COURSES OFSTUDY,SCHEME OF EXAMINATION &SYLLABUS

Dept. of Computer Science & Application
M.C.A.(MASTER OFCOMPUTERAPPLICATION)
(Effectivefromthesession:2018-2019)

Uttarakhand Technical University Dehradun
Dept. of Computer Science & Application
M.C.A.(MASTER OFCOMPUTERAPPLICATION)
SCHEME OF EXAMINATION
YEAR 1, SEMESTER I

S.No	Subject Code	Subject Name	Periods			Evaluation Scheme			ESE	Subject Total
						Sessional Exam				
			L	T	P	CA	TA	Total		
1.	MCAT 101	Programming & Problem Solving Using C	3	1	0	30	20	50	100	150
2.	MCAT 102	Computer Organization & Architecture	3	1	0	30	20	50	100	150
3.	MCAT 103	Computer Based Numerical & Statistical Technique	3	1	0	30	20	50	100	150
4.	MCAT 104	Combinatorics& Graph Theory	3	1	0	30	20	50	100	150
5.	MCAT 105	System Analysis & Design	3	1	0	30	20	50	100	150
6.	MCAT 106	Fundamental of Information Technology	3	1	0	30	20	50	100	150
Total (Theory)										**900**
PRACTICAL'S										
7.	MCAP 101	Programming with C Lab	0	0	2	10	15	25	25	50
8.	MCAP 102	Computer Organization Lab	0	0	2	10	15	25	25	50
9.	MCAP 103	CBNST Lab	0	0	2	10	15	25	25	50
10.	MCAP 104	Seminar	0	0	4	30	20	50	50	100
11.	MCP 105	GP	0	0	0	-	-	-	50	50
Total (Practical's)										**300**
Total (Theory + Practical)										**1200**

Dept. of Computer Science & Application
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SCHEME OF EXAMINATION
YEAR 1, SEMESTER II

S.No	Subject Code	Subject Name	Periods			Evaluation Scheme				
						Sessional Exam			ESE	Subject Total
			L	T	P	CA	TA	Total		
1.	MCAT201	Object Oriented Programming With C++	3	1	0	30	20	50	100	150
2.	MCAT202	Data Structure	3	1	0	30	20	50	100	150
3.	MCAT203	Discrete Mathematics	3	1	0	30	20	50	100	150
4.	MCAT204	Operating System	3	1	0	30	20	50	100	150
5.	MCAT205	E-Governance	3	1	0	30	20	50	100	150
6.	MCAT206	Unix & Shell Programming	3	1	0	30	20	50	100	150
Total (Theory)										**900**
PRACTICAL'S										
7.	MCAP 201	C++ Lab	0	0	2	10	15	25	25	50
8.	MCAP 202	Data Structure Lab	0	0	2	10	15	25	25	50
9.	MCAP 206	Unix & Shell Programming Lab	0	0	2	10	15	25	25	50
10.	MCAP 207	Project I	0	0	4	30	20	50	50	100
11.	MCAP208	GP	0	0	0				50	50
Total (Practical's)										**300**
Total (Theory + Practical)										**1200**

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SCHEME OF EXAMINATION
YEAR 2, SEMESTER III

S.No	Subject Code	Subject Name	Periods			Evaluation Scheme				
						Sessional Exam			ESE	Subject Total
			L	T	P	CA	TA	Total		
1.	MCAT 301	Internet & JAVA Programming	3	1	0	30	20	50	100	150
2.	MCAT 302	Analysis & Design of Algorithm	3	1	0	30	20	50	100	150
3.	MCAT 303	Database Management System	3	1	0	30	20	50	100	150
4.	MCAT 304	Simulation & Modelling	3	1	0	30	20	50	100	150
5.	MCAT305	Web Technologies	3	1	0	30	20	50	100	150
6.	MCAT311	ELECTIVE-I	3	1	0	30	20	50	100	150
Total (Theory)										**900**
PRACTICAL'S										
7.	MCAP 301	Java Lab	0	0	2	10	15	25	25	50
8.	MCAP 302	Algorithm Design Lab	0	0	2	10	15	25	25	50
9.	MCAP 303	Database Lab	0	0	2	10	15	25	25	50
10.	MCAP306	Project II	0	0	4	30	20	50	50	100
11.	MCAP 307	GP	0	0	0				50	50
Total (Practical's)										**300**
Total (Theory + Practical)										**1200**

ELECTIVE-I (ECA-30X)

S.No	Subject Code	Subject Name
1.	MCAT 311	Advanced Operating System
2.	MCAT 312	E-Commerce
3.	MCAT 313	Software Project Management

Dept. of Computer Science & Application
M.C.A.(MASTER OFCOMPUTERAPPLICATION)
SCHEME OF EXAMINATION
YEAR 2, SEMESTER IV

S.No	Subject Code	Subject Name	Periods			Evaluation Scheme				
						Sessional Exam			ESE	Subject Total
			L	T	P	CA	TA	Total		
1.	MCAT 401	Advanced JAVA	3	1	0	30	20	50	100	150
2.	MCAT 402	Data Communication & Computer Networks	3	1	0	30	20	50	100	150
3.	MCAT 403	Software Engineering	3	1	0	30	20	50	100	150
4.	MCAT 401	Computer Graphics	3	1	0	30	20	50	100	150
5.	MCAT-24X	**ELECTIVE-II**	3	1	0	30	20	50	100	150
6.	MCAT-34X	**ELECTIVE-III**	3	1	0	30	20	50	100	150
Total (Theory)										**900**
PRACTICAL'S										
7.	MCAP 405	Computer Networks Lab	0	0	2	10	15	25	25	50
8.	MCAP 403	Software Engineering Lab	0	0	2	10	15	25	25	50
9.	MCAP 404	Computer Graphics Lab	0	0	2	10	15	25	25	50
10.	MCAP 406	Project III	0	0	4	30	20	50	50	100
11.	MCAP 407	GP	0	0	0				50	50
Total (Practical's)										**300**
Total (Theory + Practical)										**1200**

ELECTIVE-II (ECA-40X)

S.No	Subject Code	Subject Name
1.	MCAT 421	Advanced DBMS
2.	MCAT 422	Digital Image Processing
3.	MCAT 423	Artificial Intelligence

ELECTIVE-III (ECA-41Y)

S.No	Subject Code	Subject Name

1.	MCAT 431	Multimedia Communications
2.	MCAT 432	Bio-Informatics
3.	MCAT 433	Mobile &Adhoc Computing
4.	MCAT 434	Big Data Analysis

Dept. of Computer Science & Application

M.C.A.(MASTER OFCOMPUTERAPPLICATION)
SCHEME OF EXAMINATION
YEAR 3, SEMESTER V

S.No	Subject Code	Subject Name	Periods			Evaluation Scheme				
						Sessional Exam			ESE	Subject Total
			L	T	P	CA	TA	Total		
1.	MCAT 501	.Net Technology With C#	3	1	0	30	20	50	100	150
2.	MCAT 502	Data Mining	3	1	0	30	20	50	100	150
3.	MCAT 503	Cryptography & Network Security	3	1	0	30	20	50	100	150
4.	MCAT 504	Software Testing & Quality Assurance	3	1	0	30	20	50	100	150
5.	MCAT-54X	**ELECTIVE-IV**	3	1	0	30	20	50	100	150
6.	MCAT-5SX	**ELECTIVE-V**	3	1	0	30	20	50	100	150
Total (Theory)										**900**
PRACTICAL'S										
7.	MMCP 051	.Net Lab	0	0	2	10	15	25	25	50
8.	MCAP 505	Advanced Network Lab	0	0	2	10	15	25	25	50
9.	MCAP 504	Software Testing Lab	0	0	2	10	15	25	25	50
10.	MCAP 506	Project IV	0	0	4	30	20	50	50	100
11.	MCAP 507	GP	0	0	0				50	50
Total (Practical's)										**300**
Total (Theory + Practical)										**1200**

ELECTIVE-IV (ECA-50X)

S.No	Subject Code	Subject Name
1.	MCAT 541	Intellectual Property and Entrepreneurship Skill
2.	MCAT 542	Real Time Systems
3.	MCAT 543	Client Server Computing

ELECTIVE-V (ECA-51Y)

S.No	Subject Code	Subject Name
1.	MCAT 551	Web Mining

2.	MCAT 552	Soft Computing
3.	MCAT 553	Cloud Computing
4.	MCAT 554	Internet of Things

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SCHEME OF EXAMINATION
YEAR 3, SEMESTER IV

S.No	Subject Code	Subject Name	Periods			Evaluation Scheme		
						Sessional Exam	ESE	Subject Total
			L	T	P	Total		
1.	MCAP 601	Industrial Project				400	800	1200
Total								**1200**

Dept. of Computer Science & Application
MCA Semester –I
MCAT 101Programming & Problem Solving Using C

UNIT-I: Definition of Algorithms-Writing algorithms- top down design – Programverification-Theefficiencyofalgorithms-ConceptofRecursion-somesimple 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.

