaScript: The Complete Reference by Thomas Powell, Fritz Schneider**  
**R10.HTML & CSS: The Complete Reference, Fifth Edition by Powell Thomas**  
**R11.JavaScript The Complete Reference 3rd Edition (Paperback, Powell Thomas)**  
**R12.jQuery Reference Guide by Chaffer Jonathan**  
**R13.Complete Ref. PHP 6. Introducing HTML5 - Bruce Lawson, Remy Sharp**  
**R14.HTML 5 Black Book (Covers CSS3, JavaScript, XML, XHTML, AJAX, PHP, jQuery) 2Ed**  
**R15.JavaScript The Complete Reference 3rd Edition (Paperback, Powell Thomas)**  
**R16.Learning jQuery - Jonathan Chaffer, Karl Swedberg**  
**R17.HTML5 & CSS3 , Castro Elizabeth 7th Edition**  
**R18. Head First PHP & MySQL – by Lynn Beighley & Michael Morrison**  
**R19. The Joy of PHP Programming: A Beginner's Guide – by Alan orbes**

**Weblinks:**

1. <http://www.w3schools.com>
2. <https://www.tutorialspoint.com>

  
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**F.Y.MCA**  
**Academic Year 2024-2025 Semesters- II**  
**[MCA241102L]: WEB TECHNOLOGIES**

<b>Teaching Scheme:</b> LAB:- Hours/Week 04	<b>Credit</b> LAB:02	<b>Examination Scheme:</b> ICSE : 60Marks End Sem. Exam : 40 Marks Total : 100 Marks
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**Course Objective:**

1. To impart the design, development and implementation of Dynamic Web Pages.
2. To develop programs for Web using Scripting Languages.
3. To Design and implement dynamic websites with good sense of designing and latest technical aspects.

**Course Outcome:**

- After successful completion of the course, students will able to:
- CO1: Student will able to design various term related web designing technology like HTML.  
 CO2: Students will be able to apply Cascading Style Sheets on the HTML elements of web pages.  
 CO3: Students will be able to Implement interactive and validate web page(s) using JavaScript.  
 CO4: Students will be able to implement the event handling, web pages traversing using jQuery  
 CO5: Design MVC based application with use of Angular JS concepts like, model, controller, Directives etc.  
 CO6: Build Dynamic web site using server-side PHP Programming and Database connectivity.

**Guidelines for Assessment**

Continuous assessment of laboratory work is done based on overall performance and Laboratory assignments performance of student. Each Laboratory assignment assessment will assign grade/marks based on parameters with appropriate weightage. Suggested parameters for overall assessment as well as each Laboratory assignment assessment include-timely completion, performance, innovation, efficient codes, punctuality and neatness.

**A. List Of Experiments:**

1. Designing web pages using various HTML tags.
2. Implementation of CSS on HTML
3. Implementation of interactive web pages with various validations using JavaScript
4. Implementation of various events handling of web pages using jQuery
5. Designing of application based on MVC architecture using Angular JS
6. Implementation of Dynamic web pages using PHP and Database connectivity

**B. Mini Project**

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**Academic Year – 2024-2025 Semester-II**  
**[MCA241204T]: Optimization Techniques**

<b>Teaching Scheme:</b> TH: -Hours/Week : 03	<b>Credit</b> TH: 03	<b>Examination Scheme:</b> In Sem. Evaluation : 20 Marks Mid Sem. Exam : 30 Marks End Sem. Exam : 50 Marks Total : 100 Marks
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**Course Objective:**

1. Formulate and solve linear programming problems using various methods
2. Apply optimization techniques to special cases in linear programming
3. Analyze and solve sequential models and replacement theory problems.
4. Understand and apply network analysis techniques to project management.
5. Develop inventory models and apply queuing theory to manage inventory and waiting lines.

**Course Outcome:**

After successful completion of the course, students will able to:

- CO1.** Define and interpret various operations research models and techniques
- CO2.** Apply optimization techniques to real-world problems
- CO3.** Analyze and solve complex problems using linear programming, network analysis, and inventory management.
- CO4.** Design and develop innovative solutions to operations research problems
- CO5.** Evaluate and interpret results of operations research models and solutions.
- CO6.** Communicate complex operations research concepts and solutions effectively

**Course Contents**

UNIT-I	Linear Programming	09 Hours
1.1 Linear Programming model – simplex method 1.2 Two Phase Simplex Method and problems 1.3 Dual Simplex Method and problems 1.4 Big –M method and problems.		
UNIT-II	Special Cases in LP	07Hours
2.1 Transportation Problem 2.1 Optimization Technique for TP (MODI Method) 2.3 Assignment Problem and its solutions by Hungarian Method		
UNIT-III	Sequential Model and Replacement Theory	07 Hours

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3.1 Introduction and general notations 3.2 Algorithm for solving Sequence Problem 3.3 Processing n jobs through 1 machine and 2 machines 3.4 Replacement of items that deteriorates with time 3.5 when money value is consider & Problems 3.6 Individuals and Group Replacement

<b>UNIT-IV</b>	<b>Network Analysis including PERT and CPM-I</b>	<b>7 Hours</b>
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4.1 Basic differences between PERT and CPM. 4.2 Arrow Networks, time estimates, Earliest expected time Latest – allowable occurrences time Forward Pass Computation Backward Pass Computation 4.3 Representation in Tabular Form 4.4 Critical Path 4.5 Probability of meeting scheduled date of completion, 4.6 Calculation on CPM network.

<b>UNIT-V</b>	<b>Network Analysis including PERT and CPM - II</b>	<b>5 Hours</b>
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5.1 Critical Path 5.2 Crashing the network 5.3 Resource leveling and recourse loading

<b>UNIT-VI</b>	<b>Inventory Theory and Queuing Theory</b>	<b>3 Hours</b>
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6.1 Inventory Model Building 6.2 Single item deterministic Model 6.3 Inventory Control Models without strategies 6.4 Inventory Control Models with shortages 6.5 Introduction and classification of queues


**Text Books:**


- T1: J K Sharma, Operations Research Theory and Applications, MacMillan India Ltd  
 T2: R. Panneer selvam, Operations Research, 2nd Edition, PHI Learning Private Ltd New Delhi

**Reference Books:**

- R1.** Taha, Hamdy A. Operations Research: An Introduction. Pearson Education India, 1982.  
**R2.** Kedarnath Ramnath and Co, Operations Research-S.D. Sharma Vohra, N. D. Quantitative Techniques in Management, Tata McGraw-Hill Education, 2006.  
**R3.** Hillier, Frederick S. Introduction to operations research. Tata McGraw-Hill Education, 2012.  
**R4.** Kanti Swarup, Gupta P.K., Man Mohan, Operations Research, 12th Edition; Sultan Chand & Sons, New Delhi.

  
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**S. Y. MCA**

**Academic Year 2024-2025 Semester II**

[MCA241205AT]: Internet of Things

<b>Teaching Scheme:</b> TH: - 03/Week	<b>Credit</b> TH: 03	<b>Examination Scheme:</b> In Sem. Evaluation : 20 Marks Mid Sem. Exam : 30 Marks End Sem. Exam : 50 Marks Total : 100 Marks
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**Course Objectives:** This course will enable students to

1. Gain vision and Introduction to IoT
2. Acquire IoT Market Perspective
3. Describe IoT standards and Business Processes
4. Gain IoT Architecture
5. Insight about IoT Data Analytics and supporting services
6. Gain knowledge about IoT Applications in Industrial & Real world.

**Course Outcome:** After successful completion of the course, students will able to:

CO1. Acquire objective of IoT  
 CO2. Determine the IoT in Market Perspective  
 CO3. Gain various devices, Gateways and Data Management through IoT  
 CO4. Describes Architecture of IoT  
 CO5. Understand how to analyze and organize the data.  
 CO6. Compare IOT Applications in Industrial & Real world.

<b>Course Contents</b>		
<b>UNIT-I</b>	<b>Introduction</b>	<b>6 Hours</b>
Introduction of M2M to IoT – The Vision, From M2M to IoT, Global Context of M2M to IoT, Various Characteristics, Needs of IoT, Transformation M2M to IoT as per Market Perspective, Value Chains of M2M, IoT, An evolving Industrial Structure of IoT, The global value chain and global information monopolies at international level		
<b>UNIT-II</b>	<b>IoT Architecture An Overview</b>	<b>6 Hours</b>
M2M to IoT An Architecture Introduction, Building an Architecture, Various Principles, It's Need, and various Capabilities. IoT Architecture Outline, Various Standards to be considered, Fundamentals of M2M to IoT Technology, Various Devices and Gateways, LAN and WAN, Data Management		
<b>UNIT-III</b>	<b>Fundamentals of M2M &amp;IoT</b>	<b>6 Hours</b>
Fundamentals of M2M to IoT, Various Business Processes in IoT, Everything as a Service (XaaS), Analytics: M2M to IoT, Knowledge Management, Architecture Reference Model- Introduction, Reference Model		

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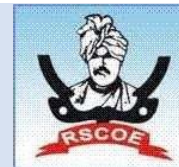
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<b>UNIT-IV</b>	<b>IoT Reference Architecture</b>	<b>6 Hours</b>
Introduction to IoT Reference Architecture, Various View like Functional View, Information View, Deployment and Operational View, Other architectural views, Introduction to Real-world Design Constraints, Technical Design Constraints, Data representation and visualization, Interaction and remote control etc.		
<b>UNIT-V</b>	<b>Data Analytics and Supporting Services</b>	<b>6 Hours</b>
<b>Data Analytics:</b> Introduction, Structured Versus Unstructured Data, Data in Motion versus Data at Rest, IoT Data Analytics Challenges, Data Acquiring, Organizing in IoT/M2M		
<b>Supporting Services:</b> Computing Using a Cloud Platform for IoT/M2M Applications/Services, Everything as a service and Cloud Service Models.		
<b>UNIT-VI</b>	<b>Case Study &amp; IoT Applications</b>	<b>6 Hours</b>
IoT Applications in Home, Infrastructures, Buildings, Security, Industries, Home appliances, other IoT Electronic Equipments, Industry 4.0 concepts.		
<b>Text Books :</b>		
T1. DaCosta, Francis. Rethinking the Internet of Things: a scalable approach to connecting everything. Apress, 2013		
T2. Schwartz, Marco. Internet of Things with the ArduinoYún. Packt Publishing Ltd, 2014		
<b>Reference Books:</b>		
R1. Internet of Things - A Hands-on Approach, ArshdeepBahga and Vijay Madiseti, Universities Press, 2015, ISBN: 9788173719547		
R2. Getting Started with Raspberry Pi, Matt Richardson & Shawn Wallace, O'Reilly (SPD), 2014, ISBN:9789350239759		
R3. Jan Holler, VlasiosTsiatsis, Catherine Mulligan, Stefan Avesand, StamatisKarnouskos, David Boyle, "From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence", 1st Edition, Academic Press, 2014.		
R4. Vijay Madiseti and ArshdeepBahga, "Internet of Things (A Hands-on- Approach)", 1stEdition, VPT, 2014.		
R5. Hakima Chachi "Internet of Things (Connecting Objects)" Wiley – 2010.		

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**Academic Year – 2024-2025 Semester-II**  
**[MCA241205BT]: Design and Analysis of Algorithm**

<b>Teaching Scheme:</b> TH: -Hours/Week : 03	<b>Credit</b> TH: 03	<b>Examination Scheme:</b> In Sem. Evaluation: 20 Marks Mid Sem. Exam : 30 Marks End Sem. Exam : 50 Marks Total : 100 Marks
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**Course Objective:**

1. To analyze performance of algorithms, Big O Notations, Sorting
2. To choose the appropriate data structure and algorithm design method for a specified application.
3. To solve problems using algorithm design methods such as the greedy method
4. To solve problems using algorithm design methods such as the divide and conquer, dynamic programming
5. To solve problems using algorithm design methods such as the Backtracking
6. To introduce the problem solving using branch and bound, various problems in P and NP classes

**Course Outcome:**  
 After successful completion of the course, students will able to:

**CO1:**Analyze a problem and identify the computing requirements appropriate for its solution, and to understand how the worst-case time complexity of an algorithm is defined, how asymptotic notation is used to provide a rough classification of algorithms.

**CO2:**Ability to design, implement, and evaluate an algorithm to meet desired needs

**CO3 :**Apply dynamic programming, backtracking, branch and bound strategy for problem solving

**CO4 :**Ability to distinguish between polynomial and non-polynomial problem solving

<b>Course Contents</b>		
<b>UNIT-I</b>	<b>Introduction</b>	<b>7 Hours</b>
Algorithm, analysis, Time complexity and space complexity, O-notation, Omega notation and Theta notation, Heaps and Heap sort, Sets and disjoint set, Union and find algorithms, Sorting in linear time, Tower of Hanoi		
<b>UNIT-II</b>	<b>Divide And Conquer</b>	<b>5 Hours</b>
Divide and Conquer, General Strategy, Exponentiation. Binary Search, Quick Sort Merge Sort		
<b>UNIT-III</b>	<b>Greedy Method</b>	<b>6 Hours</b>
General Strategy, Knapsack problem, Job sequencing with Deadlines, Optimal merge patterns, Minimal Spanning Trees, Dijkstra's algorithm.		
<b>UNIT-IV</b>	<b>Dynamic Programming</b>	<b>6 Hours</b>

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General Strategy, Multistage graphs, OBST, 0/1 Knapsack, Traveling Salesperson Problem, Flow Shop Scheduling

<b>UNIT-V</b>	<b>Backtracking</b>	<b>6 Hours</b>
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Backtracking: General Strategy, N- Queen's problem, Graph Coloring, Hamiltonian Cycles, 0/1 Knapsack

<b>UNIT-VI</b>	<b>Branch and Bound, NP-HARD AND NP-COMPLETE PROBLEMS</b>	<b>6 Hours</b>
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General Strategy, 0/1 Knapsack, Traveling Salesperson Problem, Basic concepts, of NP-Hard And NP-Complete Problems (Only concepts should be covered)

**Text Books :**

- T1.** Design and Analysis of Algorithms, S. Sridhar First Ed., ISBN: 9780198093695, Oxford University Press  
**T2.** Design And Analysis Of Algorithms, Anany Levitin, 3Rd Ed, Pearson,

**Reference Books:**

- R1.** Bressard, "Fundamental of Algorithm." PHI  
**R2.** Horowitz/Sahani, "Fundamentals of computer Algorithms", Galgotia  
**R3.** Magnifying Data Structures, Arpita Gopal : PHI Publications  
**R4.** Thomas H Cormen and Charles E.L Leiserson, "Introduction to Algorithm" PHI  
**R5.** A. V. Aho and J.D. Ullman, "Design and Analysis of Algorithms", Addison Wesley

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**Academic Year – 2024-2025 Semester-II**  
**[MCA241205CT]: Cyber Security and Cyber Law**

<b>Teaching Scheme:</b> TH:-03Hours/Week	<b>Credit</b> TH:03	<b>ExaminationScheme:</b> InSem.Evaluation : 20 Marks MidSem.Exam : 30Marks End Sem.Exam : 50Marks Total : 100 Marks
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**Course Objective:**

Students should be able to understand

1. The difference between threat, risk, attack and vulnerability
2. How threats materialize into attacks.
3. Where to find information about threats, vulnerabilities and attacks.
4. Typical threats, attacks and exploits and the motivations behind them.
5. Cyber Laws and Risks management

**Course Outcome:**

On completion of the course, student will be able to–

CO1: Understand concepts of Cyber-attacks, security issues and policies

CO2: Understand and identify cyber vulnerabilities and safeguards.

