

Curriculum and Syllabus

MCA (First year) (2022-23 Admission Batch)

(Approved by Academic Council and Board of Studies)



GIFT Autonomous College

(Approved by AICTE, New Delhi, Affiliated to BPUT, Rourkela)

Recognized under section 2(f) of the UGC act, 1956
*At. Gramadiha, Po. Gangapada, Via. Janla, Dist- Khorda,
Pincode: 752054*

Program Outcomes (PG Program)

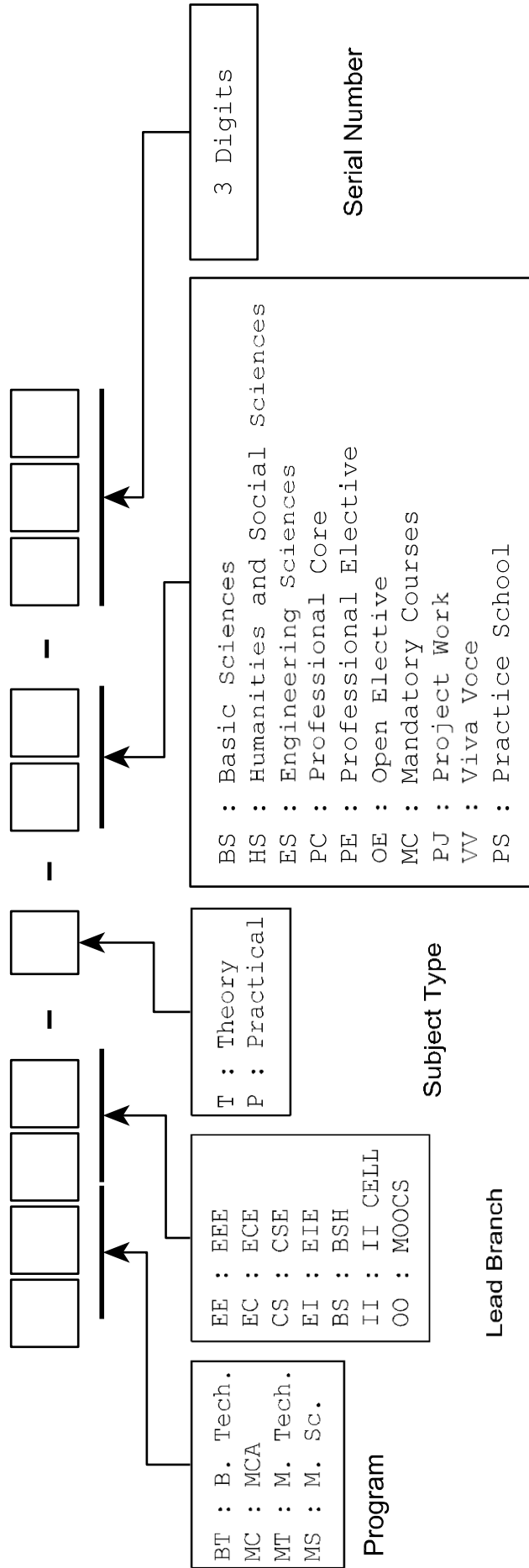
Post Graduates Attributes (PGAs) form a set of individually assessable outcomes that are the components indicative of the post graduate's potential to acquire competence to practice at the appropriate level. The Program Outcomes (POs) for PG Engineering programs:

- P01. **Engineering Knowledge:** Apply the knowledge of mathematics and computing fundamentals to various real-life applications for any given requirement.
- P02. **Problem Analysis:** Identify, formulate, review research literature and design and develop applications to analyze and solve all computer science related problems
- P03. **Design/Development of Solutions:** Design applications for any desired needs with appropriate considerations for any specific need on societal and environmental aspects.
- P04. **Conduct Investigations of Complex Problems:** Analyze and review literatures to invoke the research skills to design, interpret and make inferences from the resulting data.
- P05. **Modern Tool Usage:** Integrate and apply efficiently the contemporary IT tools to all computer applications.
- P06. **The Engineer and Society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- P07. **Environment and Sustainability:** Involve in perennial learning for a continued career development and progress as a computer professional.
- P08. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- P09. **Individual and Team Work:** Function effectively both as a team leader and team member on multi-disciplinary projects to demonstrate computing and management skills.
- P010. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
- P011. **Project Management and Finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
- P012. **Life-long Learning:** Create and design innovative methodologies to solve complex problems for the betterment of the society by applying the inherent skills with absolute focus to function as an successful entrepreneur.

Course Types & Definitions

L	Lecture
T	Tutorial
P	Laboratory / Practical / Sessional
WCH	Weekly Contact Hours
BS	Basic Sciences
HS	Humanities & Social Sciences (including Management)
ES	Engineering Sciences
PC	Professional Core
PE	Professional Elective
OE	Open Elective
MC	Mandatory Course
EEC	Employability Enhancement Courses
SEPD	Skill Enhancement and Personality Development

Subject Code Format



FIRST YEAR MCA SYLLABUS
**(MASTER IN COMPUTER
APPLICATION)**

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First Semester MCA Admission Batch- 2022-23

CURRICULUM STRUCTURE

Gandhi institute For Technology (GIFT), Autonomous
MCA SYLLABUS- (Batch--2022-23) FIRST YEAR

FIRST SEMESTER					
Sl. No.	Category	Course Code	Course Title	L-T-P	Credit
1	BS	MC-T-BS-101	Discrete Mathematics & Graph Theory	3-0-0	3
2	PC	MC-T-PC-102	Problem Solving Using C	3-0-0	2
3	PC	MC-T-PC-103	Operating System	3-0-0	3
4	PC	MC-T-PC-104	Database Management Systems	3-0-0	3
5	SC	MC-T-SC-105	SEPD-1(Skill Enhancement and Personality Development)	1-0-0	1
6	PC	MC-T-PC-106	Data Structures	3-0-0	4
Total Credit (Theory)					16
Practical					
1	PC	MC-P-PC-102	Data Structures Using C Lab	0-0-3	2
2	PC	MC-P-PC-103	Operating System and LINUX Lab	0-0-3	1.5
3	PC	MC-P-PC-104	Database Management Systems Lab	0-0-3	1.5
4	MC	MC-P-MC-107	IT & IS (Information Technology & Information System)	0-0-2	1
5	PS	MC-P-PS-108	Project-I	0-0-2	1
6	HS	MC-P-HS-109	Professional Communication Skills	0-0-2	2
Total Credit (Practical)					9
Total Semester Credit					25

SECOND SEMESTER					
Sl. No.	Category	Course Code	Course Title	L-T-P	Credit
1	BS	MC-T-BS-201	Computer Oriented Numerical Methods	3-0-0	3
2	PC	MC-T-PC-202	Object Oriented Programming using Java	3-0-0	3
3	PC	MC-T-PC-203	Internet & Web Technology	3-0-0	3
4	PC	MC-T-PC-204	Design and Analysis of Algorithms	3-0-0	3
5	SC	MC-T-SC-205	SEPD-2(Skill Enhancement and Personality Development)	1-0-0	1
6	OO	MC-T-OO-206	NPTEL Course	0-1-0	3
Total Credit (Theory)					16
Practical					
1	PC	MC-P-PC-202	Object Oriented Programming using Java Lab	0-0-3	2
2	PC	MC-P-PC-203	Web Technology Development Lab	0-0-3	1.5
3	PC	MC-P-PC-204	Design and Analysis of Algorithm Lab	0-0-3	1.5
4	PS	MC-P-PS-207	Project-II	0-0-2	1
Total Credit (Practical)					6
Total Semester Credit					22

EVALUATION PROCESS

1. Evaluation Process of Theory Subjects:

Components	Marks	Frequency	Assigned To
Quiz Test	5	2	Concerned Faculty
Surprise Test	5	2	Concerned Faculty
Assignment	5	2	Concerned Faculty
Attendance	5	Closing of Instruction	To be retrieved from CMS
Mini Project	10	1 (Before Closing of Instruction)	Concerned Faculty
Mid-Semester Examination	20	1	Examination Cell
End-Semester Examination	100	1	Examination Cell
Total	150		

2. Evaluation Process of Practical Subjects:

Components	Marks	Frequency	Assigned To
Attendance	10	Closing of Instruction	To be retrieved from CMS
Daily Performance & Viva-voce	40	On the day of Experiment	Concerned Faculty (Upload in CMS in weeklybasis)
Lab Record	20	On the day of Experiment	Concerned Faculty
End-Semester Lab Test	30	1	At the end of the semester as per the schedulepublished by Examination Cell
Total	100		

3. Evaluation Process of Skill Courses:

Components	Marks	Frequency	Assigned To
End-Semester Examination	100	1	Examination Cell/ Concerned Faculty
Total	100		

4. Evaluation Process of Mandatory Courses:

Components	Marks	Frequency	Assigned To
In-Semester Evaluation	100	1	Examination Cell/ Concerned Faculty
Total	100		

Detailed Syllabus For
FIRST
SEMESTER

First Semester MCA Admission Batch- 2022-23

Type	Code	DISCRETE MATHEMATICS & GRAPH THEORY	L-T-P	Credits	Marks
BS	MC-T-BS-101		3-0-0	3	100

COURSE OUTCOMES

Students will be able to

CO.1	Understand mathematical logic and predicates.
CO.2	Explain set theory, functions and algebraic structures.
CO.3	Demonstrate the ability to describe computer programs using Recursive Functions.
CO.4	Apply basic Counting techniques to solve Combinatorial Problems.
CO.5	Utilize generating functions and substitutions to solve recurrence relations.
CO.6	Demonstrate the Graphs and Trees as tools to visualize and simplify situations.

Module-I (12 Hours)

Statements and Notations - Connectives - Well-formed Formulas - Truth Tables - Tautology - Equivalence Implication.

Logic - Methods of proofs (Equivalence - Converse - Inverse - Contra-positive - and Contradiction - Direct Proofs - Disproving by Counter Example - Proof by Contradiction - Method of Induction) .

Propositional calculus -Predicative Logic – Existential Quantifiers - Universal Quantifiers - Free & Bound Variables.

Module-II (8 Hours)

Relations: Relations and their properties, and its applications, representing relations, closure of relations, Warshall's algorithm, equivalence of relations, partial orderings.

Module-III (06 Hours)

Sequences and Summation, recurrence relations, solving recurrence relations

Lattice theory: Lattices and algebras systems, principles of duality, basic properties of algebraic systems defined by lattices, distributive and complimented lattices, and Boolean algebras (CNF & DNF only)

Module-IV (08Hours)

Algebraic Structures-Algebraic Systems-Properties with Examples-Semi Groups-Monoids-Groups and Subgroup with Examples (Basic Concepts), isomorphism, and normal subgroups, rings (basics only),

Module-V (06 Hours)

Definition-Representation of Graph-Matrix Representation (Incident and Adjacent Matrices) -Sub-graphs. Planar Graphs - Isomorphism - Multi-graphs - Cut Sets (Vertices & Edges) - Euler Circuit and Hamiltonian Cycle - Chromatic Number.

Text Books:

1. K.H. Rosen, "Discrete Mathematics and its application", 7th edition, Tata McGraw Hill Publication
2. J. L. Mott, A. Kandel & T. P. Baker, Discrete Mathematics for Computer Scientists & Mathematicians,

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Prentice Hall India, 2nd Edition, 2009.

3. C. L. Liu, D.P. Mohapatra, "Elements of Discrete Mathematics- A Computer Oriented Approach", 4th Edition, Tata McGraw Hill, 2013.

Reference Books:

1. Tremblay J.P. and P. Manohar, Discrete Mathematical Structures with Applications to Computer Science, Tata McGrawHill, 1997.

2. D. P. Acharjya, Sreekumar "Fundamental Approach to Discrete Mathematics", New Age Publisher

3. Seymour Lipschutz and Marc Lipson, Discrete Mathematics, Revised 3rd Edition, Schaum's Outline Series, Tata McGraw Hill, New Delhi, 2009.

Mapping of COs to POs and PSOs (1: Low, 2: Medium, 3: High):

COURSE CODE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO.1		3	3	3								3	3	2	1
CO.2		3	2	3	2							3	2	3	2
CO.3		2	3	2								2	2	3	2
CO.4		3	2	3	2							3	3	2	3
CO.5	3	3	3	3								3	3	3	3
CO.6	2	3	3	3								3	3	3	3

First Semester MCA Admission Batch- 2022-23

Type	Code	PROBLEM SOLVING USING C	L-T-P	Credits	Marks
PC	MC-T-PC-102		3-0-0	3	100

COURSE OUTCOMES:

Students will be able to

CO.1	Basic of C Programming Using Data Types.
CO.2	Develop conditional and iterative statements to write C programs.
CO.3	Exercise user defined functions and pointers to solve real time problems.
CO.4	Inscribe C programs to access arrays, strings and functions.
CO.5	Exercise user defined data types including structures and unions to handle files.
CO.6	Explain basic operations of Sorting and Searching Techniques.

MODULE - I (8 Hours)

Algorithm, Representation of Algorithm: Flowchart/Pseudo-code with examples. From algorithms to programs; C Program source code, C Program structure, basic syntax, data types, variables, constants, storage class, syntax and logical errors in compilation, object and executable code, Arithmetic expressions, operators and precedence.

MODULE - II (8 Hours)

Decision making: Conditional Branching, if statement, if else statement, nested if else statement, switch, nested switch statements, Iteration and loops, break, continue.

MODULE - III (8 Hours)

Arrays: Arrays (1-D, 2-D), initialization, Accessing Array Elements, Character arrays and Strings, Pointers, Pointer arithmetic, dynamic memory allocation, pointer to array and array of pointers,

MODULE - IV (8 Hours)

Functions, Parameter passing in functions, call by value, idea of call by reference, recursion, and passing arrays to functions, nested function, local and global variables, static variables.