UNIT-II: **C character set- Delimiters-**The C Keywords-Identifiers- Constants-Variables-Rules for Defining Variables-Data Types-Declaring Variables- Initializing Variables – Type Conversion-Priority of Operators and their Clubbing- Comma and Conditional Operator-Arithmetic Operators-Relational Operators –Logical Operators-Bitwise Operators-Input and Output in C-Formatted and Unformatted Functions -Library Functions.
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.

UNIT-III: Advanced Concepts Of C : Introduction to pointers – pointer declaration – Arithmetic Operations with pointers – pointers and arrays – pointers and two-dimensional arrays – array of pointers – pointers to pointers – pointers and strings – void pointers – function definition and declaration – proto types - types of functions – call by value and reference – functions returning more values – function as an argument – function with operators – function and decision statements – function and loop statements – function with arrays and pointers – recursion – pointer to function – storage classes.

UNIT-IV: Additionalin C: Pre-processor directives – structures and unions – bit wise operators–files–commandlinearguments–dynamicmemoryallocation–graphicsinC.

UNIT-V: **ProblemSolving:**ReversalofanArray-Removalofduplicatesinanorderedarray-Partitioningofanarray-Findingthek^{th}smallestofanelementofanarray-Findingthe longestmonotonesubsequenceofanarray-Linearsearch-Binarysearch-Hashsearching- Bubblesort-mergesort-Quicksort-Insertionsort-selectionsort-Textprocessing-TowersofHanoiproblemusingrecursion.

TextBooks:
   1. Gottfried(schaumseries), Programmingand problemsolvingin 'C',TMH.
   2. KanetkarY.P. Letus C, BPB Publications
ReferenceBooks:
   1. TheC programminglanguage,by PHI Kernighan and Ritchie
   2. TheSpiritof C, Cooper Mullish, JaicoPublishingHouse,Delhi
   3. Pointersin C, by KanetkarY.P. , BPB Publications
   4. ProgramminginC , by McGraw Hill,New York.1990.
   5. programmingin C ,Jeeyapoovan,PearsonEducation

Dept. of Computer Science & Application
MCA Semester –I
MCAT 102Computer Organization & Architecture

UNIT-I:
Review of Number Systems – Number representation: Signed, Unsigned, Fixed point, Floating point. Computer codes – BCD, Gray code, Excess 3 code, Error detection and correction codes, Parity, Hamming codes. Boolean algebra – Basic Postulates and theorems, Switching functions, Canonical forms, Logic gates. Simplifications of Boolean functions using Karnaugh maps and tabulation methods

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-IV: Von Neumann Machine (IAS Computer), Operational flow chart (Fetch, Execute), Instruction Cycle, Organization of Central Processing UNIT, Hardwired & micro programmed control UNIT, Single Organization, General Register Organization, Stack Organization, Addressing modes, Instruction formats, data transfer & Manipulation, I/O Organization, Programming Registers

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:
1. Computer System Architecture, PHI/Pearson Education, 3rd Edition, M. Morris Mano
2. Digital Computer Fundamentals, Tata McGraw Hill, 6th Edition, Thomas C. Bartee

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 Stalling,"Computer Organization &Architecture",PearsonEducaiton Asia
6. Computer Organization, John P.Hayes (McGraw Hill)

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:
  1. Rajaraman V., "Computer Oriented Numerical Methods", PHI-2004
  2. Gerald & Wheatley, "Applied Numerical Analyses", AW-2003
ReferenceBooks
  1. Burden, RichardL.,Fairs,J.DouglasFairs, "NumericalAnalysis",ThomsonAsia.PTE, 7thEdition.
  2. Gourdin A., BoumahratM."Applied Numerical Method", PHI.
  3. Rajasekaran, S." NumericalMethodinScience& Engineering,A Practical
     Approach"S.Chand&Co Ltd.,IIEdition.
  4. Jain M. K. &IyengerR.K. "NumericalMethods for Scientific&Engg. Computation,"New
  5. Age, InternationalPub. 4th Edition.

Dept. of Computer Science & Application
MCA Semester –I
MCAT 104Combinatorics& Graph Theory

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 separatability, 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
3. Joshi K. D., "Fundamental of discrete mathematics", New Age International
4. John Truss, "Discrete mathematics for computer scientist"
5. C. L. Liu, "Discrete mathematics

Dept. of Computer Science & Application
MCA Semester –I
MCAT 105System Analysis & Design

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

UNIT-II: Systems Analysis and Design Life Cycle: Requirements determination – requirements specifications – feasibility analysis – final specifications – hardware and software study – system design – system implementation – system evaluation – system modification. Role of systems analyst – attributes of a systems analyst – tools used in system analysis.

UNIT-III: Information gathering – strategies – methods – case study – documenting study – system requirements specification – from narratives of requirements to classification of requirements as strategic, tactical, operational and statutory.

UNIT-IV: Feasibility analysis – deciding project goals – examining alternative solutions – cost – benefit analysis – quantifications of costs and benefits – payback period – system proposal preparation for managements – parts and documentation of a proposal – tools for prototype creation.

UNIT-V: Tools for systems analysts – data flow diagrams – case study for use of DFD, good conventions – leveling of DFDs – leveling rules – logical and physical DFDs – software tools to create DFDs.

Text Books:
1. Modern System Analysis and Design, Hoffer,George,Valacich,Panigtahi, Pearson Publication
2. Structured System Analysis and Design, J.B. Dixit, Raj Kuamar, Laxmi Publications

Reference Books:
1. Professionals Guide to Systems Analysis, Martin Modell,Mcgraw Hill Software Engineering Series
2. Systems Analysis and Design for the Global Enterprise, Lonnie D. Bentley, McGraw-Hill
3. Systems Analysis and Design, Alan Dennis,Wiley Publishing
4. Satzinger, J. W., Jackson, R. B., &Burd, S. (2007). Systems Analysis & Design In A Changing World, Fourth Edition. Boston: Thomson Course Technology.
5. Kerzner, H. (2006). Project Management - A Systems Approach to Planning, Scheduling, and Controlling
6. Satzinger, Jackson, Burd, Systems Analysis & Design In A Changing World; Fifth Edition

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
1. Leon& Leon"Computers Today"LeonVikas Pub.
2. S Jaiswal, " InformationTechnologyToday " GalgotiaPub.
3. P. K. Sinha ."IntroductiontoComputers "
4. V. Rajaraman"Fundamentalof computer" PHI.
5. Sanders. D.H. " ComputersToday " McGraw Hill
6. S. K. Basandra "ComputersToday" GalgotiaPublication
7. Introduction to computer science, ITL Education solution limited. Personal education.
8. Introduction to computer by peter Norton TMH. Publication ltd.

Dept. of Computer Science & Application
MCA Semester-I
MCAP 101: Programming with C Lab

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 fibbonacci 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 - n*2/2! + n*3/3! - n*4/4! + $...............
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.