CO3: Identify and learn websecurity and services.

CO4: Cyberlaws and international and national security policies and investigations.

CO5: Concepts of network security and cryptography

CO6: Managing security risks and planning incidents

**Course Contents**

<b>UNIT-I</b>	<b>Introduction to Cyber Security</b>	<b>4 Hours</b>
Overview of Cyber Security, CIA (Confidentiality, Integrity, Availability), Threats and Attacks: Attacker goals, capabilities, and motivations • Malware, • Social engineering, Risk, threats, vulnerabilities, and attack vectors		

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<b>UNIT-II</b>	<b>Network Security and Cryptography</b>	<b>7 Hours</b>
<p>• Network specific threats and attack types, Access Control and Intrusion Detection, Server Management and Firewalls, Security for VPN and Next Generation Technologies, Use of cryptography for data and network security • Architectures for secure networks Security for wireless, cellular networks, Introduction to Cryptography: Encryption &amp; Decryption, Digital Signatures, Applications of Cryptography, Tools and techniques of Cryptography : Chinese Remainder Theorem and its simplification in Cryptography, Diffie-Hellman key exchange algorithm, RSA algorithm, Elgamal Arithmetic, Elliptic Curve Cryptography, Message Digest and Cryptographic Hash Functions, MD5 and SHA-1.</p>		
<b>UNIT-III</b>	<b>Securing Web Application, Services and Servers</b>	<b>7 Hours</b>
<p>Introduction: why web application security, importance, challenges, Web security VS network security. Web application vulnerabilities, Broken Access Control, Broken Authentication and Session Management Buffer Overflows, Cross Site Scripting Flaws, Denial of Service, SQL Injection Flaws, Insecure Storage, Unvalidated Input, Defensive Measures, Improper Error Handling, Insecure Configuration Management Web application security guidelines, improvement and testing. Identity Management and Web Services, Authorization Patterns, Security Considerations, Challenges.</p>		
<b>UNIT-IV</b>	<b>Digital Forensics</b>	<b>7 Hours</b>
<p>Network Forensics: Introduction, Network basics for digital investigators: History, Technical overview, Network Technologies, Connecting networks using Internet Protocols. Mobile device Forensic and Email Forensics: Mobile Device Forensics, Types of evidence on mobile device, Handling mobile device as a source of evidence, Forensic prevention of mobile devices, Forensic examination &amp; analysis of mobile devices, Forensic acquisition &amp; examination of SIM cards (Architecture, Data Storage, Files, Mobile Operating System) mobile devices, Mobile forensics and its challenges Email Forensics: Email header Analysis, Function &amp; Forensics, Chat and Social Networking Evidence. Web forensics and Anti forensics.</p>		
<b>UNIT-V</b>	<b>IT Security Management</b>	<b>5 Hours</b>
<p>IT Security Management: Organizational Context and Security Policy, Security Risk Assessment, Security Controls or Safeguards, IT Security Plan, Implementation of Controls, Monitoring Risks, Physical and Infrastructure Security, Human Resources Security, Legal and Ethical Aspects: Cybercrime and Computer Crime, Intellectual Property, Privacy, Ethical Issues.</p>		

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UNIT-VI	Cyber space and the Law	6 Hours
Introduction, Cyber Security Regulations, Roles of International Law, the state and Private Sector in Cyberspace, Cyber Security Standards. The INDIAN Cyberspace, National Cyber Security Policy . Laws and Ethics in Information Security, Codes of Ethics, Protecting programs and data Cybercrime and Information security, The legal perspectives-Indian perspective, Global perspective.		
<b>TextBooks:</b>		
<b>T1.</b> Computer Security: Principles and Practices, Pearson 6Ed, ISBN 978-0-13-335469-0, William Stalling		
<b>T2.</b> Cyber Security- Understanding Cyber Crimes, Computer Forensics and Legal Perspectives, Wiely India Pvt. Ltd, ISBN-978-81-265-2179-1, Nina Godbole, Sunit Belapure		
<b>T3.</b> Cryptography and Network Security, Behrouz A Forouzan		
<b>ReferenceBooks:</b>		
R1. Security in Computing, Charles P. Pfleeger Shari Lawrence Pfleeger Jonathan Margulies, 5 <sup>th</sup> Edition, Pearson Education, 2015.		
R2. CyberSpace and Cyber Security, George K. Kostopoulos, CRC Press, 2013		
R3. CyberSecurity: Analytics, Technology and Automation edited, Martt Lehto, Pekka Neittaanmäki, Springer International Publishing Switzerland 2015		
R4. Computer Forensics and Investigations, Nelson Phillips and Enfinger Stuart, Cengage Learning, New Delhi, 2009.		
R5. CyberSecurity: A Practitioner's Guide (Amazon Asia-Pacific Holdings Private Limited, 2017)		

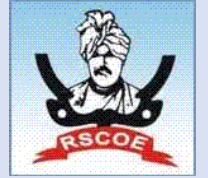
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**S. Y. MCA**  
**Academic Year- 2024-2025 Semester- II**  
**[MCA241205DT]: DevOps**

<b>Teaching Scheme:</b> <b>TH: -Hours/Week : 03</b>	<b>Credit</b> <b>TH: 03</b>	<b>Examination Scheme:</b> <b>In Sem. Evaluation : 20 Marks</b> <b>Mid Sem. Exam : 30 Marks</b> <b>End Sem. Exam : 50 Marks</b> <b>Total : 100 Marks</b>
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<p><b>Course Objective:</b>          Students should be able to understand</p> <ol style="list-style-type: none"> <li>1. Understand the principles of continuous development and deployment.</li> <li>2. DevOps productivity by automating infrastructure and workflows and continuously measuring applications performance.</li> <li>3. Understand and use AWS Services.</li> <li>4. Concepts of version control and using Git</li> <li>5. Understand and use the container Technology</li> <li>6. Using DevOps tools like Git, Jenkins, Ansible, Docker</li> </ol>
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<p><b>Course Outcome:</b>          On completion of the course, student will be able to—</p> <p>CO1: CO2: Explain the principles of continuous development and deployment of software.          CO2: Describe DevOps &amp; DevSecOps methodologies and their key concepts          CO3: Set up complete private infrastructure using version control systems and CI/CD tools          CO4: Use container Technology in Software development          CO5: Implement Containerization using Kubernetes, Configuration management with Ansible          CO6: Using DevOps tools like Jenkins, Git, Maven etc. in various aspects of DevOps delivery model          DevOps using Cloud and Using AWS Services ☐</p>
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Course Contents		
UNIT-I	Introduction to DevOps	04 Hours
What is DevOps?, Why is DevOps is Needed?, How is DevOps ? Why is DevOps used?, DevOps Lifecycle, Principles, Roles, Responsibilities, and Skills of a DevOps Engineer, DevOps and Software Development Life Cycle: Waterfall Model,Agile Model		
UNIT-II	DevOps Architecture	05 Hours

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DevOps Architecture, Deployments, Orchestration, Need, Instance of applications, DevOps delivery pipeline, DevOps eco system. DevOps adoption in projects: Technology aspects, Agiling capabilities, Tool stack implementation, People aspect, processes.

<b>UNIT-III</b>	<b>Continuous Integration, Delivery and Deployment</b>	<b>05 Hours</b>
CI/CD: Introduction to Continuous Integration, Continuous Delivery and Deployment , Benefits of CI/CD, Metrics to track CICD practices . Devops Maturity Model: Key factors of DevOps maturity model, stages of Devops maturity model, DevOps maturity Assessment		
<b>UNIT-IV</b>	<b>Container Technology</b>	<b>08 Hours</b>
Container Technology - Introduction to Containers? Benefits of Contain Containers Work?, Virtual Machines vs Containers, brief intro to Container Terminology, Overview of Container Architecture, Installing Container engine tool, Creating Containerized Services, Provisioning Containerized Services, Manipulating Container Images Creating Custom Container Images - Designing Custom Container Images, Building Custom Container Images with Dockerfile.		
<b>UNIT-V</b>	<b>Containerization and Configuration Management</b>	<b>07 Hours</b>
Configuration management with Ansible - Introduction to Ansible, Ansible Installation, Configure Ansible roles, write, Playbooks, working with playbooks, manage ansible variables, Executing Adhoc command, Ansible Variables. Containerization using Kubernetes- Introduction to Kubernetes engine, Kubernetes Cluster Architecture, understanding YAML, creating a services in Kubernetes.		
<b>UNIT-VI</b>	<b>DevOps Tools</b>	<b>07 Hours</b>
Introduction to Jenkins with Architecture, Jenkins Management, Introduction to Maven, Introduction to Git: What is Git, Why Git, GIT, Workflow. DevOps on Cloud: Why Cloud, Introduction to Cloud Computing, Why DevOps on Cloud, Introduction to AWS, Various AWS services, DevOps using AWS.		
<b>Text Books :</b>		
<p><b>T1.</b> The DevOPS Handbook: How to Create World-Class Agility, Reliability, and Security in Technology Organizations by Gene Kim , John Willis , Patrick Debois , Jez Humb,O'Reilly publications</p> <p><b>T2.</b> What is Devops? Infrastructure as code By in Mike Loukides ,O'Reilly publications.</p>		

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**T3. Continuous Delivery: Reliable Software Releases Through Build, Test, and Deployment Automation**, by Jez Humble and David Farley

**T4. Achieving DevOps: A Novel About Delivering the Best of Agile, DevOps, and Microservices** by Dave Harrison, Knox Lively

**Reference:**

R1: DevOps For Dummies 2ndIBMLimitedEdition by Sanjeev Sharma and Bernie Coyne

R2: DevOps\_Revealed\_by\_International\_DevOps\_Certification\_Academy.

R3: Effective DevOps by Jennifer Davis & Katherine Daniels.

R4: The DevOps Handbook\_ How to Create World Class Agility, Reliability, and Security in Technology Organizations.

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**F.Y. MCA**

**Academic Year –2024-2025 Semester-II**  
**[MCA241205ET]: Block Chain Technology**

<b>Teaching Scheme:</b> TH: -Hours/Week : 03	<b>Credit</b> TH:03	<b>Examination Scheme:</b> In Sem. Evaluation:20 Marks Mid Sem. Exam : 30 Marks End Sem. Exam : 50 Marks Total : 100 Marks
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**Course Objective:**

1. To provide conceptual understanding of block chain technology
2. To acquire skills to develop block chain based solutions
3. To familiarize potential applications for Bit coin-like crypto currencies
4. To develop & integrate ideas from various domains and implement the technology in different perspectives
5. The course will enable an individual to learn, how these systems work and how to develop secure software that interacts with the Bit coin network and other crypto currencies

**Course Outcome:**

After successful completion of the course, students will able to:

- CO1.** Understand the types, benefits and limitation of block chain
- CO2.** Explore the block chain decentralization and cryptography concepts
- CO3.** Apply the tools for understanding the background of crypto currencies
- CO4.** Build and deploy block chain application for on premise and cloud based architecture
- CO5.** Identify major research challenges and technical gaps existing between theory and practice in crypto currency domain
- CO6.** Understanding of latest advances and its applications in Block Chain Technology

**Course Contents**

UNIT-I	Block Chain Fundamentals	06 Hours
	Block chain 101: Distributed systems, History of block chain, Introduction to block chain, Types of block chain, CAP theorem and block chain, Benefits and limitations of block chain.	
UNIT-II	Decentralization and Cryptography Fundamentals	05 Hours
	Decentralization and Cryptography: Decentralization using block chain, Methods of decentralization, Routes to decentralization, Decentralized organizations. Cryptography and Technical Foundations: Cryptographic primitives, Asymmetric cryptography, Public and private keys.	
UNIT-III	Bit Coin	05 Hours
	Bit coin - Wallet - Blocks - Merkle Tree - hardness of mining - transaction verifiability - anonymity - forks - double spending - mathematical analysis of properties of Bit coin. Bitcoin block chain, the challenges, and solutions, proof of work, Proof of stake, alternatives to Bitcoin consensus, Bitcoin	

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scripting language and their uses with examples.

<b>UNIT-IV</b>	<b>Bitcoin and Block chain</b>	<b>07 Hours</b>
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Bitcoin and Block chain: Creation of coins, Payments and double spending, Bitcoin Scripts, Bitcoin P2P Network, Transaction in Bitcoin Network, Block Mining, Block propagation and block relay Working with Consensus in Bitcoin: Distributed consensus in open environments, Consensus in a Bitcoin network, Proof of Work (PoW) -basic introduction, Hashcash PoW, Bitcoin PoW.

