Dept. of Computer Science & Application
M.C.A.(MASTER OF COMPUTER APPLICATION)
(Effective from the session: 2018-2019)
# Uttar Pradesh Technical University Dehradun
## Dept. of Computer Science & Application
### M.C.A. (MASTER OF COMPUTER APPLICATION)
#### SCHEME OF EXAMINATION
##### YEAR 1, SEMESTER I

<table>
<thead>
<tr>
<th>S.No</th>
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<th>Periods</th>
<th>Evaluation Scheme</th>
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<td>1.</td>
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<td>Programming &amp; Problem Solving Using C</td>
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**Total (Theory)**

**PRACTICAL’S**

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<tr>
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**Total (Practical’s)**

**Total (Theory + Practical)**

900

300

1200
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**PRACTICAL’S**

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**Total (Practical’s)**

**Total (Theory + Practical)**

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# Scheme of Examination

## Year 2, Semester III

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### Practical’s

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### Total (Theory + Practical)

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### Elective-I (ECA-30X)

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<td>MCAT 312</td>
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<td>MCAT 313</td>
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### Scheme of Examination

**Year 2, Semester I**

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**Total (Theory)** 900

**Practical’s**

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**Total (Practical’s)** 300

**Total (Theory + Practical)** 1200

### ELECTIVE-II (ECA-40X)

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### ELECTIVE-III (ECA-41Y)

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## Dept. of Computer Science & Application
### M.C.A.(MASTER OF COMPUTER APPLICATION)
#### SCHEME OF EXAMINATION
##### YEAR 3, SEMESTER V

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| Total (Theory + Practical) | 1200 |

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### ELECTIVE-V (ECA-51Y)

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### M.C.A. (MASTER OF COMPUTER APPLICATION) SCHEME OF EXAMINATION
#### YEAR 3, SEMESTER IV

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UNIT-I: Definition of Algorithms-Writing algorithms- top down design – Program verification- The efficiency of algorithms- Concept of recursion-some simple example to illustrate the second concept like finding the GCD of two numbers-Swapping two variables-Summation of n given numbers-generation of Fibonacci sequence-Reversing a given number-Base conversion.


if statement- if…else statement- various forms of if- nested if-break statement-continue statement – go to Statement - switch statement - nested switch statement - for statement -while statement do while statement - arrays - working with string and standard functions.


Text Books:
1. Gottfried(schaumseries), Programming and problem solving in 'C', TMH.

Reference Books:
1. The C programming language, by PHI Kernighan and Ritchie
2. The Spirit of C, Cooper Mullish, Jaico Publishing House, Delhi
5. Programming in C, Jeeyapoovan, Pearson Education
UNIT-I:

UNIT-II:
**Analysis and design procedures of Combinational circuits** - Arithmetic Circuits: Binary / BCD adders and subtractors, Carry look ahead adder, Magnitude comparator, Code conversion Decoders, Encoders, Multiplexers and Demultiplexers.

UNIT-III:
**Sequential Devices:** General model of sequential circuits – Latch, Design of Flip Flops, Master slave configuration. Mealy/Moore models – Sequence detector – Concept of state, State diagram, State table, State reduction procedures using Implication chart. Design of synchronous sequential circuits – Updown / Modulus counters, Serial adder, Binary counters.


UNIT-V: Memory Hierarchy. Main memory (RAM/ROM chips), Auxiliary memory, Associative memory, Cache memory, Virtual Memory, Memory Management Hardware, hit/miss ratio, magnetic disk and its performance, magnetic Tape etc.

**Text Books:**

**Reference Book:**
1. Computer Organization, Vravice, Zaky & Hamacher (TMH Publication)
2. Structured Computer Organization, Tannenbaum (PHI)
3. Morris Mano, ”Computer System Architecture”, PHI
4. Computer Organization, Stallings (PHI)
5. William Stallings, ”Computer Organization & Architecture”, PearsonEducation Asia
UNIT-I:
**Floating point Arithmetic:** Representation of floating point numbers, Operations, Normalization, Pitfalls of floating point representation, Errors in numerical computation.

**Iterative Methods:** Zeros of a single transcendental equation and zeros of polynomial using Bisection Method, Iteration Method, Regula-Falsi method, Newton Raphson method, Secant method, Rate of convergence of iterative methods.

UNIT-II:
**Interpolation and approximation:** Finite Differences, Difference tables Polynomial Interpolation: Newton’s forward and backward formula, Central Difference Formulae: Gauss forward and backward formula, Stirling’s, Bessel’s, Everett’s formula. Interpolation with unequal intervals.

**Langrange’s Interpolation, Newton Divided difference formula,** Approximation of function by Taylor’s series.

UNIT-III:
**Numerical Differentiation and Integration:** Introduction, Numerical Differentiation, Numerical Integration, Trapezoidal rule, Simpson’s rules, Boole’s Rule, Weddle’s Rule.

**Solution of differential equations:** Picard’s Method, Euler’s Method, Taylor’s Method, Runge-Kutta methods,

**Simultaneous Linear Equations:** Solutions of system of Linear equations, Gauss Elimination, Gauss Jordan method, Gauss Seidal iterative method, Rate of Convergence.

UNIT-IV:
**Curve fitting, Cubic Spline and Approximation:** Method of least squares, fitting of straight lines, polynomials, exponential curves etc. Cubic Spline Approximation.

**Correlation and Regression analysis:** Introduction, Scatter Diagram, Types of Correlation, Karl Pearson’s Method, Rank Correlation, Linear and Non-linear regression, Multiple regression.

UNIT-V:
**Time series and forecasting:** Method of Semi Averages, Method of Moving Averages, Method of Least Square, smoothening of curves, forecasting models and methods.

**Statistical Quality Controls:** Advantages of Q.C, Controls charts, Types of control charts-Mean chart, R- Range chart, Standard Deviation Chart.

**Text Books:**

**Reference Books**
2. Gourdin A., BoumahratM.”Applied Numerical Method”, PHI.
UNIT-I: Rules of sum and products, Permutation, Combination, Permutation groups and application, Probability, Ramsey theory, discrete numeric function and generating function, Combinatorial problems, Difference equations.

UNIT-II: Recurrence Relation—Introduction, Linear recurrence relation with constant coefficient, Homogeneous solution, Particular solution, Total solution, Solution by the method of generating function.

UNIT-III: Graphs, sub-graphs, some basic properties, Walks, Path & circuits, Connected graphs, Disconnected graphs and components, Euler and Hamiltonian graphs, Various operation on graphs, Tree and fundamental circuits, Distance diameters, Radius and pendant vertices, Rooted and binary trees, Counting trees, Spanning trees, Finding all spanning trees of a graph and a weighted graph.

UNIT-IV: Cut-sets and cut vertices, some properties, All cut sets in a graph, Fundamental circuits and cut sets, Connectivity and separability, Network flows, mincut theorem, Planar graphs, Combinatorial and geometric dual, Kuratowski’s to graphs detection of planarity, Geometric dual, Some more criterion of planarity, Thickness and Crossings, Vector space of a graph and vectors, basis vectors, cut set vector, circuit vector, circuit and cut set verses sub spaces, orthogonal vector and sub space. Incidence matrix of graphs, sub matrices of A(G), circuit matrix, cut set matrix, path matrix and relationship among Af, Bf, Cf, fundamental circuit matrix and rank of Bf adjacency matrix, rank nullity theorem.