Dept. of Computer Science & Application
MCA Semester-I
MCAP 102: Computer Organization Lab

1. Study and Bread Board Realization of Logic Gates. K-Map, Flip-Flop equation, realization of characteristic and excitation table of various Flip Flops.
2. Implementation of Half Adder, Full Adder and Subtractor.
3. Implementation of Ripple Counters and Registers.
4. Implementation of Decoder and Encoder circuits.
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 memorymanagement 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:
1. Rambaugh James etal, "Object Oriented Design and Modeling", PHI-1997
2. Balagurusamy E, "Object Oriented Programming with C++", TMH, 2001

ReferenceBooks:
1. BjarneStroustrup, "C++ Programming Language", Addison Wesley
2. Booch Grady, "Object Oriented Analysis and Design with application 3/e", Pearson
3. Lipman, Stanley B, JonsceLajole, " C++ Primer Reading", AWL, 1999
4. Dillon and Lee, "Object Oriented Conceptual Modeling", New Delhi PHI-1993
5. Stephen R. Shah, "Introduction to Object Oriented Analysis and Design", TMH

Dept. of Computer Science & Application
MCA Semester –II
MCAT 202Data Structure

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

Trees: Basic terminology, Binary Trees, Binary tree representation, algebraic Expressions, Complete Binary Tree, Extended Binary Trees, Array and Linked Representation of Binary trees, Traversing Binary trees, Threaded Binary trees, path length algorithm. Huffman Algorithm.

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
2. Horowitz and Sahani, "Fundamentals of data Structures", Galgotia

ReferenceBooks:
1. R. Kruse etal, "Data Structures and Program Design in C" Pearson Education
2. A M Tenenbaumetal, "Data Structures using C & C++", PHI
3. Adam Drozdek, "Data Structures and Algorithms in C++", Thomson Asia

4. Pal G. Sorenson, "An Introduction to Data Structures with Application", TMH.

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 ofrelations, 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
Propositional Logic: Prepositions, logical operations, Tautologies, Contradictions, Logical implication, Logical equivalence, Normal forms, Theory of Inference and deduction. Predicate Calculus: Predicates and quantifiers. Mathematical Induction.

UNIT – III
Lattices and Boolean Algebra: Introduction, Partially Ordered Set, Hasse diagram, Well ordered set,Lattices, Properties of lattices, Bounded lattices, Complemented and Distributive lattices, Boolean Algebra.

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:
1. C.L.Liu: Elements of Discrete Mathematics, McGraw Hill.
2. Lipschutz, Seymour: Discrete Mathematics, Schaum's Series
3. Babu Ram: Discrete Mathematics, Vinayek Publishers, New

ReferenceBooks:
1. Bernard Kolman, Robert Busby, Sharon C. Ross, "Discrete Mathematical Structures", Sixth Edition,
   2008, Pearson Education Inc., New Delhi. / Prentice Hall of India (PHI) Pvt. Ltd., New Delhi.
2. Kenneth H. Rosen, "Discrete Mathematics and Its Applications", Sixth Edition, 2008, Tata McGraw-Hill (TMH) Publications Pvt. Ltd., New Delhi.
3. D. S. Malik & M. K. Sen, "Discrete Mathematical Structures", First Edition, 2005, CENGAGE Learning India Pvt. Ltd., New Delhi.
4. Judith L. Gersting, "Mathematical Structures for Computer Science: A Modern treatment to Discrete
5. Mathematics", Fifth / Sixth Edition (Asian Student Editions), 2008, W. H. Freeman & Company, New Delhi.
6. Richard Johnsonbaugh, "Discrete Mathematics", Seventh Edition, 2008, Pearson Education

Inc., New Delhi.

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

UNIT-I
Introduction: Operating System and Function, Evolution of Operating System, Batch, Interactive, Time Sharing and Real Time System, System Protection. Operating System Structure: System Components, System Structure, Operating System Services.

UNIT-II
Concurrent Processes: Process Concept, Principle of Concurrency, Producer / Consumer Problem, Critical Section, Problem, Semaphores, Classical Problems in Concurrency, Inter Processes Communication, Process Generation, Process Scheduling.

UNIT-III
CPU Scheduling: Scheduling Concept, Performance Criteria Scheduling Algorithm, Evolution, Multiprocessor Scheduling. Deadlock: System Model, Deadlock Characterization, Prevention, Avoidance and Detection, Recovery from Deadlock.

UNIT-IV
Memory Management: Basic Machine, Resident Monitor, Multiprogramming with Fixed Partition, Multiprogramming With Variable Partition, Multiple Base Register, Paging, Segmentation, Paged Segmentation, Virtual Memory Concept, Demand Paging, Performance,Paged Replaced Algorithm, Allocation of Frames, Thrashing, Cache Memory Organization, Impact on Performance.

UNIT-V
I/O Management & Disk Scheduling: I/O Devices and the Organization of I/O Disk I/O, Operating System Design Issues. File System: File Concept, File Organization and Access Mechanism, File Directories, File Sharing, Implementation Issues.

Text Books:
  1. Stalling, Willium, "Operating System", Maxwell Macmillan
  2. Silveschatza, Peterson J, "Operating System Concepts", Willey.
ReferenceBooks:
  1. Milenekovie , "Operating System Concept", McGraw Hill.
  2. Petersons, "Operating Systems", Addision Wesley.
  3. Dietal, "An Introduction to Operating System", Addision Wesley.
  4. Gary Nutt, "Operating System, A Modern Perspective", Addision Wesley.
  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
 CriticalFlow Model,Interactive-servicemodel/Government–to-Citizen-to-GovernmentModel(G2C2G), MajorareasofE-governanceServices,PublicGrievances:Telephone,Rationcard,transportation,Rural services LandRecords, Police:FIRregistration,Lostandfound,Socialservices: Death,domicile,school certificates

UNIT-IV
Publicinformation:employment,hospitals, railway, Agricultural sector: Fertilizers, Seeds, UtilitypaymentsElectricity,water,telephone,Commercial:incometax,customduty,exciseduty-GovernanceInfrastructure,stagesinevolutionandstrategiesforsuccess,E-Governance Infrastructure, stages in evolutionandstrategies forsuccess

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

Text Books:
1. Geo-informationinternationalpublications
2. E-governanceprojects,PHIpublication
ReferenceBooks:
 1. E - Governance: Concepts and Case Studies ,Prabhu, Prentice Hall India Learning Private Limited; 2 edition (2012)
 2. E-Governance, Pankaj Sharma, APH Publishing Corporation
 3. E-Governance In India: Initiatives and Issues, R.P. Sinha, Concept publicingcopney

Dept. of Computer Science & Application
MCA Semester –II
MCAT 206 Unix& Shell Programming

UNIT-I
The UNIX Operating System, The UNIX Architecture, Features of UNIX, Internal And External Commands, Command Structure: cal, date, echo, printf, bc, script, passwd,PATH, who, uname, tty, stty, pwd, cd, mkdir, rmdir, od**.** The File System, cat, cp, rm, mv, more, file, ls, wc, pg, cmp, comm, diff, gzip, tar, zip, df, du, mount, umount, chmod.
The vi editor ,security by file Permissions. ping, telnet, ftp, finger, arp, rlogin**.**

UNIT-II
Unix Session, Standard Streams, Redirection, Pipes, Tee Command, Command Execution, Command-Line Editing, Quotes, Command Substitution, Job Control, Aliases, Variables, Predefined Variables, Options, Shell Edition Environment Customization.FILTERS: Filters, Concatenating files, Display Beginning and End of files, Cut and Paste, Sorting, Translating Characters,Ordering a File, uniq.

UNIT-III
Atoms,operatorsGREP:Operation, grep Family, Searching for File Content.
SED:Scripts, Operation, Addresses, commands, Applications, grep and sed. AWK:Execution, Fields and Records, Scripts, Operations, Patterns, Actions, Associative Arrays, String Functions, Mathematical Functions, User – Defined Functions, Using System commands in awk, Applications, awk and grep, sed and awk.

UNIT-IV
Korn Shell Features, Two Special Files, Variables, Output, Input, Exit Status of a Command, eval Command, Environmental Variables, Options, Startup Scripts, Command History, Command Execution Process.
C shell features, Two Special Files, Variables, Output, Input, Exit Status of a Command, eval Command, Environmental Variables, On-Off Variables, Startup and Shutdown Scripts, Command History, Command Execution Scripts.