<b>UNIT-V</b>	<b>Ethereum</b>	<b>06 Hours</b>
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Ethereum - Ethereum Virtual Machine (EVM) - Wallets for Ethereum - Solidity - Smart Contracts - some attacks on smart contracts. Ethereum and Smart Contracts- The Turing Completeness of Smart Contract Languages and verification challenges- comparing Bitcoin scripting vs. Ethereum Smart Contracts

<b>UNIT-VI</b>	<b>Block Chain-Recent Trend</b>	<b>07 Hours</b>
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Block chain Implementation Challenges- Zero Knowledge proofs and protocols in Block chain - Succinct non interactive argument for Knowledge (SNARK) - pairing on Elliptic curves – Zcash - attacks on Block chains – such as Sybil attacks, selfish mining, 51% attacks - -advent of algorand, and Sharding based consensus algorithms

**Text Books :**

**T1.** Mastering Blockchain by Imran Bashir Packt Publishing Ltd. ISBN 978-1- 78883-04-4

**T2.** Melanie Swan, “Block Chain: Blueprint for a New Economy”, O’Reilly, first edition – 2015.

**T3.** Anshul Kaushik, “Block Chain and Crypto Currencies”, Khanna Publishing House, Delhi.

**T4.** Imran Bashir, “Mastering Block Chain: Distributed Ledger Technology, Decentralization and Smart Contracts Explained”, Packt Publishing, first edition – 2012

**Reference Books:**

**R1:** Ritesh Modi, “Solidity Programming Essentials: A Beginner’s Guide to Build Smart Contracts for Ethereum and Block Chain”, Packt Publishing

**R2:** Imran Bashir, “Mastering Block Chain: Distributed Ledger Technology Decentralization and Smart Contracts Explained”, Packt Publishing

**R3:** Mastering Bitcoin: Unlocking Digital Cryptocurrencies, Andreas M. Antonopoulos, O’Reilly Media, First Edition, 2014

**R4:** Bitcoin and Cryptocurrency Technologies, Author- Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller, Steven Goldfeder, Princeton University, 2016

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**F. Y. MCA**  
**Academic Year 2024-2025 Semester- II**  
**[MCA241205FT ]: Big Data Analytics**

<b>Teaching Scheme:</b> TH: - 03 Hours/Week	<b>Credit</b> TH: 03	<b>Examination Scheme:</b> In Sem. Evaluation : 20 Marks Mid Sem. Exam : 30 Marks End Sem. Exam : 50 Marks Total : 100 Marks
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<b>Course Objective:</b>
<ol style="list-style-type: none"> <li>1. Optimize business decisions and create competitive advantage with big data analytic.</li> <li>2. The several key big data technologies used for storage, analysis and manipulation of data.</li> <li>3. The key concepts of Hadoop framework and map reduce.</li> <li>4. The concepts of PIG and HIVE for application development.</li> </ol>

<b>Course Outcome:</b>
After successful completion of the course, students will able to:
<b>CO1.</b> Understand the basic concepts of Big Data and Technology used in the same
<b>CO2.</b> Understand the Hadoop technology and its implementation and Hadoop file distribution System
<b>CO3.</b> Understand the Basic aspects of the Map reduce Functions
<b>CO4.</b> Understand the Basic aspects of the Pig and Hive technology used for the operations on HDFS

Course Contents		
UNIT-I	INTRODUCTION TO BIG DATA	6 Hours
Introduction to Big data: Characteristics of Data, Evolution of Big Data, Definition of Big Data, Challenges with Big Data, Traditional Business Intelligence (BI) versus Big Data. Big data analytics: Classification of Analytics, Importance and challenges facing big data, Terminologies Used in Big Data Environments, The Big Data Technology Landscape.		
UNIT-II	INTRODUCTION TO HADOOP	6 Hours
Introducing Hadoop, RDBMS versus Hadoop, Distributed Computing Challenges, History and overview of Hadoop, Use Case of Hadoop, Hadoop Distributors, Processing Data with Hadoop, Interacting with Hadoop Ecosystem.		
UNIT-III	THE HADOOP DISTRIBUTED FILESYSTEM	6 Hours

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Hadoop Distributed File System (HDFS): The Design of HDFS, HDFS Concepts, Basic Filesystem Operations, HadoopFilesystems.

<b>UNIT-IV</b>	<b>HADOOP File SYSTEM</b>	<b>6 Hours</b>
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The Java Interface- Reading Data from a Hadoop URL, Reading Data Using the File system API, Writing Data. Data Flow- Anatomy of a File Read, Anatomy of a File Write, Limitations.

<b>UNIT-V</b>	<b>UNDERSTANDING MAP REDUCE FUNDAMENTALS</b>	<b>6 Hours</b>
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Map Reduce Framework: Exploring the features of Map Reduce, Working of MapReduce, Exploring Map and Reduce Functions, Techniques to optimize MapReduce jobs, Uses of MapReduce .Controlling MapReduce Execution with Input Format, Reading Data with Custom Record Reader, -Reader, Writer, Combiner, Partitioners, MapReduce Phases, Developing simple MapReduce Application.

<b>UNIT-VI</b>	<b>INTRODUCTION TO PIG AND HIVE</b>	<b>6 Hours</b>
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Introducing Pig: Pig architecture, Benefits, Installing Pig, Properties of Pig, Running Pig, Getting started with Pig Latin, working with operators in Pig, Working with functions in Pig. Introducing Hive: Getting started with Hive, Hive Services, Data types in Hive, Built-in functions in Hive, Hive DDL.

**Text Books:**  
 T1. Seema Acharya, Subhashini Chellappan, Big Data and Analytics, Wiley Publications, 2nd Edition, 2014, DT Editorial Services, Big Data, Dream Tech Press, 2nd Edition, 2015.  
 T2. Tom White, Hadoop: The Definitive Guide, O .,Reilly, 3rd Edition, 2012.  
 T3. Black Book Big Data, Dream tech publications, 1st Edition, 2017.

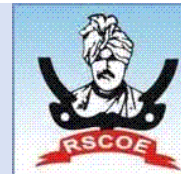
**Reference Books:**  
 R1. Michael Minelli, Michele Chambers, Ambiga Dhiraj, Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today ,,s Business, Wiley CIO Series, 1st Edition, 2013.  
 R2. Rajiv Sabherwal, Irma Becerra- Fernandez, “Business Intelligence Practice, Technologies and Management”, John Wiley, 1st Edition, 2011.  
 R3. ArvindSathi, “Big Data Analytics: Disruptive Technologies for Changing the Game”, IBM Corporation, 1st Edition, 2012.

**Web References:**  
 1. [https://www.sas.com/en\\_us/insights/analytics/big,data,analytics.html](https://www.sas.com/en_us/insights/analytics/big,data,analytics.html)  
 2. <https://www.searchbusinessanalytics.techtarget.com/definition/big,data,analytics>  
 3. <https://www.webopedia.com>

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## F. Y. MCA

### Academic Year- 2024-2025 Semester-II

#### [MCA241205GT]: Entrepreneurship Development

<b>Teaching Scheme:</b> TH: -Hours/Week : 03	<b>Credit</b> TH: 03	<b>Examination Scheme:</b> In Sem. Evaluation: 20 Marks Mid Sem. Exam : 30 Marks End Sem. Exam : 50 Marks Total : 100 Marks
<b>Course Objective:</b>		
<ol style="list-style-type: none"> <li>1. To develop and strengthen entrepreneurial quality in students. and motivation</li> <li>2. To develop and strengthen motivation quality in students</li> <li>3. To impart basic entrepreneurial skills</li> <li>4. To impart understandings to run a business efficiently and effectively.</li> </ol>		
<b>Course Outcome:</b>		
CO1. After successful completion of the course, students will able to:		
CO2. Students will gain the Knowledge of Entrepreneurship and will get the competence		
CO3. Students will gain skills needed to run a business.		
CO4. Students will gain knowledge needed to run a business		
<b>Course Contents</b>		
<b>UNIT-I</b>	<b>Entrepreneurial Competence</b>	<b>06Hours</b>
Entrepreneurship concept, Entrepreneurship as a Career, Entrepreneurial Personality, Characteristics of Successful, Entrepreneur, Knowledge and Skills of Entrepreneur		
<b>UNIT-II</b>	<b>Entrepreneurial Environment</b>	<b>07 Hours</b>
Business Environment, Role of Family and Society, Entrepreneurship Development Programmes, Government Policies for Small Scale Enterprises, Small Enterprises in International Business		
<b>UNIT-III</b>	<b>Business Plan Preparation</b>	<b>06 Hours</b>
Sources of Product for Business, Pre-feasibility Studies, Criteria for Selection Process, Ownership Structure, Capital, Budgeting Project Profile Preparation, Matching Entrepreneur with the Project, Feasibility Report Preparation and Evaluative Criteria		
<b>UNIT-IV</b>	<b>Launching of Small Business</b>	<b>07 Hours</b>
Financial Planning, Human Resource mobilization, Production and Operation Management, Marketing and Channel Selection		

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<b>UNIT-V</b>	<b>Management of Small Business</b>	<b>05 Hours</b>
Growth strategies in small business, Product Launching, Incubation, IT startups Monitoring and Evaluation of Business, Industrial Sickness, Effective Management of small Business		
<b>UNIT-VI</b>	<b>Rules and Legislation</b>	<b>05 Hours</b>
Applicability of Legislation, Industries Development (Regulations) Act, 1951, Factories Act, 1948., The Industrial Employment (Standing Orders) Act		
<b>Text Books:</b> R1. Arya Kumar. Entrepreneurship. Pearson. 2012 R2. Donald F Kuratko, T.V Rao. Entrepreneurship: A South Asian perspective. Cengage Learning. 2012		
<b>Reference Books:</b> R1. Mathew Manimala, Entrepreneurship Theory at the Crossroads, Paradigms & Praxis, R2. Biztrantra ,2nd Edition ,2005 R3. Prasanna Chandra, Projects Planning, Analysis, Selection, Implementation and Reviews, R4. Tata McGraw-Hill, 1996. R5. P.Saravanavel, Entrepreneurial Development, Ess Pee kay Publishing House, Chennai -1997.		

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**Academic Year – 2024-2025 Semester-II**  
**[HS241206L]: IKS**

<b>Teaching Scheme:</b> PR: -Hours/Week : 02	<b>Credit</b> PR: 01	<b>Examination Scheme:</b> ICSE : 30 Marks ESE : 20 Marks Total : 50 Marks
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Prerequisite: Historical background of India

**Course Objective:**

- i) Understand the foundational concepts and key tenets of Indian knowledge systems.
- ii) Understand various philosophical and spiritual traditions within the Indian context.
- iii) Examine the historical evolution of Indian literature, art, and science.

**Course Outcome:**

**After successful completion of the course, students will able to:**

- CO1: Recollect the ancient Indian rich heritage through philosophy, science, spirituality and health.
- CO2: Explain wisdom and moral framework to shape management skills , interpersonal and social interaction patterns required in every step of life's journey.
- CO3: Develop collaborative learning to solve socio economical and Environmental problems.

<b>UNIT-I</b>	<b>Introduction to Indian Knowledge Systems and Vedic Corpus</b>	<b>5 Hours</b>
Overview of Indian Knowledge system with Ancient Indian Knowledge in Action. Shrutis with synopsis of Vedas. Message in Vedas. Application of concept in Vedas. Glimpses of Upanishads. Message of Upanishads.		
<b>UNIT-II</b>	<b>Wisdom through Smrutis and Foundation of Indian Education</b>	<b>6 Hours</b>
Classification of Indian philosophy with Unique features. Science based knowledge from Darshanas. Wisdom through Ages, Glimpses of Kautilyas Arthashastra (Mind map on Statecraft, leadership and ethics, and Governance. for better management), Management Principles from Mahabharata. Indigenous Indian Education System overview.		

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<b>UNIT-III</b>	<b>Health wellness and Psychology</b>	<b>5 Hours</b>
Introduction wellness through Indian medical system, Glimpses of Yoga Shastra, Mind body consciousness complex. Ancient Indian approach to psychology, Contributions of Yoga to the world.		
<b>UNIT-IV</b>	<b>Foundational concepts for Science, Engineering and Technology through (IKS)</b>	<b>6 Hours</b>
Ancient Indian Mathematics and its contribution to the world. Introduction to mathematics (number system). Binary Mathematics and Geometry. Metallurgy (Iron and steel in India and alloys). Mining and ore extraction. Surgical instruments and ship building. The great Indian Architecture and irrigation systems.		
Guidelines for Assessment		
Assessment is a continuous assessment based on submission of the assignments, timely completion, attendance and understanding		
List of Assignments		
1	Participation in class discussions and activities	
2	Weekly quizzes to assess understanding of concepts	
3	Theme based poster presentation exploring a specific aspect of Indian knowledge systems	
4	Case Studies from ancient Indian knowledge and Foundational aspects of Ashtanga yoga	
<p>Text Books:</p> <ol style="list-style-type: none"> <li>An Introduction to Indian Knowledge Systems: Concepts and Applications, B Mahadevan, V R Bhat, and Nagendra Pavana R N; 2022 (Prentice Hall of India).</li> <li>Indian Knowledge Systems: Vol I and II, Kapil Kapoor and A K Singh; 2005 (D.K. Print World Ltd).</li> </ol>		

  
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**F. Y. MCA**  
**Academic Year – 2024-2025 Semester-II**  
**[MCA241207L]: Professional Communication Skills**

<b>Teaching Scheme:</b> PR: -Hours/Week : 02	<b>Credit</b> PR: 01	<b>Examination Scheme:</b> ICSE : 30 Marks ESE : 20 Marks Total : 50 Marks
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<p><b>Course Objective:</b></p> <ol style="list-style-type: none"> <li>1. Understand the role of communication in personal &amp; professional success.</li> <li>2. Develop awareness of appropriate communication strategies.</li> <li>3. To enhance the verbal communication of students.</li> <li>4. To focus on Formal and Informal Conversation, etiquettes. .</li> <li>5. Ethically use, document and integrate sources.</li> <li>6. Practice critical thinking to develop innovative and well-founded perspectives related to the Student's emphases.</li> <li>7. Use technology to communicate effectively in various settings and contexts.</li> <li>8. Demonstrate appropriate and professional ethical behavior.</li> </ol>
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<p><b>Course Outcome:</b>  <b>After successful completion of the course, students will able to:</b>  <b>CO1:</b> Understand and apply effective communication methods and Listening skills.  <b>CO2:</b> Display competence in oral, written, and visual communication.  <b>CO3:</b> Respond to industry professionals and recruiters and effectively answer interview questions, and clearly understand what to do before, during and after an interview.  <b>CO4:</b> Demonstrate positive group communication exchanges.  <b>CO5:</b> Display competence in written communication and use current technology related to the communication field  <b>CO6:</b> Respond effectively to cultural communication differences and communicate ethically</p>
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**Course Contents**

UNIT-I	Communication Skills	04 Hours
<p>Communication: Meaning, Nature, Importance and Purpose of Communication, Types of Communication, Process of Communication, Communication Network in an Organization, Strategy for Effective Communication, Verbal and Non-Verbal Communication, Barriers to Communication, Essentials of Good Communication, Communication Techniques.</p> <p>Listening: The Process of Listening, Barriers to Listening, Types of Listening, Purpose of Listening, Listening to Conversation (Formal and Informal) , Active Listening- an Effective Listening Skill , Benefits of Effective Listening , Barriers to Listening , Listening to Announcements- (railway/ bus stations/ airport /sports announcement/ commentaries etc.), Academic Listening (Listening to Lectures) , Listening to Talks and Presentations , Note Taking Tips. Various Class activities should be conducted</p>		

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for more practical exposure.