Structures, defining structures and Array of Structures, Structure vs Union, passing structure to function, File handling: ASCII and binary Files

MODULE - V (8 Hours)

Development of Algorithms: Notations and Analysis, Storage structures for arrays-sparse matrices,

Searching Algorithms: Linear Search, Binary Search

Sorting Algorithms: Bubble Sort, Selection Sort, Insertion Sort, Quick Sort.

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Text Books:

1. E. Balagurusamy, Programming in ANSI C, 8th Edition, Tata McGraw Hill, 2019.
2. M. Tanenbaum, Data Structures using C & C++, Prentice-Hall of India Pvt. Ltd.
3. Herbert Schild, C: Omplete Reference, Tata McGraw Hill

Reference Books:

1. A.K.Rath and A. K. Jagadev, "Data Structures and Program Design using C", 2nd Edition, Scitech Publications, 2011.
2. Bruno R Preiss, "Data Structures and Algorithms with Object Oriented Design Pattern in C++", John Wiley & Sons, Inc., 1999.
3. Horowitz and Sahani, "Fundamentals of Data Structures", Galgotia Publication Pvt. Ltd
4. Yashavant Kanetkar, Let Us C, 17th Edition, BPB Publications New Delhi, 2019

Mapping of COs to POs and PSOs (1: Low, 2: Medium, 3: High):

COURSE CODE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO.1		2	3	3	2							3	3	2	1
CO.2		3	3	3	2							3	2	3	2
CO.3		2	3	2								2	2	3	2
CO.4		3	2	2	2							3	2	2	3
CO.5	3	3	3	3								3	3	3	3
CO.6	2	3	3	3								3	3	3	3

First Semester MCA Admission Batch- 2022-23

Type	Code	OPERATING SYSTEM	L-T-P	Credits	Marks
PC	MC-T-PC-103		3-0-0	3	100

COURSE OUTCOMES

Students will be able to

CO.1	Explain the concepts of process and implement CPU scheduling algorithms.
CO.2	Illustrate different problems and solutions related to process synchronization.
CO.3	Understand deadlock and use various algorithms to handle deadlocks.
CO.4	Understand various memory management mechanisms.
CO.5	Analyze various mechanisms used in virtual memory management.
CO.6	Analyze various file system and disk storage mechanisms.

MODULE-I (10 Hours)

Overview of Operating Systems: Introduction, how OS takes System Control, Why OS is essential, Functions of the Operating Systems, Evolution of Operating Systems, Generations of OS.

Operating System Structure & Processes: Introduction, System Components, Operating System Structure, Operating System Services, System Calls, System Programs, Process, Process States, Process Control.

MODULE-II (08 Hours)

Operating System Services for Process Management & Scheduling: Introduction, Process Creation, Termination & Other Issues, Threads, Multithreading, Types of Threads, Schedulers, Types of Schedulers, Types of Scheduling, Scheduling Algorithms, Types of Scheduling Algorithms.

MODULE-III (08 Hours)

Process Synchronization, Inter process Communication & Deadlock: Introduction, Data Access and Control Synchronization, Critical Sections, Race Condition, Classical Problems & Solutions of Process Synchronization, Semaphores, Message Passing, Deadlock, Conditions for Deadlock, Resource Allocation Graph, Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlocks.

MODULE-IV (08 Hours)

Memory Management & Virtual Memory: Introduction, Memory Management Schemes, Sharing and Protection in Paging, Sharing and Protection in Segmentation, Virtual Memory, Demand Paging, Page Replacement Algorithms, Thrashing.

MODULE-V (06 Hours)

File System Interface: File Concept, Access methods, Directory Structure, Allocation methods, Free space management, Disk Scheduling, Disk Management, Swap space management, RAID Concepts of Advanced OS: Distributed, Real Time, Multiprocessor, Network, Embedded, Database Operating Systems.

Text Books:

1. Silberschatz and Galvin, "Operating System Concepts", John Wiley Publishing

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2. William Stallings, "Operating Systems Internals & Design Principles", Pearson Education

Reference Books:

1. Naresh Chauhan, "Principles of Operating Systems", Oxford India Publications
2. Pabitra Pal Choudhury, "Operating System Principles and Design", PHI Publication
3. Sibsankar Halder and Alex A. Aravind, "Operating System", Pearson Education

Mapping of COs to POs and PSOs (1: Low, 2: Medium, 3: High):

COURSE CODE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO.1		3	3	3								3	3	2	1
CO.2		3	3	3								3	2	3	2
CO.3		2	3	2								2	2	3	2
CO.4		3	2	3								3	3	2	3
CO.5	3	3	3	3								3	3	3	3
CO.6	2	3	3	3								3	3	3	3

First Semester MCA Admission Batch- 2022-23

Type	Code	DATABASE MANAGEMENT SYSTEMS	L-T-P	Credits	Marks
PC	MC-T-PC-104			3-0-0	3

COURSE OUTCOMES:

Students will be able to

CO.1	Understand data models to design a database.
CO.2	Illustrate the conceptual design for large enterprises.
CO.3	Formulate SQL queries and integrity constraints over relations.
CO.4	Apply normalization on database for eliminating redundancy.
CO.5	Summarize transaction properties, concurrency control and recovery techniques.
CO.6	Explain various data storage and security mechanisms.

Module -I (06 Hours)

Introduction to DBMS: concept and overview of DBMS, Types of DBMS, data models, DB languages, DB users and Administrator, 3-schema architecture of DBMS, data independence, EF Codd Rule.

Module -II (06 Hours)

ER Model: basic concepts, design issues, keys, ER diagram, Weak entity sets, Extended ER features. Relational model: structure of relational model, Relational algebra, Extended relational algebra Operations.

Module - III (08 Hours)

Relational database design: Properties of Relational Decomposition, Functional Dependency, Anomalies in designing DB, Normalization using FDs, various Normal forms-1NF, 2NF, 3NF, BCNF, 4NF, 5NF.

Module-IV (10 Hours)

SQL and Integrity Constraints: Concepts of DDL, DML, DCL, various SQL operations: set operations, aggregate functions, constraints, view, nested sub-queries, PL/SQL, cursor, trigger.

Module - V (10 Hours)

Internals of RDBMS: Query optimization, various optimization algorithms, Transaction processing, concurrency control and recovery management.

Emerging Database Technologies and Applications: Distributed Database, Data warehousing and Data mining. Mobile Data Management, Geographical Information Systems (GIS), Genomic Databases.

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Text Books:

1. Korth, Silverschatz, Abraham, "Database system concepts", Tata McGraw Hill Publication
2. R.Elmasri, S.B Navathe, "Fundamentals of Database System", Adision Wesley Publishing

Reference Books:

1. Er.Rajiv chopra, "Database management systems, A Practical Approach", S.Chand Publishing
2. Ramkrishna, "Database management systems", Tata McGraw Hill Publication

Mapping of COs to POs and PSOs (1: Low, 2: Medium, 3: High):

COURSE CODE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO.1		3	3	3								3	3	2	1
CO.2		3	3	3								3	2	3	2
CO.3		2	3	2								2	2	3	2
CO.4		3	2	3								3	3	2	3
CO.5	3	3	3	3								3	3	3	3
CO.6	2	3	3	3								3	3	3	3

First Semester MCA Admission Batch- 2022-23

Type	Code	SEPD-1 (SKILL ENHANCEMENT AND PERSONALITY DEVELOPMENT)	L-T-P	Credits	Marks
SC	MC-T-SC-105		1-0-0	1	50

COURSE OUTCOMES:

Students will be able to

CO.1	Able to clear campus selection process.
CO.2	Develop an attitude of constant self-improvement.
CO.3	To increase the self-confidence to attain the employability.
CO.4	Develop the aptitude and reasoning skill.
CO.5	Able to demonstrate as well as lead the team.
CO.6	Able to develop overall programming skill and communication skill as well.

Total Hours-40 Hrs

Module-I:

10 Hrs

Quantitative Aptitude: Number system, Percentage and application, SI and CI, Profit and Loss, Ratio and Proportion, Average and Allegation, Mixture and Solution.

Module-II:

10 Hrs

Quantitative Aptitude: Time –Speed-Distance, Time and Work, Function and equation Series and Progression, Trigonometric.

Module-III:

10 Hrs

Logical Reasoning: Arrangement based problem, Blood relation problem, Deductive Logic, Data Interpretation, Age related problem Coding and Decoding Problems.

Module-IV:

10 Hrs

Verbal ability: Sentence correction, Grammar, Para jumbles, Idioms and Phases, Syllogisms and Deductive logic.

Books:

1. Quantitative Aptitude by Dr.R.S. Aggarwal, S.Chand
2. Verbal and Non-verbal reasoning by Dr.R.S.Aggarwal

Mapping of COs to POs and PSOs (1: Low, 2: Medium, 3: High):

COURSE CODE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO.1		3	3	3								3	3	2	1
CO.2		3	3	3								3	2	3	2
CO.3		2	3	2								2	2	3	2
CO.4		3	2	3								3	3	2	3
CO.5	3	3	3	3								3	3	3	3
CO.6	2	3	3	3								3	3	3	3

First Semester MCA Admission Batch- 2022-23

Type	Code	DATA STRUCTURES	L-T-P	Credits	Marks
PC	MC-T-PC-106		3-0-0	4	100

COURSE OUTCOMES:

Students will be able to

CO.1	Understand the concept of Dynamic memory management, data types, algorithms, Big O notation.
CO.2	Understand basic data structures such as arrays, linked lists, stacks and queues.
CO.3	Describe the hash function and concepts of collision and its resolution methods.
CO.4	Solve problem involving graphs, trees and heaps
CO.5	Implement to solve searching and sorting related problems.
CO.6	Apply Algorithm for solving problems like sorting, searching, insertion and deletion of data

MODULE- I: (10 Hrs)

Fundamentals: Introduction to Data Structures, Classification of Data Structures, Algorithms, Asymptotic Notations, Abstract Data Types .

Arrays: Storage Structures for Arrays, Sparse Matrixes, Strings, Pattern Matching.

Linked Lists: Dynamic Memory Management, Single Linked Lists, Double Linked Lists, Circular Linked Lists, Operations on Polynomials.

MODULE- II: (06 Hrs)

Stacks and Queues: Representation, Linked Stacks and Queues, Operations on Stacks and Queues, Applications of Stack and Queues.

MODULE- III: (10 Hrs)

Trees: Terminology, Representation, Binary Trees, Binary Search Trees, Searching, Insertion and Deletions Operations in a Binary Search Tree, Height Balanced Trees, M-way Search Trees, B-Trees, B+ Trees, General Trees, Representation of General Trees and Binary Trees, Forests, Application of Trees.

MODULE- IV: (10 Hrs)

Graphs: Terminology, Representation, Path Matrix, Graph Traversal, Shortest Path Problems, Topological Sort. Searching and Sorting Techniques: Linear and Binary Search, Bubble Sort, Insertion Sort, Selection Sort, Quick Sort, Merge Sort, Heap and Heap Sort, Radix Sort, Comparison of Sorting Techniques.

MODULE- V: (04 Hrs)

Hashing: Hash Functions and Hashing Techniques. External sorting, Implementation using programming in C.

Text Book

1. Data Structures Using C - Aaron M. Tenenbaum
2. Tremblay, Jean-Paul, and Paul G. Sorenson, "An introduction to data structures with applications", McGraw-Hill, Inc., 1984.

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Reference Books

1. Ellis Horowitz, SartajSahni, Susan Anderson-Freed, "Fundamentals of Data Structures in C", Second Edition, 2008, Universities Press Pvt. Ltd. Hyderabad.
2. Seymour, Lipchitz. "Data Structures with C."TMH (2010)

Mapping of COs to POs and PSOs (1: Low, 2: Medium, 3: High):

COURSE CODE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO.1		3	3	3								3	3	2	1
CO.2		3	3	3								3	2	3	2
CO.3		2	3	2								2	2	3	2
CO.4		3	2	3								3	3	2	3
CO.5	3	3	3	3								3	3	3	3
CO.6	2	3	3	3								3	3	3	3

First Semester MCA Admission Batch- 2022-23

Type	Code	DATA STRUCTURES USING C LAB	L-T-P	Credits	Marks
PC	MC-P-PC-102		0-0-3	2	100

COURSE OUTCOMES:

Students will be able to

CO.1	Basic of C Programming Using Data Types.
CO.2	Develop conditional and iterative statements to write C programs.
CO.3	Exercise user defined functions and pointers to solve real time problems.
CO.4	Inscribe C programs to access arrays, strings and functions.
CO.5	Exercise user defined data types including structures and unions to handle files.
CO.6	Explain basic operations of Sorting and Searching Techniques.

LIST OF EXPERIMENTS:

1. Programs on arithmetic expressions, operators, and precedence.
2. Programs on Conditional Branching.
3. Programs on Loops.
4. Programs on 1-D and 2-D Array
5. Programs on Functions.
6. Programs on Recursive Functions.
7. Programs on Pointers.
8. Programs on Dynamic Memory Allocation.
9. Programs on Structure & Union
10. Implementation of Linear and Binary Search.
11. Implementation of sorting algorithms: Bubble Sort, Selection Sort, Insertion Sort
12. Implementation of , Quick Sort, Merge Sort using recursion.
13. Program on Array implementation of Stack and Queue ADTs
14. Program on Linked list implementation of List, Stack and Queue ADTs
15. Program on Implementation of Binary Trees and operations of Binary Trees
16. Program on Graph representation and Traversal algorithms

Reading Material (s)

Programming using C Lab Manual, Department of CSE, GIFT, Bhubaneswar

Mapping of COs to POs and PSOs (1: Low, 2: Medium, 3: High):

COURSE CODE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO.1		3	3	3								3	3	2	1
CO.2		3	3	3								3	2	3	2
CO.3		2	3	2								2	2	3	2
CO.4		3	2	3								3	3	2	3
CO.5	3	3	3	3								3	3	3	3
CO.6	2	3	3	3								3	3	3	3

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Type	Code	OPERATING SYSTEM AND LINUX LAB	L-T-P	Credits	Marks
PC	MC-P-PC-103		0-0-3	1.5	100

COURSE OUTCOMES:

Students will be able to

CO.1	Would be able to write program to simulate various CPU scheduling algorithms.
CO.2	Would be able to write program for various memory mapping algorithms such as FIFO, LRU and optimal page replacement algorithms.
CO.3	Would be able to simulate paging and page replacement algorithms for deadlock avoidance and prevention.
CO.4	Illustrate the knowledge of the basics of Unix/Linux commands.
CO.5	Apply the concepts of shell scripting on data and files.
CO.6	Apply the Inter Process Communication in Linux environment.