UNIT-V: Coloring and covering, partitioning of graph, Chromatic number, Chromatic partitioning, Chromatic polynomials, Matching, covering, Four color problem, Directed graphs, Types of directed graphs, Directed paths and connectedness, Euler digraphs, Trees with directed edges, Fundamental circuit in digraph, Matrices A, B, C of digraph adjacency matrix of digraph, Enumeration and its types, Counting of labeled and unlabeled trees, Polya’s theorem, Graph enumeration with polyas theorem, Graph theoretic algorithm.

Text Books:
1. Deo ,N.: Graph Theory, PHI
2. Harary, F: Graph Theory, Narosa

Reference Books:
1. Bondy and Murthy: Graph Theory and Applications, Adison Wesley
2. Combinatory and Graph Theory”,Dr. S.B. Singh, Khanna Book Publishing
4. John Truss, “Discrete mathematics for computer scientist”
5. C. L. Liu, “Discrete mathematics
UNIT-I: Data and Information – Types of information: operational, tactical, strategic and statutory – why do we need information systems – management structure – requirements of information at different levels of management – functional allocation of management – requirements of information for various functions – qualities of information


Text Books:

Reference Books:
Dept. of Computer Science & Application  
MCA Semester –I  
MCAT 106Fundamental of Information Technology

UNIT-I  
**Number System** - Binary, Decimal, Octal, Hexadecimal and their inter-conversions. Computer Arithmetic – Binary addition and subtraction using signed-magnitude complement, Binary multiplication and division.

UNIT-II  
**Digital Logic Circuits**- Boolean algebra – Basic identities of Boolean algebra, Boolean function. Logic Gates – AND, OR, NOT, NOR, NAND, EX-OR, EX-NOR operations and their truth tables.

UNIT-III  
**Information Concept & Processing** – Definition of information, need for information, quality of information, value of information, categories and levels of information in business organization. Entropy category and level of information in business organization, Data concepts and data Processing, Data representation.

UNIT-IV  
**Computer & Communication**- Application of data transmission, types of data transmission, media for data transmission, types of networking, client server architecture.

**Programming Language Classification**- Computer languages, generation of languages, translators-interpreters, compilers, assembles.

UNIT-V  
**Information Technology Application In India**- Scientific business, education and entertainment application, industry automation, weather forecasting awareness, ongoing IT project in India-NICNET, ERNET etc.

**Text Books**  
1. Introduction to information technology, ITL education solution limited, personal education.
2. Foundation of information technology by D S Yadav . New age publication ltd.

**References Books**  
3. P. K. Sinha ."IntroductiontoComputers "
4. V. Rajaraman"Fundamentalof computer" PHI.
7. Introduction to computer science, ITL Education solution limited. Personal education.
8. Introduction to computer by peter Norton TMH. Publication ltd.
1. Write C program to find largest of three integers.
2. Write C program to check whether the given string is palindrome or not.
3. Write C program to find whether the given integer is
   (i) a prime number
   (ii) An Armstrong number.
4. Write C program for Pascal triangle.
5. Write C program to find sum and average of n integer using linear array.
6. Write C program to perform addition, multiplication, transpose on matrices.
7. Write C program to find fibonacci series of iterative method using user-defined function.
8. Write C program to find factorial of n by recursion using user-defined functions.
9. Write C program to perform following operations by using user defined functions:
   (i) Concatenation
   (ii) Reverse
   (iii) String Matching
10. Write C program to find sum of n terms of series:
    (i) \( n - \frac{n\times2}{2!} + \frac{n\times3}{3!} - \frac{n\times4}{4!} + \ldots \ldots \ldots \)
11. Write C program to interchange two values using
    (i) Call by value.
    (ii) Call by reference.
12. Write C program to sort the list of integers using dynamic memory allocation.
13. Write C program to display the mark sheet of a student using structure.
14. Write C program to perform following operations on data files:
    (i) read from data file.
    (ii) write to data file.
15. Write C program to copy the content of one file to another file using command line argument.

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2. Implementation of Half Adder, Full Adder and Subtractor.
3. Implementation of Ripple Counters and Registers.
5. Implementation of Multiplexer and D-Multiplexer circuits.
Dept. of Computer Science & Application  
MCA Semester-I  
MCAP 103: CBNST Lab

Write Programs in ‘C’ Language:
1. To deduce error involved in polynomial equation.
2. To Find out the root of the Algebraic and Transcendental equations using Bisection, Regula-falsi, Newton Raphson and Iterative Methods. Also give the rate of convergence of roots in tabular form for each of these methods.
3. To implement Newton’s Forward and Backward Interpolation formula.
4. To implement Gauss Forward and Backward, Bessel’s, Sterling’s and Evertt’s Interpolation formula
5. To implement Newton’s Divided Difference and Langranges Interpolation formula.
6. To implement Numerical Differentiations.
7. To implement Numerical Integration using Trapezoidal, Simpson 1/3 and Simpson 3/8 rule.
8. To implement Least Square Method for curve fitting.
9. To draw frequency chart like histogram, frequency curve and pie-chart etc.
10. To estimate regression equation from sampled data and evaluate values of standard deviation, t-statistics, regression coefficient, value of R2 for at least two independent variables.

Dept. of Computer Science & Application  
MCA Semester-I  
MCAP 104: Seminar

Prerequisites: General knowledge of computer systems design, both software and hardware, is necessary.

Objectives: To increase participants' familiarity with recent and important research results in computer systems; to improve participants' skills in presenting computer systems research.

- In the Seminar participants discuss recent and important results in the area of computer systems research.
- For a typical meeting, attendees will read and discuss one paper chosen from recent systems, networking, security conference or other Computer Applications related topics.
- Papers are selected for discussion according to the semester's focus topic, the papers' relevance to participants' own research, and/or the papers' relevance to upcoming technologies.
- Each meeting has one or more designated “facilitators” who are responsible for leading the discussion.
UNIT-I
**Object Modeling**: Object & classes, Links and Associations, Generalization and Inheritance, Aggregation, Abstract classes, A sample object model, Multiple Inheritance, Meta data, candidate keys, constraints.

**Dynamic Modeling**:
- Events and States
- Operations and Methods
- Concurrency.

UNIT-II
**Functional Modeling**: Data flow Diagrams, Specifying Operations, Constraints, a sample functional model.

**Translating object oriented design** into an implementation, OMT Methodologies, examples and case studies to demonstrate methodology, comparison of Methodology, SA/SD, and JSD.

UNIT-III
**Introduction to Object Oriented Programming paradigm**: basic concepts, benefits and applications.
- Overview of C++, Sample C++ program, data types, operators, expressions, and statements, arrays and strings, pointers & user-defined types.

**Functions**: prototype, argument passing, default arguments, inline functions.

UNIT-IV
**Classes & Objects**: Class Specification, Class Objects, Scope resolution operator, Access specifiers, Data members, member functions, Constructors, Destructors, Static data members, static member functions, friend functions.

**Pointers and Dynamic Memory Management**: Declaring and initializing pointers, accessing data through pointers, memory allocation (static and dynamic), dynamic memory management using new and delete operators, pointer to an object, this pointer.