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:
1. Sumitabha Das, "Unix Concepts And Applications", 4thEdition.
2. Designof UnixO.S. , MauriceBach, PrenticeHallof India.
ReferenceBooks:
1. Behrouz A. Forouzan, Richard F. Gilbery, "Unix and shell Programming", 1stEdition, Cengage Learning India, 2003.
2. YashwanthKanitkar,"Unix Shell programming", 1stEdition, BPB Publisher, 2010.

3. The UNIX ProgrammingEnvironment, B.W. Kernighan&R. Pike, , PrenticeHallof India, 1995.
4. AdvanceUNIX by StevenPrata, aProgrammingGuide,BPB publication,New Delhi.

Dept. of Computer Science & Application
MCA Semester-II

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.

Dept. of Computer Science & Application
MCA Semester-II

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 (Dijkistra's)
6. Finding connected components in a graph.
7. Multimedia of two matrices using Matric Multimedia Multiplication Method

Dept. of Computer Science & Application
MCA Semester-II
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.

Dept. of Computer Science & Application
MCA Semester –III
MCAT 301 Internet & JAVA Programming

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

GUI Programming: GUI Basics, Graphics, Event-Driven Programming, Creating User Interfaces, Applets and Multimedia, Exception Handling, Binary I/O, Files & Streams, Recursion, DynamicBinding, Generics & Generic Programming, Java Collections Framework, Algorithm Efficiency, Searching & Sorting.

UNIT-IV
Java Swing: Creating a Swing Applet and Application, Programming using Panes, Pluggable Look and feel , Labels, Text fields, Buttons, Toggle Buttons, Check boxes, Radio Buttons, View Ports, Scroll Panes, Scroll Bars, Lists, Combo Box, Progress Bar, Menus and Toolbars, Layered Panes, Tabbed Panes, Split Panes, Layouts, Windows, Dialog Boxes, Inner, Frame, JDBC: The connectivity Model, JDBC/ODBC Bridge, Java.sql Package, connectivity to remote database, navigating through multiple rows retrieved from a database.

UNIT-V
Java Beans: Application Builder tools, The bean develop kit(BDK), JAR files, Introspection, Developing a simple bean, using Bound properties, The Java Beans API, Session Beans, Entity Beans, Introduction to Enterprise Java Beans (EJB), Introduction to RMI (Remote Method Invocation): A Single client-server application using RMI.

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
3. Mark Wutica, "Java Enterprise Edition", QUE
4. Steven Holzner, "Java2 Black book", dreamtech

Dept. of Computer Science & Application
MCA Semester –III
MCAT 302 Analysis & Design of Algorithm

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
Graph Algorithms: Elementary Graphs Algorithms, Minimum Spanning Trees, Single-source Shortest Paths, All-Pairs Shortest Paths, Maximum Flow and Traveling Salesman Problem.

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:
1. Basse, "Computer Algorithms: Introduction to Design & Analysis", Addision Wesley.
2. Horowitz &Sahani, "Fundamental of Computer Algorithm", Galgotia.

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:
1. Bharti P.K, "An introduction to Database Systems", JPNP
2. Paul Beynon Davies, "Database Systems", Palgrave Macmillan

Dept. of Computer Science & Application
MCA Semester –III
MCAT 304 Simulation & Modelling

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.

UNIT-II: System Simulation and Continuous System Simulation Types of System Simulation, Monte Carlo Method, Comparison of analytical and Simulation methods, Numerical Computation techniques for Continuous and Discrete Models, Distributed Lag Models, Cobweb Model. Continuous System models, Analog and Hybrid computers, Digital- Analog Simulators, Continuous system simulation languages,Hybrid simulation ,Real Time simulations.

UNIT–III: System Dynamics & Probability concepts in Simulation Exponential growth and decay models, logistic curves,Generalization of growth models, System dynamics diagrams, Multi segment models, Representation of Time Delays. Discrete and Continuous probability functions, Continuous Uniformly Distributed Random Numbers, Generation of a Random numbers, Generating Discrete distributions, Non-Uniform Continuous Distributed Random Numbers, Rejection Method.

UNIT-IV: Simulation of Queueing Systems and Discrete System Simulation Poisson arrival patterns, Exponential distribution, Service times, Normal Distribution Queuing Disciplines, Simulation of single and two server queue. Application of queuing theory in computer system. Discrete Events,Generation of arrival patterns,Simulation programming tasks, Gathering statistics, Measuring occupancy and Utilization, Recording Distributions and Transit times.

UNIT-V: Introduction to Simulation languages and Analysis of Simulation output GPSS: Action times, Succession of events, Choice of paths, Conditional transfers,program control statements. SIMSCRIPT: Organization of SIMSCRIPT Program, Names & Labels, SIMSCRIPT statements. Estimation methods, Relication of Runs , Batch Means, Regenerative techniques, Time Series Analysis, Spectral Analysis and Autoregressive Processes.

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
2. Severance, " System Modeling & Simulation, Willey Pub

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:
1. Jeffrey C. Jackson, "Web Technologies: A Computer Science Perspective", Prentice Hall, 2007
2. Herbert Schildt, "Java: The Complete Reference", McGraw-Hill Professional, 2006.

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-IFundamentals Of OperatingSystems

Overview – Synchronization Mechanisms – Processes and Threads - Process Scheduling – Deadlocks: Detection, Prevention and Recovery – Models of Resources – Memory Management Techniques.

UNIT-II Distributed Operating Systems

Issues in Distributed Operating System – Architecture – Communication Primitives – Lamport's Logical clocks – Causal Ordering of Messages – Distributed Mutual Exclusion Algorithms – Centralized and Distributed Deadlock Detection Algorithms – Agreement Protocols.

UNIT-III Distributed Resource Management

Distributed File Systems – Design Issues - Distributed Shared Memory – Algorithms for Implementing Distributed Shared memory–Issues in Load Distributing – Scheduling Algorithms – Synchronous and Asynchronous Check Pointing and Recovery – Fault Tolerance – Two-Phase Commit Protocol – Nonblocking Commit Protocol – Security and Protection.

UNIT-IV Real Time And Mobile Operating Systems

Basic Model of Real Time Systems - Characteristics- Applications of Real Time Systems – Real Time Task Scheduling - Handling Resource Sharing - Mobile Operating Systems –Micro Kernel Design - Client Server Resource Access – Processes and Threads - Memory Management - File system.

UNIT-V Case Studies

Linux System: Design Principles - Kernel Modules - Process Management Scheduling - Memory Management - Input-Output Management - File System - Interprocess Communication. iOS and Android: Architecture and SDK Framework - Media Layer - Services Layer - Core OS Layer - File System.

Text Books:
1. MukeshSinghal and Niranjan G. Shivaratri, "Advanced Concepts in Operating Systems – Distributed, Database, and Multiprocessor Operating Systems", Tata McGraw-Hill, 2001.
2. Abraham Silberschatz; Peter Baer Galvin; Greg Gagne, "Operating System Concepts", Seventh Edition, John Wiley & Sons, 2004.

Reference Books:
1. Daniel P Bovet and Marco Cesati, "Understanding the Linux kernel", 3rd edition, O'Reilly, 2005.

2. Rajib Mall, "Real-Time Systems: Theory and Practice", Pearson Education India, 2006.

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

UNIT-I
Introduction to Electronic Commerce – E-Commerce Framework- Anatomy of E-CommerceApplications – E-Commerce Consumer & Organization Applications- E- Commerce and World Wide Web – Internet Service Providers – Architectural Framework for Electronic Commerce – WWW as the Architecture- Hypertext publishing.

UNIT – II
Electronic Payment Systems – Types of Electronic Payment Systems – Digital Token BasedElectronic Payment System – Smart Cards – Credit Cards – Risk in Electronic Payment Systems – Designing Electronic Payment Systems

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
Corporate Digital Library – Document Library, Digital Document Types, Corporate Data Warehouse, Advertising and Marketing – Information based Marketing, Advertising on Internet, On-Line Marketing Process, Market Research.

UNIT –V
Consumer Search and Resource Discovery – Information Search and Retrieval, CommerceCatalogues, Information Filtering Multimedia – Key Multimedia Concepts, Digital Videoand Electronic Commerce, Desktop Video Processing.