UNIT-II	Body Language	4 Hours
<p>Body Language : 1.Communicating with Your Body-Interpret a New Language, The Power of Para verbal Communication, Bodies Speak Louder than Words 2.How to Read Body Language- Head Movement, Translate Gestures into Words, Open vs. Closed Body Language, Watch Eye Movement 3.Body Language Assumptions-Common Postures, Personal Space Invasion, Reactive Movements, Fidgeting and Boredom 4.Male vs. Female Variations- Facial Expressions by Gender, Personal Space Differences, Common Female Body Language, Common Male Body Language 5.Nonverbal Signals- Gestures and Hand Signals, Sending Signals to Others, It's ,Not What You Say, It's How You Stand, What is Your Posture Communicating? 6. Facial Expressions- Emotions Displayed, Micro-Expressions, Facial Action Coding System (FACS), Universal Facial Expressions 7. Body Language in the Workplace-Communicate with Power, Cultural Differences, Building Rapport and Trust, Using Mirroring 8.Are They Lying? - Hand Movements, Forced Smiles, Eye Movement, Changes in Posture 9. Using Body Language- Becoming Aware of Your Signals, Communicating with Confidence, Posturing Explained, Practicing in the Mirror 10.Match Your Words with Your Body- Involuntary Movements, Say What You Mean, Staying Consistent, Actions Will Trump Words</p>		
UNIT-III	Interview and Presentation skills	04 Hours
<p>Interview Skills: Preparing for the Job Interview: Importance and Factors Involving Job Interview; Characteristics of Job Interview; Job Interview Process, How you should prepare for a job interview, find out about companies, overcome nerves, decide which clothes to wear, vocabulary about your hard and soft skills, and answering questions using the STAR technique, Job Interview Techniques-Manners and etiquettes to be maintained during an interview</p> <p>Answering Interview Questions: Sample Questions Commonly asked During Interview, Avoiding mistakes during the interview, tips to help you answer questions effectively and confidently, understanding the importance of non-verbal communication during interviews, and the importance of intonation.</p> <p>Responding to Challenging Interview: Questions Answering those challenging interview questions, being able to stand out during interviews, providing diplomatic answers to questions you would prefer had not been asked and giving yourself time to come up with an answer, and stressing key words in your replies, Critical Success Factors for Interview, Negotiating Salary &amp; Compensation.</p> <p>Closing the Job Interview Effectively: Post Interview and Online Interviews Considering the questions that you, the interviewee should ask, or not ask, deciding what you should do, or not do at the end of the interview, and after the interview, and discovering how online interviews are similar and different to face to face interviews, Post-Interview &amp; Follow-up.</p> <p>Mock Interviews should be conducted.</p> <p>Presentation Skills: Preparing a PowerPoint Presentation, Greeting and introducing, Presenting a Paper, Group Discussions. Preparing for and Facing a Job Interview</p>		
UNIT-IV	Group Discussion Preparation	4 Hours

  
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GD Introduction: What is a Group Discussion?, Who holds a Group Discussion?, How is a GD Conducted? Why is a "GD" conducted?, Why GD is important?, GD: Approach (Carefully craft the opening gambit, Use Key Word Approach, Apply Shock Strategy GD: Do's and Don'ts, GD: Communications, Types of GD topics: Techniques, GD: Etiquette, GD: Content Discuss Solved Case Studies and Conduct GD in Class on different topics, Experience sharing by Industry people & Alumni

<b>UNIT-V</b>	<b>Written communication</b>	<b>04 Hours</b>
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Elements of Effective Writing (What is Writing?), Main Forms of Written Communication, Letter Writing (formal and informal), Applying for a job (Preparing Cover letters, Preparing a CV/Resume and Effective Profiling), Summarizing (Précis Writing, Note-making, Preparing Agenda and Minutes for Meetings), Writing Notices and Memos, Drafting an E-mail, Press Release, Correspondence with Govt./Authorities, Office Orders, Enquiries and Replies)

<b>UNIT-VI</b>	<b>Grooming for Career Building</b>	<b>04 Hours</b>
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Telephone Skills : Basics of Telephone communication • How to handle calls- telephone manners • Leaving a message • Greeting and Leave Taking over phone (etiquette).  
 Time & Stress Management: Identifying Time Wasters • Time Management Tips • Identifying Factors Responsible for Stress • Stress Management Tips • Test Preparation Tips.  
 Soft Skills for Leadership and Team Management: Qualities of a Good Leader • Leadership Styles • Decision Making • Intrapersonal skills • Interpersonal skills • Problem solving • Critical thinking • Negotiation skills.

**List of Laboratory Assignments/Experiments (to be covered)**

<b>1</b>	Understanding and implementation of effective communication and Listening skills
<b>2</b>	Implementation in oral, written, and visual communication
<b>3</b>	Implementation of Interview skills
<b>4</b>	Group communication exchanges
<b>5</b>	Written communication and use current technology related to the communication field
<b>6</b>	Implementation effectively to cultural communication differences and communicate ethically

**Reference Books:**

- R1:** Communicating at work: Strategies for success in business and the professions: Adler, Elmhurst, & Lucas (2013). NE: McGraw Hill.
- R2:** The Definitive Book of Body Language Allan Pease
- R3:** The Art of Public Speaking by Dale Carnegie
- R4:** On Writing Well: The Classic Guide to Writing Nonfiction by William Zinsser
- R5:** Five Stars: The Communication Secrets to Get from Good to Great (Hardcover) by Carmine Gallo

**Weblinks:**

W1: [www.google.com](http://www.google.com)

W2: [www.citehr.com](http://www.citehr.com)

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**Academic Year – 2024-2025 Semester-III**  
**[MCA242101T]: Research Methodology**

<b>Teaching Scheme:</b> TH: -Hours/Week : 03	<b>Credit</b> TH : 03	<b>Examination Scheme:</b> In Sem Evaluation : 20 Marks Mid Sem. Exam : 30 Marks End Sem. Exam : 50 Marks Total : 100 Marks
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**Course Objective:**

1. Introduction to philosophy of research.
2. Understand process to formulate research questions / idea
3. Understand process of planning of research time, resource
4. Understand different statistical analysis methods
5. Develop thesis and report writing.

**Course Outcome:**  
 After successful completion of the course, students will able to:

CO1: Knowledge on various kinds of research questions and research designs

CO2: Formulate research problems (task) and develop a sufficiently coherent research design

CO3: Assess the appropriateness of different kinds of research designs

CO4: Knowledge on qualitative, quantitative and mixed methods of research, as well as relevant ethical and philosophical considerations

CO5: Develop independent thinking for critically analyzing research reports

<b>Course Contents</b>		
<b>UNIT-I</b>	<b>Research Foundation</b>	<b>6Hours</b>
What is Research, Objectives of Research, Types of Research, Scientific Research, Research and Theory, Conceptual and theoretical Models, Importance of research Methodology in scientific research		
<b>UNIT-II</b>	<b>Review of Literature</b>	<b>6 Hours</b>

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Need for Reviewing Literature, What to Review and for what purpose, Literature Search Procedure, Sources of Literature, Planning of Review work, Note Taking, Library and documentation.

<b>UNIT-III</b>	<b>Planning of Research</b>	<b>6 Hours</b>
The planning process, Selection of a Problem for Research, Formulation of the Selected , Problems, Hypothesis formation, Measurement, Research Design/Plan		
<b>UNIT-IV</b>	<b>Processing of Data and Statistical Analysis of Data</b>	<b>6 Hours</b>
Measures of Relationship, Simple Regression Analysis, Multiple Correlation and Regression, Partial Correlation, Neural Network based optimization, Optimization of fuzzy systems, Error Analysis, Results and their discussions		
<b>UNIT-V</b>	<b>Data Processing and Statistical Analysis tools</b>	<b>6 Hours</b>
Introduction to Statistical Software, MINITAB, Weka		
<b>UNIT-VI</b>	<b>Report and Thesis writing</b>	<b>6 Hours</b>
Types of Reports, Planning of Report Writing, Research Report Format, Principles of Writing, Data and Data Analysis Reporting in a Thesis, Use of Endnote, Bibliography, API , appendix, table, Observations arrangement, Preparation of type script and lay-out of thesis, Use of LATEX Indexing of Journals, Impact factor and social Media for Researchers.		

**References:**

- R1. Research Methodology: Methods and Techniques by C. R. Kothari, New Age
- R2. Statistical Methods for Research Workers by Fisher R. A., Cosmo Publications, New Delhi ISBN:81- 307-0128-6
- R3. Design and Analysis of Experiments by Montgomery D.C. (2001), John Wiley, ISBN: 0471260088
- R4. MINITAB online manual
- R5. Methodology of Research in Social Sciences by O. R. Krishnaswamy and M. Rangnatham Himalaya publication House, 2005, ISBN: 8184880936
- R6. Weka online manual

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**Academic Year – 2024-2025 Semester-III**

**[MCA242102A-T]: Advanced Development Technology**

<b>Teaching Scheme:</b> TH: - Hours/Week : 03	<b>Credit</b> TH: 3	<b>Examination Scheme:</b> In Sem. Evaluation : 20 Marks Mid Sem. Exam : 30 Marks End Sem. Exam : 50 Marks Total : 100 Marks
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<p><b>Course Objective:</b></p> <ol style="list-style-type: none"> <li>1. Explain how C# fits into the .NET platform and analyse the basic structure of a C# and ASP Application.</li> <li>2. Describe the object oriented aspects of C#.</li> <li>3. Develop applications using ASP .Net using C#.</li> <li>4. Design and develop Web based applications on .NET</li> <li>5. Describe the foundations of CLR execution.</li> <li>6. Describe the developing the MVC Applications and Ajax controls on web form.</li> </ol>
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<p><b>Course Outcome:</b>  <b>After successful completion of the course, students will able to:</b></p> <p>CO1: Gain a comprehensive understanding of the philosophy and architecture of C-Sharp Programming</p> <p>CO2: Learn how to implement object oriented concepts using c# and implementation of delegate and Exception handling.</p> <p>CO3: Attain a detailed knowledge of the building blocks of web applications using web forms, Including Programs that interact With databases.</p> <p>CO4: Develop Rich Internet Web applications by using C#, ASP.NET, ADO.NET</p> <p>CO5: Determine to Deploy web application using ADO.NET and learning to use of web services</p> <p>CO6: Express proficiency in handling of Ajax on web forms and creating MVC applications used for Web Development</p>
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<b>Course Contents</b>		
<b>UNIT-I</b>	<b>Introduction .NET Framework 4.0</b>	<b>6 Hours</b>
Benefits of .NET Framework, Architecture of .NET Framework 4.0, Components of .NET Framework 4.0: CLR, CTS, Metadata and Assemblies, .NET Framework Class Library, . ASP .Net Architecture, Processing of an application in .Net, Namespace Fundamentals, Maintaining State Information <b>Introducing C#:</b> overview of C#, Literals, Variables, Data Types, Operators, Expressions, Branching, Looping, Methods, implicit and explicit casting, Constant, Arrays, Array List, Enumerations, boxing and unboxing.		

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UNIT-II	Object Oriented aspect of C#	7 Hours
OOPs concepts, The System namespace, Access Modifiers, Static Classes and Static Class Members. Static Property, Polymorphism/Overloading, Runtime Polymorphism/Overriding. Abstraction: Abstract classes, Abstract methods. Interfaces: Syntax of Interfaces, Implementation of Interfaces and Inheritance. Delegates: Creating and using. Multicasting with Delegates, Exception Handling: The try/catch/finally statement, Checked and Unchecked Statements. Chained exceptions, using exceptions.		
UNIT-III	Creating a User Interface (Controls and Master age)	7 Hours
<b>Using Controls-:</b> Validation Controls, Navigation between Pages, Master Pages & Themes, Simple MasterPage Nested Master Page Configuring Master Page Creating Themes, Applying Themes, Applying Style sheet. <b>Data Binding -:</b> Bind data to UI, Transform and filter Data.		
UNIT-IV	Storing and Retrieving Data with ADO.NET, Catching and Correcting Errors	6 Hours
Accessing Data with ADO.NET, Using Data Sets on Web Forms, Processing Transactions, CRUD operations using SQL-Server. <b>Using Exception Handling-:</b> Using Error Pages, Logging Exceptions		
UNIT-V	Web Services, Testing Web Applications & Building and Deploying Web Applications	6 Hours
<b>Web Services -:</b> Creating Web Services, Discovering Web Services, Instantiating and Invoking Web Services, <b>Testing Web Applications -:</b> Creating Tests, Running Tests, Debugging, <b>Building and Deploying -:</b> Building a Web Application, Deploying a Web Application authenticating and Authorizing Users using windows and forms		
UNIT-VI	Use of Ajax and Introduction to MVC	6 Hours
<b>Ajax -:</b> Introduction to Ajax Controls, Using various Ajax controls on web forms. <b>Introduction to MVC -:</b> MVC Architecture, MVC- Model, Views, Controllers, Creating Simple MVC Application		

  
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**Text Books:**


**T1.** Herbert Schildt, "The Complete Reference: C# 4.0", Tata Mc Graw Hill, 2012.

**Reference Books:**

- R1.** J.NET 4.0 Programming (6-in-1), Black Book, Kogent Learning Solutions Inc., Wiley- Dream Tech Press, 2010.
- R2.** E. Balagurusamy, "Programming in C#", Tata McGraw-Hill, 3 edition 201
- R3.** Microsoft ASP.NET 4.0 Step by Step - George Shepherd, Microsoft Press
- R4.** Mastering ASP.Net - BPB Publication
- R5.** ASP.net – The Complete Reference- Tata McGraw Hill
- R6.** ASP.NET Programming –



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**S.Y. MCA**  
**Academic Year – 2024-2025 Semester-III**  
**[MCA242102A-L]: Advanced Development Technology**

<b>Teaching Scheme:</b> PR: - Hours/Week : 04	<b>Credit</b> PR: 2	<b>Examination Scheme:</b> ICSE : 60 Marks End Sem. Exam : 40 Marks Total : 100 Marks
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**Course Objective:**

1. Explain how C# fits into the .NET platform and analyse the basic structure of a C# and ASP Application.
2. Describe the object oriented aspects of C#.
3. Develop applications using ASP .Net using C#.
4. Design and develop Web based applications on .NET
5. Describe the foundations of CLR execution.
6. Describe the developing the MVC Applications and Ajax controls on web form.

