



MASTER OF COMPUTER APPLICATIONS (MCA)
(Effective from the academic year 2017-2018)
(For CBCS system in Central University of Karnataka, Kalaburagi)

DEPARTMENT OF COMPUTER SCIENCE

The Department of Computer Sciences started in 2012 in the School of Computer Science. Currently the Department of Computer Science offers Mater of Computer Applications (MCA).

ELIGIBILITY FOR ADMISSION

Candidates who have completed undergraduate degree from a recognized Indian or foreign university (foreign recognition to be decided as per AIU foreign equivalence list) in any discipline and secured a minimum of 50% aggregate (45% in case of SC/ST candidates) marks and having studied Mathematics / Computer Science as a main / optional subject at 10+2 level or undergraduate level and who have secured a minimum of 40% (35% in case of SC/ST candidates) marks in the entrance test conducted by the university.

DURATION OF COURSE

The course shall be of three years duration spread over six semesters. The maximum duration to complete the course shall be 6 years.

MEDIUM OF INSTRUCTION

The medium of instruction shall be English.

PASSING AND CLASSIFICATION

The minimum marks for passing and classification for the award of the MCA Degree shall be as per the existing norms of other PG degree courses of Central University of Karnataka, Kalaburagi.

OTHER PROVISIONS

All the other provisions relating to attendance, reappearance in examinations, repeal and saving clauses, removal of difficulties, etc., shall be as per the existing norms of other PG degree courses of Central University of Karnataka, Kalaburagi.

MCA Semester I													
SL No	In SI No	Sub Code	T=Theory P=Practical	Course Type	Course type	Title	Credits	duration	L+T+P+W+S	Duration of Exam (Min.)	IA (40%)	End..sem. Exam (60%)	Total Marks
1	1	MCA-101	T	Core: 1	CC	Mathematical Foundation of Computer Science	4	4	3+1+0=4	150	40	60	100
2	2	MCA-102	T	Core:2	CC	Computer Organization and Architecture	4	4	3+1+0=4	150	40	60	100
3	3	MCA-103	P	Practical	CP	Problem Solving Lab	3	4	0+0+4=4	150	40	60	100
4	4	MCA-104	T	Discipline Specific Elective: I	DSE	MCA-104.1 Business Process using with VB MCA-104.2 Introduction to UNIX MCA-104.3 Accounting and Financial Management	3	4	3+1+0=4	150	40	60	100
5	5	MCA-105	T	Generic Elective: I	GE	To be selected from other Dept.	3	4	3+1+0=4	150	40	60	100
6	6	MCA-106	T	Ability enhancement compulsory Course (Foundation compulsory): I	AEEC	Problem Solving and Programming Using C	3	4	3+1+0=4	150	40	60	100
7	7	MCA-107	T	Skill enhancement course Foundation-Man making: I	SEC	Computer Fundamentals and Web Utilities	3	4	3+1+0=4	150	40	60	100
						L18; T6 ; P4 = 28	23	28					700

MCA Semester II													
SL No	In SI No	Sub Code	T=Theory P=Practical	Course Type	Course type	Title	Credits	duration	L+T+P+W+S	Duration of Exam (Min.)	IA (40%)	End..sem. Exam (60 %)	Total Marks
8	1	MCA-201	T	Core: 3	CC	Data Structures	4	4	3+1+0=4	150	40	60	100
9	2	MCA-202	T	Core: 4	CC	Operating System	4	4	3+1+0=4	150	40	60	100
10	3	MCA-203	P	Practical	CP	DS & OOP's Lab	3	4	0+0+4=4	150	40	60	100
11	4	MCA-204	T	Discipline Specific Elective :II	DSE	MCA-204.1 System software MCA-204.2 Operations Research MCA-204.3 Principles of Programming Languages MCA-204.4 Middle ware Technology MCA-204.5 Digital Image Processing MCA-204.6 Modelling and Simulation	3	4	0+0+4=4	150	40	60	100
12	5	MCA-205	T	Generic Elective: II	GE	To be selected from other Dept.	3	4	3+1+0=4	150	40	60	100
13	6	MCA-206	T	Ability enhancement compulsory Course (Foundation compulsory): II	AEEC	Computer Oriented Numerical and Statistical Methods	3	4	3+1+0=4	150	40	60	100
14	7	MCA-207	T	Skill enhancement course Foundation-Man making: II	SEC	Object Oriented Programming with C++	3	4	3+1+0=4	150	40	60	100
						L18; T6 ; P4 = 28	23	28					700

MCA Semester III													
SL No	In SI No	Sub Code	T=Theory P=Practical	Course Type	Course type	Title	Credits	duration	L+T+P+W+S	Duration of Exam (Min.)	IA (40%)	End..sem. Exam (60 %)	Total Marks
15	1	MCA-301	T	Core: 5	CC	Design and Analysis of Algorithm	4	4	3+1+0=4	150	40	60	100
16	2	MCA-302	T	Core: 6	CC	Database Management Systems	4	4	3+1+0=4	150	40	60	100
17	3	MCA-303	P	Practical	CP	CG & DBMS Lab	3	4	3+1+0=4	150	40	60	100
18	4	MCA-304	T	Discipline Specific Elective :III	DSE	MCA – 304.1 Multimedia Systems and Applications MCA-304.2 Management Information System MCA- 304.3 Enterprise Resource Planning MCA -304.4 Neural Networks MCA -304.5 Information Security MCA -304.6 Microprocessor Architecture	3	4	0+0+4=4	150	40	60	100
19	5	MCA-305	T	Discipline Specific Elective :IV	DSE	MCA-305.1 Mobile Computing MCA-305.2 Client Server Systems MCA-305.3 ATM Networks MCA-305.4 Component Software MCA-305.5 Distributed Database Systems MCA-305.6 Artificial Intelligence and Expert Systems	3	4	3+1+0=4	150	40	60	100
20	6	MCA-306	T	Ability enhancement compulsory Course (Foundation compulsory): III	AEEC	Computer Graphics and Visualization	3	4	3+1+0=4	150	40	60	100
21	7	MCA-307	T	Skill enhancement course Foundation-Man making:III	SEC	Computer Ethics	3	4	3+1+0=4	150	40	60	100
						L18; T6 ; P4 = 28	23	28					700