Text Books:
1. Ravi Kalakota& A. B. Whinston - "Frontiers of Electronic Commerce", Pearson Education, India, 1999.

Reference Books:
1. Daniel Minoli, Emma Minoli: "Web Commerce Technology Handbook", Tata McGraw Hill
2. Bajaj and Nag. "E-Commerce the cutting edge of Business". TMH.

Dept. of Computer Science & Application
MCA Semester –III
MCAT 313 Software Project Management

UNIT-I:
Introduction and Software Project Planning
Fundamentals of Software Project Management (SPM), Need Identification, Vision and Scope document, Project Management Cycle, SPM Objectives, Management Spectrum, SPM framework, Software Project Planning, Planning Objectives, Project Plan, Types of project plan,Structure of a Software Project Management Plan, Software project estimation, Estimationmethods, Estimation models, Decision process.

UNIT-II:
Project Organization and Scheduling
Project Elements, Work Breakdown Structure (WBS), Types of WBS, Functions, Activities andTasks, Project Life Cycle and Product Life Cycle, Ways to Organize Personnel, Project schedule,Scheduling Objectives, Building the project schedule, Scheduling terminology and techniques,Network Diagrams: PERT, CPM, Bar Charts: Milestone Charts, Gantt Charts.

UNIT-III:
Project Monitoring and Control
Dimensions of Project Monitoring & Control, Earned Value Analysis, Earned Value Indicators: Budgeted Cost for Work Scheduled (BCWS), Cost Variance (CV), Schedule Variance (SV), Cost Performance Index (CPI), Schedule Performance Index (SPI), Interpretation of Earned Value Indicators, Error Tracking, Software Reviews, Types of Review: Inspections, Deskchecks, Walkthroughs, Code Reviews, Pair Programming.

UNIT-IV:
Software Quality Assurance and Testing
Testing Objectives, Testing Principles, Test Plans, Test Cases, Types of Testing, Levels of Testing, Test Strategies, Program Correctness, Program Verification & validation, Testing Automation & Testing Tools, Concept of Software Quality, Software Quality Attributes, Software Quality Metrics and Indicators, The SEI Capability Maturity Model (CMM), SQA Activities, Formal SQA Approaches: Proof of correctness, Statistical quality assurance, Cleanroom process.

UNIT-V:
Project Management and Project Management Tools
Software Configuration Management: Software Configuration Items and tasks, Baselines, Planfor Change, Change Control, Change Requests Management, Version Control, Risk management: Risks and risk types, Risk Breakdown Structure (RBS), Risk Management Process: Risk identification, Risk analysis, Risk planning, Risk monitoring, Cost Benefit Analysis, Software Project Management Tools: CASE Tools, Planning and Scheduling Tools, MS-Project.

Text Books:
   1. M. Cotterell, Software Project Management, Tata McGraw-Hill Publication.
Reference Books:
   1. Royce, Software Project Management, Pearson Education

2. Kieron Conway, Software Project Management, Dreamtech Press
3. S. A. Kelkar, Software Project Management, PHI Publication.

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.
7. Use Java Language for Client Server Interaction with stream socket connections.
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.

Dept. of Computer Science & Application
MCA Semester –IV
MCAT 401   Advanced JAVA

UNIT-I
Introduction to Java Scripts, Objects in Java Script, Dynamic HTML with Java Script. XML: Document type definition, XML Schemas, Document Object model, Presenting XML, Using XML Processors: DOM and SAX Review of Applets, Class, Event Handling, AWT programming.

UNIT-II
Introduction to Swing: JApplet, Handling Swing Controls like Icons – Labels – Buttons – Text Boxes – Combo – Boxes – Tabbed Pains – Scroll Pains – Trees – Tables Differences between AWT Controls & Swing Controls Developing a Home page using Applet & Swing. Java Beans: Introduction to Java Beans, Advantages of Java Beans, BDK Introspection, Using Bound properties, Bean Info Interface, Constrained properties Persistence, Customizers, Java Beans API.

UNIT-III
Introduction to Servlets: Lifecycle of a Servlet, JSDK The Servlet API, The javax.servlet Package, Reading Servlet parameters, Reading Initialization parameters. The javax.servlet HTTP package, Handling Http Request & Responses, Using Cookies- Session Tracking, Security Issues Introduction to JSP, The Problem with Servlet. The Anatomy of a JSP Page, JSP Processing. JSP Application Design with MVC Setting Up and JSP Environment: Installing the Java Software Development Kit, Tomcat Server & Testing Tomcat.

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
Database Access, Database Programming using JDBC, Studying Javax.sql.* package, accessing a Database from a JSP Page, Application – Specific Database, Actions Deploying JAVA Beans in a JSP Page. Introduction to struts framework.

Text Books:
  1. Patrick Naughton and Herbert Schildt: The Complete Reference Java, Latest Edition, Tata McGraw-Hill.
Reference Books:
  1. Hans Bergstan: Java Server Pages.
  2. Bill Siggelkow, S P D O'Reilly: Jakarta Struts, Cookbook.
  3. Murach: Murach's beginning JAVA JDK 5, SPD.

Dept. of Computer Science & Application
MCA Semester –IV
MCAT 402 Data Communication & Computer Networks

UNIT -I
Introduction Concepts: Goals and Applications of Networks, Network structure and architecture,The OSI reference model, services, Network Topology Design - Delay Analysis, Back BoneDesign, Local Access Network Design, Physical Layer Transmission Media, Switching methods,ISDN, Terminal Handling.

UNIT-II
Medium Access sub layer: Medium Access sub layer - Channel Allocations, LAN protocols - ALOHA protocols - Overview of IEEE standards - FDDI. Data Link Layer - Elementary DataLink Protocols, Sliding Window protocols, Error Handling.

UNIT - III
Network Layer: Network Layer - Point - to Point Networks, Routing, Congestion controlInternetworking -TCP / IP, IP packet, IP address, IPv6.

UNIT - IV
Transport Layer: Transport Layer - Design issues, connection management, session Layer-Design issues, Remote procedure call. Presentation Layer-Design issues, Data compressiontechniques, cryptography - TCP - Window Management.

UNIT-V
Application Layer: Application Layer: File Transfer, Access and Management, Electronic mail,Virtual Terminals, Other application. Example Networks - Internet and Public Networks.

Text Books :
1. Forouzen, "Data Communication and Networking", TMH
Reference Books:
1. A.S. Tanenbaum, Computer Networks, Pearson Education
2. W. Stallings, Data and Computer Communication, Macmillan Press

Dept. of Computer Science & Application
MCA Semester –IV
MCAT 403 Software Engineering

UNIT-I: Introduction
Introduction to Software Engineering, Software Components, Software Characteristics, Software Crisis, Software Engineering Processes, Similarity and Differences from Conventional Engineering Processes, Software Quality Attributes. Software Development Life Cycle (SDLC) Models: Water Fall Model, Prototype Model, Spiral Model, Evolutionary Development Models, Iterative Enhancement Models.

UNIT-II: Software Requirement Specifications (SRS)
Requirement Engineering Process: Elicitation, Analysis, Documentation, Review and Management of User Needs, Feasibility Study, Information Modeling, Data Flow Diagrams,Entity Relationship Diagrams, Decision Tables, SRS Document, IEEE Standards for SRS.

UNIT-III: Software Design
Basic Concept of Software Design, Architectural Design, Low Level Design: Modularization,Design Structure Charts, Pseudo Codes, Flow Charts, Coupling and Cohesion Measures, Design Strategies: Function Oriented Design, Object Oriented Design, Top-Down and Bottom-Up Design. Software Measurement and Metrics: Various Size Oriented Measures: Halestead's Software Science, Function Point (FP) Based Measures, Cyclomatic Complexity Measures: Control Flow Graphs.

UNIT-IV: Software Testing
Testing Objectives, UNIT Testing, Integration Testing, Acceptance Testing, Regression Testing, Testing for Functionality and Testing for Performance, Top-Down and Bottom-Up Testing Strategies: Test Drivers and Test Stubs, Structural Testing (White Box Testing), Functional Testing (Black Box Testing), Test Data Suit Preparation, Alpha and Beta Testing of Products.