**Course Outcome:**


**After successful completion of the course, students will able to:**

- CO1: Gain a comprehensive understanding of the philosophy and architecture of C-Sharp Programming
- CO2: Learn how to implement object oriented concepts using c# and implementation of delegate and Exception handling.
- CO3: Attain a detailed knowledge of the building blocks of web applications using web forms, Including Programs that interact With databases.
- CO4: Develop Rich Internet Web applications by using C#, ASP.NET, ADO.NET
- CO5: Determine to Deploy web application using ADO.NET and learning to use of web services
- CO6: Express proficiency in handling of Ajax on web forms and creating MVC applications used for Web Development

**A) List of Laboratory Assignments/Experiments (minimum -- to be covered)**

1. Simple programs using branching and looping, arrays, strings and methods, structures, classes, objects, inheritance, polymorphism and interfaces
2. Programs to implement operator overloading, delegates, events, errors and exceptions
3. Perform string manipulation with the string builder and string classes
4. Program to implement windows forms

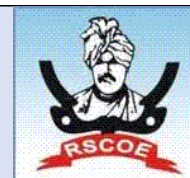
  
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5. Simple application using web controls a) Finding factorial Value  
b) Currency Conversion c) Quadratic Equation d) Temperature Conversion e) Login control
6. Calendar control a) Display messages b) Display vacation c) Selected day using style d)
7. Difference between two calendar dates
8. Tree view control a) Tree view control and data list b) operations
9. Program to implement connectivity with database
10. Binding to databases using controls
11. Program to implement multiple forms, standard modules, and menus
12. Program to implement file manipulation
13. Working with XML, using Crystal Reports in web forms

### MINI Project

Develop a website using ASP .Net with C# concepts learnt in the theory and exercises listed in part A with a good look and feel effects. You can use ASP .Net and .Net framework 4.0 and database.

**Note: -**


1. A team of two students must develop the web-based project. However, during the examination, Each student must demonstrate the project individually.
2. The team must submit a brief project report (20-25 pages) that must include the following:
  - a. Introduction
  - b. System Requirement Specification
  - c. System Design
  - d. Implementation
  - e. Screen Shots
  - f. Conclusion & Future Enhancement
  - g. Bibliography


The Demonstration, Viva and Report Evaluation will be done for 50 Marks.

### Instructions:

1. Mini project student group size is limited to two students only.  
Project report duly signed by the Guide and HOD need to be submitted during examination

  
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**Academic Year – 2024-2025 Semester – III**

**[MCA242102B-T]: Mobile Application Development**

<b>Teaching Scheme:</b> TH:-03Hours/Week	<b>Credit</b> TH:03	<b>Examination Scheme:</b> InSem. Evaluation : 20 Marks Mid Sem. Exam : 30Marks End Sem. Exam : 50Marks Total : 100 Marks
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**Course Objective:**

1. To provide conceptual understanding of Mobile applications development
2. To acquire skills to develop Mobile applications.
3. To Designing and develop mobile applications using a chosen application development framework.
4. To evaluate alternative mobile frameworks, and contrast different programming platforms.

**Course Outcome:**

After successful completion of the course, students will able to:

- CO1. Demonstrate their understanding of the fundamentals of Android operating systems
- CO2. Demonstrate their skills of using Android software development tools
- CO3. Understand database activities like retrieval and Sharing.
- CO4. Discover the need for working with SQLite and its operations.
- CO5. Illustrate the Peer to peer to communication using instant messaging and GTalk services.
- CO6. Illustrate the android wifi features and Accessing Android Hardware.

**Course Contents**

UNIT-I	Android application development undamentals	5 Hours
Overview of Android, Features of android, Architecture of Android, Libraries, Software development kit, Introducing views, List of views and view groups, Introducing layouts, Creating new views, Creating and using Menus		
UNIT-II	Starting with Application Coding	6 Hours
Introducing Intents, Introducing Adapters, Using Internet Resources, Selecting Location Provider, finding your location, creating map-based activities.		
UNIT-III	Data Storage, retrieval and Sharing	7 Hours
File system in android, Internal storage and external storage, Saving and loading files, File Management tools		
UNIT-IV	Introduction to SQLite	7 Hours

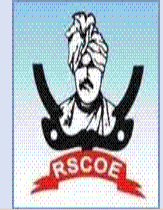
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Creating SQLite database, Editing Tasks with SQLite, Cursors and content values, Working with Android database

<b>UNIT-V</b>	<b>Peer to peer to communication</b>	<b>7 Hours</b>
Accessing Telephony Hardware, Introducing Android Instant Messaging, GTalk Service : Using, binding & Making connection, Managing chat Sessions, Sending and receiving Data messages, Introducing SMS Using, sending & receiving SMS Messages		
<b>UNIT-VI</b>	<b>Accessing Android Hardware</b>	<b>5 Hours</b>

Audio, Video and Using the camera, Introducing Sensor Manager, Android Telephony, Using Bluetooth , Manage network and Wi-Fi connections

**Text Books :**


- T1.** Professional Android™ Application Development Wrox Publications, Reto Meier
- T2.** Hello Android, Introducing Google's Mobile Development Platform, Ed Burnette, Pragmatic Programmers, ISBN: 978-1-93435-617-3
- T3.** Sams teach yourself Android application development, Lauren Dercy and Shande Conder, Sams publishing


**Reference Books:**

- R1.** Reto Meier, "Professional Android 2 Application Development", Wiley India Pvt Ltd
- R2.** Mark L Murphy, "Beginning Android", Wiley India Pvt Ltd
- R3.** Android Application Development All in one for Dummies by Barry Burd, Edition: I

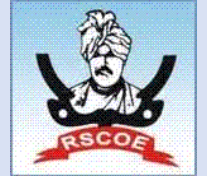
**Web Links:**

- <https://developer.android.com>
- <http://www.tutorialspoint.com/android/>

  
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**Academic Year – 2024-2025 Semester – III**  
**[MCA242102B-L]: Mobile Application Development**

<b>Teaching Scheme:</b> LAB:-04Hours/Week	<b>Credit</b> LAB:02	<b>Examination Scheme:</b> ICSE : 60 Marks End Sem. Exam : 40Marks Total : 100 Marks
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**Course Objective:**

1. To provide conceptual understanding of Mobile applications development
2. To acquire skills to develop Mobile applications.
3. To Designing and develop mobile applications using a chosen application development framework.
4. To evaluate alternative mobile frameworks, and contrast different programming platforms.


**Course Outcome:**  
 After successful completion of the course, students will able to:


**CO1.** Demonstrate their understanding of the fundamentals of Android operating systems  
**CO2.** Demonstrate their skills of using Android software development tools  
**CO3.** Understand database activities like retrieval and Sharing.  
**CO4.** Discover the need for working with SQLite and its operations.  
**CO5.** Illustrate the Peer to peer to communication using instant messaging and GTalk services.  
**CO6.** Illustrate the android wifi features and Accessing Android Hardware.


**Guidelines for Assessment**

Continuous assessment of laboratory work is done based on overall performance and Laboratory assignments performance of student. Each Laboratory assignment assessment will assign grade/marks based on parameters with appropriate weightage. Suggested parameters for overall assessment as well as each Laboratory assignment assessment include- timely completion, performance, innovation, efficient codes, punctuality and neatness.

**Students need to develop Mini Project on the basis of various concepts learned in the subject.**

  
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**S. Y. MCA**

**Academic Year – 2024-2025 Semester – III**

**[MCA242102C-T]: Artificial Intelligence & Machine Learning**

<b>Teaching Scheme:</b> <b>TH: - 03 Hours/Week</b>	<b>Credit</b> <b>TH: 03</b>	<b>Examination Scheme:</b> <b>In Sem. Evaluation : 20 Marks</b> <b>Mid Sem. Exam : 30 Marks</b> <b>End Sem. Exam : 50 Marks</b> <b>Total : 100 Marks</b>
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**Course Objective:**

1. To Understand the Concept of Machine Learning
2. To Implement supervised and unsupervised Learning algorithms using Python.
3. To evaluation of **State space search and Heuristic Search Techniques**
4. To implement data processing techniques using Python Libraries.
5. To understand the concept of **Generative AI**

**Course Outcome:**

On completion of the course, student will be able to–

CO1: Understand core concepts, methodologies and techniques used in Artificial Intelligence and Machine Learning and Generative AI

CO2: Describe the workflow of a machine learning project, including data pre-processing, model training, evaluation, and deployment.

CO3: Apply statistical techniques to solve data related problems effectively

CO4: Apply exploratory data analysis using Numpy and Pandas to derive insights from data sets.

CO5: Apply various algorithms of Supervised Learning , Unsupervised Learning and Heuristic Search Techniques.

<b>Course Contents</b>		
<b>UNIT-I</b>	<b>Machine Learning(ML) Python MODULES</b>	<b>6 Hours</b>
<b>NumPy</b> - Creating Arrays, Array Indexing, Array Iterating, Joining Array, Array Split, Array Search , Array Sort. <b>Pandas</b> - Series, DataFrames , Read CSV, Analyzing DataFrames, Cleaning Data, Data Correlations. <b>Matplotlib</b> – Pyplot , Plotting, Subplot, Scatter, Bars, Histograms.		
<b>UNIT-II</b>	<b>Introduction : Machine Learning(ML)</b>	<b>7 Hours</b>
Machine Learning Process- Preliminaries for Machine, Learning algorithms -Turning data into Probabilities and Statistics for Machine Learning- Probability theory – Probability Distributions – Decision Theory.		
<b>UNIT-III</b>	<b>Supervised &amp; Unsupervised Learning</b>	<b>7 Hours</b>

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Regression- Linear Regression, Multiple Linear Regression , Polynomial Regression, Classification- Logistic Regression, Support vector Machines , K-Means clustering, KNN (K-Nearest Neighbors), Apriori Algorithm.

<b>UNIT-IV</b>	<b>Introduction to AI Fundamentals</b>	<b>6 Hours</b>
Defining Artificial Intelligence, History of AI, AI task domains, Defining AI techniques, Turing Test, Intelligent Agents: Agents and Environments, Nature of Environments, Rationality, Performance Measures, Structure of Agents, Problem-Solving Agents.		
<b>UNIT-V</b>	<b>State space search and Heuristic Search Techniques</b>	<b>6 Hours</b>
Defining problems as state space search, Problem Characteristics, Production Systems and characteristics, Breadth First Search , Depth First Search, Heuristic Search, Best First Search, A* Algorithm , Hill Climbing Algorithm.		
<b>UNIT-VI</b>	<b>Representing knowledge</b>	<b>6 Hours</b>
Knowledge Representation Techniques: Computable functions and predicates, Backward Chaining, Procedural vs. Declarative Knowledge, Forward vs. Backward Reasoning, Semantic Networks, Partitioned Semantic Networks, Conceptual Dependency, Issues in Knowledge Representation.		

References:

- R1. Artificial Intelligence**, Elaine Rich, Kevin Knight, Shivashankar B. Nair, 3rd Edition, McGraw Hill
- R2. Artificial Intelligence-A modern Approach**, Stuart Russell and Peter Norvig, 3rd Edition, Pearson Education
- R3.** Tom Mitchell, “**Machine Learning**”, McGraw-Hill, 1997.
- R4.** Ethem Alpaydin, “**Introduction to Machine Learning**”, MIT Press, Third Edition, 2014
- R5.** Rogers, Simon, and Mark Girolami. **A first course in machine learning**. CRC Press, 2015.

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**S. Y. MCA**  
**Academic Year – 2024-2025 Semester – III**  
**[MCA242102C-L]: Artificial Intelligence & Machine Learning**

<b>Teaching Scheme:</b> LAB: -04 Hours/Week	<b>Credit</b> LAB: 02	<b>Examination Scheme:</b> ICSE : 60 Marks End Sem. Exam : 40 Marks Total : 100 Marks
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**Course Objective:**

1. To implement Array Indexing, Sorting and searching using NumPy
2. To implement data cleaning and analyzing using Pandas.
3. To gain knowledge of plotting and histogram using Matplotlib
4. To enhance problem solving skills using Heuristic Search Techniques
5. To implement various supervised and unsupervised Learning algorithms

**Course Outcome:**  
 On completion of the course, student will be able to–  
 CO1: Demonstrate basics of Python Libraries concepts  
 CO2: Demonstrate array indexing , array sorting , data cleaning, data analyzing operations and plotting operation using Python libraries.  
 CO3: Implement various supervised and unsupervised Learning algorithms using Python.  
 CO4: Implement various Heuristic Search algorithm.  
 CO5: Implement Generative Algorithms.

**Guidelines for Assessment**

Continuous assessment of laboratory work is done based on overall performance and Laboratory assignments performance of student. Each Laboratory assignment assessment will assign grade/marksbased on parameters with appropriate weightage. Suggested parameters for overall assessment as wellas each Laboratory assignment assessment include- timely completion, performance, innovation,efficient codes, punctuality and neatness.

**A. List of Laboratory Assignments/Experiments (minimum -- to becovered)**

1. Write a NumPy to create above Series and then double the value in series and store inanother series named Series2
2. Write a NumPy program to reverse an array (first element becomes last).
3. Number of students in class 11 and 12 in three streams( 'Science', 'Commerce' and 'Humanities') are stored in two series objects c11 and c12. Write NumPy code to find totalnumber of students in class 11 and 12 , stream wise.