LIST OF EXPERIMENTS:

1. Execute the following UNIX/Linux commands: cal, - date, - echo, -bc, -passwd, - PATH, - who, -uname, - pwd, - cd, -mkdir, -rmdir, - cat, -cp, -rm, - mv, - more, - ls, -wc, cmp, -comm, - diff, - tar, -df, - du, - mount, - umount, -chmod and vi editor commands.
2. Write a shell script to accept three numbers and display the largest.
3. Write a shell script to find the number of files in a directory.
4. Write a shell script to display first ten positive numbers using until loop.
5. Write a shell script to print the first 10 odd numbers using the while loop.
6. Implement the following forms of IPC. a) Pipes b) FIFO
7. Implement file transfer using Message Queue form of IPC.
8. Write a C program to simulate Producer-Consumer problem using semaphores.
9. Write a C program to simulate the concept of Dining-Philosophers problem
10. Write a C program to simulate the following non-preemptive CPU scheduling algorithms to find turnaround time and waiting time.
 - a) FCFS b) SJF c) Round Robin (pre-emptive) d) Priority
11. Write a C program to simulate Banker's algorithm for the purpose of deadlock avoidance.
12. Write a C program to simulate the following Contiguous Memory allocation techniques
 - a) Worst-fit b) Best-fit c) First-fit
13. Write a C program to simulate Page replacement algorithms
 - a) FIFO b) LRU c) LFU d) Optimal

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14. Write a C program to simulate Paging technique of Memory management.
15. Write a C program to simulate Disk scheduling algorithms
a) FCFS b) SCAN c) CSCAN

List of Augmented Experiments

1. Simulate the UNIX help main menu
2. Simulate the File Management Commands Sub-menu
3. Simulate the Text Processing Commands Sub-menu
4. Simulate the System Status Commands Sub-menu
5. Code for Shell Script to make a menu driven calculator using case in Unix / Linux / Ubuntu
6. Using the file input - do the following using sed - displaying the result on the screen
7. Create a chat server using Message Queue
8. Simulate alarm using Unix / Linux / Ubuntu alarm system call

Reading Material (s)

Operating Systems and Linux Programming Lab manual, Department of CSE, GIFT, Bhubaneswar

Mapping of COs to POs and PSOs (1: Low, 2: Medium, 3: High):

COURSE CODE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO.1		3	3	3								3	3	2	1
CO.2		3	3	3								3	2	3	2
CO.3		2	3	2								2	2	3	2
CO.4		3	2	3								3	3	2	3
CO.5	3	3	3	3								3	3	3	3
CO.6	2	3	3	3								3	3	3	3

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Type	Code	DATABASE MANAGEMENT SYSTEMS LAB	L-T-P	Credits	Marks
PC	MC-P-PC-104			0-0-3	1.5

COURSE OUTCOMES:

Students will be able to

CO.1	Illustrate ER model and identify the roles and privileges of various users in a database.
CO.2	Apply common SQL statements (including DDL, DML and DCL) to perform different operations.
CO.3	Construct SQL Queries for various operations on database.
CO.4	Interpret Embedded and Nested Queries.
CO.5	Implement control statements in PL/SQL.
CO.6	Apply triggers and assertions to stop malicious operations on tables

LIST OF EXPERIMENTS:

1. Execute a single line and group functions for a table.
2. Execute DCL and TCL Commands.
3. Create and manipulate various DB objects for a table.
4. Create views, partitions and locks for a particular DB
5. Write PL/SQL procedure for an application using exception handling
6. Write PL/SQL procedure for an application using cursors.
7. Write a DBMS program to prepare reports for an application using functions.
8. Write a PL/SQL block for transaction operations of a typical application using triggers.
9. Write a PL/SQL block for transaction operations of a typical application using package.
10. Design and develop an application using any front end and back-end tool (make use of ER diagram and DFD).
11. Create table for various relation.
12. Implement the query in sql for a) insertion b) retrieval c) updating d) deletion.
13. Creating Views
14. Writing Assertion
15. Writing Triggers
16. Implementing operation on relation using PL/SQL
17. Creating Forms
18. Generating Reports

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Reading Material (s)

Database Management Systems Lab Manual, Department of CSE, GIFT, Bhubaneswar

Mapping of COs to POs and PSOs (1: Low, 2: Medium, 3: High):

COURSE CODE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO.1		3	3	3								3	3	2	1
CO.2		3	3	3								3	2	3	2
CO.3		2	3	2								2	2	3	2
CO.4		3	2	3								3	3	2	3
CO.5	3	3	3	3								3	3	3	3
CO.6	2	3	3	3								3	3	3	3

First Semester MCA Admission Batch- 2022-23

Type	Code	IT & IS (INFORMATION TECHNOLOGY & INFORMATION SYSTEM)	L-T-P	Credits	Marks
MC	MC-P-MC-107		0-0-2	1	100

COURSE OUTCOMES:

Students will be able to

CO.1	To give basic fundamental concept about computer system.
CO.2	To get familiar with MS Windows.
CO.3	To get hands on expertise in MS Office.
CO.4	Able to solve problems systematically using MS excel.
CO.5	Able to design professional presentation using MS PowerPoint.
CO.6	Able to manage the information in computer system

Experiment-1	Introduction Windows OS, OS Commands and operations, Introduction to MS Office	2 Hours
Experiment-2	MS-Word: Create, open, save, print command of file. Home tab: Edit texts, Format text, Paragraph setting and apply styles.	2 Hours
Experiment-3	MS-WORD: Insert tab: Cover page, blank page, page break, table, picture, clip art.	2 Hours
Experiment-4	MS-WORD: Insert tab: shape, chart, hyperlink, header and footer, textbox, word art, equation and symbols.	2 Hours
Experiment-5	MS-WORD: Mailing tab : Mail merge, Page Layout tab: margin, orientation, size, columns, watermark, page color, page border, Review tab: spelling and grammar checking, Thesaurus.	2 Hours
Experiment-6	MS-EXCEL: Create workbook, Home tab, Insert tab : Table, picture, Clip art, Shapes, Charts, Hyperlink, Textbox, Word Art.	2 Hours
Experiment-7	MS-EXCEL: Page Layout tab : Margin, Orientation, Paper size, print area, Background	2 Hours
Experiment-8	MS-EXCEL: Formulas tab : Auto sum(sum, average, count numbers, max, min), Insert Function(if, sum if, count if, average if, max if, min if)	2 Hours
Experiment-9	MS-EXCEL: Data Tab: Sort and filter, Text to column, Remove Duplicate, Data Validation, Group.	2 Hours
Experiment-10	MS-POWER POINT: Create file, Home tab, Insert new slide, change layout, Insert tab : Table, picture, Clip art, Shapes, Charts, Hyperlink, Textbox, Word Art, Header Footer, movie, sound.	2 Hours
Experiment-11	MS-POWERPOINT: Design tab : Theme, color, font, background style. Animation Tab: Custom animation, Transition(style, sound, speed), Slide show.	2 Hours
Experiment-12	MS-ACCESS: Overview, Home Tab: Views, Records, Sort & Filter Create Table: Create new Table,	2 Hours

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Experiment-13 MS-ACCESS: Table: Template, Table Design, Insert data. External Data Tab:2 Hours
Import, Export

EXPERIMENT BEYOND SYLLABUS

Experiment-14 Create a resume using MS-Word. Create a table named Student Mark Entry2 Hours
to enter rollno, name, mark of 6 subjects. Enter total and average mark.

Experiment-15 Create a datasheet contains 100 student information using MS-Excel. Create2 Hours
a column chart named Student Mark Graph that contains name, mark of 6
subjects for five students.

Reading Material (s)

IT & IS Lab Manual, Department of CSE, GIFT, Bhubaneswar

Mapping of COs to POs and PSOs (1: Low, 2: Medium, 3: High):

COURSE CODE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO.1		3	3	3								3	3	2	1
CO.2		3	3	3								3	2	3	2
CO.3		2	3	2								2	2	3	2
CO.4		3	2	3								3	3	2	3
CO.5	3	3	3	3								3	3	3	3
CO.6	2	3	3	3								3	3	3	3

First Semester MCA Admission Batch- 2022-23

Type	Code	INDICATIVE PROJECT LAB (PROJECT-I)	L-T-P	Credits	Marks
PS	MC-P-PS-108		0-0-2	1	50

COURSE OUTCOMES:

Students will be able to

CO.1	Students will be able to do understand the concept of sensors, Arduino.
CO.2	Should be able to formulate the problem with proper diagnosis.
CO.3	Able to learn the parts of Arduino system and their assembling program.
CO.4	Interpret Embedded coding to interact with hardware.
CO.5	Apply new ideas to solve one problem in various ways.
CO.6	Apply and learn to make product with sensor feasibility.

MODULE – I (8 Hours)

Arduino Programming – Introduction to Sensors, Introduction to Microcontrollers.

Arduino: Introduction, Pin Configuration, Installation of software and Programing, Serial Communication.

MODULE – II (12 Hours)

Project Work: Implementation of Sensors & Microcontroller Programing using Arduino.

(Group Activity: 2 students per Group, any 3 projects have to be completed by each group)

Sample Projects:

- Obstacle detection using Arduino
- Controlling 4 LEDs to make different patterns
- Voice Activation System
- Use Humidity Sensor using Arduino
- Arduino Based Color Detector
- Touch Dimmer Switch Circuit Using Arduino
- Wireless Door Bell
- Arduino Traffic Light Controller
- Frequency Counter Using Arduino
- Arduino 4-Digit 7-Segment LED Display
- Arduino based Digital Thermometer
- Arduino Light Sensor
- Portable Ultrasonic Range Meter

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- Security Alarm System Using Arduino
- Arduino Alarm Clock
- Interfacing LCD with Arduino

Mapping of COs to POs and PSOs (1: Low, 2: Medium, 3: High):

COURSE CODE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO.1		3	3	3								3	3	2	1
CO.2		3	3	3								3	2	3	2
CO.3		2	3	2								2	2	3	2
CO.4		3	2	3								3	3	2	3
CO.5	3	3	3	3								3	3	3	3
CO.6	2	3	3	3								3	3	3	3

First Semester MCA Admission Batch- 2022-23

Type	Code	PROFESSIONAL COMMUNICATION SKILLS	L-T-P	Credits	Marks
HS	MC-P-HS-109		0-0-2	2	100

COURSE OUTCOMES:

Students will be able to

CO.1	Develop effective listening skills for better comprehension of English spoken in different social and workplace contexts.
CO.2	Compose speech clearly on a specific topic using appropriate language in informal discussions.
CO.3	Explain the implicit and explicit meanings of a text while reading.
CO.4	Summarize the texts of reading and listening based on comprehension.
CO.5	Construct sentences using proper grammatical sentence structures.
CO.6	Choose and use the appropriate vocabulary, phrases in different contexts.

SI No	LS	Name of the Activity	Remarks
1	S1	INTRODUCTION TO THE COURSE	
2	S2	DESCRIBING OBJECT, PEOPLE& PLACE	
3	S3	NARRATING YOUR UNFORGETTABLE MOMENT	
4	S4	ROLE PLAY ON NEGOTIATION SKILLS	
5	S5	WELCOME & FAREWELL SPEECH	
6	W1	REPORTING AN EVENT	
7	L1	LISTENING 1	AUDIO CLIPS(Q/A)
8	L1	LISTENING	MOVIE/ STRUCTURED TALK
9	L3	LISTENING WITH NOTEMAKING	
10	S6	DEBATE	
11	S7	GROUP DISCUSSION	CONTROVERSIAL
1	S8	GROUP DISCUSSION	FACTUAL
12	W2	E MAIL WRITING	
13	W3	E MAIL WRITING	RESPONSE
14	S9	NEWSPAPER READING	
15	R1	READING COMPREHENSION	
16	W4	FORMAL LETTERS 1	COMPLAINT, ENQUIRY, ORDER
17	W5	FORMAL LETTERS 2	PERSUASIVE
18	W6	CV WRITING-1	FUNCTIONAL
19	S10	PERSONAL INTERVIEW	TETE- A- TETE
20	S11	PERSONAL INTERVIEW	JOB RELATED
21	S12	PANEL DISCUSSION	CONTEMPORARY DISCUSSION

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23	S13	ORGANISING A MEETING	
24	W8	PREPARING AGENDA & MINUTES	
25	S13	BUSINESS PRESENTATION	
26	PL1	PRACTICE	
27	PS1	PRACTICE	
28	PS2	PRACTICE	
29	PR1	PRACTICE	
30	PW1	PRACTICE	
<i>PROJECT-To be decided by the faculty concerned pertaining to the activities.</i>			

Mapping of COs to POs and PSOs (1: Low, 2: Medium, 3: High):

COURSE CODE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO.1		3	3	3								3	3	2	1
CO.2		3	3	3								3	2	3	2
CO.3		2	3	2								2	2	3	2
CO.4		3	2	3								3	3	2	3
CO.5	3	3	3	3								3	3	3	3
CO.6	2	3	3	3								3	3	3	3

Detailed Syllabus For
SECOND
SEMESTER

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Type	Code	Computer Oriented Numerical Methods	L-T-P	Credits	Marks
BS	MC-T-BS-201		3-0-0	3	100

COURSE OUTCOMES:

Students will be able to

CO.1	Knowledge of Error & root finding methods of one variable and more variables by Numerical Method.
CO.2	Analysis and conversion a tabular data in-to a polynomial function by Numerical methods and solving of differential Equations.
CO.3	Knowledge of the matrix with Eigen value & vectors and its properties for application.
CO.4	Knowledge of probability and process of finding chance of any game or trails
CO.5	Define random variable and get the knowledge of different distributions functions of discrete & continuous in nature.
CO.6	Confident interval of Sample and its testing with correlation.