UNIT-V
**Concept of binding** - early binding and late binding, virtual functions, pure virtual functions, abstract class.

**Files**: File streams, hierarchy of file stream classes, error handling during file operations, reading/writing of files, accessing records randomly, updating files.

**TextBook**:

**ReferenceBooks**:
1. BjarneStroustrup, “C++ Programming Language”, Addison Wesley
UNIT-I
Introduction: Basic Terminology, Elementary Data Organization, Structure operations.
Arrays: Array Definition, Representation and Analysis, Single and Multidimensional Arrays, address calculation, application of arrays, Character String in C, Character string operation, Array as Parameters, Ordered List, Sparse Matrices and Vectors.
Stacks: Array Representation and Implementation of stack, Operations on Stacks: Push & Pop, Array Representation of Stack, Linked Representation of Stack, Operations Associated with Stacks,
Application of stack: Conversion of Infix to Prefix and Postfix Expressions, Evaluation of postfix expression using stack.

UNIT-II
Queues: Array and linked representation and implementation of queues, Operations on Queue: Create, Add, Delete, Full and Empty, Circular queues, D-queues and Priority Queues.
Linked list: Representation and Implementation of Singly Linked Lists, Two-way Header List, Traversing and Searching of Linked List, Overflow and Underflow, Insertion and deletion to/from Linked Lists, Insertion and deletion Algorithms, Doubly linked list, Linked List in Array, Polynomial representation and addition, Garbage Collection and Compaction.

UNIT-III
Searching and Hashing: Sequential search, binary search, comparison and analysis, Hash Table, Hash Functions, Collision Resolution Strategies, Hash Table Implementation.

UNIT-IV
Sorting: Insertion Sort, Bubble Sorting, Quick Sort, Two Way Merge Sort, Radix Sort, Sorting on Different Keys. Binary Search Trees: Binary Search Tree (BST), Insertion and Deletion in BST, Complexity of Search Algorithm

UNIT-V
File Structures: Physical Storage Media File Organization, Organization of records into Blocks, Sequential Files, Indexing and Hashing, Primary indices, Secondary indices, B+ Tree index Files, B Tree index Files, Indexing and Hashing Comparisons.

TextBook:
1. Lipschutz, “Data Structure”, TMH

ReferenceBooks:
1. R. Kruse etal, “Data Structures and Program Design in C” Pearson Education

Dept. of Computer Science & Application
MCA Semester –II
MCAT 203 Discrete Mathematics

UNIT – I
Relation: Relations, Properties of Binary relation, Matrix representation of relations, Closures of relations, Equivalence relations, Partial order relation.
Function: Types, Composition of function, Recursively defined function.
Algebraic Structures: Properties, Semi group, Monoid, Group, Abelian group, Subgroup, Cyclic group, Cosets, Normal Subgroups, Lagrange’s Theorem, Permutation groups.

UNIT – II

UNIT – III

UNIT-IV: Introduction to defining language, Kleene Closure, Arithmetic expressions, Chomsky Hierarchy, Regular expressions, Generalized Transition graph. Finite Boolean algebra, functions of Boolean algebra.
UNIT-V Conversion of regular expression to Finite Automata, NFA, DFA, Conversion of NFA to DFA, Optimizing DFA, FA with our Moore machine, Mealy machine, Conversions.

Text Books:
2. Lipschutz, Seymour: Discrete Mathematics, Schaum’s Series

Reference Books:
Inc., New Delhi.

Dept. of Computer Science & Application
MCA Semester –II
MCAT 204 Operating System

UNIT-I

UNIT-II

UNIT-III

UNIT-IV

UNIT-V

Text Books:

Reference Books:
5. Crow ley, "Operating System", TMH.
Dept. of Computer Science & Application  
MCA Semester –II  
MCAT 205 E-Governance

UNIT-I  
OverviewofE-GovernmentandE-Governance,StagesofE-Governance,NationalE- Governance Plan (NeGP),MissionModeProjectsandtheirimplementationstatus,E-Governance,IntroductiontoE- governance,RoleofICT’sine-governance,Need,importanceofE-governance, SWAN(State Wide Area Network ) architecture.

UNIT-II  
Categoriesofe-governance,KeyIssuesofE-Governance,Technology,Policies, Infrastructure, Training, Copyrights,ConsultingFunds,E-governanceModels, ModelofDigitalGovernance,Broadcasting/WiderDisseminationModel

UNIT-III  

UNIT-IV  
Publicinformation:employment,hospitals, railway, Agricultural sector: Fertilizers, Seeds, Utility payments Electricity,water,telephone,Commercial: incometax,customduty,exciseduty- GovernanceInfrastructure, stages in evolutionandstrategiesforsuccess,E-Governance Infrastructure, stages in evolution and strategies for success

UNIT-V  
HumanInfrastructuralpreparedness,ChallengesagainstE-governance,StudyofE- governanceinitiativesin Indianstates, E-readiness, LegalInfrastructuralpreparedness

Text Books:
1. Geo-informationinternationalpublications  
2. E-governanceprojects,PHIpublication

ReferenceBooks:  
2. E-Governance, Pankaj Sharma, APH Publishing Corporation  
3. E-Governance In India: Initiatives and Issues, R.P. Sinha, Concept publicingcopney
UNIT-I

UNIT-II

UNIT-III

UNIT-IV

UNIT-V
File Structures, System Calls for File Management – create, open, close, read, write, lseek, link, symlink, unlink, stat, fstat, lstat, chmod, chown, Directory API – opendir, readdir, closedir, mkdir, rmdir, umask.

Text Books:
2. Designof Unix O.S., Maurice Bach, Prentice Hall of India.

Reference Books:
MCAP 201: C++ Lab

1. Program illustrating Overloading of Various operators.
2. Program illustrating use of friend, inline static Member functions, default arguments.
3. Program illustrating use of destructor and various types of constructor.
4. Program illustrating various Functions Virtual Base Class.
5. Program illustrating use of Virtual Functions, Virtual Base Class.
6. Program illustrating how exception handling is done.
7. Program implementing various kinds of Sorting algorithms, Search algorithms, Graphs algorithm.

MCAP 202: Data Structure Lab

1. Dynamic Implementation of Linked List
2. Realization of Stack/Queue using linked list
3. Creation of Binary Search Tree
4. Inorder/Prorder/Post order traversal of Binary Tree
5. Writing program for Shortest Path algorithm (Dijkstra's)
6. Finding connected components in a graph.
7. Multimedia of two matrices using Matric Multimedia Multiplication Method

MCAP 206: Unix & Shell Programming Lab

1. Execution of various file/directory handling commands.
2. Simple shell script for basic arithmetic and logical calculations.
3. Shell scripts to check various attributes of files and directories.
4. Shell scripts to perform various operations on given strings.
5. Shell scripts to explore system variables such as PATH, HOME etc.
6. Shell scripts to check and list attributes of processes.
7. Execution of various system administrative commands.
8. Write awk script that uses all of its features.
9. Use sed instruction to process /etc/passwd file.
10. Write a shell script to display list of users currently logged in.
11. Write a shell script to delete all the temporary files.
12. Write a shell script to search an element from an array using binary searching.
The objective of Project I is to conduct a preliminary analysis, propose alternative solutions, describe costs and benefits and submit a preliminary plan with recommendations.