MCA Semester IV													
SL No	In SI No	Sub Code	T=Theory P=Practical	Course Type	Course type	Title	Credits	duration	L+T+P+W+S	Duration of Exam (Min.)	IA (40%)	End..sem. Exam (60 %)	Total Marks
22	1	MCA-401	T	Core: 7	CC	Theory of Computation	4	4	3+1+0=4	150	40	60	100
23	2	MCA-402	T	Core:8	CC	Software Engineering	4	4	3+1+0=4	150	40	60	100
24	3	MCA-403	P	Practical	CP	Java Lab	3	4	0+0+4=4	150	40	60	100
25	4	MCA-404	T	Discipline Specific Elective :III	DSE	MCA-404.1 Natural Language Processing MCA-404.2 Decision Support System MCA-404.3 Information Retrieval MCA-404.4 Embedded Systems MCA-404.5 Computational Biology MCA-404.6 Computer Vision	3	4	3+1+0=4	150	40	60	100
26	5	MCA-405	T	Discipline Specific Elective :IV	DSE	MCA-405.1 Software Architecture MCA-405.2 Pattern Recognition MCA-405..3 Distributed and Computing MCA-405.4. Fundamentals of Agent technology MCA-405.5 Advanced Java MCA-405.6 Computer Forensics and Cryptography	3	4	3+1+0=4	150	40	60	100
27	6	MCA-406	T	Ability enhancement compulsory Course (Foundation compulsory): IV	AEEC	JAVA Programming	3	4	3+1+0=4	150	40	60	100
28	7	MCA-407	T	Skill enhancement course Foundation-Man making:IV	SEC	Soft Skills	3	4	3+1+0=4	150	40	60	100
						L18; T6 ; P4 = 28	23	28					700

MCA Semester V													
SL No	In SI No	Sub Code	T=Theory P=Practical	Course Type	Course type	Title	Credits	duration	L+T+P+W+S	Duration of Exam (Min.)	IA (40%)	End..sem. Exam (60 %)	Total Marks
29	1	MCA-501	T	Core: 9	CC	Data Communication and Computer Networks	4	4	3+1+0=4	150	40	60	100
30	2	MCA-502	T	Core:10	CC	.NET Framework and C#	4	4	3+1+0=4	150	40	60	100
31	3	MCA-503	P	Practical	CP	.NET Framework and C# Lab	3	4	0+0+4=4	150	40	60	100
32	4	MCA-504	T	Discipline Specific Elective :III	DSE	MCA-504.1 Compiler Design MCA-504.2 Software Testing and Quality Assurance MCA-504.3 Data Warehousing and Mining MCA-504.4 Soft Computing MCA-504.5 UNIX System Programming MCA-504.6 Artificial Intelligence and Applications MCA-504.6 Elements of Software Project Management	3	4	3+1+0=4	150	40	60	100
33	5	MCA-505	T	Ability enhancement compulsory Course (Foundation compulsory): V	AEEC	Internet Programming and Web Technology	3	4	3+1+0=4	150	40	60	100
34	6	MCA-506	P	Ability enhancement compulsory Course (Foundation compulsory): VI	AEEC	Practical – IX (Mini-Project Work)	3	4	0+0+4=4	150	40	60	100
						L12; T4; P8=21	20	24					600

MCA Semester VI													
SL No	In SI No	Sub Code	T=Theory P=Practical	Course Type	Course type	Title	Credits	duration	L+T+P+W+S	Duration of Exam (Min.)	IA (40%)	End..sem. Exam (60 %)	Total Marks
35	1	MCA-601	P	Core: 11	CP	A: Internship * Project Seminar	3		0+0+3=3				50
36	2	MCA-602	P	Core:12	CP	Internship * A: Dissertation / Targeted Project B: Dissertation/ Training and Evaluation	9		0+0+6=6				150
37	3	MCA-603	P	Core:13	CP	Project Viva voce	3		0+0+3=3				50
						L0; T0; P 12= 12	15						250

MCA-101 MATHEMATICAL FOUNDATION OF COMPUTER SCIENCE

Credits: 4

Contact Hrs (L:T:P): 4 (3:1:0)

IA: 40 Marks

End Exam: 60 Marks

UNIT-I

10Hrs

The Foundations: Logic and Proofs

Propositional Logic, Applications of Propositional Logic, Propositional Equivalences, Predicates and Quantifiers, Nested Quantifiers, Rules of Inference, Introduction to Proofs, Proof Methods and Strategy

UNIT-II

10Hrs

Basic Structures: Sets, Functions, Sequences, Sums, and Matrices.

Sets, Set Operations, Functions, Sequences and Summations, Cardinality of Sets, Matrices

UNIT-III

10Hrs

Induction and Recursion

Mathematical Induction, Strong Induction and Well-Ordering, Recursive Definitions and Structural Induction, Recursive Algorithms, Program Correctness.

Advanced Counting Techniques

Applications of Recurrence Relations, Solving Linear Recurrence, Relations, Divide-and-Conquer Algorithms and Recurrence Relations, Generating Functions, Inclusion-Exclusion, Applications of Inclusion–Exclusion.

UNIT-IV

10Hrs

Relations: Relations and Their Properties, n-ary Relations and Their Applications, Representing Relations, Closures of Relations, Equivalence Relations, Partial Orderings.

UNIT-V

8Hrs

Graphs: Graphs and Graph Models, Graph Terminology and Special Types of Graphs, Representing Graphs and Graph Isomorphism, Connectivity, Euler and Hamilton Paths, Shortest-Path Problems, Planar Graphs, Graph Coloring.

Trees: Introduction to Trees, Applications of Trees, Tree Traversal, Spanning Trees, Minimum Spanning Trees.