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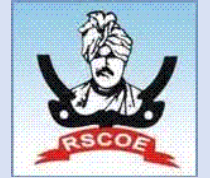
4. Write a NumPy program to sort an along the first, last axis of an array.
  5. Write a NumPy program to create a new shape to an array without changing its data.
  6. Write a NumPy program to count the number of "P" in a given array, element-wise.
  7. Write a Pandas program to change the order of index of a given series.
  8. Write a Pandas program to calculate the number of characters in each word in a givenseries.
  9. Write a Pandas program to select the rows where number of attempts in the examination is less than 2 and score greater than 15.
  10. Write a Pandas program to insert a given column at a specific column index in a DataFrame.
  11. Write a Pandas program to count the missing values in a given DataFrame.
  12. Predict Salary using Simple Linear Regression .
  13. Predict Profit using Multiple Linear Regression.
  14. Predict Salary using Polynomial Regression .
  15. Predict Purchasing capability with % Accuracy of a person using Logistic Regression.
  16. Predict Purchasing capability with % Accuracy of a using K-Nearest Neighbors (K-NN) Model.
  17. Write a program to implement Best First Search traversal.
  18. Write a program to implement using A\* algorithm.
  19. Use Heuristic Search Techniques to Implement Hill-Climbing Algorithms.
- B. Develop a Mini project using concepts learnt in the theory and exercises listed in part A**

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**Academic Year – 2024-2025 Semester-III**

**[MCA242102D-T] : Framework - Spring**

<b>Teaching Scheme:</b> <b>TH: - Hours/Week : 03</b>	<b>Credit</b> <b>TH: 03</b>	<b>Examination Scheme:</b> <b>In Sem. Evaluation : 20 Marks</b> <b>Mid Sem. Exam : 30 Marks</b> <b>End Sem. Exam : 50 Marks</b> <b>Total : 100 Marks</b>
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**Course Objective:**

1. To enable the students to understand the core principles of Spring Framework and use of dependency Injection.
- 2) Students will be able to develop Rest Api using testing tool Postman.
- 3) Students will be able to develop building web applications using Spring MVC and H2 Databases.

**Course Outcome:**  
 After successful completion of the course, students will able to:

- CO1.** Apply the spring core concept to map and solve simple real world problem.
- CO2.** To develop web application using various dependencies
- CO3.** To develop Rest api using testing tool springboot Developer tool
- CO4.** To develop CURD application using JPA
- CO5.** To develop CURD application using JDBC Template
- CO6.** To develop robust web applications using Spring MVC with H2 database

**Course Contents**

<b>UNIT-I</b>	<b>Introduction to Spring Boot</b>	<b>7 Hours</b>
<b>Spring Boot - Goals and Important Features</b> dependency injection. Developing Spring Applications before Spring Boot. Using Spring_INITIALIZER to create a Spring Boot Application. Creating a Simple REST Controller. What is Spring Boot Auto Configuration? Spring Boot vs Spring vs Spring MVC		

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<b>UNIT-II</b>	<b>Spring Boot Starter Projects</b>	<b>6 Hours</b>
Spring Boot Starter Projects - Springboot Annotation, Starter Web and Starter JPA, Overview of different Spring BootStarter Projects, Spring Boot Actuator, and Spring Boot Developer Tools.		
<b>UNIT-III</b>	<b>REST API</b>	<b>7 Hours</b>
Postman usage to call and test REST API , Rest Annotation with In MemoryDatabase , CRUD Operations - Create, Read/Retrieve, Update and Delete		
<b>UNIT-IV</b>	<b>JPA Repository Concepts</b>	<b>6 Hours</b>
Crud Repository, JPA Query Concepts, Named Queries, Query Annotation, Async Results Pagination and Sorting		
<b>UNIT-V</b>	<b>Spring JdbcTemplate</b>	<b>6 Hours</b>
Problem of Jdbc API, Advantage of Spring JdbcTemplate, JdbcTemplate class and methods, Example of Spring JdbcTemplate		
<b>UNIT-VI</b>	<b>Spring MVC CRUD operations</b>	<b>6 Hours</b>
<b>CRUD operations-:</b> Crud operations (create, read, update and delete.) with spring MVC forms and spring boot H2 databases.		
<b>Text Books:</b>		
T1. Spring Boot in Action – Craig Wells		
T2. Spring Microservices in Action – John Carmell		
<b>Reference Books:</b>		
R1. Learning Spring Boot 2.0 – Stephani Maldini R2. Spring 5 Recipes: A Problem – Solution Approach		
R3. Reactive Spring - JoshLong		
R4. Spring Security in Action – Laurentiu Spilca		
R5. Expert Spring MVC and Web Flow – Seth Ladd		
<b>WebLinks-</b>		
1) <a href="http://www.springboottutorial.com/spring-boot-auto-configuration">http://www.springboottutorial.com/spring-boot-auto-configuration</a>		
2) <a href="http://www.springboottutorial.com/spring-boot-vs-spring-mvc-vs-spring">http://www.springboottutorial.com/spring-boot-vs-spring-mvc-vs-spring</a>		
3) <a href="http://www.springboottutorial.com/spring-boot-starter-projects">http://www.springboottutorial.com/spring-boot-starter-projects</a>		
4) <a href="https://www.javatpoint.com/spring-vs-spring-boot-vs-spring-mvc">https://www.javatpoint.com/spring-vs-spring-boot-vs-spring-mvc</a>		

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**S. Y. MCA**  
**Academic Year 2024-2025 Semester-III**  
**[MCA242102D-L] : Framework - Spring**

<b>Teaching Scheme:</b>	<b>Credit</b>	<b>Examination Scheme:</b>
<b>PR: -Hours/Week : 04</b>	<b>LAB: 02</b>	<b>ICSE : 60 Marks</b>
		<b>End Sem.Exam: : 40 Marks</b>
		<b>Total : 100 Marks</b>

**Course Objective:**

1. Describe the application development and configuration using spring Boot Framework and spring.
2. Learn the use of starter web and starter JPA for database access using spring and Postman usage to call and test REST API services
3. Learn JPA to handles most of the complexity of JDBC-based database access and object-relational mappings
4. Learn how Spring Integration enables lightweight messaging within Spring-based applications and supports integration with external systems.
5. To Learn Web MVC Framework for building web applications using Spring MVC and H2 Databases.

**Course Outcome:**

After successful completion of the course, students will able to:

- CO1.** Learn to develop the spring Boot application and its configuration.
- CO2.** To Learn use of starter web and starter JPA for database access using spring.
- CO3.** Indicate the use Postman usage to call and test REST API services for database access.
- CO4.** Express proficiency in handling the most of the complexity of JDBC-based database access and object-relational mappings Using JPA Repository
- CO5.** Create a Spring-based applications using JDBC template .
- CO6.** Develop the web applications using Spring MVC and H2 Databases.

**Guidelines for Assessment**

Continuous assessment of laboratory work is done based on overall performance and Laboratory assignments performance of student. Each Laboratory assignment assessment will assign grade/marks based on parameters with appropriate weightage. Suggested parameters for overall assessment as well as each Laboratory assignment assessment include- timely completion, performance, innovation, Efficient codes, punctuality and neatness. Evaluation of mini project based on presentation and work done.

**A. List of Laboratory Assignments/Experiments (minimum -- to be covered)**

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1. Creating a simple Spring Boot web applications
2. Managing Spring Boot beans, properties, and application configuration
3. Creating and consuming REST services
4. Demonstrate the Postman usage to call and test REST API services
5. Implementation of JDBC-based database access and object-relational mappings Using JPARepository
6. Creating Spring Boot web applications using spring web MVC
7. Perform the crud operations with spring MVC forms and spring boot H2 databases.

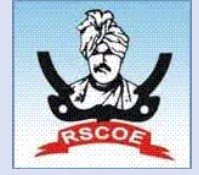
**B. Mini Project using Spring Boot, Web MVC and H2 Databases**

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**Academic Year – 2024-2025 Semesters-III**  
**[MCA242102E-T]: REACT JS**

<b>Teaching Scheme:</b> TH:-03 Hours/Week	<b>Credit</b> TH:03	<b>Examination Scheme:</b> InSem.Evaluation: 20 Marks Mid Sem. Exam :30 Marks End Sem. Exam :50 Marks Total : 100 Marks
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**Course Objective:**

1. Use a JavaScript package manager (either npm or Yarn)
2. The objective of this course is to help you learn the practical aspects of ReactJS and its ecosystem.
3. ReactJS will enable developers to develop large web applications which can change data, without reloading the page.

**Course Outcome:**

After successful completion of the course, students will able to:

- CO1.** Students will learn about MVC architecture, what is React and difference between single and multiple page applications? You will also learn how to install React, make use of NPM packages and ES6 concepts.
- CO2.** Students will learn React core concepts like Components, State and Props. You will also learn how to build the application layout using forms and style sheets.
- CO3.** Students will learn to build an application using different route techniques and consume remote data by integrating API in React applications.
- CO4.** Students will learn how to integrate Redux with React. Also, you will understand the other key terminologies associated with Redux to build a web application.
- CO5.** Students you will learn how to write and handle the Asynchronous actions using Redux
- CO6.** Students will learn how to implement Class component- Stateful features within Functional components using React Hooks.

**Course Contents**

UNIT-I	Introduction to Web Development and React	5 Hours
ReactJS – Introduction, Need of ReactJS, Applications, ReactJS – Installation, ReactJS - Creating a React Application, ReactJS – Features, ReactJS - Advantages & Disadvantages, Architecture, Different Client-side Technologies, JavaScript, DOM.		
UNIT-II	Components and Styling the Application Layout	6 Hours
React Elements, Render Function, Components, Class Component, Component Constructor, Functional Components, Multiple Components, Props, Props with Class		

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based Component, Props with Function based Component, States, Component Lifecycle, React Events, React Page, Layout, React Forms, Different Form Concepts, Styling in React, Inline Styling

**UNIT-III**

**Component-based Architecture**

**7 Hours**

Understanding the concept of components, Props and state management in React, Functional components vs. class components, Creating reusable components, Component lifecycle methods

**UNIT-IV**

**Handling Navigation with Routes**

**7 Hours**

Routing, react-router, Features of react-router, Configuration of routing using react-router, Navigation using Links, 404 page (Not found Page), URL Parameters, Nested Routes, Implementing styles using NavLink, Application Programming Interface, Build a REST API using json-server, API consumption in React application using Fetch method, ReactJS - JSX

**UNIT-V**

**React State Management using Redux**

**7 Hours**


ReactJS - State Management, Actions, reducers, and the store, Need of Redux, What is Redux?, Redux Architecture, Redux Action, Redux Reducers, Redux Store, Principles of Redux, Pros of Redux, Connecting React components to Redux, NPM Packages required..


**UNIT-VI**

**React Hooks**

**5 Hours**

Understanding React hooks in depth, useState, useEffect, useContext, and more, Custom hooks and their usage, Best practices for using hooks, Applying learned concepts to real-world projects, Building a multi-page web application using React.

  
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**Academic Year – 2024-2025 Semesters-III**  
**[MCA242102E-L]: REACT JS**

<b>Teaching Scheme:</b> LAB :-04 Hours/Week	<b>Credit</b> PR:02	<b>Examination Scheme:</b> ICSE : 60 Marks End Sem. Exam : 40 Marks Total : 100 Marks
<b>Course Objective:</b> 1. Use a JavaScript package manager (either npm or Yarn) 2. The objective of this course is to help you learn the practical aspects of ReactJS and its ecosystem. 3. ReactJS will enable developers to develop large web applications which can change data, without reloading the page.		
<b>Course Outcome:</b> After successful completion of the course, students will able to: <b>CO1.</b> Students will learn about MVC architecture, what is React and difference between single and multiple page applications? You will also learn how to install React, make use of NPM packages and ES6 concepts. <b>CO2.</b> Students will learn React core concepts like Components, State and Props. You will also learn how to build the application layout using forms and style sheets. <b>CO3.</b> Students will learn to build an application using different route techniques and consume remote data by integrating API in React applications. <b>CO4.</b> Students will learn how to integrate Redux with React. Also, you will understand the other key terminologies associated with Redux to build a web application. <b>CO5.</b> Students you will learn how to write and handle the Asynchronous actions using Redux <b>CO6.</b> Students will learn how to implement Class component- Stateful features within Functional components using React Hooks.		
<b>Guidelines for Assessment</b>		
Continuous assessment of laboratory work is done based on overall performance and Laboratory assignments performance of student. Each Laboratory assignment assessment will assign grade/marks based on parameters with appropriate weightage. Suggested parameters for overall assessment as well as each Laboratory assignment assessment include-timely completion, performance, innovation, efficient codes, punctuality and neatness.		

  
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**A. List of Laboratory Assignments/ Experiments( minimum—to be covered)**

1. Designing web pages using various DOM elements.
2. Implementation of Components and Styling the Application Layout
3. Implementation of Handling Navigation with Routes.
4. Implementation of various React State Management using Redux.
5. Implementation of Asynchronous Programming with Saga Middleware.
6. Implementation of React Hooks.

**B. Mini Project** Develop a Mini project using concepts learnt in the theory and exercises listed in part A

  
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**S.Y.MCA**  
**Academic Year – 2024-2025 Semesters-III**

**[MCA242102F-T]: Data Science**

<b>Teaching Scheme:</b> <b>TH: - 03 Hours/Week</b>	<b>Credit</b> <b>TH: 03</b>	<b>Examination Scheme:</b> <b>In Sem. Evaluation : 20 Marks</b> <b>Mid Sem. Exam : 30 Marks</b> <b>End Sem. Exam : 50 Marks</b> <b>Total : 100 Marks</b>
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**Course Objective:**

1. An understanding of the data operations
2. An overview of simple statistical models and the basics of Machine Learning Techniques of Regression.
3. An understanding good practices of Data Science.
4. Skills in the use of tools such as python, IDE.
5. Understanding of the basics of the Supervised Learning.

**Course Outcome:**  
 On completion of the course, student will be able to–  
 CO1: Describe what Data Science is and the skill sets needed to be a data scientist  
 CO2: Explain the significance of exploratory data analysis (EDA) in data science.  
 CO3: Ability to learn the supervised learning, SVM.  
 CO4: Apply basic machine learning algorithms (Linear Regression)  
 CO5: Explore the Networks, Page Rank.  
 CO6: Apply Data Cleaning , Preparation and Visualization Techniques.