The student will:

1. Conduct the preliminary analysis: in this step, you need to find out the organization's objectives and the nature and scope of the problem under study. Even if a problem refers only to a small segment of the organization itself, you need to find out what the objectives of the organization itself are. Then you need to see how the problem being studied fits in with them.

2. Propose alternative solutions: In digging into the organization's objectives and specific problems, you may have already covered some solutions. Alternate proposals may come from interviewing employees, clients, suppliers, and/or consultants. You can also study what competitors are doing. With this data, you will have three choices: leave the system as is, improve it, or develop a new system.

3. Describe the costs and benefits.

UNIT-I
Internet: Connecting to Internet Telephone, Cable, and Satellite Connection, Choosing an ISP, Introduction to Internet Services, E-Mail Concepts, Sending and Receiving secure E-Mail, Voice and Video Conferencing.

UNIT-II
Core Java: Introduction to Java Programming Language, Data Types and Operations, Structured Programming, Selection Statements, Loops, Methods, Method Abstraction and Stepwise Refinement, Arrays, Object-Oriented Programming: Classes and Objects, Constructors, Implementing & Designing Classes.

UNIT-III

UNIT-IV

UNIT-V

Text Books:
1. Margaret Levine Young, “The Complete Reference Internet”, TMH
2. Balagurusamy E, “Programming in JAVA”, TMH

Reference Books:
1. Naughton, Schildt, “The Complete Reference JAVA2”, TMH
2. Dustin R. Callway, “Inside Servlets”, Addison Wesley
UNIT-I:
**Introduction:** Algorithms, Growth of Functions, Algorithm Analysis – Time Space Trade off – Asymptotic Notations, Master’s Theorem, Designing of Algorithms. **Sorting and order Statistics:** Heap sort, Merge Sort, Medians and Order Statistics.

UNIT-II:
**Advanced Data Structure:** Red-Black Trees, Binary Search Tree, Augmenting Data Structure. B-Trees, Binomial Heaps, Fibonacci Heaps, Data Structure for Disjoint Sets.

UNIT-III:
**Advanced Design and Analysis Techniques:** Dynamic Programming, Greedy Algorithms, Amortized Analysis, Back Tracking.

UNIT-IV

UNIT-V:
**Selected Topics:** Sorting Networks, Starssen’s algorithm for matrix multiplication, Randomized algorithms, String Matching, NP Completeness, and Approximation Algorithms.

**Text Books:**
1. Coreman, Rivest, Lisserson : “Algorithm", PHI.

**Reference Books:**
UNIT-I: Introduction: An overview of database management system, Database System Vs File System, Database System concepts and architecture, data models schema and instances, data independence and data base language and interfaces, Data definitions language, DML, Overall Database Structure.
Data modeling using the Entity Relationship Model: ER model concepts, notation for ER diagram, mapping constraints, keys, Concepts of Super Key, candidate key, primary key, Generalization, aggregation, reduction of An ER diagrams to tables, extended ER model, relationships of higher degree.

UNIT-II: Relational data Model and Language: Relational data model concepts, integrity constraints: entity integrity, Referential integrity, Keys constraints, Domain constraints, relational algebra, relational calculus, tuple and domain calculus
Introduction to SQL: Characteristics of SQL, Advantages of SQL, SQL data types and literals, Types of SQL Commands, SQL operators and their procedure, Tables, views and indexes, Queries and sub queries, Aggregate Functions, Insert, update and delete operations, Joins, Unions, Intersection, Minus, Cursors in SQL. PL/SQL, Triggers and clusters

UNIT-III: Data Base Design & Normalization: Functional dependencies, normal forms, first, second, third normal forms, BCNF, inclusion dependencies, loss less join decompositions, normalization using FD, MVD, and JDs, alternative approaches to database design

UNIT-IV: Transaction Processing Concepts: Transaction system, testing of serializability, Serializability of schedules, Conflict & view serializable schedule, recoverability, Recovery from transaction failures, log based recovery, Checkpoints, deadlock handling

UNIT-V: Concurrency Control Techniques: Concurrency control, locking Techniques for concurrency control, Time stamping protocols for concurrency control, validation based protocol, multiple granularity, Multi- version Schemes, Recovery with concurrent transaction. Transaction Processing in Distributed system, data fragmentation. Replication and allocation techniques for distributed system, overview of concurrency control and recovery in distrusted database

Text Books:
1. Date C J, “An Introduction To Database System”, Addison Wesley
2. Navathe E, “Database management systems”

Reference Books:
UNIT-I: Introduction to Modeling and Simulation Nature of Simulation. Systems, Models and Simulation, Continuous and Discrete Systems, system modeling, concept of simulation, Components of a simulation study, Principles used in modeling, Static and Dynamic physical models, Static and Dynamic Mathematical models Introduction to Static and Dynamic System simulation, Advantages, Disadvantages and pitfalls of Simulation.


Text Books:
1. Seila, Simulation Modeling, Cengage Learning
2. Deo, System Simulation with Digital Computer, PHI

Reference Books:
1. Law, „Simulation Modeling And Analysis, McGraw Hill
UNIT I: Web Designing & Introduction to HTML: Concepts of effective web design, Web design issues including Browser, Bandwidth and Cache, Display resolution, Look and Feel of the Website, Page Layout and linking, User centric design, Sitemap, Planning and publishing website, Designing effective navigation Basics of HTML, formatting and fonts, commenting code, color, hyperlink, lists, tables, images, forms, XHTML, Meta tags, Character entities, frames and frame sets, Browser architecture and Web site structure. Overview and features of HTML5.

UNIT II: Introduction to JavaScript: JavaScript Variables and Data Types, Declaring Variables, Data Types, Statements and Operators, Control Structures, Conditional Statements, Loop Statements, Object-Based Programming, Functions, Executing Deferred Scripts, Objects, Message box in JavaScript, Dialog Boxes, Alert Boxes, Confirm Boxes, Prompt Boxes, JavaScript with HTML, Events, Event Handlers, Forms, Forms Array.

UNIT III Style Sheets: Need for CSS, Introduction to CSS, basic syntax and structure, using CSS, background images, colors and properties, manipulating texts, using fonts, borders and boxes, margins, padding lists, positioning using CSS, CSS2, Overview and features of CSS3

XML: Introduction to XML, uses of XML, simple XML, XML key components, DTD and Schemas, Using XML with application. Transforming XML using XSL and XSLT

UNIT IV PHP : Introduction and basic syntax of PHP, decision and looping with examples, PHP and HTML, Arrays, Functions, Browser control and detection, string, Form processing, Files, Advance Features: Cookies and Sessions, Object Oriented Programming with PHP

UNIT V: PHP Database Connectivity: Basic commands with PHP examples, Connection to server, creating database, selecting a database, listing database, listing table names, creating a table, inserting data, altering tables, queries, deleting database, deleting data and tables, PHP myadmin and database bugs.