NUMERICAL METHODS

MODULE - I (06 Hours)

Error and type of error, Binary to decimal conversion change & vice-versa, Solution of Non-linear equations in one variable (Bisection, Secant, Newton Raphson, Fixed Point Iteration method.

MODULE - II (10 Hours)

Interpolation: Newton's forward and backward interpolation, Newton divided difference interpolation, Lagrange Interpolation. Numerical Differentiation and Numerical Integration, The trapezoidal rule, The Simpson's rule, Gauss Integration formulas. Solution of ordinary differential equations: Euler's method, Improvement of Euler's method, Runge-Kutta 2nd and fourth orders.

MODULE-III (12 Hours)

Linear Algebra: Matrix, Rank of the matrix, Solutions of the system of equations by Gauss-Elimination method. Vectors: linearly independent and dependent vector, orthogonal vectors. Eigen value and Eigen vectors of a square matrix, Similar matrix, Diagonalization of the square matrix & Positive definite matrix. Solutions of the linear system of equations by LU decomposition & Gauss-Seidel method. Power method for finding Eigen value.

MODULE-IV (10 Hours)

Basics of the permutation & combination, Probability: Sample Space, Probability, Conditional Probability, Independent Events, Random variables, Probability distributions, Expectations, Mean and variance.

MODULE-V (10 Hours)

Bernoulli Trials, Binomial, Poisson, Normal distribution, Correlation and Regression Analysis, Rank Correlation, Sample and Confidence intervals for mean and variance of a Normal Distribution. Testing of hypothesis for the sample.

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Book of Reference:

1. E. Kreyszig, & Advanced Engineering Mathematics: Tenth Edition, Wiley India
2. B S Grewal , Higher Engineering Mathematics & Khanna Publication
3. R. E. Walpole, R. h. Myers, S. L. Myers, K. E. Ye, Probability and Statistics, Pearson
4. M K Jain, SRK Iyengar, R K Jain , Numerical Method for Scientific and Engineering Computation, Wiley India
5. B.V.RAMANA, Higher Engineering Mathematics, Tata Magraw Hill.
6. P C Biswal, "Probability and Statistics" PHI Pvt Ltd.

Mapping of COs to POs and PSOs (1: Low, 2: Medium, 3: High):

COURSE CODE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO.1		3	3	3								3	3	2	1
CO.2		3	3	3								3	2	3	2
CO.3		2	3	2								2	2	3	2
CO.4		3	2	3								3	3	2	3
CO.5	3	3	3	3								3	3	3	3
CO.6	2	3	3	3								3	3	3	3

Second Semester MCA Admission Batch- 2022-23

Type	Code	OBJECT ORIENTED PROGRAMMING USING JAVA	L-T-P	Credits	Marks
PC	MC-T-PC-202		3-0-0	3	100

COURSE OUTCOMES:

Students will be able to

CO.1	Understand the benefit of a well-structured program.
CO.2	Understand different computer programming paradigms.
CO.3	Understand underlying principles of object-oriented programming in JAVA.
CO.4	Develop problem solving and programming skills using OOP concepts.
CO.5	Apply the concept of multi-threading, inheritance and Exception Handling.
CO.6	Develop the ability to solve real world problems through software development in high level programming language like JAVA.

MODULE - I (8 Hours)

An introduction to programming, Different types of programming languages, Description of Compiler and Interpreter, Advantage of Object-Oriented Programming, Object Oriented Programming, Features of Object-Oriented Programming. Introduction to Java, History behind Java, Difference between C/C++ and Java, Features of Java, First Java Program, Prerequisites Before start writing a java program, Writing the program, Compiling the program, How Java Program compiles? Executing the program, How Java program executes? What is JVM and its Significance in executing a program? Architecture of JVM. Java Tokens, Datatypes, Operators, what are Operators? Different types of Operators, Typecasting, Control Structures and Arrays, Different types of control structures, Conditional Statements, Loops/ Iterators, Jumping Statements, Java Arrays, Multidimensional Arrays, Taking Input from keyboard, Command Line Arguments, Using Scanner Class, Using Buffered Reader class.

MODULE - II (12 Hours)

Introduction to Classes, Objects and Methods, Description of data hiding and data encapsulation, Constructors, Use of static Keyword in Java, Use of this Keyword in Java, Array of Objects, Concept of Access Modifiers (Public, Private, Protected, Default). Understanding Inheritance, Types of Inheritance and Java supported Inheritance, Significance of Inheritance, Constructor call in Inheritance, Use of super keyword in Java, Polymorphism, Understanding Polymorphism, Types of polymorphism, Significance of Polymorphism in Java, Method Overloading, Constructor Overloading, Method Overriding, Dynamic Method Dispatching. Introduction to different classes, String class, String Buffer, String Builder, String Tokenizer, Concept of Wrapper Classes, Introduction to wrapper classes, Different predefined wrapper classes, Predefined Constructors for the wrapper classes. Conversion of types from one type (Object) to another type (Primitive) and Vice versa, Concept of Auto boxing and unboxing. Basics of Data Abstraction, Understanding Abstract classes, Understanding Interfaces, Multiple Inheritance Using Interfaces, Packages,

Module-III (8 Hours)

Introduction to Packages, Java API Packages, User-Defined Packages, Accessing Packages, Error and Exception Handling, Introduction to error and exception, Types of exceptions and difference between the types, Runtime Stack Mechanism, Hierarchy of Exception classes, Default exception handling in Java, User defined/Customized Exception Handling, understanding different keywords

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(try, catch, finally, throw, throws), User defined exception classes, commonly used Exceptions and their details. Introduction of multithreading/Multitasking, Ways to define a Thread in Java, Thread naming and Priorities, Thread execution prevention methods. (yield (), join (), sleep ()), Concept of Synchronization, Inter Thread Communication, Basics of Deadlock, Demon Thread, Improvement in Multithreading, Inner Classes, Introduction, Member inner class, Static inner class, Local inner class, Anonymous inner class.

Module-IV (10 Hours)

Instruction to IO Streams (java.io package), Byte Stream and Character Stream, Files and Random Access Files, Serialization, Collection Frame Work (java.util), Introduction, Util Package interfaces, List, Set, Map etc, List interfaces and its classes, Setter interfaces and its classes. Introduction to Applet, Introduction, Life Cycle of an Applet, GUI with an Applet, Abstract Window Toolkit (AWT), Introduction to GUI, Description of Components and Containers, Component/Container hierarchy, Understanding different Components/Container classes and their constructors, Event Handling, Different mechanisms of Event Handling, Listener Interfaces, Adapter classes.

Module-V (6 Hours)

Introduction Swing (JFC), Diff b/w awt and swing, Components Hierarchy, Panes, Individual Swings Components JLabel, JButton, JTextField, JTextArea. Introduction to JavaFX, Getting started with JavaFX, Graphics, User Interface Components, Effects, Animation, and Media, Application Logic, Interoperability, JavaFX Scene Builder 2, Getting Started with scene Builder. Working with scene Builder.

Text Book:

1. Herbert Scheldt (2010), The complete reference, 7th edition, Tata Mc graw Hill, New Delhi.
2. Java How to Program, by Paul Deitel, Harvey Deitel ,11/e, Deitel & Associates.

Reference Book:

1. Programming with Java, E. Balagurusamy, McGraw-Hill Education, 6th Edition.
2. Y. Daniel Liang (2010), Introduction to Java programming, 7th edition, Pearson education, India.
3. J. Nino, F. A. Hosch (2002), An Introduction to programming and OO design using Java, John Wiley & sons, New Jersey.
4. Head First Java, O'rielly publications

Mapping of COs to POs and PSOs (1: Low, 2: Medium, 3: High):

COURSE CODE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
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CO.3		2	3	2								2	2	3	2
CO.4		3	2	3								3	3	2	3
CO.5	3	3	3	3								3	3	3	3
CO.6	2	3	3	3								3	3	3	3

Second Semester MCA Admission Batch- 2022-23

Type	Code	INTERNET AND WEB TECHNOLOGY	L-T-P	Credits	Marks
PC	MC-T-PC-203			3-0-0	3

COURSE OUTCOMES:

Students will be able to

CO.1	Understanding the internet Architecture and html
CO.2	Design Image Map: Attributes, Client-Side Image Maps and Server-Side Maps. HTML Layout.
CO.3	Design Java Script and operator.
CO.4	Applying JavaScript (Properties and Methods of Each).
CO.5	Understanding the Server-Side Programming: Common Gateway Interface (CGI), Active Server Pages.
CO.6	To apply the client server chat or communication.

Module I (8 Periods):

Internet Architecture: Internet overview, evolution of internet. Internet components: Local Area Networks, Access Networks, Core Networks, Routers, Transmission infrastructure, ISPs. TCP/IP model, TCP/IP vs OSI model. HTML: HTML Overview, Structure of HTML Documents, Document Types, HTML Elements and attributes. Anchor Attributes, Image Tag and its attributes, Image and Anchors, Table.

Module II (8 Periods):

Image Map: Attributes, Client-Side Image Maps and Server-Side Maps. HTML Layout: Background, colors and text, Tables, Frames, Layers, Page content Division
CSS: Style Sheet Basic, Properties, Positioning with Style Sheet. Forms: Elements, Form controls. Dynamic HTML.

Module III (8 Periods):

Java Script: Introduction, Client-Side JavaScript, Server-Side JavaScript, JavaScript Objects, JavaScript Security. Operators: Assignment Operators, Comparison Operators, Arithmetic Operators, Increment, Decrement, Unary Negation, Logical Operators, String Operators, Special Operators, Conditional operator, Comma operator, delete, new, this, void. Statements: Break, comment, continue, delete, do ... while, export, for, for...in, function, if...else, import, labelled, return, switch, var, while.

Module IV (8 Periods):

JavaScript (Properties and Methods of Each): Array, Boolean, Date, Function, Math, Number, Object, String, RegExp. Document and its associated objects, document, Link, Area, Anchor, Image, Applet, Layer. Events and Event Handlers: General Information about Events, Defining Event Handlers, event.

Module V (8 Periods):

Server-Side Programming: Common Gateway Interface (CGI), Active Server Pages. Internet applications: FTP, Telnet, Email, Chat. World Wide Web: HTTP protocol. Search Engines. E-commerce and security issues including symmetric and asymmetric key, encryption and digital signature, and authentication. Emerging trends, Internet telephony, and virtual reality over the web, etc. Intranet and extranet, firewall.

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Text Book:

1. Computer Networking: A Top-Down Approach Featuring the Internet by Kurose and Ross, Pearson.
2. Web Design the Complete Reference by Thomas Powell, Tata McGrawHill.
3. HTML The Complete Reference by Thomas Powell, Tata McGrawHill.

Reference Book:

1. JavaScript the Complete Reference, Second Edition by Thomas Powell, Fritz Schneider. Tata McGrawHill

Mapping of COs to POs and PSOs (1: Low, 2: Medium, 3: High):

COURSE CODE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
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CO.2		3	3	3								3	2	3	2
CO.3		2	3	2								2	2	3	2
CO.4		3	2	3								3	3	2	3
CO.5	3	3	3	3								3	3	3	3
CO.6	2	3	3	3								3	3	3	3

Second Semester MCA Admission Batch- 2022-23

Type	Code	DESIGN AND ANALYSIS OF ALGORITHMS	L-T-P	Credits	Marks
PC	MC-T-PC-204			3-0-0	3

COURSE OUTCOMES:

Students will be able to

CO.1	Analyze the asymptotic performance of algorithms.
CO.2	Write rigorous correctness proofs for algorithms
CO.3	Demonstrate a familiarity with major algorithms and data structures.
CO.4	Apply important algorithmic design paradigms and methods of analysis.
CO.5	Synthesize efficient algorithms in common engineering design situations.
CO.6	To apply mathematical foundations, algorithmic principles, and computer science theory to the modeling and design of computer-based systems.

MODULE – I (06 Hours)

Notion of Algorithm : Growth of functions,

Recurrences: The Master method, The Substitution

method, The Iteration method, Asymptotic Notations and Basic Efficiency Classes (Use of Big O, θ , etc.) in analysis of algorithms, Mathematical Analysis of few Non-Recursive and Recursive Algorithms.

MODULE – II (10 Hours)

Sorting and Searching Techniques : Selection Sort, Bubble Sort, Insertion Sort, Sequential Search, Binary Search, Depth First Search and Breadth First Search, Balanced Search Trees, AVL Trees, Red-Black Trees, Heaps and Heap Sort, Disjoint Set and their Implementation, Divide and Conquer Paradigm of problem solving, Complexity analysis and understanding of Merge Sort, Quick Sort, Binary Search Trees.

Module-III (08 Hours)

Greedy Techniques: Prim's Algorithm, Kruskal's Algorithm, Dijkstra's and Bellman Ford Algorithm, Huffman Trees, Knapsack problem.