UNIT-V: Software Maintenance and Software Project Management
Software as an Evolutionary Entity, Need for Maintenance, Categories of Maintenance: Preventive, Corrective and Perfective Maintenance, Cost of Maintenance, Software Re- Engineering, Reverse Engineering. Software Configuration Management Activities, Change Control Process, Software Version Control, An Overview of CASE Tools. Estimation of Various Parameters such as Cost, Efforts, Schedule/Duration, Constructive Cost Models (COCOMO), Resource Allocation Models, Software Risk Analysis and Management.

Text Books:
1. R. S. Pressman, Software Engineering: A Practitioners Approach, McGraw Hill.
2. Rajib Mall, Fundamentals of Software Engineering, PHI Publication.

Reference Books:
1. K. K. Aggarwal and Yogesh Singh, Software Engineering, New Age InternationalPublishers.
2. PankajJalote, Software Engineering, Wiley.
3. Carlo Ghezzi, M. Jarayeri, D. Manodrioli, Fundamentals of Software Engineering, PHI

Dept. of Computer Science & Application
MCA Semester –IV
MCAT 404 Computer Graphics

UNIT –I
Overview of Graphics Systems – Video display devices, raster-scan systems. Random– scan system, Graphics monitors and workstations. Input devices, Hardcopy devices, Graphics software. Output primitives: Line drawing algorithms, Circle generation algorithms, ellipsegenerating algorithms, pixel addressing, Filled area primitives, Fill area functions, cell array,character generations.

UNIT –II
Attributes of output primitives: Line attributes, curve attributes color and Gray-scale level, Area fill attributes, character attributes, and Bundled attributes Enquiry functions. Two dimensional Geometric transformations: Basic transformations, Homogenous co-ordinates, affine transformations, Transformation functions. Raster methods for transformations.

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, WilerAthertion 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
Three – Dimensional object representations: Polysurfaces curved lines and surfaces, spline representation, Bezier curves and surfaces, B-Spline curves and surface, CSG Methods: Octrees, BSP Trees. Three Dimensional Transformation : Three dimensional viewing: Viewing coordinates, projections, Visible surface detection methods: Back-face Detection, Depth-buffer methods, scan line methods, Depth-sorting methods, BSP – Tree Methods, Arc sub division methods, Basic illuminations models – Gourand shading, phong shading.

Text Books:
1. Heanry Donald, Pauline Baker M: Computer Graphics, PIH 2nd edn, 1995.
2. Harrington S: Computer Graphics A Programming Approach 2nd Edn. McGraw Hill,1987.

Reference Books:
1. L. Ammeraal and K. Zhang (2007). Computer Graphics for Java Programmers, Second Edition, John-Wiley & Sons.
2. David Rogers (1998). Procedural Elements for Computer Graphics. McGraw-Hill.
3. James D. Foley, Andries Van Dam, Steven K. Feiner and John F. Hughes (1995). Computer Graphics: Principles and Practice. Addison-Wesley.
4. Donald Hearn and M. Pauline Baker (1994). Computer Graphics. Prentice-Hall.
5. Francis S. Hill (2001). Computer Graphics. Prentice Hall.

Dept. of Computer Science & Application
MCA Semester –IV
MCAT 421 Advanced DBMS

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 serializablity 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
Issues of Recovery and atomicity in Distributed Databases, Traditional recovery techniques,Log based recovery, Recovery with Concurrent Transactions, Recovery in Message passingsystems, Checkpoints, Algorithms for recovery line, Concepts in Orphan and InconsistentMessages.

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

Text Books:
1. Ceei and Pelagatti,'Distributed Database', TMH
2. Singhal and Shivratri, 'Advance Concepts in Operating Systems' MC Graw Hill
Reference Books:
1. Silberschatz, Korth and Sudershan, Database System Concept', McGraw Hill
2. Ramakrishna and Gehrke,' Database Management System, McGraw Hill
3. Garcia-Molina, Ullman,Widom,' Database System Implementation' Pearson Education

Dept. of Computer Science & Application
MCA Semester –IV
MCAT 422 Digital Image Processing

UNIT-I
Introduction: What is Digital Image Processing, The origins of Digital Image Processing, Examples of Fields that use Digital Image Processing, Fundamental steps in Digital Image processing, Components of Image Processing system Fundamentals**:** · Elements of Visual Perception, Light and Electromagnetic Spectrum, Image Sensing and Acquisition, Image Sampling and Quantization, Some basic Relationships between Pixels, Linear and Nonlinear Operations

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
Morphology: Dilation, Erosion, Opening and Closing, Hit-and Miss transform, Morphological Algorithms :Boundry Extraction, Region filling, Extraction of connected components, Convex Hull, Image Segmentation: Definition, characteristics of segmentation. Detection of Discontinuities, Edge Linking and Boundary Detection, Thresholding, Region based segmentation. Introduction to Representation & Description, Introduction to Object Recoginition.

Text Books :
   1. Digital Image Processing.Rafael --- C. Gonzalez and Richard E.Woods. Addision Wesley.
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
Proposition, tautologies, Theorem proving, Semantic method of theorem proving, forward chaining, backward chaining standard theorems, method of substitution. Theorem proving using Wang's algorithm.Predicate Logic: Alphabet of first order logic (FOL), predicate, well formed formula, clause form, algorithm for writing sentence into clause form, Unification of predicates, unification algorithm, resolution Robinson's interface rule, Scene interpretation using predicate 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
Definition, Probabilistic techniques, Certainty factor based reasoning, conditional probability. Medical diagnosis problem, Baye's Theorem and its limitations, Bayesian belief network, propagation of belief, Dumpster-Shafer theory of uncertainty management, belief interval, Fuzzy relation, inverse Fuzzy relations, Fuzzy post inverse, Fuzzy Inversion.

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 back tracking 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 :
   1. Rich and Knight: Artificial Intelligence, 2/e 1992.
Reference Books:
   1. Konar: Artificial Intelligence and Soft Computing—Behavioral and Cognitive Modeling of Human Brain, CRC Press, USA.
   2. E. Charniak and D. McDermott: Introduction to Artificial Intelligence, Addison Wesley Longman.
   3. Ellinc and rich: Artificial Intelligence, 2/e 1992.

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 :
1. Buford "Multimedia Systems" Addison Wesley.

Reference Books:
1. Agrawal & Tiwari "Multimedia Systems" Excel.
2. Mark Nelson "Data Compression Book" BPB.
3. Sleinreitz "Multimedia System" Addison Wesley.

Dept. of Computer Science & Application
MCA Semester –IV
MCAT 432 Bio-Informatics

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 bioinformaticsapplications.

UNIT-II:
The Information Molecules and Information Flow:Basic chemistry of nucleic acids, Structure ofDNA, 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:
   1. O'Reilly, "Developing Bio informatics computer skills", Indian Edition's publication.
Reference Books:
   1. Stephen Misner& Stephen Krawetz, " Bioinformatics- Methods & Protocols, Addison Wesley

Dept. of Computer Science & Application
MCA Semester –IV
MCAT 433 Mobile &Adhoc Computing

UNIT-I
Issues in Mobile Computing, Wireless Telephony, Digital Cellular Standards, GSM: air-interface, channel structure, location management: HLR-VLR, hierarchical, handoffs, channel allocation in cellular systems, CDMA, GPRS.

UNIT-II
Wireless Networking, Wireless LAN Overview: MAC issues, IEEE 802.11, Blue Tooth, Wireless multiple access protocols, TCP over wireless, Wireless applications, data broadcasting, Mobile IP, WAP: Architecture, protocol stack, application environment.

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:
1. ShambhuUpadhyaya, Abhijeet Chaudhary, Kevin Kwiat, Mark Weises, "Mobile Computing", Kluwer Academic Publishers
2. UWE Hansmann, LotharMerk, Martin-S-Nickious, Thomas Stohe, "Principles of MobileComputing", Springer International Edition

Reference Books:
1. B'Far, Reza (2004). Mobile Computing Principles: Designing and Developing Mobile Applications with UML and XML. Cambridge University Press..
2. Poslad, Stefan (2009). Ubiquitous Computing: Smart Devices, Environments and Interactions. Wiley.
3. Rhoton, John (2001). The Wireless Internet Explained. Digital Press
4. Talukder, Asoke; Yavagal, Roopa (2006). Mobile Computing: Technology, Applications, and Service Creation. McGraw-Hill Professional.