Suggested Reading:

1. Kenneth H. Rosen: Discrete Mathematics and Its Applications, McGraw Hill Education; 4th revised edition.
2. Discrete Mathematical Structures. Trembley and Manohar McGraw Hill Education; 1st Edition (2001)
3. Graph Theory with Applications to Engg. & Comp. Sci.: Narsingh Deo- Prentice Hall India
4. Discrete Mathematical Structure Bernard Kolman, Robert C. Busby, Sharon Ross, 2003.
5. Ralph P. Grimaldi – Discrete and Combinatorial Mathematics – 5th Edition, Pearson, 2004.

MCA-102 COMPUTER ORGANIZATIONS AND ARCHITECTURE

Credits: 4

Contact Hrs (L:T:P): 4 (3:1:0)

IA: 40 Marks

End Exam: 60 Marks

Unit-I

10 Hrs

Number Systems: binary, octal hexadecimal, number base conversion, addition, subtraction of binary numbers, one's and two's complements, positive and negative numbers, character codes ASCH, EBCDIC.

Boolean algebra and Logic gates: Axiomatic definition of Boolean algebra, Basic theorems and properties, Boolean functions, canonical and standard forms, logic functions using gates and design of combinational circuits.

Unit-II

10 Hrs

Simplification of Boolean functions: Karnaugh maps, product of sums, sum of products, simplification, NAND and NOR implementation, don't care condition.

Combinational and Sequential logic: Adders, subtractors, code converters, decoder multiplexer, flip-flops, shift registers, counters.

Unit-III

10 Hrs

Processor Logic Design: Processor organization, arithmetic logic unit, design of arithmetic and logic circuits, design of arithmetic logic unit, status registers, design of shifter, processor unit, design of accumulator.

Control Logic Design: Processor Organization, Hardware control micro program control, control of processor unit, PLA control, micro program sequencer, computer design.

Unit- IV

10 Hrs

Micro – computer System Design: Microcomputer organization, microprocessor organization, instructions and addressing modes, subroutines and interrupts, memory organization, input-output interface, programmed input-output, input – output processor, input – output device characteristics, direct memory access (DMA).

Unit-V

8 Hrs

Memory Organization: Serial access, random access memories (RAM), read only memories (ROM), virtual memory, cache memory.

Suggested Reading:

1. Digital Logic and Computer Design, Morris Mano, PHI
2. Digital Computer Fundamentals, Bartee, T.C., MC Graw Hill
3. Computer Architecture and Organization, Tanenbaum A.S., Mc Graw Hill
4. Computer Architecture and Organization, Hayes, J.P., Mc Graw Hill
5. Introduction to Microprocessors, Gaonkar, Tata Mc Graw Hill
6. Digital Computer Electronics, Albert Paul Malvino, Jerald Brown, TMH.

MCA-103 PROBLEM SOLVING LAB

Credits: 3
Contact Hrs (L:T:P): 4 (0:0:4)

IA: 40 Marks
End Exam: 60 Marks

Problem solving algorithms studied in paper MCA-106 shall be implemented using C.

MCA-104.1 BUSINESS PROCESS

Credits: 3
Contact Hrs (L:T:P): 4 (3:1:0)

IA: 40 Marks
End Exam: 60 Marks

Unit –I 10 Hrs

Nature and types of business organizations, introduction to business process, organization structure ,definition complexity, formalization, outcomes for individuals size technology internal culture environment national cultures it industry scenario.

Unit-II 10 Hrs

Recognizing a creation company, the whoosh beginners mind, creation company vs. Compliance company.

Unit-III 10 Hrs

Becoming a creation company choosing to change heart of collaboration models. Leading a creation company, freedom and focus, creation leadership.

10 Hrs

Unit –IV

Introduction to business process, reengineering business process, reengineering through IT people view case study empowering through IT.

Unit-V 8 Hrs

Introduction to E-business , rules of E-business, E-business execution frame work, trend spotting construction steps of E-business design, case studies, constructing the e-business architecture.

Suggested Reading:

1. Richard H. Hall, Organizations, Structures, processes, and outcomes, Pearson Education, 2001.
2. M. S. Jayaraman etal., business process reengineering Tata Mcgraw Hill publications, 2001.
3. Tom McGhee, whoosh: Business in the fast lane, perseus publication, 2002.
4. R. Kalakota and m. Robinson, E-business: roadmap for success, Pearson Education, 2000.

MCA-104.2 INTRODUCTION TO UNIX

Credits: 3

Contact Hrs (L:T:P): 4 (3:1:0)

IA: 40 Marks

End Exam: 60 Marks

Unit-I

10 Hrs

Introduction to Operating System, Basic overview and history of Unix/Linux, Installation of UNIX/LINUX Operating System, Basic Commands.

Unit-II

10 Hrs

The Vi/Vim Editor, Programming in Linux: Simple Bash and K shell scripting shell scripting, Compiling C/C++ files.

Unit-III

10 Hrs

The UNIX file system, Typical UNIX directory structure, Directory and file handling commands, Making hard and soft (symbolic) link, Specifying multiple filenames.

Unit-IV

10 Hrs

Processes, Pipes, Redirecting input and output, controlling processes associated with the current shell, controlling other Processes

Unix-V

8 Hrs

UNIX Networking Basics: Network Configuration, Network background knowledge, Basic Networking debugging.

Suggested Reading:

1. UNIX concepts and Applications, Sumitabha Das, Third Edition, TMH, 2003
2. UNIX and Shell Programming, Behrouz A. Forouzan and Richard F. GilbergAText book, Thomson Edition 2003.

MCA-104.3 ACCOUNTING AND FINANCIAL MANAGEMENT

Credits: 3
Contact Hrs (L:T:P): 4 (3:1:0)

IA: 40 Marks
End Exam: 60 Marks

Unit I 10 Hrs

Principals of accounting: Concepts of financial accounting. Its functions and limitations. Assets and liabilities – owner’s equity. Accounting records and systems. Control accounts and subsidiary ledgers. Preparations of income statement and balance sheet. Meaning scope, advantages and disadvantages of management accounting. Assets and working capital : Fixed assets. Sources working capital.

Unit II 10 Hrs

Interpreting accounts and financial statements: Use of ratios in interpreting financial statements. Advantages and limitations of ratio analysis.

Standards for control: Fixed and variable costs – cost, volume profit analysis – break even point, marginal costing – contribution, standard costing analysis of variances.