<b>Course Contents</b>		
<b>UNIT-I</b>	<b>Introduction</b>	<b>6 Hours</b>
Introduction, Toolboxes: Python, fundamental libraries for data Scientists. Integrated development environment (IDE). Data operations: Reading, selecting, filtering, manipulating, sorting, grouping, rearranging, ranking, and plotting.		
<b>UNIT-II</b>	<b>Descriptive Statistics &amp; Data Preparation</b>	<b>7 Hours</b>
Descriptive statistics, data preparation. Exploratory Data Analysis data summarization, data distribution, measuring asymmetry. Sample and estimated mean, variance and standard score. Statistical Inference frequency approach, variability of estimates, hypothesis testing using confidence intervals, using p-values		
<b>UNIT-III</b>	<b>Supervised Learning</b>	<b>7 Hours</b>
Supervised Learning: First step, Learning curves, Training-validation and test. Learning models generalities, Support Vector Machines, Random Forest. Examples		

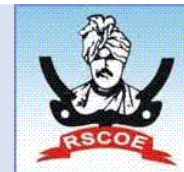
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<b>UNIT-IV</b>	<b>Regression Analysis</b>	<b>6 Hours</b>
Regression analysis, Regression: Linear Regression Simple linear regression, Multiple & Polynomial regression, Sparse model. Unsupervised Learning, Clustering, Similarity and Distances, Quality Measures of Clustering, Case Study.		
<b>UNIT-V</b>	<b>Network Analysis</b>	<b>6 Hours</b>
Network Analysis, Graphs, Social Networks, Centrality, Drawing centrality of Graphs, Page Rank, Ego-Networks, community Detection		
<b>UNIT-VI</b>	<b>DATA CLEANING, PREPARATION AND VISUALIZATION</b>	<b>6 Hours</b>
Data Cleaning and Preparation: Handling Missing Data - Data Transformation: Removing Duplicates, Transforming Data Using a Function or Mapping, Replacing Values, Detecting and Filtering Outliers-String, Manipulation: Vectorized String Functions in pandas. Plotting with pandas: Line Plots, Bar Plots, Histograms and Density Plots, Scatter or Point Plots.		
<b>Text Books:</b>		
<b>R1.</b> Introduction to Data Science a Python approach to concepts, Techniques and Applications, Igual, L. Seghi', S. Springer, ISBN:978-3-319-50016-4		
<b>R2.</b> Data Analysis with Python A Modern Approach, David Taieb, Packt Publishing, ISBN-9781789950069		
<b>R3.</b> Python Data Analysis, Second Ed., Armando Fandango, Packt Publishing, ISBN: 9781787127487		

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**S.Y.MCA**  
**Academic Year 2024-2025 Semesters-III**  
**[MCA242102F-L]: Data Science**

<b>Teaching Scheme:</b> LAB: - 04 Hours/Week	<b>Credit</b> <b>PR: 03</b>	<b>Examination Scheme:</b> <b>ICSE : 60 Marks</b> <b>End Sem. Exam : 40 Marks</b> <b>Total : 100 Marks</b>
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**Course Objective:**

1. An understanding of the data operations
2. An overview of simple statistical models and the basics of Machine Learning Techniques of Regression.
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 On completion of the course, student will be able to–  
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 CO4: Apply basic machine learning algorithms (Linear Regression)  
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**Guidelines for Assessment**

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**List of Laboratory Assignments/Experiments (minimum -- to be covered)**

1. Create Pandas Series and DataFrame from various inputs.
2. Import any CSV file to Pandas DataFrame and perform the following:
  - (a) Visualize the first and last 10 records
  - (b) Get the shape, index and column details
  - (c) Select/Delete the records(rows)/columns based on conditions.
  - (d) Perform ranking and sorting operations.
3. Write a Pandas program to change the order of index of a given series.
4. Create NumPy arrays from Python Data Structures, Intrinsic NumPy objects and Random Functions.
5. Manipulation of NumPy arrays- Indexing, Slicing, Reshaping, Joining and Splitting.
6. Computation on NumPy arrays using Universal Functions and Mathematical methods.

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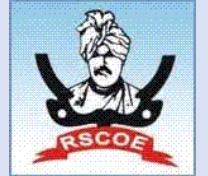


7.Import a CSV file and perform various Statistical and Comparison operations on rows/columns
8.Load an image file and do crop and flip operation using NumPy Indexing.
9.Create Pandas Series and DataFrame from various inputs.
10. Import any CSV file to Pandas DataFrame and perform the following: (a) Handle missing data by detecting and dropping/ filling missing values. (b) Transform data using apply() and map() method. (c) Detect and filter outliers. (d) Perform Vectorized String operations on Pandas Series. (e) Visualize data using Line Plots, Bar Plots, Histograms, Density Plots and Scatter Plots.
11. Write a Pandas program to count the missing values in a given DataFrame.
12. Predict Salary using Simple Linear Regression .
13. Predict Profit using Multiple Linear Regression.
14. Predict Salary using Polynomial Regression .
15. Predict Purchasing capability with % Accuracy of a person using Logistic Regression.
16. Predict Purchasing capability with % Accuracy of a using K-Nearest Neighbors (K-NN) Model.
17. Write a program to implement Best First Search traversal.
18. Write a program to implement using A* algorithm.
19. Use Heuristic Search Techniques to Implement Hill-Climbing Algorithms.
B. <b>Mini Project</b> Develop a Mini project using concepts learnt in the theory and exercises listed in part A

  
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**S. Y. MCA**

**Academic Year- 2024-2025 Semester- III**  
**[MCA242103T]: Emerging Software Testing and Tools**

<b>Teaching Scheme:</b> TH: -Hours/Week : 03	<b>Credit</b> TH: 03	<b>Examination Scheme:</b> In Sem. Evaluation : 20 Marks Mid Sem. Exam : 30 Marks End Sem. Exam : 50 Marks Total : 100 marks
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**Course Objective:**

Students should be able to understand

1. To learn the overview of software testing concepts and its techniques.
2. To expose to various testing tools.
3. To understand and manage the effective testing process.

**Course Outcome:**

On completion of the course, student will be able to–

- CO1: Design, implement and evaluate effective and efficient test cases to meet desired needs.
- CO2: Choose appropriate testing techniques and tools for real time testing applications.
- CO3: Write stubs and drivers code during unit, integration and system testing phase.
- CO4: Design Test cases to test object-oriented application, web based systems and to test mobile apps.
- CO5: Develop Test Plan document and produce Test Summary Reports in synchronization with the software development activities.
- CO6: Apply Software Testing process models and to improve the quality of the software from maintenance point of view

**Course Contents**

<b>UNIT-I</b>	<b>Introduction to Software Testing</b>	<b>05 Hours</b>
Basics of Software Testing –Evolution - Myths and Facts-Goals -Definitions-Model for Software Testing-Software Testing as a Process- Software Testing Terminology and Methodology- Software Testing Life Cycle(STLC)- types of testing- testing in the development life-cycle		
<b>UNIT-II</b>	<b>Dynamic - Static and regression Testing</b>	<b>10 Hours</b>

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Black-Box Testing Techniques - Requirement based testing - Boundary Value Analysis (BVA) - Equivalence Class Testing - State Table-Based Testing - Cause-Effect Graphing Based Testing - Decision Table-Based Testing - Error Guessing. White-Box Testing Techniques: Need - Logic Coverage Criteria - Basis Path. Testing - Graph Matrices - Loop Testing - Data Flow Testing - Mutation Testing.

Testing principles-Verification and Validation – Test case design strategies. Inspections- Structured Walkthroughs- Technical Reviews- Validation Activities – Progressive vs. Regressive Testing - Regression Testing Produces Quality Software - Regression Testability - When is Regression Testing Done?- Types- Regression Testing Techniques.

**UNIT-III**

**Levels of Testing**

**06 Hours**

Need for Levels of Testing - unit testing – Test Harness - Integration testing - system testing – Types of system test: Functional, performance, stress and configuration testing - Regression testing - Acceptance testing

**UNIT-IV**

**Testing for Specialized Environment**

**06 Hours**

Object oriented testing - Testing Web based System – Challenges in testing for Web based software –Mobile app testing –Testing Mobile Apps – Mobile test Automation and tools – Mobile Test and Launch strategies

**UNIT-V**

**Managing the Testing Process**

**05 Hours**

Test Organization-Structure of Testing Group-Test Planning- Detailed Test Design and Test Specifications-Definition of Software Metrics-Classification -Entities to be Measured-Size Metrics-Testing Metrics for Monitoring and Controlling the Testing Process-Estimating Testing Efforts-Cyclomatic Complexity Measures for Testing-Function Point Metrics for Testing-Test Point Analysis (TPA)

**UNIT-VI**

**Quality Management**

**04 Hours**

Software Quality- Quality Costs- Benefits of Investment on Quality-Quality Control and Quality Assurance-Quality Management and Project Management-Quality Factors-Methods of Quality Management-SQA Models-Testing Process Maturity Models- Need for Test Process Maturity-Measurement and Improvement of Test Process- Test Process Maturity Models.

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**Text Books :**

T1. Software Engineering – A practitioner's approach by Roger S. Pressman, 5th Edition, McGraw Hill

**Reference:**

- R1. Naresh Chauhan, Software Testing Principles and Practices, 2013, 6th impression, Oxford University Press.
- R2. Srinivasan Desikan, Software Testing principles and practices, 2012, 4th Edition, Pearson Publication
- R3. Ilene Burnstein, Practical Software Testing, 2013, 12th Edition, Springer Verlag International Edition, Springer, India.
- R4. Software Engineering: A Precise Approach by Pankaj Jalote.
- R5. Foundations of Software Testing by Aditya P. Mathur – Pearson Education custom edition 2000
- R6. Testing Object Oriented Systems: models, patterns and tools, Robert V Binder, Addison Wesley, 1996

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**S. Y. MCA**

**Academic Year- 2024-2025 Semester- III**  
**[MCA242103L]: Emerging Software Testing and Tools**

<b>Teaching SchemeLAB :</b> 02 Hours/Week	<b>Credit</b> <b>PR: 02</b>	<b>Examination Scheme:</b> <b>ICSE : 60 Marks</b> <b>End Sem. Exam: 40 Marks</b> <b>Total : 100 Marks</b>
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**Course Objective:**

Students should be able to understand

1. To learn the overview of software testing concepts and its techniques.
2. To expose to various testing tools.
3. To understand and manage the effective testing process.

**Course Outcome:**

On completion of the course, student will be able to–

- CO1: Design, implement and evaluate effective and efficient test cases to meet desired needs.
- CO2: Choose appropriate testing techniques and tools for real time testing applications.
- CO3: Write stubs and drivers code during unit, integration and system testing phase.
- CO4: Design Test cases to test object-oriented application, web based systems and to test mobile apps.
- CO5: Develop Test Plan document and produce Test Summary Reports in synchronization with the software development activities.
- CO6: Apply Software Testing process models and to improve the quality of the software from maintenance point of view

**Guidelines for Assessment**

Continuous assessment of laboratory work is done based on overall performance and Laboratory assignments performance of student. Each Laboratory assignment assessment will assign grade/marks based on parameters with appropriate weightage. Suggested parameters for overall assessment as well as each Laboratory assignment assessment include- timely completion, performance, innovation, efficient codes, punctuality and neatness.

**List of Laboratory Assignments/Experiments (minimum -- to be covered)**

I. Introduction to Selenium, Installation and Setup

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2.Selenium WebDriver Commands • Browser Commands • Navigation Commands • Web Element Commands • Find Element and Find Elements Command • Check Box & Radio Button Operations • Drop Down& Multiple Select Operations • Handle DynamicWeb Tables in Selenium Web driver Radio Button Operations • Drop Down& Multiple Select Operations • Handle DynamicWeb Tables in Selenium Web driver

3.Navigate back/forwards, get, refresh • I\_ loading a page in current window / Newwindow • Move back and forward • Refresh Page

4.Interrogation: i. get window title ii. Current url iii. Page source

5.Locating web elements by Id, ClassName, LinkText, PartialLinkText, Name, TagName,CssSelector ,XPath

6.Inspecting elements in web browsers

7.Element interrogation

8.Manipulation: Click, submit, shift-click, special actions, type text, clear text, list boxselection and manipulation commands

9.Synchronization: Page load time out, implicit wait, explicit wait, Expected Conditionsclass

10.Window handling: size, position, handles, switch to

11.Screenshot/capture

12.Browser profile: set preferred language, changing user agent, enable extension

13.Cookies: reading, creating and deleting

14.Data Driven Testing; Use pre-stored data as input and expected output (possible dataSource file Excel)

15.Page Object Model: test scenario like shopping cart from login

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**S. Y. MCA**  
**Academic Year – 2024-2025 Semester-III**  
**[ MCA242103T]: Principles and Practices of Management and**  
**Organizational Behavior**

<b>Teaching Scheme:</b> TH: -Hours/Week : 03	<b>Credit</b> TH: 03	<b>Examination Scheme:</b> In Sem. Evaluation : 20 Marks Mid Sem. Exam : 30 Marks End Sem. Exam : 50 Marks Total : 100 Marks
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**Course Objective:**

1. To improve students understanding of Management & human behavior in organization and the ability to lead people to achieve more effectively toward increased organizational performance.
2. Understand individual behavior in organizations, including diversity, attitudes, job satisfaction, emotions, moods, personality, values, perception, decision making, and motivational theories.
3. Understand group behavior in organizations, including communication, leadership, power and politics, conflict, and negotiations.
4. Understand the organizational system, including organizational structures, culture, human resources, and change.

**Course Outcome:**

After successful completion of the course, students will able to:

- CO1:** Describe various aspects of management.  
**CO2:** Analyze the interactions between multiple aspects of management.  
**CO3:** Understand individual behavior in organizations, including diversity, attitudes.  
**CO4:** Justify the role of leadership qualities.  
**CO5:** Ability to create group and team as per organization perspective.  
**CO6:** Ability to handle stress and conflict situation in an organization.