Dept. of Computer Science & Application
MCA Semester –IV
MCAT 433 Big Data Analysis

UNIT I : Introduction to Big Data: Big Data and its Importance – Four V's of Big Data – Drivers for Big Data –Introduction to Big Data Analytics – Big Data Analytics applications.

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.

UNIT V: Advanced Analytics Platform: Real-Time Architecture – Orchestration and Synthesis Using Analytics Engines– Discovery using Data at Rest – Implementation of Big Data Analytics – Big Data Convergence – Analytics Business Maturity Model. Hadoop Eco-System: Pig – Installing and Running , Comparison with Databases – Pig Latin – User-Define Functions – Data Processing Operators – Installing and Running Hive– Hive QL – Tables – Querying Data – User-Defined Functions. Fundamentals of HBase and ZooKeeper - IBM InfoSphereBigInsights and Streams. Visualizations - Visual data analysis techniques, Interaction techniques; Systems and applications.

Text Books:
1. Michael Minelli, Michehe Chambers, "Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today's Business", 1st Edition, AmbigaDhiraj, Wiely CIO Series, 2013.

Reference Books:
1. ArvindSathi, "Big Data Analytics: Disruptive Technologies for Changing the Game", 1st Edition, IBM Corporation, 2012.
2. Bill Franks, "Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with Advanced Analytics", 1st Edition, Wiley and SAS BusinessSeries, 2012.
3. Tom White, "Hadoop: The Definitive Guide", 3rd Edition, O'reilly, 2012.

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 lass 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

Dept. of Computer Science & Application
MCA Semester-IV
MCAP 404: Computer Graphics Lab

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.

Dept. of Computer Science & Application
MCA Semester-IV
MCAP 406: Project III

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
The .Net framework: Introduction, The Origin of .Net Technology, Common Language Runtime (CLR), Common Type System (CTS), Common Language Specification (CLS), Microsoft Intermediate Language (MSIL), Just-In –Time Compilation, Framework Base Classes.

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
C# Using Libraries: Namespace- System, Input-Output, Multi-Threading, Networking andsockets, Managing Console I/O Operations, Windows Forms, Error Handling.

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
.Net Assemblies and Attribute: .Net Assemblies features and structure, private and shareassemblies, Built-In attribute and custom attribute. Introduction about generic.

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
3. ShibiParikkar, " C# with .Net Frame Work" , Firewall Media.

Dept. of Computer Science & Application
MCA Semester –V
MCAT 502 Data Mining

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

Data Preprocessing - Data Cleaning - Data Integration and Transformation - Data Reduction: overview of data reduction strategies – Attributes subset selection – Regression and Log-Linear Models: Parametric data reduction – Histograms – Clustering –Sampling – Data Cube Aggregation - Data Transformation and Data Discretization.

UNIT-III: Classification

Basic Concepts – Decision Tree induction – Bayes Classification Methods – Rule Based Classification – Model Evaluation and Selection – Techniques to improve Classification Accuracy – Classification: Advanced concepts – Bayesian Belief Networks - Classification by Back Propagation –Support Vector Machine – Classification using frequent Patterns.

UNIT-IV: Cluster Analysis
Cluster Analysis: Basic concepts and Methods – Cluster Analysis – Partitioning methods - Hierarchical methods – Density Based Methods – Grid Based Methods Evaluation of Clustering – Advanced Cluster Analysis: Probabilistic model based clustering – Clustering High Dimensional Data – Clustering Graph and Network Data.

UNIT-V: Association Rule Mining
Association Rule Mining: Market Basket Analysis - Frequent pattern mining – Apriori algorithm Generating Association rules from frequent items - Improving the efficiency of Apriori algorithm – Mining Multilevel association rules - Multidimensional association rules - Constraint based association Mining.

Text Books:
1. Jiawei Han and MichelineKamber, jian Pei "Data Mining:Concepts and Techniques", 3rdEdition, Elsevier, 2012.

Reference Books:
2. Alex Berson and Stephen J. Smith, "Data Warehousing, Data Mining & OLAP", TataMcGraw – Hill Edition, 10th Reprint 2007.
3. MargaratH.Dunham, "Data Mining: Introductory and Advanced Topics", Pearson Education, 2004.

4. David Hand, Heikki Manila and Padhraicsymth, "Principles of Data Mining", Prentice Hall of India, 2004.

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 relativeprime 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
Message Authentication Codes: Authentication requirements, authentication functions, messageauthentication code, hash functions, birthday attacks, security of hash functions, Secure hashalgorithm (SHA) Digital Signatures: Digital Signatures, Elgamal Digital Signature Techniques, Digital signature standards (DSS), proof of digital signature algorithm.

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
IP Security: Architecture, Authentication header, Encapsulating security payloads, combiningsecurity associations, key management. Introduction to Secure Socket Layer, Secure electronic transaction (SET). System Security: Introductory idea of Intrusion, Intrusion detection, Viruses and related threats, Firewalls.

Text Books:
1. William Stallings, "Cryptography and Network Security: Principals and Practice", Pearson Education.
Reference Books:
1. Behrouz A. Frouzan: Cryptography and Network Security, TMH
2. Bruce Schiener, "Applied Cryptography". John Wiley & Sons
3. Bernard Menezes," Network Security and Cryptography", Cengage Learning.
4. AtulKahate, "Cryptography and Network Security", TMH

Dept. of Computer Science & Application
MCA Semester –V
MCAT 504 Software Testing & Quality Assurance

UNIT-I
Introduction: Software Quality, Role of testing, v & v, objectives and issues of testing, Testing activities and levels, Sources of Information for Test Case Selection, White-Box and Black-Box Testing , Test Planning and Design, Monitoring and Measuring Test Execution, Test Tools and Automation, Test Team Organization and Management. UNIT Testing: Concept, Static UNIT Testing, Defect Prevention, Dynamic UNIT Testing, Mutation Testing, Debugging.

UNIT-II
Control Flow & Data Flow Testing: Outline of CFT, CF Graph, Paths in a Control Flow Graph, Path Selection Criteria,Generating Test Input, Examples of Test Data Selection. Overview of Dynamic Data Flow Testing, Data Flow Graph, Data Flow Testing Criteria, Comparison of Testing Techniques.

UNIT-III
System Integration Testing & Test Design: Concept of Integration Testing, Different Types of Interfaces and Interface Errors, Granularity of System Integration Testing, System Integration Techniques, Test Plan for System Integration,Off-the-Shelf Component Testing, System Test Categories.

UNIT-IV
System Test Planning, Automation & Execution: Structure of a System Test Plan, Test Approach, Test Suite Structure, Test Environment, Test Execution Strategy, Test Effort Estimation, Scheduling and Test Milestones, System Test Automation, Selection of Test Automation Tools, Test Selection Guidelines for Automation, Structure of an AutomatedTest Case, Test Automation Infrastructure Metrics for Tracking System Test, Metrics for Monitoring Test Execution, Beta Testing, System Test Report, Measuring Test Effectiveness. Acceptance Testing.

UNIT-V
Software Quality: Five Views of Software Quality, McCall's Quality Factors and Criteria, Quality Factors Quality Criteria, Relationship between Quality Factors and Criteria, Quality Metrics, ISO 9126 Quality Characteristics, ISO 9000:2000 Software Quality Standard ISO 9000:2000 Fundamentals, ISO 9001:2000 Requirements.

Text Books:
1. Software Testing and Quality Assurance theory and practice byKshiraSagarNaik and PriyadarshiTripathy
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 541Intellectual 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 Co-operation 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

IP contracts, IP and competition law, International IP law and IP litigation, international IP institutions, Using primary sources to research IP history, IP related agreements, Licensing, IP entrepreneurship: company models for IP, How to read a patent document Technical, business and legal applications of patent information, Performing patent searches, practical exercises, International enforcement. The Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) Agreement and the globalization of IP law, Workshop, exercises and case study

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:
1. Innovation and Entrepreneurship in Organisations: by Richard M. Burton &BorgeObel Elsevier.