Unit III 10 Hrs

Budgeting / forecasting: Concepts of budgets and budgetary control. Characteristics of budgets – classification of budgets, advantages. Concept of capital budgeting methods pay back, average rate of return and discounted cash flow method. Cost of capital.

Unit IV 10 Hrs

Inventory Valuation: Meaning, need, systems and methods of inventory valuation, inventory valuation for balance sheet purpose.

Unit V 8 Hrs

Depreciation Accounting: Meaning & objectives of Depreciation Accounting, Method & providing depreciation & Accounting treatment thereto.

Suggested Reading:

1. Financial Management Paperback – Jul 2014 by M.Y. Khan, P. K Jain TMH New Delhi, 1981
2. Manmohan and Goyal: Principles of Management and Accounting, Edition 2, Sahitya Bahvan, Agra, 1975.
3. J. Batty : Management Accounting, Allied Publishers, New Delhi, 1980
4. Michael H. Granof, Financial Accounting (Principles and Issues) TMH New Delhi, 1983.
5. Sharma S. and Gupta: Financial Accounting for Management: McMillan Publishers Pvt. Ltd. New Delhi, 1996.
6. Maheshwari S. N.: Advanced Accounting Vol. I and II. Vikas Publishing Hopuse, New Delhi, 1996

GENERAL ELECTIVES

MCA-105 (GE –I): E-COMMERCE

Credits: 3
Contact Hrs (L:T:P): 4 (3:1:0)

IA: 40 Marks
End Exam: 60 Marks

Unit-I

10 Hrs

Electronic commerce environment and opportunities: background, the electronic commerce environment, electronic marketplace technologies, modes of electronic, Commerce: overview, electronic data interchange, migration to open EDI, Electronic commerce with WWW/internet commerce net advocacy web Commerce going forward

Unit-II

10hrs

Approaches to safe electronic commerce: overview, secure transport protocols secure transactions secure electronic payment protocol(SEPP), secure electronic Transaction (set), certificates for authentication security on web servers and Enterprise networks electronic cash and electronic payment schemes: internet Monetary payment and security requirements payment and purchase order process, online electronic cash

Unit -III

10hrs

Internet/intranet security issues and solutions: the need for computer security specific intruder approaches security strategies security tools encryption enterprise networking and access to the internet antivirus programs security teams.

Unit-IV

10hrs

Master card/visa secure electronic transaction: introduction, business requirements, concepts, payment processing e-mail and secure e-mail technologies for electronic commerce: introduction the mean of distribution a model for message handling how does e-mail work? Mime: multipurpose internet mail extensions s/mime: secure multipurpose internet mail extensions moss: message object security services

Unit-V

8 hrs

Internet and web site establishment: introduction technologies for web servers, internet tools relevant to commerce, internet applications for commerce, internet charges, internet access and architecture searching the internet.

Suggested Reading:

1. Daniel Minoli & Emma Minoli, Web Commerce Technology Handbook, Tata McGraw, Hill, 1999.
2. K. Bajaj & D. Nag, E, Commerce, Tata McGraw, Hill, 1999.

MCA-106 PROBLEM SOLVING AND PROGRAMMING USING C

Credits: 3

Contact Hrs (L:T:P): 4 (3:1:0)

IA: 40 Marks

End Exam: 60 Marks

UNIT I:

5 Hrs

Introduction to Algorithms, flowchart and pseudo code, Basic Structure of C Program, C-Tokens.

UNIT II:

10 Hrs

Types, Operators and Expressions: Variable Names, Data Types and Sizes, Constants, Declarations, Arithmetic Operators, Relational and Logical Operators, Type Conversions, Increment and Decrement Operators, Bitwise Operators, Assignment Operators and Expressions, Conditional Expressions, Precedence and Order of Evaluation

Control Flow : Statements and Blocks, If-Else, Else-If, Switch, Loops - While and For Loops - Do-While, Break and Continue, Goto and labels

UNIT III:

12 Hrs

Functions and Program Structure: Basics of Functions, Functions Returning Non-integers, External Variables, Scope Rules, Header Files, Static Variables, Register Variables, Block Structure, Initialization, Recursion, The C Preprocessor

Pointers and Arrays : Pointers and Addresses, Pointers and Function Arguments, Pointers and Arrays, Address Arithmetic, Character Pointers and Functions, Pointer Arrays; Pointers to Pointers, Multi-dimensional Arrays, Initialization of Pointer Arrays, Pointers vs. Multi-dimensional Arrays, Command-line Arguments, Pointers to Functions, Complicated Declarations

UNIT IV:

10 Hrs

Structures: Basics of Structures, Structures and Functions, Arrays of Structures, Pointers to Structures, Self-referential Structures, Table Lookup, Typedef. Unions Bit-fields

UNIT-V:

3Hrs

Input and Output: Standard Input and Output, Formatted Output – printf, Variable-length Argument Lists, Formatted Input – scanf, File Access, Error Handling - Stderr and Exit, Line Input and Output, Miscellaneous Functions

Suggested Reading:

1. The C Programming Language: ANSI C: 2nd Edition, Brian W. Kernighan Dennis M. Ritchie, PHI Learning 2009
2. Programming in ANSI C: Balagurusamy 6th Edition, Tata McGraw Hill Education, 2012
3. Programming with C by Byron Gottfried Tata McGraw Hill Education 2011
4. Let Us C by Yashavant Kanetkar 13th Edition, BPB Publications, 2013
5. ANSI C Programming, Gary J. Bronson 2009, Cengage Learning, 2009
6. The Complete Reference, Herbert Schildt , Tata McGraw Hill Education, 2000

MCA-107 COMPUTER FUNDAMENTALS AND WEB UTILITIES

Credits: 3
Contact Hrs (L:T:P): 4 (3:1:0)

IA: 40 Marks
End Exam: 60 Marks

Unit-I

10 Hrs

Basics: History and generations of Computer, Types of Computer, Organization of Computer System, Hardware and Software Components, Memory unit: Types of memory, ROM, RAM, types of RAM & ROM, Introduction to cache and virtual memory.