**Course Contents**

UNIT-I	Management & Development of Management Thought	04 Hours
Meaning and Definition, The need, scope and process of Management, Managerial levels/Hierarchy, Managerial functions : Planning , Organizing , Staffing , Directing, Controlling, Types of managers & its Skill : Functional, Specialize, Generalize, Social responsibility of management, Evolution of Management: Introduction to Scientific Management by Taylor, Administrative Management by Fayol, Contribution of Peter Drucker.		
UNIT-II	Decision Making	04 Hours
Introduction, Decision making environment- Decision making under certainty, under uncertainty, under risk, Types of Decision , decision making processes & Tools, Individual Vs Group decision making, Information Technology & Decision Making, Herbert Simon's Model & Principle of Rationality		

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<b>UNIT-III</b>	<b>Organization, Organizational Behavior &amp; Organizational Culture</b>	<b>04 Hours</b>
Definition and Need for Organization, Introduction to OB, Organizing Process, Organizational structure (Functional organization, Product Organization, Territorial Organization), Types of Corporate Culture.		
<b>UNIT-IV</b>	<b>Motivation and Leadership</b>	<b>08 Hours</b>
Concept of Motivation, Benefits to organization and Manager, Maslow's need Hierarchy theory, Definition, Nature, Qualities of Leader, Leader V/s Manager, Leadership Theories ( Great Man Theory, Trait Theory, Behavioral Theories), Leadership Styles(Autocratic, Participative, Laissez faire or subordinate-centered ,Bureaucratic leadership, Transformational leadership, Transactional leadership )		
<b>UNIT-V</b>	<b>Group and Group Dynamics, Team Building</b>	<b>08 Hours</b>
Concept of Group, Effect & Characteristics of group, Types of groups, The Five-Stage Model of Group Development, Group Properties (Roles, Norms, Status, Size, and Cohesiveness), Concept of Team, Nature, Benefits from team, Types of Teams, Creating Effective Teams, Turning Individuals into Team Player, Concept of Team, Nature, Benefits from team, Types of Teams, Creating Effective Teams, Turning Individuals into Team Player.		
<b>UNIT-VI</b>	<b>Stress Management and Conflict Management</b>	<b>08 Hours</b>
Work stress: Meaning of stress, Sources of Stress, Types of stress, Stress Management strategies, Concept of Conflict, Functional versus Dysfunctional Conflict, Five stage Conflict Process, Types of Conflict (Task Conflict, Relationship Conflict, Process Conflict, Personality Conflict, Intergroup Conflict), Managing Conflict (Styles for Handling Dysfunctional Conflict, Third-Party Interventions).		

Reference Books:

- R1.** Principles and Practices of Management- Shejwalkar
- R2.** Essential of management- 7th edition Koontz H & Weirich H TMH
- R3.** Management Today Principles And Practices - Burton & Thakur
- R4.** Mgmt. Principles and Functions - Ivancevich & Gibson, Donnelly
- R5.** Organizational behavior Keith Davis
- R6.** Organizational behavior Fred Luthans TMH 10th edition
- R7.** Organizational behavior Dr. Ashwatthapa THI 7th edition
- R8.** Organizational Behaviour - Fred Luthans
- R9.** Organizational Behaviour - Stephen Robbins
- R10.** Organizational Behaviour - K. Aswathappa (8th revised edition)

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**S. Y. MCA**

**Academic Year – 2024-2025 Semester -III**

**[MCA242103T]: Cloud Computing**

<b>Teaching Scheme:</b> TH : - 03Hours/Week	<b>Credit</b> TH: 03	<b>Examination Scheme:</b> In Sem. Evaluation : 20 Marks Mid Sem. Exam : 30 Marks End Sem. Exam : 50 Marks Total : 100 Marks
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**Course Objective:**

1. Introduce the fundamental aspects of cloud computing
2. To understand the concept of Virtualization and design of cloud Services
3. Understanding the various cloud implementations and migration techniques
4. To understand the different aspects of Cloud Security
5. Demonstrate different features of cloud platforms used in Industry
6. Understand the different Application of Cloud Computing


**Course Outcome:**


After successful completion of the course, students will able to:

- CO1.** Elaborating the basic concepts of cloud computing and defining the basic terms
- CO2.** Identify the components of cloud computing for service perspective
- CO3.** Ability to understand various service delivery models of a cloud computing architecture.
- CO4.** In depth learning of security challenges and preventive measures in cloud computing
- CO5.** Explore the different cloud service Platforms.
- CO6.** Uses of cloud computing services in different fields

**Course Contents**

UNIT-I	Cloud Computing Fundamentals	06 Hours
Motivation for Cloud Computing, The Need for Cloud Computing, Defining Cloud Computing, Definition of Cloud computing, Cloud Computing Is a Service, Cloud Computing Is a Platform, Principles of Cloud computing, Five Essential Characteristics, Open Challenges-Cloud Interoperability and Standards-Scalability and Fault Tolerance.		
UNIT-II	Cloud Virtualization	07 Hours
Introduction, Characteristics of Virtualized Environments, Types of Virtualization, Virtualization and Cloud Computing, Pros and Cons of Virtualization, Technology Examples- Xen: Para virtualization, VMware: Full Virtualization, Microsoft Hyper-V.		
UNIT-III	Cloud Computing Architecture	06 Hours
Introduction, Cloud Reference Model-Architecture-Infrastructure / Hardware as a Service-Platforms as a Service, Four Cloud Deployment Models- Public Clouds- Private Clouds- Hybrid Clouds, Community Clouds.		

  
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jobs through 1 machine and 2 machines 3.4 Replacement of items that deteriorates with time 3.5 when money value is consider & Problems 3.6 Individuals and Group Replacement

<b>UNIT-IV</b>	<b>Security in theCloud</b>	<b>05 Hours</b>
Security Overview, Cloud Security Challenges and Risks, Software-as-a-Service Security, Security Monitoring, DataSecurity, Application Security, Identity Management and Access Control, Autonomic Security.		
<b>UNIT-V</b>	<b>Cloud Platforms inIndustry</b>	<b>07 Hours</b>
Amazon web services: Compute services, Storage services, Communication services, Google App Engine: Architecture and core concepts, Application life cycle, Creating Account on Google App Engine, configuring Google App Engine Services. Microsoft Azure: Azure core concepts, SQL Azure, Creating Account on Microsoft Azure and introduction to configuring MicrosoftAzure Services.		
<b>UNIT-VI</b>	<b>Cloud Applications</b>	<b>05 Hours</b>
Scientific Applications- Healthcare: ECG Analysis in the Cloud, Biology: Protein Structure Prediction, Geoscience: Satellite Image Processing, Business and Consumer Applications- CRMand ERP, Social Networking, Media Applications		
<b>Text Books :</b>		
<b>T1.</b> Dr. Kumar Saurabh, Cloud Computing Insight into New Era Infrastructure, Wiley India. Gautam Shroff,(2011)Enterprise Cloud Computing, Cambridge University Press		
<b>T2.</b> Roger Jennings, Cloud Computing, Wiley India		
<b>Reference Books:</b>		
<b>R1:</b> Dr. Kumar Saurabh, Cloud Computing Insight into New Era Infrastructure, Wiley India. Gautam Shroff,(2011)Enterprise Cloud Computing, Cambridge University Press		
<b>R2:</b> Roger Jennings, Cloud Computing, , Wiley India		
<b>R3:</b> Rosenberg and Matheos, The Cloud at your service, Manning Publications		

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**S. Y. - MCA**  
**Academic Year – 2024-2025 Semester – III**  
**[MCA242106L]: Research Project**

<b>Teaching Scheme:</b> <b>PR: -Hours/Week: 06</b>	<b>Credit</b> <b>PR: 06</b>	<b>Examination Scheme:</b> <b>ICSE : 60 Marks</b> <b>ESE : 40 Marks</b> <b>TW : 100 Marks</b> <b>Total : 200 Marks</b>
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**Course Contents**

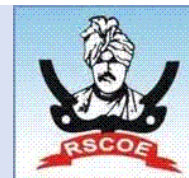
Students are encouraged to explore diverse areas such as software engineering, data science, cybersecurity, and artificial intelligence, fostering expertise that aligns with industry demands. Engaging in research not only enhances academic understanding but also cultivates practical skills in problem-solving, critical analysis, and project management. Students are encouraged to publish their research work in reputed journals/conferences

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**S. Y. - MCA**  
**Academic Year – 2024-2025 Semester – III**  
**[HS242101L]: Universal Human Values**

<b>Teaching Scheme:</b> PR: -Hours/Week : 02	<b>Credit</b> TH: 01	<b>Examination Scheme:</b> ICSE : 30 Marks ESE : 20 Marks Total : 50 Marks
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- Course Objective:**
1. To help students to distinguish between values and skills and understand the need, basic guidelines, content and process of value education.
  2. To help students to initiate a process of dialog within themselves to know what they ‘really want to be’ in their life and profession.
  3. To help students to understand the meaning of happiness and prosperity for a human being.
  4. To facilitate the students to understand harmony at all the levels of human living, and live accordingly

**Course Outcome:**  
 After successful completion of the course, students will able to:

**CO1:** Relate foundational concepts of value education , self-exploration, happiness, prosperity, and the basic human aspirations.

**CO2:** Develop an understanding of human beings as an co-existence of self and body,

**CO3:** Evaluate the values in human relationships and their impact on societal harmony and nature

**Course Contents**



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<b>UNIT-I</b>	<b>Introduction to value education</b>	<b>06 Hours</b>
Understanding value education, self-exploration as the process for value education, happiness and prosperity, right understanding, relationship and physical facility, happiness and prosperity—current scenario, method to fulfill the basic human aspiration.		
<b>UNIT-II</b>	<b>Harmony in human being</b>	<b>06 Hours</b>
Understanding human being as a coexistence of the self and body, understanding the needs of self and body, the body as an instrument of the self, understanding activities of self, understanding harmony in the self, understanding the harmony in self with body, programs to fulfill the self-regulation and health.		
<b>UNIT-III</b>	<b>Harmony in family and society</b>	<b>06 Hours</b>
Harmony in family—a basic unit of human interaction, Human—human relationship, values in relationships, understanding harmony in the society and vision for universal human order.		
<b>UNIT-IV</b>	<b>Harmony in nature and existence</b>	<b>06 Hours</b>
Understanding the harmony in nature, understanding the four orders of nature, realizing existence as co-existence at all levels and holistic perception of harmony in existence.		
<b>UNIT-V</b>	<b>Implications of the holistic understanding of harmony</b>	<b>06 Hours</b>
Natural acceptance of human values, definitiveness of ethical human conduct, basis for universal human order, competence in professional ethics, holistic technologies, production systems and management models: Typical case studies.		
<b>Guidelines for Assessment</b>		
In semester evaluation shall be based on continuous assessment based on timely submission of assignments		
<b>Text Books:</b> T1. Human values and Professional Ethics by R R Gaur, R Sangal, G P Bagaria, ExcelBooks, New Delhi, 2010 T2. Jeevan Vidya: Ek Parichaya, A Nagaraj, Jeevan Vidya Prakashan, Amarkantak, 1999.		
<b>Reference Books:</b> R1. Manav Vyavhar Darshan, A Nagaraj, Jeevan Vidya Prakashan, Amarkantak, 2001		

  
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**S. Y. - MCA**  
**Academic Year – 2024-2025 Semester - IV**  
**[MCA242201L]: Self Learning Course**

<b>Teaching Scheme:</b> <b>PR: -Hours/Week : 02</b>	<b>Credit PR: 02</b>	<b>Examination Scheme:</b> <b>ICSE : 60 Marks</b> <b>ESE : 40 Marks</b>
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**Course Objective:**  
 1. Certification of Students for knowledge and employability skills development.

**Course Outcome:**  
**After successful completion of the course, students will able to:**  
**CO1.** Have a knowledge of different certification platforms/resources.  
**CO2.** Getting the Certification from the professional organization such as MOOC.  
**CO3.** NPTEL/SWAYAM/ Coursera, Udemy, Spoken Tutorials.  
**CO4.** Enhance the Employability.

**Course Contents**

**MOOC:**  
 A massive open online course (MOOC) is an online course aimed at unlimited participation and open access via the web. In addition to traditional course materials, such as filmed lectures, readings, and problem sets, many MOOCs provide interactive courses with user forums or social media discussions. The MOOC contains the organization like NPTEL/SWAYAM, Spoken Tutorials, Coursera, Udemy etc. These organizations contain many online course.

**NPTEL/SWAYAM:** It contains courses from different areas Such as Engineering, Management, Entrepreneurship etc. and soon. Under Computer engineering it contains courses like Scalable Data Science, Deep Learning, Cloud computing, Introduction to internet of things, Software Testing, Big Data Computing and So on.

**Spoken Tutorials:** It also contains the courses like courses from different areas Such as Engineering, Management etc. Under Computer engineering it contains courses like PHP, Python, R, CAD etc. and soon.

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**Coursera:** It contains courses from different areas Such as Engineering, Management, Entrepreneurship etc and soon. Under Computer engineering it contains courses like Java, C++, IOT, Linux, Block chain, Big Data etc.

**Udemy:** It contains courses from different areas Such as Engineering, Management, Entrepreneurship etc. and soon. Under Computer engineering it contains courses like Java, C++, IOT, Linux, Block chain, Big Data etc.

### Lab Contents

#### Guidelines for Instructor's Manual

Students are expected to choose one subject for certification. Self-learning Courses to be done as per the own choice from the different reputed organizations such as MOOC/NPTEL/SWAYAM/Cousera/Udemy/Spoken Tutorials etc.


#### Guidelines for Assessment

Certificate to be submitted to the concern faculty.

**References:**

- R1.** <https://www.udemy.com>
- R2.** <https://www.coursera.org>
- R3.** <https://swayam.gov.in>
- R4.** <https://spoken-tutorial.org/accounts/login/>

  
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**S. Y. - MCA**

**Academic Year – 2024-2025 Semester – IV**

**[MCA242202]: Industrial Internship**

<b>Teaching Scheme:</b>	<b>Credit PR: 12</b>	<b>Examination Scheme:</b>
		<b>ICSE : 200 Marks</b>
		<b>ESE : 200 Marks</b>
		<b>Total : 400 Marks</b>

**Course Objective:**

1. Finding areas of interest in current IT domain.
2. Increasing awareness in technological development in chosen field.
3. Exploring the application areas
4. Showcase of Presentation skills

**Course Outcome:**  
**After successful completion of the course, students will able to:**

**CO1.** Domain knowledge of the topic selected

**CO2.** Get an idea about documentation through SRS

**CO3.** Will get knowledge about system design and implementation


**CO4.** Will get the presentation knowledge


**Course Contents**

Students are expected to complete the project work on the area/ module assigned in the internship program at industry.

**Project Evaluation**

1. A students must develop the project in industry. However, during the examination, Each student must demonstrate the project individually
2. The student must submit a hard bound project report that must include the following :  
Introduction, System Requirement Specification, System Design, Implementation, Screen Shots, Conclusion & Future Enhancement, Bibliography
3. The Demonstration, Viva and Report Evaluation will be done for specified marks.

  
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