Dynamic Programming Paradigm : Floyd-Warshall Algorithm, Optimal Binary Search trees, Matrix Chain Multiplication Problem, Longest Common Subsequence Problem, 0/1 Knapsack Problem, Maximum Network Flow Problem.

Module-IV (08 Hours)

String Matching Algorithms: Naive string matching algorithm, The Rabin-Karp Algorithm, string matching with Finite Automata, Knuth Morris Pratt string matching algorithm.

Backtracking: n-Queen's problem, Hamiltonian Circuit problem, Subset-Sum problem, State Space Search Tree for these problems

Second Semester MCA Admission Batch- 2022-23

Module-V (08 Hours)

Branch and Bound: Travelling Salesman Problem and its State Space Search Tree.

Introduction to Computability: Polynomial-time verification, NP-Completeness and Reducibility, NP-Complete problems.

Approximation Algorithms: Vertex Cover Problem.

Text Books:

1. Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest and Clifford Stein, "Introduction to Algorithms", Third Edition, PHI Learning Private Limited, 2012.
2. Anany Levitin, "Introduction to the Design and Analysis of Algorithms", Third Edition, Pearson Education, 2012.

Reference Books:

1. Alfred V. Aho, John E. Hopcroft and Jeffrey D. Ullman, "Data Structures and Algorithms", Pearson Education, Reprint 2006.
2. Donald E. Knuth, "The Art of Computer Programming", Volumes 1& 3 Pearson Education, 2009.
3. <http://nptel.ac.in/>
4. "Fundamentals of Data Structures", Illustrated Edition by Ellis Horowitz, Sartaj Sahni, Computer Science Press.
5. Algorithms, Data Structures, and Problem Solving , Illustrated Edition by Mark Allen Weiss, Addison-Wesley Publishing Company

Mapping of COs to POs and PSOs (1: Low, 2: Medium, 3: High):

COURSE CODE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO.1		3	3	3								3	3	2	1
CO.2		3	3	3								3	2	3	2
CO.3		2	3	2								2	2	3	2
CO.4		3	2	3								3	3	2	3
CO.5	3	3	3	3								3	3	3	3
CO.6	2	3	3	3								3	3	3	3

Second Semester MCA Admission Batch- 2022-23

Type	Code	SEPD-2(Skill Enhancement and Personality Development)	L-T-P	Credits	Marks
SC	MC-T-SC-205		1-0-0	1	50

COURSE OUTCOMES:

Students will be able to

CO.1	To improve habits, attitudes, preferences and experience.
CO.2	Identify their own potentials and accept their own limitations.
CO.3	Overcome their limitations and move towards self-esteem.
CO.4	Maximize self-potential in enabling a holistic development.
CO.5	Participate effectively in Group Discussions.
CO.6	To present their views in public, perform well in Personal.

MODULE - I (10 Hours)

Self - knowledge:

1. Exploring habits, attitudes, preferences and experience
2. becoming aware of strengths and weaknesses, talents and problems, emotions and ideas
3. Identifying the optimum means of improving personal performance
4. Identifying areas of expertise and use these to solve problems in new contexts
5. Knowing your ambitions, goals, and values
6. Understanding feelings and emotions: primary feelings and secondary feelings, Self-regulating emotions

MODULE - II (10 Hours)

Self-management:

1. IQ, EQ, SQ, MI
2. Understanding of life story
3. Focusing on Internal narratives
4. Managing change, confusion and uncertainty
5. Sharpening the Intellect
6. Schooling the mind
7. Socializing the individual

Module-III (10 Hours)

Introduction to Group Discussions (GD):

1. Mock GD 1
2. Mock GD 2.

Interview skills:

1. Preparing for interviews through mock interview session.
2. Writing a good and effective C.V. and SWOC presentation.

Module-IV (10 Hours)

Assertiveness and EI:

1. Theory inputs and activities.
2. Conducting Mock Interviews

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Team work activity:

1. Building blocks of a team - discussion & activity.
2. Panel Discussion.

Summarizing and note making:

1. Techniques and important tips.

Personality assessment:

1. self-assessment and discussion

Text Books:

1. Personality Development by D.P.Sabharwal
2. Personality Development by L.Kendo
3. Effective Technical communication by M.A.Rijvi
4. English Phonetics of Indian Students by T.Balasubramaniam

Reference Books:

1. Here, There & Everywhere by Sudha Murty
2. Personality Development by Swami Vivekananda
3. Technical communication: Principle and practice by M.Raman and S,Sharma

Online Resources:

1. <https://nptel.ac.in/courses/109104107>
2. <https://nptel.ac.in/courses/109104031>

Mapping of COs to POs and PSOs (1: Low, 2: Medium, 3: High):

COURSE CODE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO.1		3	3	3								3	3	2	1
CO.2		3	3	3								3	2	3	2
CO.3		2	3	2								2	2	3	2
CO.4		3	2	3								3	3	2	3
CO.5	3	3	3	3								3	3	3	3
CO.6	2	3	3	3								3	3	3	3

Second Semester MCA Admission Batch- 2022-23

Type	Code	COMPUTER ORGANIZATION AND ARCHITECTURE (NPTEL)	L-T-P	Credits	Marks
00	MC-T-00-206			0-1-0	3

COURSE OUTCOMES:

Students will be able to

CO.1	After completion of this course, the student would have gained adequate knowledge about Basic structure of computer and addressing modes and their relevance to programming paradigms such as Assembly language.
CO.2	Would have understood detailed implementation of pipeline hazard detection and optimization techniques.
CO.3	Would have gained good understanding of design implementation of various hierarchical memory technology and cache optimization techniques.
CO.4	Would have understood details and design of parallel processing systems and inter connection network systems.
CO.5	Understood the detail of array and vector process with VLIW architecture in diagrammatical and logical way.
CO.6	Would have understood details of multiprocessor architecture.

MODULE – I (10 Hours)

Introduction: Review of basic computer architecture: CPU, memory, input-output subsystems, control unit. Instruction set architecture of CPU–registers, addressing modes, instruction set. Quantitative techniques in computer design, measuring and reporting performance.

MODULE – II (12 Hours)

Pipelining: Basic concepts, Instruction and Arithmetic pipeline, Data hazards, Control hazards and Structural hazards, Techniques for handling hazards. Exception handling. Pipeline optimization techniques. Instruction-level Parallelism: Basic concepts, Techniques for increasing ILP, Superscalar, Super pipelined and VLIW Processor architectures.

Module-III (08 Hours)

Hierarchical memory technology: Inclusion, Coherence and locality properties, Cache memory organizations, cache size vs. block size, mapping functions, replacement algorithms, write policies. Cache optimization techniques.

Module-IV (08 Hours)

Taxonomy of Parallel Architectures, Interconnection networks: mesh interconnection, omega inter connection, array processor and vector processor.

Module-V (08 Hours)

Multiprocessor architecture: Centralized shared- memory architecture, Distributed shared memory architecture, RISC and CISC, NUMA and UMA Multiprocessor system.

Textbook:

1. Computer Organization, V. Carl Hamacher, Zvonko G. Vranesic, Safwat G. Zaky, Jan 1, 1978,
2. Computer architecture and parallel processing ,Book by Fayé A. Briggs and Kai Hwang
3. Computer System Architecture Book by M. Morris Mano

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Reference book:

1. Computer Organization and Design: The Hardware/Software Interface: Third Edition Book by David A Patterson and John L. Hennessy
2. Computer Architecture and Parallel Processing by Kai Hwang and Faye A. Briggs

Mapping of COs to POs and PSOs (1: Low, 2: Medium, 3: High):

COURSE CODE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO.1		3	3	3								3	3	2	1
CO.2		3	3	3								3	2	3	2
CO.3		2	3	2								2	2	3	2
CO.4		3	2	3								3	3	2	3
CO.5	3	3	3	3								3	3	3	3
CO.6	2	3	3	3								3	3	3	3

Second Semester MCA Admission Batch- 2022-23

Type	Code	WEB TECHNOLOGY DEVELOPMENT LAB	L-T-P	Credits	Marks
PC	MC-P-PC-203		0-0-3	1.5	100

COURSE OUTCOMES:

Students will be able to

CO.1	Understanding about html tags and formatting elements.
CO.2	Design tables, image tags, order and unordered list
CO.3	Using CSS design the login and registration form.
CO.4	Describe about various CSS selectors.
CO.5	Applying JavaScript variables, operators and functions.
CO.6	Develop dummy website applying the stylesheet.

EXPERIMENT-1 [2 Hrs]

1. Create your first web page using head, paragraph, br, title and heading tags.
2. Create your web page using formatting elements like bold, italic, delete, insert, sup, sub etc.
3. Create a web page using inline and block level element.

EXPERIMENT-2 [2 Hrs]

1. Create a web page using anchor tag and image tag.
2. Create a web page using order and unordered list tag.
3. Create a table with all attributes.

EXPERIMENT -3 [2 Hrs]

1. Create a marksheet of a student using table.
2. Create a registration form of a college using all attributes of form.

EXPERIMENT-4 [2 Hrs]

1. Create a div and fill the div with contents and make text color as red, background color as yellow and give a 2px border color blue.
2. Create a span tag and color a part of text.

EXPERIMENT-5 [2 Hrs]

1. Create three containers with div tag, where you should give margin and padding property.
2. Write the code for the selectors and show the output.

EXPERIMENT-6 [2 Hrs]

1. Design and modify the mark sheet of a student using CSS.

EXPERIMENT-7 [2 Hrs]

1. Write the code for displaying "Hello students" using JavaScript.
2. Write the code for local and global variables using JavaScript and discuss the difference between them.

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EXPERIMENT-8 [2 Hrs]

1. Write the code which shows all the arithmetic operators at once.
2. Write the code for comparisons operators in JavaScript which shows the output false and true.

EXPERIMENT-9 [2 Hrs]

1. Write the code for call the function in JavaScript where you should use alert.
2. Write the code in JavaScript to display the power of provided value.
3. Write the code to block and unblock a table at once.

EXPERIMENT-10 [2 Hrs]

1. Write a JavaScript program to find the area of a triangle where length of the three of its sides are 5,6,7.
2. Given a string reverse each word in the sentence.
3. Given a string return true if they are anagram of one another.

Mapping of COs to POs and PSOs (1: Low, 2: Medium, 3: High):

COURSE CODE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO.1		3	3	3								3	3	2	1
CO.2		3	3	3								3	2	3	2
CO.3		2	3	2								2	2	3	2
CO.4		3	2	3								3	3	2	3
CO.5	3	3	3	3								3	3	3	3
CO.6	2	3	3	3								3	3	3	3

Second Semester MCA Admission Batch- 2022-23

Type	Code	OBJECT ORIENTED PROGRAMMING USING JAVA LAB	L-T-P	Credits	Marks
PC	MC-P-PC-202		0-0-3	2	100

COURSE OUTCOMES:

Students will be able to

CO.1	To understand the basic concepts and fundamentals of platform independent object-oriented language.
CO.2	To demonstrate skills in writing programs using exception handling techniques and multithreading.
CO.3	Develop reusable programs using the concepts of inheritance, polymorphism, interfaces and packages.
CO.4	Demonstrate streams and efficient user interface design techniques.
CO.5	Define random variable and get the knowledge of different distributions problems of discrete & continuous.
CO.6	Design event driven GUI and web related applications which mimic the real world scenarios.

[2 Hrs. each for 10 experiments]

1. Introduction, Compiling & executing a java program.
2. Data types & variables, decision control structures: if, nested if etc.
3. Loop control structures: do, while, for etc.
4. Classes and objects.
5. Data abstraction & data hiding, inheritance, polymorphism.
6. Interfaces and inner classes, wrapper classes, generics
7. Java Threads, Thread Synchronizations
8. Exception handlings in JAVA
9. JAVA applet programs
10. Mouse and Keyboard Event handling in JAVA
11. Use of JAVA Swing Components

Mapping of COs to POs and PSOs (1: Low, 2: Medium, 3: High):

COURSE CODE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO.1		3	3	3								3	3	2	1
CO.2		3	3	3								3	2	3	2
CO.3		2	3	2								2	2	3	2
CO.4		3	2	3								3	3	2	3
CO.5	3	3	3	3								3	3	3	3
CO.6	2	3	3	3								3	3	3	3

Second Semester MCA Admission Batch- 2022-23

Type	Code	DESIGN AND ANALYSIS OF ALGORITHM LAB	L-T-P	Credits	Marks
PC	MC-P-PC-204		0-0-3	1.5	100

COURSE OUTCOMES:

Students will be able to

CO.1	Ability to develop C programs for computing and real-life applications using basic elements like control statements, arrays, functions, pointers and strings, and data structures like stacks, queues and linked lists.
CO.2	Ability to Implement searching and sorting algorithms
CO.3	To write programs to solve problems using divide and conquer strategy.
CO.4	To write programs to solve problems using backtracking strategy.
CO.5	To write programs to solve problems using greedy and dynamic programming techniques
CO.6	To develop application or design algorithm to solve real life problems.

Programs to Practice:

2Hrs [10 programs]

1. Implementation of different searching algorithms.
2. Implementation of different sorting algorithms.
3. Problem solving using Divide and Conquer technique.
4. Problem solving using Dynamic Programming technique.
5. Problem solving using Greedy technique.
6. Problem solving using Backtracking technique.
7. Problem solving using disjoint-set data structure operations.
8. Problem solving using Branch and Bound technique.
9. Implementation of Graph Traversal algorithms – Breadth-First-Search (BFS) and Depth-First-Search (DFS).
10. Implementation of Minimum Spanning Tree construction algorithms – Kruskal and Prim.
11. Implementation of different String-Matching algorithms.
12. Problem solving for the Shortest Path problems.
13. Problem solving using Approximation algorithms.