Unit-II

10 Hrs

Number system: Binary Octal, Hexa-decimal, Number base conversion, Binary addition, Subtraction, One's and Two's compliment, Character codes – ASCII, EBCDIC.

Unit-III

10 Hrs

Operating System: Types of operating system, Functions, Introduction to DOS and WINDOWS operating system.

Software: Types of languages, Types of software (System and Application software).

Unit-IV

10 Hrs

Network and Internet: History and evolution of Computer Network, Types of network (LAN, MAN & WAN), Internet and its applications.

Unit-V

08 Hrs

Office Automation: Working with MS-Word, MS-Excel and MS-POWER POINT

Suggested Reading:

1. Computer Concepts & C Programming, P.B.Kottur, Sapna Book House Bangalore 2009
2. Computer Fundamentals, V. Rajaraman ,Prentice Hall of India,2008
3. Computer Fundamental P.K. Sinha , Prentice Hall of India, 6th Edition,1992
4. Fundamentals of Information Technology second edition, Alexis Leon,2009
5. Microsoft Office-Complete reference ,Curt Simmons, Mc Graw Hill,2003

MCA-201 DATA STRUCTURES

Credits: 4
Contact Hrs (L:T:P): 4 (3:1:0)

IA: 40 Marks
End Exam: 60 Marks

Unit-I

10 Hrs

Introduction: Primitive & Non primitive data types, Dynamic memory allocation, Storage information & representation of Integers, Real numbers & Strings, Strings and String Operations, Relations and Relational Operations, Logical Operations and Expressions.

Unit-II

10 Hrs

Linear Data Structures: Concepts and Terminology, Storage Structures for arrays.

Stacks: Definition and Concepts, Operations on Stacks. Applications of Stacks – Evaluation of Postfix Expression, Conversion from infix to postfix, infix to prefix expressions, Recursion – Factorial of n, Fibonacci sequence, Binary Search, The tower of Honai Problem.

Unit-III

10 Hrs

Queues: Definition and concepts, Operations on Queues. Types of Queues like Ordinary queues, Double Ended Queues, Circular Queue, Priority queues.

Linked Lists: Definition and Concepts, Operations on Linked Lists, Singly Linked Linear Lists, Circular singly Lined linear Lists, Doubly Linear Lists.

Applications of Linked Linear Lists – Polynomial Manipulation, Linked Dictionary.

Unit-IV

10 Hrs

Non Linear Data Structures:

Trees: Definition and Concepts, Operations on Binary trees, Storage representation and Manipulation of Binary trees, Binary Search Tree – Operations. Applications of Trees – Manipulation of Arithmetic Expressions, Symbol – Table Construction. Sparse Matrices.

Unit-V

8 Hrs

Graphs and their representation: Matrix representation of Graphs, Breadth First Search and Depth First Search.

Sorting & Searching: Introduction to Algorithm, Analysis of Time complexity of – Selection, Bubble, Merge, Quick, Heap Sort. Sequential Search & binary Search.

Suggested Reading:

1. Data structure Using C By Aaron M. Tenenbaum, Yedidyah Langsam, Moshe J. Augenstein, II Edition PHI Publications 2005.
2. An Introduction to Data Structures with Applications, Jean – Paul Tembley and Paul G. Sorenson., II Edition, Tata Mc Graw Hill.
3. Data Structures Using C and C++ 2 Edition Yedidyah Langsam, Aaron M. Tenenbaum, Moshe J. Augenstein PHI Learning (2009)
4. Data Structures Through C In Depth: 2 Edition Srivastava S K: BPB (2011)
5. Fundamentals of Data Structures in C :2 Edition:Ellis Horowitz, Sartaj Sahni, Susan Anderson-FreedPublisher Universities Press (2008)

MCA-202 OPERATING SYSTEMS

Credits: 4

Contact Hrs (L:T:P): 4 (3:1:0)

IA: 40 Marks

End Exam: 60 Marks

Unit-I

10 Hrs

Introduction: Operating system concepts, types of operating system – Batch, interactive, time sharing, real time and distributed operating systems. Operating system services, system calls, system components, system programs.

Process Management: Processes-process scheduling, operation on processors, co-operating process threads, interprocess communication, concept of critical section problem and solution, semaphores and implementation.

Unit-II

10 Hrs

CPU Scheduling: Scheduling criteria and scheduling algorithms, multiple processor scheduling.

Deadlock: Deadlock problem, characterization, prevention, avoidance, detection, recovery, combined approach to deadlock handling.

Unit-III

10 Hrs

Memory Management: Logical and physical address, swapping overlays, contiguous allocation, paging segmentation, segmentation with paging, virtual memory-demand paging page replacement algorithms.

Unit-IV

10 Hrs

Disk and Drum Scheduling: Physical characteristics FCFS, Shortest seek time first, SCAN scheduling, selection of disk scheduling algorithm, sector queuing.

Unit-V

08 Hrs

File System: Files, access method, directory structure, protection and file system implementation, allocation methods.

Protection: Goals, mechanism and policies, domain of protection, access matrix and its implementation, dynamic protection structure, revocation, security.

Suggested Reading:

1. Operating systems Concepts, Peterson, J. and Sliberschatz, McGraw Hill.2006
2. Operating system, Madnick, S.E. Donovan J.J., McGraw Hill.
3. Operating system Principles, Brinch Hansen P., PHI.
4. A logical Design of Operating systems, Shaw A., PHI
5. Operating systems, Milan Milenkovic, McGraw Hill.
6. Fundamentals of Operating system, including case studies, Sridhar. R.,:MS-DOS, UNIX & OS/2, Dynaram Publications.
7. Windows 3.1 A Complete Tutorial, Galgotia Publication Pvt., Ltd., Subhash Mehta.
8. Systems Programming and Operating system, McGraw Hill.

MCA-203 DS & OOP'S LAB

Credits: 3

Contact Hrs (L:T:P): 4 (0:0:4)

IA: 40 Marks

End Exam: 60 Marks

Laboratory assignment shall be carried out to include the features studied in MCA-201 (DS) and MCA-207 (OOPS).