Text Books:

Reference Books:
1. Doug Tidwell, James Snell, PavelKulchenko; Programming web services with SOAP, O’Reilly
2. Pardi, XML in Action, Web Technology, PHI
3. Yong, XML step by step, PHI
4. Aaron, Weiss, Rebecca Taply, Kim Daniels, Stuven Mulder, Jeff Kaneshki, Web Authoring Desk reference, Techmedia publications, ASP.Net Chris payme, Techmedia
UNIT-I Fundamentals Of Operating Systems


UNIT-II Distributed Operating Systems


UNIT-III Distributed Resource Management


UNIT-IV Real Time And Mobile Operating Systems


UNIT-V Case Studies


Text Books:

Reference Books:

Dept. of Computer Science & Application
MCA Semester –III
MCAT 312 E-Commerce

UNIT-I

UNIT – II

UNIT-III
Electronic Data Interchange, EDI Applications in Business, EDI implementation, MIME, and value added networks. Work flow automation and Coordination, Customization and Internal Commerce, Supply Chain Management(SCM).

UNIT –IV

UNIT –V

Text Books:

Reference Books:
2. Bajaj and Nag. "E-Commerce the cutting edge of Business". TMH.
UNIT-I:  
**Introduction and Software Project Planning**  

UNIT-II:  
**Project Organization and Scheduling**  

UNIT-III:  
**Project Monitoring and Control**  

UNIT-IV:  
**Software Quality Assurance and Testing**  

UNIT-V:  
**Project Management and Project Management Tools**  

**Text Books:**  

**Reference Books:**  
1. Royce, Software Project Management, Pearson Education
2. Kieron Conway, Software Project Management, Dreamtech Press

Dept. of Computer Science & Application
MCA Semester-III

MCAP 301: Java Lab

1. Write a program in java for illustrating, overloading, over riding and various forms of inheritance.
2. Write programs to create packages and multiple threads in Java.
3. Write programs in Java for event handling Mouse and Keyboard events.
4. Using Layout Manager create different applications.
5. Write programs in Java to create and manipulate Text Area, Canvas, Scroll Bars, Frames and Menus using swing /AWT.
6. Using Java create Applets.
8. Write a program in java to read data from disk file.

Dept. of Computer Science & Application
MCA Semester-III

MCAP 302: Algorithm Design Lab

1. Divide and conquer method (quick sort, merge sort,)
2. Greedy method (knapsack problem, job sequencing, optimal merge patterns, minimal panning trees).
3. Dynamic programming (multistage graphs, OBST, 0/1 knapsack, traveling sales person problem).
4. Implement Back tracking
5. Sorting : Insertion sort, Heap sort, Radix sort
6. Searching : Sequential and Binary Search
7. Selection: Minimum/ Maximum, K th smallest element.
8. Implement Depth First Search and Breadth First Search.
9. Write program to implement Prims algorithm.
10. Write program to implement Kruskal’s algorithm.

Dept. of Computer Science & Application
MCA Semester-III

MCAP 303: Database Lab

1. Write the queries for Data Definition and Data Manipulation Language.
2. Write SQL queries using logical operations (=,<,>,etc)
3. Write SQL queries using SQL operators
4. Write SQL query using character, number, date and group functions
5. Write SQL queries for relational algebra
6. Write SQL queries for extracting data from more than one table
7. Write SQL queries for sub queries, nested queries
8. WAP by the use of PL/SQL
9. Concepts for ROLL BACK, COMMIT & CHECK POINTS
10. Create VIEWS, CURSORS and TRIGGERS & write ASSERTIONS.
11. Create FORMS and REPORTS

Dept. of Computer Science & Application
MCA Semester-III
MCAP 306: Project II

The objective of Project II is to conduct

**Systems analysis, requirements definition:** Defines project goals into defined functions and operation of the intended application. It is the process of gathering and interpreting facts, diagnosing problems and recommending improvements to the system. Analyzes end-user information needs and also removes any inconsistencies and incompleteness in these requirements.

A series of steps followed by the developer are

1. Collection of Facts: End user requirements are obtained through documentation, client interviews, observation and questionnaires,
2. Scrutiny of the existing system: Identify pros and cons of the current system in-place, so as to carry forward the pros and avoid the cons in the new system.
3. Analyzing the proposed system: Solutions to the shortcomings in step two are found and any specific user proposals are used to prepare the specifications.
UNIT-I

UNIT-II

UNIT-III

UNIT-IV
JSP Application Development: Generating Dynamic Content, Using Scripting Elements Implicit JSP Objects, Conditional Processing – Displaying Values Using an Expression to Set an Attribute, Declaring Variables and Methods, Error Handling and Debugging, Sharing Data between JSP pages, Requests, and Users Passing Control and Date between Pages – Sharing Session and Application Data – Memory Usage Considerations.

UNIT-V

Text Books:

Reference Books:
3. Murach: Murach’s beginning JAVA JDK 5, SPD.
UNIT -I

UNIT -II

UNIT - III

UNIT - IV

UNIT - V

Text Books:
1. Forouzen, "Data Communication and Networking", TMH

Reference Books:
1. A.S. Tanenbaum, Computer Networks, Pearson Education
UNIT-I: Introduction

UNIT-II: Software Requirement Specifications (SRS)

UNIT-III: Software Design

UNIT-IV: Software Testing

UNIT-V: Software Maintenance and Software Project Management

Text Books:

Reference Books:
UNIT –I

UNIT –II

UNIT – III
Two dimensional viewing: Viewing pipeline, viewing transformation, viewing functions, line clipping – Cohen Sutherland line clipping, Liang Barsky line clipping, polygon clipping: Sutherland – Hodgman polygon clipping, WilerAtherton polygon clipping.

UNIT – IV
Structures and Hierarchical Modeling: Structure concepts, editing structures, Basic modeling concepts, hierarchical modeling with structures. Graphical user interfaces and Interactive input methods: The user Dialogue, logical classification of input devices, Input functions and Models Interactive picture construction techniques.

UNIT – V

Text Books:

Reference Books:
UNIT-I
Transaction and schedules, Concurrent Execution of transaction, Conflict and View Serializability, Testing for Serializability, Concepts in Recoverable and Cascadeless schedules.

UNIT –II
Lock based protocols, Time stamp based protocols, Multiple Granularity and Multiversion Techniques, Enforcing serializability by Locks, Locking system with multiple lock modes, Architecture for Locking scheduler.

UNIT-III
Distributed Transactions Management, Data Distribution, Fragmentation and Replication Techniques, Distributed Commit, Distributed Locking schemes, Long duration transactions, Moss Concurrency protocol.

UNIT –IV

UNIT-V
Distributed Query Processing, Multiway Joins, Semi joins, Cost based query optimization for distributed database, Updating replicated data, protocols for Distributed Deadlock Detection, Eager and Lazy Replication Techniques.

Text Books:
1. Ceei and Pelagatti, ’Distributed Database’, TMH

Reference Books:
2. Ramakrishna and Gehrke,’ Database Management System, McGraw Hill
3. Garcia-Molina, Ullman, Widom,’ Database System Implementation’ Pearson Education
UNIT-I

UNIT-II
**Image Enhancement in the spatial domain:** Background, Some basic gray level transformation, Introduction of Histogram processing, Enhancement using Arithmetic/Logic operations, Basics of spatial filtering, Smoothing spatial filters, Sharpening spatial filters.

UNIT-III
**Image Restoration:** A model of the Image Degradation/Restoration process, Noise Models, Restoration in the presence of noise only spatial filtering, Inverse filtering, Minimum Mean Square Error (Wiener) filtering, Geometric mean filter, Geometric Transformations.