2. Innovation and Entrepreneurship in Organisations: by Spyros Maksidakis& Steven C Wheelwright, John Wiley & Sons.

Web Reference:
1. http://www.ipindia.nic.in
2. https://www.uspto.gov

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

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UNIT-I: Introduction
Definition, Typical Real Time Applications: Digital Control, High Level Controls, Signal Processing etc., Release Times, Deadlines, and Timing Constraints, Hard Real Time Systems and Soft Real Time Systems, Reference Models for Real Time Systems: Processors and Resources, Temporal Parameters of Real Time Workload, Periodic Task Model, Precedence Constraints and Data Dependency.

UNIT-II: Real Time Scheduling
Common Approaches to Real Time Scheduling: Clock Driven Approach, Weighted Round Robin Approach, Priority Driven Approach, Dynamic Versus Static Systems, Optimality of Effective-Deadline-First (EDF) and Least-Slack-Time-First (LST) Algorithms, Rate Monotonic Algorithm, Offline Versus Online Scheduling, Scheduling Aperiodic and Sporadic jobs in Priority Driven and Clock Driven Systems.

UNIT-III: Resources Sharing
Effect of Resource Contention and Resource Access Control (RAC), Non-preemptive Critical Sections, Basic Priority-Inheritance and Priority-Ceiling Protocols, Stack Based Priority- Ceiling Protocol, Use of Priority-Ceiling Protocol in Dynamic Priority Systems, Pre-emption Ceiling Protocol, Access Control in Multiple-UNIT Resources, Controlling Concurrent Accesses to data Objects.

UNIT-IV: Real Time Communication
Basic Concepts in Real time Communication, Soft and Hard RT Communication systems, Modelof 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:
1. Real Time Systems by Jane W. S. Liu, Pearson Education Publication.
Reference Books:
1. Mall Rajib, "Real Time Systems", Pearson Education
2. Albert M. K. Cheng , "Real-Time Systems: Scheduling, Analysis, and Verification", Wiley.

Dept. of Computer Science & Application
MCA Semester –V
MCAT 543 Client Server Computing

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 BrokerArchitecture (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
Data Storage: magnetic disk, magnetic tape, CD-ROM, WORM, Optical disk, mirrored disk, faulttolerance, RAID, RAID-Disk network interface cards. Network protection devices, Power Protection Devices, UPS, Surge protectors. Client Server Systems Development: Services and Support, system administration, Availability, Reliability, Serviceability, Software Distribution, Performance, Network management, Help Disk, Remote Systems Management Security, LAN and Network Management issues.

UNIT –V
Client/Server System Development: Training, Training advantages of GUI Application, System Administrator training, Database Administrator training, End-user training. The future of client server Computing Enabling Technologies, The transformational system.

Text Books:
1. Patrick Smith &SteaveGuengerich, "Client / Server Computing", PHI
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

Crawls and Feeds, Deciding what to search, Crawling the Web, Directory Crawling, Document Feeds, Storing the Documents, Detecting Duplicates, Removing Noise.

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

Processing Text, From Words to Terms, Text Statistics, Vocabulary Growth, Estimating Database and Result Set Sizes, Document Parsing, Overview, Tokenizing, Stopping, Stemming, Phrases and N-grams, Document Structure and Markup, Link Analysis,Anchor Text, PageRank, Link Quality, Information Extraction, Internationalization.

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

1. Zdravko Markov, Daniel T. Larose "Data Mining the Web: Uncovering Patterns in Web Content, Structure, and Usage", Wiley, 2007
2. Jesus Mena, "Data Mining Your Website", Digital Press, 1999
3. SoumenChakrabarti, "Mining the Web: Analysis of Hypertext and Semi Structured Data", Morgan Kaufmann, 2002
4. Bing Liu, "Web Data Mining: Exploring Hyperlinks, Contents and Usage Data", Springer, 2007

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

UNIT-I: Fuzzy Systems

Fuzzy Sets – Operations on Fuzzy Sets – Fuzzy Relations – Membership Functions- Fuzzy Rules and Fuzzy Reasoning – Fuzzy Inference Systems –Fuzzy Decision Making

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
Adaptive Neuro-Fuzzy Inference Systems – Coactive Neuro-Fuzzy Modeling – Classification and Regression Trees – Data Clustering Algorithms – Rulebase Structure Identification – ANFIS Applications using Matlab.

UNIT-IV: Genetic Algorithms

Evolutionary Computation – Genetic Algorithms – Terminologies and Operators of GA –Ant Colony Optimization – Particle Swarm Optimization – GATool using Matlab.

UNIT-V: Applications

Fuzzy Classification – Fuzzy Pattern Recognition – Applications of Neural Networks: Bio informatics, Knowledge Extraction, Security Systems, Natural Landmark Recognition Task - Applications of Genetic Algorithm: Machine Learning, Image Processing, Data Mining and Wireless Networks.

Tex Books:
1. S.N.Sivanandam, S.N.Deepa, "Principles of soft computing ", 1st edition, Wiley-india, 2007.
2. Timothy J.Ross, "Fuzzy Logic with Engineering Applications", 3rd Edition, Wiley, 2010.

Reference Books:
1. Jyh-Shing Roger Jang, Chuen-Tsai Sun, EijiMizutani, "Neuro-Fuzzy and Soft Computing", 1st Edition, Prentice-Hall of India, 2003.
2. S.N.Sivanandam, S.N.Deepa, "Introduction to Genetic Algorithms", 1st edition, Springer, 2007.

3. S. N. Sivanandam, S. Sumathi and S. N. Deepa, "Introduction to Fuzzy Logic usingMATLAB", 1st Edition, Springer, 2007.

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

UNIT-I
Introduction: Cloud-definition, benefits, usage scenarios, History of Cloud Computing - Cloud Architecture - Types of Clouds - Business models around Clouds – Major Players in Cloud Computing- issues in Clouds - Eucalyptus - Nimbus - Open Nebula, Cloud Sim.

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
Collaborating Using Cloud Services Email Communication over the Cloud - CRM Management - Project Management-Event Management - Task Management – Calendar - Schedules - Word Processing – Presentation – Spreadsheet - Databases – Desktop - Social Networks and Groupware.

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
Security, Standards And Applications Security in Clouds: Cloud security challenges – Software as a Service Security,Common Standards: The Open Cloud Consortium – The Distributed management Task Force – Standards for application Developers – Standards for Messaging – Standards for Security, End user access to cloud computing, Mobile Internet devices and the cloud.

Text Books:
1. John Rittinghouse& James Ransome, Cloud Computing, Implementation, Management and Strategy, CRC Press, 2010.

Reference Books:
1. Michael Miller, Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Que Publishing, August 2008.
2. James E Smith, Ravi Nair, Virtual Machines, Morgan Kaufmann Publishers, 2006.

Dept. of Computer Science & Application
MCA Semester –V
MCAT 554 Internet of Things

UNIT I: Introduction to Internet of Things –Definition and Characteristics of IoT, Physical Design of IoT – IoT Protocols, IoT communication models, Iot Communication APIs IoTenabaled Technologies – Wireless Sensor Networks, Cloud Computing, Big data analytics, Communication protocols, Embedded Systems, IoT Levels and Templates. Domain Specific IoTs – Home, City, Environment, Energy, Retail, Logistics, Agriculture, Industry, health and Lifestyle

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

UNITIII: 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, ArshdeepBahga and Vijay Madisetti, Universities Press, 2015

Reference Books:
1. Getting Started with Raspberry Pi, Matt Richardson & Shawn Wallace, O'Reilly (SPD), 2014

Dept. of Computer Science & Application
MCA Semester –V
MCAP 501 .Net Lab

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.
3. Implementation of Key Exchange using Diffie-Hellman Approach and Elliptic Curves.
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

Dept. of Computer Science & Application
MCA Semester –V
MCAP 504 Software Testing Lab

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)

Dept. of Computer Science & Application
MCA Semester –V
MCAP 506 Project IV

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.