Mapping of COs to POs and PSOs (1: Low, 2: Medium, 3: High):

COURSE CODE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO.1		3	3	3								3	3	2	1
CO.2		3	3	3								3	2	3	2
CO.3		2	3	2								2	2	3	2
CO.4		3	2	3								3	3	2	3
CO.5	3	3	3	3								3	3	3	3
CO.6	2	3	3	3								3	3	3	3

Second Semester MCA Admission Batch- 2022-23

Type	Code	PROJECT-II	L-T-P	Credits	Marks
PS	MC-P-PS-207		0-0-2	1	50

COURSE OUTCOMES:

Students will be able to

CO.1	Apply fundamental and disciplinary concepts and methods in ways appropriate to their principal areas of study.
CO.2	Demonstrate skill and knowledge of current information and technological tools and techniques specific to the professional field of study.
CO.3	Use effectively oral, written and visual communication.
CO.4	Identify, analyze, and solve problems creatively through sustained critical investigation.
CO.5	Integrate information from multiple sources.
CO.6	Demonstrate an awareness and application of appropriate personal, societal, and professional ethical standards.

Mapping of COs to POs and PSOs (1: Low, 2: Medium, 3: High):

COURSE CODE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO.1		3	3	3								3	3	2	1
CO.2		3	3	3								3	2	3	2
CO.3		2	3	2								2	2	3	2
CO.4		3	2	3								3	3	2	3
CO.5	3	3	3	3								3	3	3	3
CO.6	2	3	3	3								3	3	3	3

SECOND YEAR

MCA SYLLABUS

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SECOND YEAR MCA

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OBJECT ORIENTED SOFTWARE ENGINEERING-----	11
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INTERNET OF THINGS(IOT)-----	15
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Third Semester MCA Admission Batch- 2022-23

CURRICULUM STRUCTURE

Gandhi institute For Technology (GIFT), Autonomous
MCA SYLLABUS- (Batch--2022-23) SECOND YEAR

THIRD SEMESTER					
Sl. No.	Category	Course Code	Course Title	L-T-P	Credit
1	PC	MC-T-PC-301	Cloud Computing	3-0-0	3
2	PC	MC-T-PC-302	Computer Networks	3-1-0	3
3	PC	MC-T-PC-303	Object oriented Software Engineering	3-0-0	3
4	PC	MC-T-PC-304	Artificial Intelligence	3-1-0	3
5	PC	MC-T-PC-305	Internet Of Things	1-0-0	3
6	OE	MC-T-OE-306	1. Research Methodology 2. Intellectual Property 3. Project Management	3-0-0	1
7	SC	MC-T-SC-307	Evaluation of summer internship	----	2
Total Credit (Theory)					18
Practical					
1	PC	MC-P-PC-303	Software Engineering Lab	0-0-3	2
2	PC	MC-P-PC-304	Machine Learning using Python Lab	0-0-3	1.5
3	PC	MC-P-PC-305	Internet Of Things Lab	0-0-2	1.5
4	PS	MC-P-PS-307	Project-III	0-0-2	2
Total Credit (Practical)					7
Total Semester Credit					26

FOURTH SEMESTER					
Sl. No.	Category	Course Code	Course Title	L-T-P	Credit
1	OO	MC-T-OO-401	Elective-1 (NPTEL MOOCS)	3-0-0	3
2	OO	MC-T-OO-402	Elective-2 (NPTEL MOOCS)	3-0-0	3
Total Credit (Theory)					6
Practical					
1	PS	MC-P-PS-403	Seminar & Technical Writing	0-0-3	2
2	PJ	MC-P-PJ-404	Major Indicative Project	0-0-3	8
Total Credit (Practical)					10
Total Semester Credit					16

EVALUATION PROCESS

1. Evaluation Process of Theory Subjects:

Components	Marks	Frequency	Assigned To
Quiz Test	5	2	Concerned Faculty
Surprise Test	5	2	Concerned Faculty
Assignment	5	2	Concerned Faculty
Attendance	5	Closing of Instruction	To be retrieved from CMS
Mini Project	10	1 (Before Closing of Instruction)	Concerned Faculty
Mid-Semester Examination	20	1	Examination Cell
End-Semester Examination	100	1	Examination Cell
Total	150		

2. Evaluation Process of Practical Subjects:

Components	Marks	Frequency	Assigned To
Attendance	10	Closing of Instruction	To be retrieved from CMS
Daily Performance & Viva-voce	40	On the day of Experiment	Concerned Faculty (Upload in CMS in weekly basis)
Lab Record	20	On the day of Experiment	Concerned Faculty
End-Semester Lab Test	30	1	At the end of the semester as per the schedule published by Examination Cell
Total	100		

3. Evaluation Process of Skill Courses:

Components	Marks	Frequency	Assigned To
End-Semester Examination	100	1	Examination Cell/Concerned Faculty
Total	100		

4. Evaluation Process of Mandatory Courses:

Components	Marks	Frequency	Assigned To
In-Semester Evaluation	100	1	Examination Cell/Concerned Faculty
Total	100		

Detailed Syllabus For
THIRD
SEMESTER

Third Semester MCA Admission Batch- 2022-23

Type	Code	Cloud Computing	L-T-P	Credits	Marks
PC	MC-T-PC-301		3-1-0	3	150

COURSE OUTCOMES:

Students will be able to

CO.1	Understand the fundamental principles of different computing paradigms.
CO.2	Acquaintance with the concept of cloud computing in relation to business activities.
CO.3	Feasibility study to migrate existing applications to a cloud environment from both a technical and an economic point of view.
CO.4	Explain virtualization of machine, resources, servers, storage, and network, with a case study of Amazon EC2, pricing models, and service provisioning.
CO.5	Describe Software as a Service, service level agreement, how to manage data, large scale processing in cloud environment.
CO.6	Explain host, application, data, identity level security in cloud computing security models and commercial reliability models from different case studies of popular cloud service providers.

Module-#	Topics	Hours
Module-1	Introduction: Client/Server systems, Thin & Thick Clients, Centralized Computing, Parallel & Distributed Computing, Amdahl's Law, P2P Computing, Cluster Computing, Grid Computing, Utility Computing, Autonomic Computing, Hosting, Data Center, Convergence of Technologies, Service Model Deployment Models, Cloud Service Examples, Cloud-based Service & Applications.	09 Hours
Module-2	Cloud Concepts & Technologies: Virtualization, Load Balancing, Scalability & Elasticity, Deployment, Replication, Monitoring, Software Defined Networking (SDN), Network Function Virtualization, MapReduce, Identity & Access Management, Service Level Agreements (SLA), Billing.	09 Hours
Module-3	Cloud Services & Platforms: Compute Services, Storage Services, Database Services, Application Services, Content Delivery Services, Analytics Services, Deployment & management Services, Identity & Access Management Services, Open Source Private Cloud Software – Cloud Stack, Eucalyptus, OpenStack.	09 Hours
Module-4	Cloud Application Design: Considerations for scalability, reliability, availability, security, maintenance and upgradation, performance; Reference Architecture for Cloud Applications, Cloud Application Design Methodologies, Data Storage Approaches; Cloud Application Benchmarking & Tuning, Workload Characteristics, Application Performance Metrics, Benchmarking Tools, Deployment Prototyping, Load Testing & Bottleneck Detection.	09 Hours
Module-5	Cloud Security: Introduction, Security Issues in the Cloud, Components of Security, Attacks & classes of Threats, CSA Security Architecture, Authentication, Authorization, Identity & Access Management, Infrastructure Security, Data Security, Key Management, Auditing & Compliance. Trending Cloud Strategies: DOCKER Container, VM Migration-Basic Migration strategies.	09 Hours
Total		45Hours

Third Semester MCA Admission Batch- 2022-23

Text Book

1. A. Bahga and V. Madiseti, Cloud Computing : A Hands-On Approach, 1st Edition, Orient Blackswan , 2014.
2. K. Hwang, G. C. Fox, and J. J. Dongarra, Distributed and Cloud Computing - From Parallel Processing to the Internet of Things, 1st Edition, Elsevier, 2012.
3. T. Mather, S. K. Swamy, and S. Latif, Cloud Security and Privacy : An Enterprise Perspective on Risks and Compliance, 1st Edition, O'Reilly Media, 2009.

Reference Books

1	A. T. Velte, T. J. Velte, and R. Elsenpeter, Cloud Computing : A Practical Approach, 1st Edition, McGraw Hill Education, 2017.
2	B. Sosinsky, Cloud Computing Bible, 1st Edition, Wiley-India, 2011.
3	T. Erl, Z. Mahmood, and R. Puttini, Cloud Computing : Concepts, Technology & Architecture, 1st Edition, Pearson India Education, 2014

Online Resources:

1. <https://nptel.ac.in/courses/106/105/106105167/>: by Prof. S. K. Ghosh, IIT Kharagpur.
2. <https://nptel.ac.in/courses/106/104/106104182/>: by Prof. R. Misra, IIT Kanpur.
3. <https://www.coursera.org/learn/cloud-computing>: Prof. Indranil Gupta, Department of Computer Science, University of Illinois at Urbana-Champaign.
4. <http://web.mit.edu/6.897/www/readings.html>: by Prof. Hari Balakrishnan, MIT

Mapping of COs to POs and PSOs (1: Low, 2: Medium, 3: High):

COURSE CODE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO.1	2		1		1			1	1			2	1		1
CO.2	2		1		2			1	1			2	1		2
CO.3	2		1		2			1	1	1		2	1		2
CO.4	2		2		2			1	1	1		3	2		2
CO.5	2		3		2			1	1	1		3	2	2	1
CO.6	2		3		2			1	1	1		3	2	2	1

Third Semester MCA Admission Batch- 2022-23

Type	Code	Computer Networks	L-T-P	Credits	Marks
PC	MC-T-PC-302		3-1-0	3	150

COURSE OUTCOMES:

Students will be able to

CO.1	To develop an understanding of modern network architectures from a design and performance perspective.
CO.2	Illustrate the conceptual design for Physical Layer and Transmission Media.
CO.3	Formulate the different Data Link Layer Protocols
CO.4	Understand and Apply Error Detection and Correction Methods of Data Link Layer.
CO.5	Summarize different Network Routing Algorithms
CO.6	Explain various Transport Layer Processes.

Detailed Syllabus

Module - #	Topics	Hours
Module - 1	Introduction to Data Communications and Networking: Uses of Computer Networks, Communication Types, Serial and Parallel Data Transmission; Principles of Network Design: Evolution of Computer Networks, Topologies, Network Models (ISO-OSI, TCP/IP), Network Architecture. Physical Layer: Transmission Medium: Guided Media, Unguided Media, switching: Circuit Switching, Packet Switching, Message Switching	10 Hrs
Module - 2	Data Link Layer: Framing; Elementary Data Link Protocols: Simplest Protocol, Stop and Wait Protocol; Sliding Window Protocol: Stop and Wait Automatic Repeat Request (ARQ), Go Back N-ARQ, Selective ARQ; Multiple Access Protocols: Pure ALOHA, Slotted Aloha, CSMA, CSMA/CD, CSMA/CA; Controlled Access Protocol: Reservation, Pooling, Token Passing; Error Detection and Correction, Standard Ethernet, MAC Sublayer	12 Hrs
Module - 3	Network Layer: Network Layer Design issues; Networks-routing algorithms: optimality principle, shortest path, flooding, Distance Vector Routing, Link State Routing, Path Vector Routing, Hierarchical Routing; Congestion control algorithms: Warning bit, Choke packets, Load shedding, Random early discard, Traffic shaping; IP addresses: IPv4, IPv6; Network devices: Repeater, Hubs, Bridges, Switches, Routers, Gateways.	10 Hrs

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Module 4	Transport Layer: Transport Service; Transport Layer Features; Process to Process Delivery: TCP, TCP Connection Establishment-3 Way Handshaking, SYN Flooding Attack, Connection Termination, Flow Control and TCP Sliding Window, Nagel's Rule, TCP Congestion Control, UDP	08 Hrs
Module 5	Application Layer: DNS, Remote Logging, File transfer, Multimedia, Ziff's law; Security: Cryptography, Network Security; Internet Security: IPSec, SSL/TLS, PGP, VPN, Firewalls.	05 Hrs
TOTAL		45 Hours

Text Books:	
1	Data Communications and Networking, Behrouz A. Forouzan, Tata McGraw-Hill
2	Computer Networks, A.S. Tannenbum, Imprint of Pearson
Reference Books:	
1	Computer Networks A System Approach, Larry L, Peterson

Mapping of COs to POs and PSOs (1: Low, 2: Medium, 3: High):

COURSE CODE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO.1		3	3	3								3	3	2	1
CO.2		3	3	3								3	2	3	2
CO.3		2	3	2								2	2	3	2
CO.4		3	2	3								3	3	2	3
CO.5	3	3	3	3								3	3	3	3
CO.6	2	3	3	3								3	3	3	3

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Type	Code	Object Oriented Software Engineering	L-T-P	Credits	Marks
PC	MC-T-PC-303		3-0-0	3	150

COURSE OUTCOMES:

Students will be able to

CO.1	To learn object-oriented (OO) analysis and design using UML and other techniques.
CO.2	To acquire knowledge how to OO languages support abstraction and polymorphism.
CO.3	To develop an agile software process, with multiple iterations, design patterns, test-driven development & pair programming.
CO.4	To improve communications skills in the contact of software development. Students will present project ideas, analyses, designs, prototypes.
CO.5	Ability to abstract object-based views for generic software systems.
CO.6	To explore specialized topics in OO software.