UNIT-IV
**Image Compression:** Fundamentals, Lossy Compression, Lossless Compression, Image Compression models, Error-free Compression: Variable length coding, LZW coding, Bit plane coding, Run length coding, Introduction to JPEG.

UNIT-V

Text Books :

Reference Books:
1. Digital Image Processing and Analysis : B. Chanda& D. Dutta Majumber, PHI
2. Image Processing in C : Dwayne Phillips, BPB
UNIT-I: Introduction
Definition of Artificial Intelligence (AI), Evolution of Computing, History of AI, Classical Romantic and modern period, subject area, Architecture of AI machines, logic family, classification of logic.
Production System: Production rules, the working memory, Recognize-act cycle, conflict resolution strategies, refractoriness, specify alternative approach for conflict resolution by Meta rules, Architecture of production system.

UNIT-II: Propositional Logic

UNIT-III: Default and Non Monotonic Logic
Axiomatic theory, Monotonicity, non-atomic reasoning using McDermott’s NML-I, problems with NML-I, reasoning with NML-II, Case study of Truth Maintenance system (TMS), neural network fundamentals.

UNIT-IV: Imprecision and Uncertainty

UNIT-V: Intelligent Search Techniques
Heuristic function, AND-OR graph, OR Graph, Heuristic search, A* algorithm and examples. Logic Programming with Prolog: Logic program, Horn clause, program for scene interpretation, unification of goals, SLD resolution, SLD tree, flow of satisfaction, controlling backtracking using CUT, command use of CUT, implementation of backtracking using stack, risk of using cuts, fail predicate, application of cut-fail combination, replacing cut-fail by not.

Text Books:

Reference Books:
2. E. Charniak and D. McDermott: Introduction to Artificial Intelligence, Addison Wesley Longman.
UNIT-I: Introduction
Introduction to Multimedia, Multimedia Information, Multimedia Objects, Multimedia in business and work. Convergence of Computer, Communication and Entertainment products Stages of Multimedia Projects: Multimedia hardware, Memory & storage devices, Communication devices, Multimedia software's, presentation tools, tools for object generations, video, sound, image capturing, Authoring tools, Card and page based authoring tools.

UNIT-II: Multimedia Building Blocks
Text, Sound MIDI, Digital Audio, Audio file formats, MIDI under windows environment Audio & Video Capture.

UNIT-III: Speech Compression & Synthesis
Digital Audio concepts, Sampling Variables, Loss less compression of sound, loss compression, silence compression & Speech Synthesis.

UNIT-IV: Images
Multiple monitors, bitmaps, Vector drawing, lossy graphic compression, Image file format, Animations Images standards, JPEG Compression, Zig Zag Coding, Multimedia Database.

UNIT-V
Content based retrieval for text and images, Video: Video representation, Colors, Video Compression, MPEG standards, MHEG Standard Video Streaming on net, Video Conferencing, Multimedia Broadcast Services, Indexing and retrieval of Video Database, Recent development in Multimedia.

Text Books:

Reference Books:
2. Mark Nelson “Data Compression Book” BPB.
UNIT-I:  
**Introduction:** Bioinformatics objectives and overviews, Interdisciplinary nature of Bioinformatics, Data integration, Data analysis, Major Bioinformatics databases and tools. Metadata: Summary & reference systems, finding new type of data online. Molecular Biology and Bioinformatics: Systems approach in biology. Central dogma of molecular biology, problems in molecular approach and the bioinformatics approach, Overview of the bioinformatics applications.

UNIT-II:  
The Information Molecules and Information Flow: Basic chemistry of nucleic acids, Structure of DNA, Structure of RNA, DNA Replication, -Transcription, -Translation, Genes- the functional elements in DNA. Analyzing DNA, DNA sequencing. Proteins: Amino acids, Protein structure, Secondary, Tertiary and Quaternary structure, Protein folding and function, Nucleic acid-Protein interaction.

UNIT-III:  
**Perl:** Perl Basics, Perl applications for bioinformatics- Bioperl, Linux Operating System, Understanding and Using Biological Databases, Java clients, CORBA, Introduction to biostatics.

UNIT-IV:  
Nucleotide sequence data: Genome, Genomic sequencing, expressed sequence tags, gene expression, transcription factor binding sites and single nucleotide polymorphism. Computational representations of molecular biological data storage techniques: databases (flat, relational and object oriented), and controlled vocabularies, general data retrieval techniques: indices, Boolean search, fuzzy search and neighboring, application to biological data warehouses.

UNIT-V:  
Biological data types and their special requirements: sequences, macromolecular structures, chemical compounds, generic variability and its connection to clinical data. Representation of patterns and relationships: alignments, regular expressions, hierarchies and graphical models.

**Text Books:**  

**Reference Books:**  
**UNIT-I**

**UNIT-II**

**UNIT-III**
Data management issues, data replication for mobile computers, adaptive clustering for mobile wireless networks, File system, Disconnected operations.

**UNIT-IV**
Mobile Agents computing, security and fault tolerance, transaction processing in mobile computing environment.

**UNIT-V**
What is Ad-hoc Network? , Problems with Message Routing in Wireless Ad-hoc Mobile Networks, Routing scheme based on signal strength, Dynamic State Routing (DSR), Route Maintenance and Routing error, Fisheye Routing (FSR), Ad-hoc on Demand Distance Vector (AODV).

**Text Books:**

**Reference Books:**

UNIT II: Big Data Technologies: Hadoop’s Parallel World – Data discovery – Open source technology for Big Data Analytics – cloud and Big Data – Predictive Analytics – Mobile Business Intelligence and Big Data – Crowd Sourcing Analytics – Inter- and Trans-Firewall Analytics - Information Management.

UNIT III: Processing Big Data: Integrating Disparate Data Stores - Mapping Data To The Programming Framework - Connecting And Extracting Data From Storage - Transforming Data For Processing - Subdividing Data In Preparation For Hadoop Map Reduce.

UNIT IV: Hadoop Map reduce: Employing Hadoop Map Reduce - Creating the components of Hadoop Map Reduce jobs - Distributing data processing across server farms - Executing Hadoop Map Reduce jobs - Monitoring the progress of job flows - The Building Blocks of Hadoop Map Reduce - Distinguishing Hadoop daemons - Investigating the Hadoop Distributed File System Selecting appropriate execution modes: local, pseudo-distributed, fully distributed.


Text Books:

Reference Books:
1. Study of complete network architecture of your institution (including topology, network devices cabling standards, protocol and security features).
2. Hands on experiment for configuring network interface card for connecting two systems.
3. Test the connectivity between two hosts.
4. Test all options of ping.
5. Write a Program to find the IP address and domain name of your system.
6. Write a Program to establish connection between a TCP client & server for studying nature of client server communication.
7. Write a Program to connect ftp server to get & put file.
8. Study IEEE standards & find out their implementation in networking environment.
9. Write a program to find an IP address of host and turn on IP address into domain name.
10. Make a report on LAN establishment in any of organization including hardware & networking aspects.