MCA-204.1 SYSTEM SOFTWARE

Credits: 3

Contact Hrs (L:T:P): 4 (3:1:0)

IA: 40 Marks

End Exam: 60 Marks

Unit-I:

10 hrs

Introduction to system software and machine structure : system programs assembler, compiler, interpreter, operating system. Machine structure instruction set and addressing modes.

Unit-II

10 hrs

Assemblers: basic assembler functions, machine dependent and machine independent assembler features. Assembler design two-pass assembler with overlay structure, one-pass assembler and multi-pass assembler.

Unit-III

10 hrs

Loaders and linkers : basic loader functions, machine dependent and machine independent loader features, loader design linkage editors, dynamic linking and bootstrap loaders.

Unit-IV

10 hrs

Microprocessors: basic microprocessor functions, machine independent features, macro processor design recursive, one-pass microprocessor, two-pass macro processor, general-purpose and macro processing with language translators.

Unit-V

8 hrs

Debuggers: Introduction, debugger architecture, H/W debugger facilities, OS debugger infrastructure, controlling execution, breakpoints and single stepping, inspecting data and variables debugging GUI applications.

Suggested Reading:

1. Leland L. Beck, System Software Introduction To System Programming, Addison Wesley, 3rdEdition,1996.
2. Jonathan B. Rosenberg, How Debuggers Work: Algorithms, Data Structures, And Architecture, John Wiley & Sons, 1 Edition (September 27, 1996).
3. Damdhare, Introduction To System Software, McGraw Hill 1987.

MCA-204.2 OPERATIONS RESEARCH

Credits: 3

Contact Hrs (L:T:P): 4 (3:1:0)

IA: 40 Marks

End Exam: 60 Marks

Unit-I

15 hrs

Introduction: Nature and meaning, models –characteristics, advantages and classification. General methods for solving O.R models. Main phases of O.R. study, scope and applications.

Linear Programming: formulation (both minimization and maximization type), Solution – graphical and simplex method, General LPP, Basic solution and degenerate solution, Standard and canonical form of LPP and its characteristic features. Simplex algorithm and flowchart for maximization type problem.

Concept of duality: Formulation of dual LPP, Duality theorem, advantages of duality, dual simplex Algorithm and sensitivity analysis.

Unit-II

10 hrs

Transport Problem: Introduction, Formulation, Necessary and sufficient condition for the existence of feasible solution to a T.P. Initial basic feasible solution by NWCR, LCM and VAM. Optional solution using U –V method. Algorithm and flow chart for minimization T.P.

Unit-III

10 hrs

Assignment Problem: Formulation, Optimal solution using Hungarian algorithm. Travelling sales man problem. Variations of the assignment problem.

Unit-IV

10 hrs

Game Theory: Basic definitions, minimax – maxmin principle and optimal strategy. Solution of games with saddle point, dominance rule for solving a two – person game.

Network Analysis: Network and basic components, Rules for network construction, basic steps in PERT/CPM techniques and applications. Time estimates and critical path in network analysis.

Unit-V

5 hrs

Queuing Analysis: Introduction to stochastic process, Markov chain, t.p.m, c-k Equations, Poisson process, birth and death process. Concept of queues.

Suggested Reading:

1. Operation Research: CBS\$ Introduction, 6/E – 1996,by Taha H.A.
2. Intro to Operations Research-TMH by Billy E. Gillett
3. Operations Research: Theory and Applications – 2009, by Sharma, Laxmi Publications
4. Operations Research Paperback by Hillier F S, CBS; 2 edition (2000)

MCA-204.3 PRINCIPLES OF PROGRAMMING LANGUAGES

Credits: 3
Contact Hrs (L:T:P): 4 (3:1:0)

IA: 40 Marks
End Exam: 60 Marks

- Unit-I** **10hrs**
Language design issues: reasons for studying concepts of programming language, language evaluation criteria, influences on language design, structure and operation of computer, virtual computers and binding times, language paradigms.
- Unit-II** **10hrs**
Data types: properties of types and objects, elementary data types, structured data types.
Abstraction: abstract data types, encapsulation by subprograms, type definition, storage management.
- Unit-III** **10hrs**
Sequence control: implicit and explicit sequence control, sequencing with arithmetic and non-arithmetic expressions, sequence control between statements. Subprograms control: subprogram sequence control, attributes of data control shared data in subprograms.
- Unit-IV** **10hrs**
Inheritance: inheritance, polymorphism; language translation issues: programming language syntax, stages in translation, formal translation models.
- Unit-V** **8hrs**
Advances in language design: variations on subprogram control, language constructors for parallel processing language semantics, software architecture.

Suggested Reading:

1. Terrance W.Pratt, Marvin V Zelkowitz, Programming Languages, Design And Implementation, Phi, 2002, (4th Edition).
2. Ravi Sethi, Programming Languages Concepts & Constructs, Addison, Wesley, (2nd Edn.), 1996.
3. E. Horowitz, Fundamentals Of Programming Languages, Galgotia Publishers, 1984.
4. A. B. Tucker, Robert, Noonan, Programming Languages, McGraw Hill,2002.
5. D. Apple J. J. Vandekopple, Programming Languages Paradigm And Practice , McGraw Hill, International Editions, (2nd Edition), 1997.

MCA-204.4 MIDDLE WARE TECHNOLOGY

Credits: 3
Contact Hrs (L:T:P): 4 (3:1:0)

IA: 40 Marks
End Exam: 60 Marks

Unit-I

10hrs

Client-server, file server, data base server, group server, object server, web server, middleware, general middleware, service specific middleware client, client-server building blocks, RPC messaging, peer-to-peer

Unit-II

10hrs

EJB: EJB architecture, overview of EJB, software architecture, view of EJB conversation building and deploying EJBs, roles in EJB.

Unit-III

10hrs

EJB session beans, EJB entity beans, EJB clients, EJB deployment, building an application with EJB.

Unit-IV

10hrs

CORBA, distributed systems, purpose, exploring CORBA alternatives, architecture, overview CORBA and networking model, CORBA object model, IDL, ORB, building an application with CORBA.