Module-#	Topics	Hours
Module-1	System Concepts – Project Organization – Communication- Life cycle models – Classical waterfall model, iterative waterfall model, prototype model, spiral model, Unified Process – Interactive and Incremental - Workflow – Agile Processes.	08 Hours
Module-2	Requirements Elicitation – Requirement Documentation - Data Flow Diagram, Data Dictionary, Structured English, Decision Trees, Decision Tables -Use Cases- Unified Modelling language- Introduction, UML Diagrams – Class diagrams, Sequence diagrams, Object diagrams, Deployment diagrams, Use case diagrams, State diagrams, Activity diagram, Component diagrams – Case Study- Identifying Classes- Noun Phrase Approach, Common class Pattern Approach, Use-Case Driven Approach, CRC. Design Principles – Design Concepts, Object Constraint Language	12 Hours
Module-3	Project Planning & Project Organizations - Top-Down and Bottom-Up Planning -Project Estimation COCOMO-I, COCOMO-II - Types of Activity - Project Duration: Schedule Monitoring Tools - Gantt chart, PERT Chart, Critical Path.	08 Hours
Module-4	Manual testing-Unit Testing- Integration Testing-System Testing-User Interface Testing. Acceptance testing. Test Case Design Techniques, Bug Life Cycle, The Bug Template, Bug Tracking, Flow Graph Notations, Cyclomatic Complexity. White box, black box, grey box testing. Automated Testing- Fundamentals of Test Automation, Role of ROI In Automation, Automation Framework, Various Automated Tools and Their Comparisons.	10 Hours

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Module-5	Software Quality - Quality Measures - FURPS - Software Quality Assurance The Software Quality Assurance Plan - Formal approaches to SQA - Clean room Methodology -Configuration Management – Maintenance process- System documentation.	07 Hours
Total		45 Hours

Text Book

1. Pressman, R.S. (2010) Software Engineering: A Practitioner's Approach. 7th Edition, McGraw Hill, New York.
2. Rajib Mall(2014)Fundamentals of Software Engineering, Prentice-Hall of India Pvt. Ltd
3. Bernd Bruegge, Alan H Dutoit, "Object-Oriented Software Engineering" Second edition, Pearson Education, 2004.

Reference Books

1	Craig Larman, "Applying UML and Patterns" Third edition, Pearson Education, 2005.
2	Stephen Schach, " Software Engineering" Seventh edition, McGraw-Hill, 2007.
3	Ivar Jacobson, Grandy Booch, James Rumbaugh, " The Unified Software Development Process", Pearson Education, 1999.
4	Alistair Cockburn, "Agile Software Development" Second edition, Pearson Education, 2007

Mapping of COs to POs and PSOs (1: Low, 2: Medium, 3: High):

COURSE CODE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO.1	2	1	1	2	3							3			
CO.2	2	2	2	2	3		3	3		3		3			
CO.3	2	2	2	2	3		3					3		3	
CO.4		3	2	3								3	3	2	3
CO.5	2	2	2	2	2									3	2
CO.6	2			2	3						3	3		3	2

Third Semester MCA Admission Batch- 2022-23

Type	Code	Artificial Intelligence	L-T-P	Credits	Marks
PC	MC-T-PC-304		3-0-0	3	150

COURSE OUTCOMES:

Students will be able to

CO.1	Understand the fundamental concepts, theories, and principles of Artificial Intelligence and Machine Learning.
CO.2	Acquire knowledge about different search techniques of AI applications.
CO.3	Develop practical skills to build search trees by applying advanced search techniques.
CO.4	Learn techniques for logic, reasoning & knowledge representation in AI.
CO.5	Learn the basics of Machine Learning as a subfield of Artificial Intelligence area.
CO.6	Apply AI & ML algorithms to real-world problems and analyze their performance.

Module-#	Topics	Hours
Module-1	Introduction –The Foundations of Artificial Intelligence, INTELLIGENT AGENTS – Agents and Environments, Good Behavior: The Concept of Rationality, the Nature of Environments, the Structure of Agents.	09 Hours
Module-2	Solving problems by search – Problem-Solving Agents, formulating problems, Searching for Solutions, Uninformed Search Strategies, Breadth-first search, Depth-first search, Searching with Partial Information. informed (Heuristic) Search Strategies, Greedy best-first search, A* Search, CSP, Means-End-Analysis.	12 Hours
Module-3	Advanced Search: Constructing Search Trees, Stochastic Search, AO* Search Implementation, Minimax Search, Alpha-Beta Pruning Basic knowledge.	06 Hours
Module-4	Knowledge Representation and Reasoning: Propositional logic, Predicate logic, First order logic, Inference in first order logic, Clause form conversion, Resolution. Chaining- concept, forward chaining and backward chaining, Utility theory and Probabilistic reasoning, Hidden Markov model, Bayesian networks.	10 Hours
Module-5	Applications of AI System – Language Models – Information Retrieval- Information, Classification fundamentals of machine learning Extraction – Natural Language Processing – Machine Translation – Speech Recognition – Robot – Hardware –Perception – Planning – Moving	08 Hours
Total		45 Hours

Text Book

1. Stuart Russell and Peter Norvig, "Artificial Intelligence – A Modern Approach", Fourth Edition, Pearson Education, 2021
2. Kevin Night, Elaine Rich, and Nair B., "Artificial Intelligence", McGraw Hill, 2008

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Reference Books

1	Dan W. Patterson, "Introduction to Artificial Intelligence and Expert Systems", Pearson Education, 2007
2	Ethem Alpaydin, "Introduction to Machine Learning", MIT Press, Fourth Edition, 2020.
3	Deepak Khemani, "Artificial Intelligence", Tata McGraw Hill Education, 2013 (http://nptel.ac.in/)
4	Patrick H. Winston, "Artificial Intelligence", Third Edition, Pearson Education, 2006
5	Tom Mitchell, "Machine Learning", McGraw Hill, 3rd Edition, 1997.

Mapping of COs to POs and PSOs (1: Low, 2: Medium, 3: High):

COURSE CODE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO.1		3	3	3								3	3	2	1
CO.2		3	3	3								3	2	3	2
CO.3		2	3	2								2	2	3	2
CO.4		3	2	3								3	3	2	3
CO.5	3	3	3	3								3	3	3	3
CO.6	2	3	3	3								3	3	3	3

Third Semester MCA Admission Batch- 2022-23

Type	Code	Internet Of Things	L-T-P	Credits	Marks
PC	MC-T-PC-305		3-0-0	3	150

COURSE OUTCOMES:

Students will be able to

CO.1	Able to Understand the concepts of Internet of Things.
CO.2	Able to realize the revolution of Internet in Mobile Devices, Cloud & Sensor Networks
CO.3	Able to introduce the scopes of using sensing, edge computing, Machine learning mechanisms in pervasive cyber physical systems.
CO.4	Able to understand the innovation opportunity in IOT application segments Identify physical and logical design of IoT.
CO.5	Able to Develop an IOT Application using Arduino Uno board .
CO.6	Able to Develop an IOT Applications using Raspberry Pi board.

Module-#	Topics	Hour
Module-1	<p>Introduction to IoT, Definition, Conceptual Framework), Architectural view (Functional blocks of IoT, Communication models & APIs), technology behind IoT, Sources of the IoT, Sensing, Edge computing, Data processing, Learning, Overview of IoT supported Hardware platforms such as: Raspberry pi, ARM Cortex Processors, Arduino and Intel Galileo boards, Wireless networking equipment and configurations, accessing hardware and device file interactions.</p> <p>Domain Specific IOTs: Home Automation, Cities, Environment, Energy, Retail, Logistics, Agriculture, Industry, Health & Life Style.</p>	12 Hours
Module-2	<p>M2M & System Management with NETCONF-YANG: M2M, Difference between IOT And M2M, SDN and NFV for IOT, Software defined Networking, Network Function Virtualization, Need for IOT Systems Management, Simple Network Management Protocol, Limitations of SNMP, Network Operator Requirements, NETCONF, YANG, IOT Systems management with NETCONF-YANG.</p> <p>Sensing Layer (4L) Different type of sensors, working principle of some sensors like Ultrasonic sensor, Thermal Sensors, Infrared Sensors, Pollutant Sensors, Temp, IMU Sensor etc.</p> <p>Hardware for IOT: Sensors, Digital sensors, actuators, radio frequency identification (RFID) technology, wireless sensor networks, participatory sensing technology.</p> <p>Embedded Platforms for IOT: Embedded computing basics</p>	12 Hours
Module-3	<p>Developing Internet of Things & Logical Design using Python: Introduction, IOT Design Methodology, Installing Python, Python Data Types & Data Structures, Control Flow, Functions, Modules, Packages, File Handling, Date/ Time Operations, Classes, Python Packages.</p> <p>Wireless Networks Present and Future (10L) Concept of TCP/IP protocol Stack, 802.11 Protocol (WiFi Network), LoRa Network, Acoustic Communication, Socket Programming,</p>	08 Hours

Third Semester MCA Admission Batch- 2022-23

Module-4	IOT Physical Devices & Endpoints: What is an IOT Device, Exemplary Device, Linux on Raspberry Pi, Interfaces, and Programming & IOT Devices, Cloud Computing, Fog Computing, Connected Vehicles, Data Aggregation for the IOT in Smart Cities.	07 Hours
Module-5	IOT Protocols: HTTP, QUIC, COAP, MQTT, , RFID Technology, IOT RFID Hardware and Software, Building an MQTT Server on a Raspberry Pi, the Software on the Raspberry Pi, Performance and Security in IOT .	06 Hours
Total		45 Hours

Text Book

1. Vijay Madiseti, Arshdeep Bahga, " Internet of Things A Hands- On- Approach",2014, ISBN:978 0996025515
2. "The Internet of Things: Enabling Technologies, Platforms, and Use Cases", by Pethuru Raj and Anupama C. Raman (CRC Press).
3. Matt Richardson & Shawn Wallace, Getting Started with Raspberry Pi, O'Reilly (SPD), 2014

Reference Books

- 1 Adrian McEwen, "Designing the Internet of Things", Wiley Publishers, 2013,ISBN:978-1-118-43062-0
- 2 Daniel Kellmerit, "The Silent Intelligence: The Internet of Things". 2013, ISBN:0989973700
- 3 R.K. Mittal and I J Nagrath, Robotics and Control, TMH, 2003
- 4 Francis daCosta, "Rethinking the Internet of Things: A Scalable Approach to Connecting Everything", 1st Edition, Apress Publications, 2013
- 5 Cuno Pfister, Getting Started with the Internet of Things, O'Reilly Media, 2011, ISBN: 978-1- 4493- 9357-1

Mapping of COs to POs and PSOs (1: Low, 2: Medium, 3: High):

COURSE CODE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO.1		3	3	3								3	3	2	1
CO.2		3	3	3								3	2	3	2
CO.3		2	3	2								2	2	3	2
CO.4		3	2	3								3	3	2	3
CO.5	3	3	3	3								3	3	3	3
CO.6	2	3	3	3								3	3	3	3

Third Semester MCA Admission Batch- 2022-23

Type	Code	Project Management	L-T-P	Credits	Marks
OE	MC-T-OE-306		1-0-0	1	150

COURSE OUTCOMES:

Students will be able to

CO.1	To enable student to understand the Project evaluation.
CO.2	To understand the techniques involved in deciding to select a project.
CO.3	Acquire knowledge to understand the concepts which underlie the appraisal of investment of projects.
CO.4	Understand the ultimate outcome of a public or a private investment that closely links the financial and economic analysis.
CO.5	Identifies the distribution of benefits and costs over the various interest groups.
CO.6	Develop practical skills to implement the advantages and drawbacks of each of the main approaches used (namely cost benefit analysis, multi criteria analysis and other important concepts).

Module-#	Topics	Hours
Module-1	Project Identification and Formulation: Project characteristics, Taxonomy of projects, Attributes of a Good Project Manager, Project Identification, project formulation, screening of Project Ideas. Tax Incentives and Tax Planning for project investment decisions, Zero based project formulation, Project objectives, establishing the Project, UNI DO manuals, detailed feasibility Study report.	6 Hours
Module-2	Project Cost Estimation and Project Appraisal: Cost of project, Components of capital cost of a project, order of magnitude estimate, technical appraisal, Commercial appraisal, Economic appraisal, Financial Appraisal, Management appraisal, Govt. projects and social projects, Social Cost benefit analysis. Environmental Appraisal.	7 Hours
Module-3	Project Financing and Risk Analysis: Sources of financing, Role of Financial institutions in project financing, covenants attached to lending, Project Risk Analysis, Techniques of Risk Analysis, Project Organization. Infrastructure projects- characteristics and issues related to infrastructure projects, state of infrastructure in India, New Approaches for infrastructure, PPP. Government support and regulation. Project evaluation objectives, evaluation methods, Project monitoring and control, Various types of Project Termination.	7 Hours
Total		20 Hours

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Reference Books

1	Project Appraisal and Financing- Lath, Prasar-1-limalaya
2	Project Management- K. Nagarajan- New Age International
3	Project Management and Appraisal-S.Khatua-Oxford
4	Project Management-Pinto-Pearson
5	Project Management and Control-N.Singh-HPH

Mapping of COs to POs and PSOs (1: Low, 2: Medium, 3: High):

COURSE CODE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO.1		3	3	3								3	3	2	1
CO.2		3	3	3								3	2	3	2
CO.3		2	3	2								2	2	3	2
CO.4		3	2	3								3	3	2	3
CO.5	3	3	3	3								3	3	3	3
CO.6	2	3	3	3								3	3	3	3

Third Semester MCA Admission Batch- 2022-23

Type	Code	Research Methodology	L-T-P	Credits	Marks
OE	MC-T-OE-306		1-0-0	1	150

COURSE OUTCOMES:

Students will be able to

CO.1	To understand Research and Research Process
CO.2	To acquaint students with identifying problems for research and develop research strategies
CO.3	To familiarize students with the techniques of data collection, analysis of data and interpretation
CO.4	Prepare a preliminary research design for projects in their subject matter areas
CO.5	Accurately collect, analyze and report data
CO.6	Review and analyze research findings Get the knowledge of objectives and types of research

Module-#	Topics	Hours
Module-1	<p>Research Methodology: Introduction, Meaning of Research, Objectives of Research, Motivation in Research, Types of Research, Research Approaches, Significance of Research, Research Methods versus Methodology, Research and Scientific Method, Importance of Knowing How Research is Done, Research Process, Criteria of Good Research, and Problems Encountered by Researchers in India.</p> <p>Defining the Research Problem: Research Problem, Selecting the Problem, Necessity of Defining the Problem, Technique Involved in Defining a Problem, An Illustration.</p>	10 Hours
Module-2	<p>Research Design: Meaning of Research Design, Need for Research Design, Features of a Good Design, Important Concepts Relating to Research Design, Different Research Designs, Basic Principles of Experimental Designs, Important Experimental Designs. Design of Sample Surveys: Introduction, Sample Design, Sampling and Non-sampling Errors, Sample Survey versus Census Survey, Types of Sampling Designs</p>	10 Hours
Total		20 Hours

Reference Books

1	Research Methodology: Methods and Techniques, C.R. Kothari, Gaurav Garg New Age International 4th Edition, 2018.
2	Research Methodology a step-by- step guide for beginners.