Dept. of Computer Science & Application
MCA Semester-IV
MCAP 403: Software Engineering Lab

1. Problem Analysis and Project Planning Thorough study of the problem- identify project scope, infrastructure.
2. Software Requirement Analysis- Describe the individual Phases/modules of the project deliverables.
3. Data Modeling Use work products – data dictionary, use case diagrams and activity diagrams, build and test class diagrams, sequence diagrams and add interface to class diagrams.
4. Software Developments and Debugging.
5. Software Testing – Prepare test plan, perform validation testing coverage analysis, Memory leaks, develop test case hierarchy, Site check and site monitor.
6. Describe: Relevance of CASE tools, high – end and low – end CASE tools, automated support for data dictionaries, DFD, ER diagrams.

List of Experiments :
1. Course Registration System
2. Online ticket reservation system
3. Students marks analyzing system
4. Platform assignment system for the trains in a railway station
5. Payroll System
6. Hotel management system
Write program in any suitable language

1. Write a program to draw a line using DDA algorithm.
2. Write a program for implementing Bresenham’s algorithm for line generation
3. Write a program for generation of circle.
4. Write a program to demonstrate Cohen- Sutherland line clipping method.
5. Write a program to implement Sutherland- Hodgeman polygon clipping algorithm.
6. Write a program to rotate a triangle. (By asking the user to input the coordinates of the Triangle and the angle of rotation)
7. Write a program to perform one point perspective projection of an object.
8. Write a program to implement Depth- Buffer method to display the visible surfaces of a given polyhedron.
9. Write a program to implement 3-D rotation of an object.
10. Write a program to draw ployline using any algorithm.
11. Write a program to draw a Bezier curve and surface.
Note: Students are advised to use C, C++ language for writing program; Use of open GL is desirable.

The objective of Project III is to conduct

- **Systems design**: Describes desired features and operations in detail, including screen layouts, business rules, process diagrams, pseudocode and other documentation.
- **Development**: The real code will be written here.
UNIT-I

UNIT-II
C -Sharp Language (C#): Introduction, Data Types, Identifiers, Variables, Constants, Literals, Array and Strings, Object and Classes, Inheritance and Polymorphism, Operator Overloading, Interfaces, Delegates and Events. Type conversion.

UNIT-III

UNIT-IV
Advanced Features Using C#: Web Services, Window Services, Asp.net Web Form Controls, ADO.Net. Distributed Application in C#, Unsafe Mode, Graphical Device interface with C#.

UNIT-V

Text Books:
1. Wiley,” Beginning Visual C# 2008”, Wrox
2. Fergal Grimes,” Microsoft .Net for Programmers”. (SPI)

Reference Books:
1. Balagurusamy,” Programming with C#”, (TMH)
2. Mark Michaelis, “Essential C# 3.0: For .NET Framework 3.5, 2/e, Pearson Education
UNIT-I: Data Mining

Introduction – Data – Types of Data – Data Mining Functionalities – Interestingness of Patterns – Classification of Data Mining Systems – Data Mining Task Primitives – Integration of a Data Mining System with a Data Warehouse – Issues.

UNIT-II: Data Preprocessing


UNIT-III: Classification


UNIT-IV: Cluster Analysis


UNIT-V: Association Rule Mining


Text Books:


Reference Books:


**Dept. of Computer Science & Application**  
**MCA Semester –V**  
**MCAT 503 Cryptography & Network Security**

**UNIT –I**  
Introduction to security attacks, services and mechanism, Classical encryption technique substitution ciphers and transposition ciphers, cryptanalysis, steganography, Stream and block ciphers. Modern Block Ciphers: Block ciphers principles, Shannon’s theory of confusion and diffusion, fiestal structure, Data encryption standard (DES), Strength of DES, Idea of differential cryptanalysis, block cipher modes of operations, Triple DES.

**UNIT-II**  
Introduction to group, field, finite field of the form GF(p), modular arithmetic, prime and relative prime numbers, Extended Euclidean Algorithm, Advanced Encryption Standard (AES) encryption and decryption Fermat’s and Euler’s theorem, Primality testing, Chinese Remainder theorem, Discrete Logarithmic Problem, Principals of public key crypto systems, RSA algorithm, security of RSA.

**UNIT-III**  

**UNIT-IV**  
Key Management and distribution: Symmetric key distribution, Diffie-Hellman Key Exchange, Public key distribution, X.509 Certificates, Public key Infrastructure. Authentication Applications: Kerberos Electronic mail security: pretty good privacy (PGP), S/MIME.

**UNIT-V**  

**Text Books:**

**Reference Books:**
UNIT-I

UNIT-II

UNIT-III

UNIT-IV

UNIT-V

Text Books:
1. Software Testing and Quality Assurance theory and practice by Kshira Sagar Naik and Priyadarshi Tripathy

Reference Books:
1. Stephen H. Khan, Metrics and Models in Software Quality Engineering Pearson Education, India
2. Shari Lawrence Pfleeger,”Software Engineering Theory and Practice Pearson

Dept. of Computer Science & Application
MCA Semester –V
MCAT 541 Intellectual Property and Entrepreneurship Skill

UNIT-I
Introduction to IP, Early history and development of IP, IP law and the history of IP law. Introduction to Indian IP laws, rules and other related information, The internationalisation of Cooperation and harmonisation of IPRs. The new challenges: public policies and technological change, IP management and commercialization, Workshop, exercises and case study.

UNIT-II
Financing of IP, commercialisation of IP, R&D and knowledge Using patent information, IP valuation Defending IP assets: IP infringement and breach of confidentiality IP and due diligence IPRs in a nutshell, Integrating IP into business, IP commercialization through agreements and partnerships, Workshop, exercises and case study.

UNIT-III

UNIT-IV
Computer programs and the ICT, Characteristics and economic importance of the software sector, Copyright protection for computer programs, Patent protection for computer-implemented inventions (CII), Other forms of IP protection for technology and innovation, Enforcement of IP rights, IP management and commercialization, Assessing and exploiting IP/IP and entrepreneurial and collaborative partnerships and ventures for the development and commercialisation of innovation, IP licensing.

UNIT-V
Copyright and the creative industries, copyright works and creators other forms of protecting creativity through IP, Copyright protection for creative works: literature, art, music, computer programs and databases, Trademarks Trade mark protection, Trade secrets and confidential information, Defending IP rights Managing and exploiting creative works, Design: design rights, Design protection, IP issues in the work environment: ownership/employers and employees/researchers/confidentiality. Scheme for Entrepreneur, role of Social Media, International IP and digital technologies.

Text Books:

Web Reference:
1. http://www.ipindia.nic.in

Dept. of Computer Science & Application
MCA Semester – V
MCAT 542 Real Time Systems

UNIT-I: Introduction

UNIT-II: Real Time Scheduling

UNIT-III: Resources Sharing

UNIT-IV: Real Time Communication
Basic Concepts in Real time Communication, Soft and Hard RT Communication systems, Model of Real Time Communication, Priority-Based Service and Weighted Round-Robin Service Disciplines for Switched Networks, Medium Access Control Protocols for Broadcast Networks, Internet and Resource Reservation Protocols

UNIT-V: Real Time Operating Systems and Databases
Features of RTOS, Time Services, UNIX as RTOS, POSIX Issues, Characteristic of Temporal data, Temporal Consistency, Concurrency Control, Overview of Commercial Real Time databases.

Text Books:

Reference Books:
1. Mall Rajib, “Real Time Systems”, Pearson Education
UNIT I
Client/Server Computing: DBMS concept and architecture, Single system image, Client Server architecture, mainframe-centric client server computing, downsizing and client server computing, preserving mainframe applications investment through porting, client server development tools, advantages of client server computing.