Unit-V

8hrs

COM, data types, interfaces, proxy and stub, marshaling, implementing Server/client, interface pointers, object creation, invocation, destruction, comparison of COM and CORBA

Suggested Reading:

1. Robert Orfali, Dan Harkey, Jeri Edwards, 'The Essential Client/Server Survival Guide', Galgotia Publication Pvt. Ltd., 2002.
2. Tom Valesky, 'Enterprise Java Beans', Pearson Education, 2002.
3. Jeremy Rosenberger, 'Teach Yourself Corba in 14 Days', Techmedia, 2000.
4. Jason Pritchard, 'Com And Corba Side By Side', Addison Wesley, 2000.
5. Inside CORBA : Distributed Object Standards and Applications – 2002, by Thomas J. Mowbray, William A. Ruh

MCA-204.5 IMAGE PROCESSING

Credits: 3
Contact Hrs (L:T:P): 4 (3:1:0)

IA: 40 Marks
End Exam: 60 Marks

Unit I.

8 Hrs

Introduction: Definition, Origin, and Examples of Digital Image Processing, Fundamental Steps in Digital Image Processing.

Digital Image Fundamentals: Basic concepts, Image digitization, Basic Relationships between Pixels, Digital image Properties.

Unit II.

10 Hrs

Intensity Transformations and Spatial Filtering: Intensity transformations, contrast stretching, histogram equalization, Correlation and convolution, Smoothing filters, sharpening filters, gradient and Laplacian.

Unit III.

10 Hrs

Filtering in the Frequency Domain: Fourier Transforms and properties, FFT (Decimation in Frequency and Decimation in Time Techniques), Convolution, Correlation, 2-D sampling, Discrete Cosine Transform, Frequency domain filtering.

Unit IV.

10 Hrs

Image Restoration and Reconstruction: Basic Framework, Interactive Restoration, Image deformation and geometric transformations, image morphing, Restoration techniques, Noise characterization, Noise restoration filters, Adaptive filters, Linear, Position invariant degradations, Estimation of Degradation functions, Restoration from projections.

Morphological Image Processing : Basics, SE, Erosion, Dilation, Opening, Closing, Hit-or-Miss Transform, Boundary Detection, Hole filling, Connected components, convex hull, thinning, thickening, skeletons, pruning, Geodesic Dilation, Erosion, Reconstruction by dilation and erosion.

Unit V.

10 Hrs

Image Segmentation: Boundary detection based techniques, Point, line detection, Edge detection, Edge linking, local processing, regional processing, Hough transform, Thresholding, Iterative thresholding, Otsu's method, Moving averages, Multivariable thresholding, Region based segmentation, Watershed algorithm, Use of motion in segmentation.

Representation and Description: Boundary following, Chain codes, Polygon Approximation Approaches, signatures, Boundary descriptors, Regional descriptors, Use of Principal Components for description.

Suggested Reading:

1. Rafael C. Gonzalez and Richard E. Woods, "Digital Image Processing", Pearson Education, 3rd Edition, 2008.
2. Milan Sonka, Vaclav Hlavac, Roger Boyle, "Image Processing, Analysis and Machine Vision", Cengage Learning; 4 edition (1 January 2014)
3. Anil K. Jain, "Fundamentals of Digital Image Processing", Prentice-Hall of India Pvt. Ltd., 1997.
4. Richard O. Duda, Peter E. Hart, David G. Stork, "Pattern Classification", John Wiley & sons, 2nd Edition, 2008.
5. Earl Gose, Richard Johnsonbaugh, Steve Jost "Pattern Recognition and Image analysis", Prentice Hall PTR, 1996

Credits: 3

Contact Hrs (L:T:P): 4 (3:1:0)

IA: 40 Marks

End Exam: 60 Marks

Unit-I**10 Hrs**

System Models: The concept of a system, system environment, stochastic activities, continuous and discrete systems, system modeling, types of models, static physical model, dynamic physical model, static mathematical models, dynamic mathematical model, and principles used in modeling.

Introduction to Simulation: Simulation of a pure-pursuit problem-an example, a system and its model, simulation of a inventory problem, the basic nature of simulation, when to simulate.

Unit-II**10 Hrs**

Simulation of Continuous Systems: A chemical reactor, simulation of a servo system, simulation of a water reservoir system, analog vs. digital simulation.

Discrete System Simulation: Fixed time-step vs. event-to-event model, on simulating randomness, generation of random nos., generation of non-uniformly distributed random nos., Monte-Carlo computation vs. stochastic simulation.

Unit-III**10 Hrs**

Simulation of queuing Systems: Simulation of a single –server queue, simulation of a two server queue, simulation of more general queues.

Inventory Control and Forecasting: Elements of inventory theory, more complex inventory models, simulation example-1, simulation example-2, and forecasting and regression analysis.

Unit-IV**10 hrs**

Design and Evaluation of Simulation Experiments: Length of simulation runs, variance reduction techniques, validation.

Unit-V**08 hrs**

Simulation Languages: Continuous and discrete simulation languages, continuous simulation languages, block-structured continuous simulation languages, expression-based languages, discrete-system simulation languages, SIMSCRIPT, GPSS, SIMULA, factors in selection of a discrete system simulation language.

Suggested Reading:

1. System Simulation with Digital Computer, N. Deo, PHI.
2. System Simulation, G. Gordon, PHI.
3. Discrete Event system simulation, Bankds J Crson& Nelson, PHI, India 1996
4. Element of stochastic Press & Simulation, Gottfried PHI, London, 1984
5. System Simulation with Digital Computer Narsingh Deo, PHI.

GENERAL ELECTIVES

MCA-205 (GE –II): INTRODUCTION TO PC AND ITS UTILITIES

Credits: 3

Contact Hrs (L:T:P): 4 (3:1:0)

IA: 40 Marks

End Exam: 60 Marks

Unit -I

10Hrs

Introduction to computers: basic components, hardware & software resources, number system: decimal, binary, octal, hexadecimal, conversions, introduction to windows operating system, components of windows os, desktop properties, GUI.

Unit-II

10Hrs

Introduction to Microsoft word: various formatting techniques, mail merge, tables and other features.

Unit-III

10Hrs

Introduction to Microsoft excel: worksheets, chart wizards, function wizard and other features.