Mapping of COs to POs and PSOs (1: Low, 2: Medium, 3: High):

COURSE CODE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO.1		3	3	3								3	3	2	1
CO.2		3	3	3								3	2	3	2
CO.3		2	3	2								2	2	3	2
CO.4		3	2	3								3	3	2	3
CO.5	3	3	3	3								3	3	3	3
CO.6	2	3	3	3								3	3	3	3

Third Semester MCA Admission Batch- 2022-23

Type	Code	Intellectual Property Right	L-T-P	Credits	Marks
OE	MC-T-OE-306		1-0-0	1	150

COURSE OUTCOMES:

Students will be able to

CO.1	Understand the basic concepts and various kinds of intellectual property rights.
CO.2	To become familiar with fundamentals of patent registration, trademark, design and IT Act.
CO.3	To provide the knowledge on the different rules and aspects of types of Intellectual Property Rights.
CO.4	Understand the concepts and different types of copyrights.
CO.5	To impart the knowledge on Intellectual Property Rights protection to novelty in research
CO.6	To impart the knowledge on recent advances of Intellectual property rights in E-Commerce and Cybercrimes.

Module-#	Topics	Hours
Module-1	<p>Introduction - Meaning of property, Origin, Nature, Meaning of Intellectual Property Rights, Provision of IPR under TRIPS and WTO.</p> <p>Kinds of Intellectual property rights- Copy Right, Patent, Trade Mark, Trade Secret and trade dress, Design, Layout Design, Geographical Indication.</p> <p>Copyright- Definition & Types of Copy Right, Registration procedure, Assignment & license, Terms of Copy Right, Infringement, Remedies, Copy rights with special reference to software.</p>	10 Hours
Module-2	<p>Patent Rights - Origin, Meaning of Patent, Types, Inventions which are not patentable, Registration Procedure, Rights and Duties of Patentee, Assignment and license, Restoration of lapsed Patents, Surrender and Revocation of Patents, Infringement, Remedies & Penalties.</p> <p>Trademarks- Meaning & Nature of Trade Marks, Types, Registration of Trade Marks, Infringement & Remedies, Offences relating to Trade Marks, Passing Off, Penalties.</p>	10 Hours
Total		20 Hours

Reference Books

1	Dr. G.B. Reddy, Intellectual Property Rights and the Law, Gogia Law Agency.
2	Dr. B.L.Wadehra, Law relating to Intellectual Property, Universal Law Publishing Co.

Mapping of COs to POs and PSOs (1: Low, 2: Medium, 3: High):

COURSE CODE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO.1		3	3	3								3	3	2	1
CO.2		3	3	3								3	2	3	2
CO.3		2	3	2								2	2	3	2
CO.4		3	2	3								3	3	2	3
CO.5	3	3	3	3								3	3	3	3
CO.6	2	3	3	3								3	3	3	3

Third Semester MCA Admission Batch- 2022-23

Type	Code	Software Engineering Lab	L-T-P	Credits	Marks
PC	MC-P-PC-303		0-0-2	2	100

COURSE OUTCOMES:

Students will be able to

CO.1	Understand and describe basic concept of UML, design, implementation of test cases and OOP concepts using java.
CO.2	Discuss and Analyses how to develop software requirements specifications for a given problem.
CO.3	Explain and build DFD models.
CO.4	Understand and develop various structure and behavior UML diagrams.
CO.5	Explain the knowledge of project management tool Demonstrate how to manage file using Project Libre project management tool.

Module-#	Topics	Hours
Experiment-1	Software requirements specification (SRS)	2 Hours
Experiment-2	Data flow diagram	2 Hours
Experiment-3	Entity relationship diagram	2 Hours
Experiment-4	UML use case diagram	2 Hours
Experiment-5	Interaction diagram	2 Hours
Experiment-6	Activity diagram	2 Hours
Experiment-7	Class diagram	2 Hours
Experiment-8	Object diagram	2 Hours
Experiment-9	Control flow diagram	2 Hours
Experiment-10	Design test cases for Black box testing	2 Hours
Experiment-11	Design test cases for Unit testing	2 Hours

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Text Book

1. Pressman, R.S. (2010) Software Engineering: A Practitioner's Approach. 7th Edition, McGraw Hill, New York.
2. Sommerville, I. (2016) Software Engineering. 10th Edition, Pearson Education Limited, Boston
3. Rajib Mall (2014) Fundamentals of Software Engineering, Prentice-Hall of India Pvt. Ltd

Reference Books

1	Bernd Bruegge, Alan H Dutoit, "Object-Oriented Software Engineering" Second edition, Pearson Education, 2004.
2	Craig Larman, "Applying UML and Patterns" Third edition, Pearson Education, 2005.
3	Stephen Schach, "Software Engineering" Seventh edition, McGraw-Hill, 2007.
4	Ivar Jacobson, Grandy Booch, James Rumbaugh, "The Unified Software Development Process", Pearson Education, 1999.
5	Alistair Cockburn, "Agile Software Development" Second edition, Pearson Education, 2007

Mapping of COs to POs and PSOs (1: Low, 2: Medium, 3: High):

COURSE CODE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO.1	2	1	1	2	3							3			
CO.2	2	2	2	2	3		3	3		3		3			
CO.3	2	2	2	2	3		3					3		3	
CO.4		3	2	3								3	3	2	3
CO.5	2	2	2	2	2									3	2
CO.6	2			2	3						3	3		3	2

Third Semester MCA Admission Batch- 2022-23

Type	Code	Machine Learning Using Python Lab	L-T-P	Credits	Marks
PC	MC-P-PC-304		0-0-1	1.5	100

COURSE OUTCOMES:

Students will be able to

CO.1	Use appropriate knowledge for problem solving using Python.
CO.2	Apply reasoning under uncertainty.
CO.3	Build supervised learning models.
CO.4	Build ensemble and unsupervised models.
CO.5	Build deep learning neural network models.

Module-#	Topics	Hours
Experiment-1	Basic implementation using Python Programming language.	2 Hours
Experiment-2	Coding simple programs in Python. a) Read your name and print Hello message with name b) Read two numbers and print their sum, difference, product and division. Word and character count of a given string. d) Area of a given shape (rectangle, triangle and circle) reading shape and appropriate values from standard input.	2 Hours
Experiment-3	Importing different packages and demonstrating the usability towards problem solving.	2 Hours
Experiment-4	Implement KNN algorithm.	2 Hours
Experiment-5	Implement K-Means algorithm.	2 Hours
Experiment-6	Build simple NN models.	2 Hours
Experiment-7	Build CNN Model.	2 Hours
Experiment-8	Build SVM Model.	2 Hours

Text Book

1. Stuart Russell and Peter Norvig, "Artificial Intelligence – A Modern Approach", Fourth Edition, Pearson Education, 2021
2. Ethem Alpaydin, "Introduction to Machine Learning", MIT Press, Fourth Edition, 2020.

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Reference Books

1	Dan W. Patterson, "Introduction to Artificial Intelligence and Expert Systems", Pearson Education, 2007
2	Kevin Night, Elaine Rich, and Nair B., "Artificial Intelligence", McGraw Hill, 2008
3	Deepak Khemani, "Artificial Intelligence", Tata McGraw Hill Education, 2013 (http://nptel.ac.in/)
4	Patrick H. Winston, "Artificial Intelligence", Third Edition, Pearson Education, 2006

Mapping of COs to POs and PSOs (1: Low, 2: Medium, 3: High):

COURSE CODE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO.1		3	3	3								3	3	2	1
CO.2		3	3	3								3	2	3	2
CO.3		2	3	2								2	2	3	2
CO.4		3	2	3								3	3	2	3
CO.5	3	3	3	3								3	3	3	3
CO.6	2	3	3	3								3	3	3	3

Third Semester MCA Admission Batch- 2022-23

Type	Code	Internet Of Things Lab	L-T-P	Credits	Marks
PC	MC-P-PC-305		0-0-1	1.5	100

COURSE OUTCOMES:

Students will be able to

CO.1	Remember basic understanding of computer and basic concepts of running programs.
CO.2	Understand the concepts how to use python-based ide) for the raspberry pi
CO.3	Learn to concise and precise on implementing pseudo code using python
CO.4	Illustrate the usages of raspberry pi
CO.5	Illustrate the usages of Arduino board
CO.6	Develop projects using raspberry pi and Arduino board and develop smart products.

Module-#	Topics	Hours
Experiment-1	Getting started with Raspberry Pi, Install Raspian on your SD card	2 Hours
Experiment-2	Linux basic commands. :ls, cd, touch, mv, rm, man, mkdir, rmdir, tar, gzip, cat, more, less, ps, sudo, cron, chown, chgrp, ping etc	2 Hours
Experiment-3	Coding simple programs in Python. a) Read your name and print Hello message with name b) Read two numbers and print their sum, difference, product and division. Word and character count of a given string. d) Area of a given shape (rectangle, triangle and circle) reading shape and appropriate values from standard input.	2 Hours
Experiment-4	How to use Python-based IDE (integrated development environments) for the Raspberry Pi and how to trace and debug Python code on the device	2 Hours
Experiment-5	How to have your Raspberry Pi interact with online services through the use of public APIs and SDKs.	2 Hours
Experiment-6	Arduino basic setup, how to install it and use it, shields to extend the functionality of an Arduino based system	2 Hours
Experiment-7	Designing of automated obstacle detection system.	2 Hours
Experiment-8	Designing of automated alcohol detection system.	2 Hours

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Experiment-9	Designing of automated plant watering system.	2 Hours
Experiment-10	Designing of traffic light system.	2 Hours
Experiment-11	a) Light an LED through Python program b) Get input from two switches and switch on corresponding LEDs	2 Hours
Experiment-12	c) Flash an LED at a given on time and off time cycle, where the two times are taken from a file. 5. a) Flash an LED based on cron output (acts as an alarm) Switch on a relay at a given time using cron, where the relay's contact terminals are connected to a load.	2 Hours

Mapping of COs to POs and PSOs (1: Low, 2: Medium, 3: High):

COURSE CODE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO.1		3	3	3								3	3	2	1
CO.2		3	3	3								3	2	3	2
CO.3		2	3	2								2	2	3	2
CO.4		3	2	3								3	3	2	3
CO.5	3	3	3	3								3	3	3	3
CO.6	2	3	3	3								3	3	3	3

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Type	Code	Project-III	L-T-P	Credits	Marks
PS	MC-P-PS-307		0-0-1	2	100

COURSE OUTCOMES:

Students will be able to

CO.1	Apply fundamental and disciplinary concepts and methods in ways appropriate to their principal areas of study.
CO.2	Demonstrate skill and knowledge of current information and technological tools and techniques specific to the professional field of study.
CO.3	Use effectively oral, written and visual communication.
CO.4	Identify, analyze, and solve problems creatively through sustained critical investigation.
CO.5	Integrate information from multiple sources.
CO.6	Demonstrate an awareness and application of appropriate personal, societal, and professional ethical standards.

Mapping of COs to POs and PSOs (1: Low, 2: Medium, 3: High):

COURSE CODE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO.1		3	3	3								3	3	2	1
CO.2		3	3	3								3	2	3	2
CO.3		2	3	2								2	2	3	2
CO.4		3	2	3								3	3	2	3
CO.5	3	3	3	3								3	3	3	3
CO.6	2	3	3	3								3	3	3	3

Detailed Syllabus For
FOURTH
SEMESTER

Fourth Semester MCA Admission Batch- 2022-23

Type	Code	Elective-I	L-T-P	Credits	Marks
00	MC-T-00-401		3-0-0	3	150

SL NO	Group - 1
1	Software Testing (12weeks)
2	Computer Vision (12weeks)
3	Cyber Security and Privacy (12 weeks)
4	Introduction To Industry 4.0 And Industrial Internet Of Things (12 weeks)
5	Computer Graphics (8 Weeks)

Fourth Semester MCA Admission Batch- 2022-23

Type	Code	Elective-II	L-T-P	Credits	Marks
00	MC-T-00-402		3-0-0	3	150

SL NO	Group - 2
1	Social Networks (IIT Ropar)(12 weeks)
2	Deep Learning (IIT Kgp) (12 weeks)
3	Ethical Hacking (12 weeks)
4	Business Analytics & Text Mining Modelling Using Python (8weeks)
5	Big Data Computing (8 Weeks)