UNIT II
Components of Client/Server application: The client: services, request for services, RPC, windows services, fax, print services, remote boot services, other remote services, Utility Services & Other Services, Dynamic Data Exchange (DDE), Object Linking and Embedding (OLE), Common Object Request Broker Architecture (CORBA). The server: Detailed server functionality, the network operating system, available platforms, the network operating system, available platform, the server operating system.

UNIT III
Client/Server Network: connectivity, communication interface technology, Interposes communication, wide area network technologies, network topologies (Token Ring, Ethernet, FDDI, CDDI) network, management, Client-server system development: Software, Client–Server System Hardware: Network, Acquisition, PC-level processing UNIT, Macintosh, notebooks, pen, UNIX workstation, x-terminals, server hardware.

UNIT IV

UNIT V

Text Books:

Reference Books:
1. Client/Server Computing (Professional Reference Series), Patrick N. Smith; Steven L. Guengerich, Sams Publishing.

Dept. of Computer Science & Application
MCA Semester – V
MCAT 551 Web Mining

UNIT-I
Search Engine Basics, Creating an SEO Plan, Building Your Site for SEO, Keywords and Your Web Site, Pay-per-Click and SEO, Maximizing Pay-per-Click Strategies, Increasing Keyword Success, Understanding and Using Behavioural Targeting, Managing Keyword and PPC Campaigns, Keyword Tools and Services, Tagging Your Web Site, The Content Piece of the Puzzle, Understanding the Role of Links and Linking.

UNIT-II
Basic Search Engines and information retrieval, Architecture of a Search Engine, Basic Building Blocks (Text Acquisition, Text Transformation, Index Creation, User Interaction, Ranking Evaluation), Evaluating Search Engines, Why Evaluate?.

UNIT-III

UNIT-IV
Ranking with Indexes, Abstract Model of Ranking, Inverted indexes, Documents Counts, Positions, Fields and Extents, Scores, Ordering, Compression, Entropy and Ambiguity, Delta Encoding, Bit-aligned codes, Byte-aligned codes, Looking ahead.

UNIT-V

Text Books:
1. Mining The Web, Soumen Chakraborty.
2. Search Engine Optimization, Jerry L. Ledford

Reference Books:
2. Jesus Mena, "Data Mining Your Website", Digital Press, 1999

Dept. of Computer Science & Application
MCA Semester –V
MCAT 552 SOFT COMPUTING

UNIT-I: Fuzzy Systems


UNIT-II: Artificial Neural Networks

Machine Learning Using Neural Network, Adaptive Networks – Feed forward Networks – Supervised Learning Neural Networks – Radial Basis Function Networks –Unsupervised Learning Neural Networks

UNIT-III: Neuro - Fuzzy Modeling


UNIT-IV: Genetic Algorithms


UNIT-V: Applications


Text Books:

Reference Books:

Dept. of Computer Science & Application  
MCA Semester –V  
MCAT 553 Cloud Computing

UNIT-I  

UNIT-II  
Cloud Services: Types of Cloud services: Software as a Service-Platform as a Service –Infrastructure as a Service - Database as a Service - Monitoring as a Service –Communication as services. Service providers- Google, Amazon, Microsoft Azure, IBM, Sales force.

UNIT-III  

UNIT-IV  
Virtualization For Cloud Need for Virtualization – Pros and cons of Virtualization – Types of Virtualization –System Vm, Process VM, Virtual Machine monitor – Virtual machine properties - Interpretation and binary translation, HLL VM - Hypervisors – Xen, KVM , VMWare, Virtual Box, Hyper-V.

UNIT-V  

Text Books:

Reference Books:

UNIT II: IoT and M2M – Software defined networks, network function virtualization, difference between SDN and NFV for IoT. Basics of IoT System Management with NETCOZF, YANG-NETCONF, YANG, SNMP NETOPEER

UNIT III: Introduction to Python - Language features of Python, Data types, data structures, Control of flow, functions, modules, packaging, file handling, data/time operations, classes, Exception handling Python packages - JSON, XML, HTTPLib, URLLib, SMTPLib

UNIT IV: IoT Physical Devices and Endpoints - Introduction to Raspberry PI-Interfaces (serial, SPI, I2C) Programming – Python program with Raspberry PI with focus of interfacing external gadgets, controlling output, reading input from pins.

UNIT V: IoT Physical Servers and Cloud Offerings – Introduction to Cloud Storage models and communication APIs Webserver – Web server for IoT, Cloud for IoT, Python web application framework Designing a RESTful web API

Text Books:
1. Internet of Things - A Hands-on Approach, Arshdeep Bahga and Vijay Madisetti, Universities Press, 2015

Reference Books:
1. Getting Started with Raspberry Pi, Matt Richardson & Shawn Wallace, O'Reilly (SPD), 2014
1. WAP to implement SET, Get Properties?
2. WAP to implement String Using array’s?
3. WAP to print the ARMSTRONG Number?
4. Create a console application to calculate area of circle. Accept radius from user Calculate circle area and print it
5. Create a console application to build simple calculator Calculator will have following functions Accept 2 numbers Perform Add/Sub/Div/Mult Print Result.
6. WAP to Use a Exception (Predefined and User defined).
7. WAP to implement the concept of Abstract and Sealed Classes.
8. WAP to implement ADO.Net Database connectivity.
9. WAP to implement the concept of Data Streams.
10. WAP to implement the Events and Delegates.
11. Design the WEB base Database connectivity Form by using ASP.NET.
12. WAP to implement Indexers.

Dept. of Computer Science & Application
MCA Semester –V
MCAP 505 Advanced Network Lab

1. Implementation of DES and IDEA Algorithms
2. Implementation of AES and Asymmetric RSA algorithm.
4. Implementation of the hash code using SHA-1 and hash code using MD5.
5. Authentication using Digital Signature Algorithm - Configure a mail agent to support Digital Certificates, send a mail and verify the correctness of this system using the configured parameters.
6. Simulation of ECC
7. Simulation of DSA using RSA and ECC
8. Simulation of Blind Signature
9. Simulation of E-Voting
10. Simulation of Smartcard
11. Implementation of new protocols in NS2
1. Write programs in „C“ Language to demonstrate the working of the following constructs:
   i) do...while ii) while….do iii) if...else iv) switch v) for
2. A program written in “C” language for Matrix Multiplication fails! Introspect the causes for its failure and write down the possible reasons for its failure.
3. Take any system (e.g. ATM system) and study its system specifications and report the various bugs.
4. Write the test cases for any known application (e.g. Banking application)
5. Create a test plan document for any application (e.g. Library Management System)
6. Study of any testing tool (e.g. Win runner)
7. Study of any web testing tool (e.g. Selenium)
8. Study of any bug tracking tool (e.g. Bugzilla, bugbit)
9. Study of any test management tool (e.g. Test Director)
10. Study of any open source-testing tool (e.g. Test Link)

The objective of Project IV is to conduct

- **Integration and testing**: Brings all the pieces together into a special testing environment, then checks for errors, bugs and interoperability.
- **Acceptance, installation, deployment**: The final stage of initial development, where the software is put into production and runs actual business.