Unit-IV

10Hrs

Introduction to Microsoft power point: various views, slide layout, inserting pictures and sounds, custom animation and other features.

Unit -V

8Hrs

Introduction to Internet: getting connected to internet, internet features, protocols, e-mail, internet explorer & outlook express.

Suggested Reading:

1. N. Krishnan, Windows & MS-Office2000With Database Concepts, Scitech, Publications,2001.
2. N. Krishnan, Computer Fundamental & Windows With Internet Technology.
Alexis Leon & Mathews Leon, Internet For Every One, Vikas Publishing House Private Ltd,2001.

MCA-206 COMPUTER ORIENTED NUMERICAL AND STATISTICAL METHODS

Credits: 3
Contact Hrs (L:T:P): 4 (3:1:0)

IA: 40 Marks
End Exam: 60 Marks

Unit-I

20hrs

Numerical techniques for finding roots, bisection method, Newton, Raphson method, numerical integration using Simpson's rules, Gaussian quadrature method, solving differential equations, interpolation and extrapolation.

Unit-II

16hrs

Basic statistical measures – Mean, median, standard deviation, skew, kurtosis; rank, percentile, frequency distributions, standard distributions, regression analysis, least squares fit, polynomial and curve fitting, multiple regression;

Unit-III

12hrs

Introduction to time series analysis, forecasting, moving averages, exponential smoothing, autoregressive models; goodness of fit methods, ANOVA, F-test, applications to computer Science.

Suggested Reading:

1. Computer Oriented Numerical and Statistical Methods Book by SANT SHARAN MISHRA, PHI Learning Pvt. Ltd
2. Numerical Recipes 3rd Edition: The Art of Scientific Computing Hardcover – 6 Sep 2007 by William H. Press (Author), Saul A. Teukolsky (Author), William T. Vetterling
3. W.H. Press, et.al: Numerical recipes in C, Cambridge University Press.
4. Statsoft : Statsoft online Textbook, <http://www.statsoft.com>.

MCA-207 OBJECT ORIENTED PROGRAMMING WITH C++

Credits: 3

Contact Hrs (L:T:P): 4 (3:1:0)

IA: 40 Marks

End Exam: 60 Marks

Unit -I

Limitations in structured programming, characteristics of object oriented language, data types loops , pointers , arrays , structures, functions , classes , objects.

Unit -II

Operator overloading, inheritance, polymorphism, templates, exception handling class hierarchies, library organization and containers, strings, stream, design and programming.

Unit -III

Java vs. C++, java on the internet, exception handling, multithreading and persistence, java keywords and flow control, garbage collection.

Unit -IV

Final declaration, packages and interfaces, java I/O classes, run time type, identification user interface design, basics with swing.

Unit-V

Network programming, applets, class architecture, simple applet programs, abstract window tool kit.

Note: Unit I & II deals with C++ and Java

Unit III , IV & V deals with Java.

Suggested Reading:

1. Bjarne Stroustrup, The C++ Programming Language, (3rd and Special Edition) Addison Wesley, 2000
2. Bruce Eckel, Thinking in Java, (3rd Edition) Prentice Hall PTR, 2002.
3. Robert Lafore, Object Oriented Programming in C++ , Galgotia publications, 4th Edition,2002.
4. E. Balaguruswamy, Programming with Java, Tata McGraw Hill Publications Limited, 2nd Edition, 1999.

MCA-301 DESIGN AND ANALYSIS OF ALGORITHMS

Credits: 4
Contact Hrs (L:T:P): 4 (3:1:0)

IA: 40 Marks
End Exam: 60 Marks

Unit-I: **10 hrs**
Introduction, Fundamentals of the Analysis of Algorithm Efficiency, Brute Force
Notion of Algorithm, Fundamentals of Algorithmic Problem Solving, Important Problem, Types,

Unit-II: **10 hrs**
Fundamental data Structures. Analysis Framework, Asymptotic Notations and Basic efficiency classes, Mathematical analysis of Recursive and Non-recursive algorithms, Examples. Selection Sort and Bubble Sort, Sequential Search and String Matching.

Unit-III: **10hrs**
Divide-and-Conquer: Merge sort, Quick sort, Binary Search, Binary tree Traversals and related properties, Multiplication of large integers, Strassen's Matrix Multiplication

Decrease-and-Conquer : Insertion Sort, Depth First and Breadth First Search, Topological sorting, Algorithms for Generating Combinatorial Objects.

Unit-IV: **10hrs**
Space and Time Tradeoffs: Sorting by Counting, Input Enhancement in String Matching, Hashing.
Dynamic Programming: Computing a binomial coefficient, Warshall's and Floyd's Algorithms, The Knapsack Problem and Memory Functions

Unit-V: **08hrs**
Greedy Technique Prim's Algorithm, Kruskal's Algorithm, Dijkstra's Algorithm, Knapsack
Limitations of Algorithm Power: Lower-Bound Arguments, Decision Trees, P, NP and NP-Complete Problems

Suggested Reading:

1. "Introduction to the Design and Analysis of Algorithms" Anany Levitin, Publisher: Pearson (2008), 2 Editions
2. "Introduction to Algorithms", Cormen T.H., Leiserson C.E and Rivest R.L, PHI 1998.
3. "Computer Algorithms" Horowitz E., Sahani S., Rajasekharan S., Galgotia Publication 2001.
4. "Algorithm Design" Michael T Goodrich and Roberto Tamassia, Wiley India
5. "Introduction to Design and Analysis of Algorithms" R C T Lee, S S Tseng,
6. R C Chang, Y T Tsai, A Strategic Approach, Tata McGraw Hill

MCA-302 DATABASE MANAGEMENT SYSTEM

Credits: 4

Contact Hrs (L:T:P): 4 (3:1:0)

IA: 40 Marks

End Exam: 60 Marks

Unit-I:

10 Hrs

Databases and Users

Introduction, File Oriented Approach, characteristics of Database Approach, advantages of DBMS over File Processing System. Implications of database approach, when not to use a DBMS.

Database system concepts and architecture: Data Models, Schemas and Instances, DBMS Architecture and Data Independence- the Three Schema Architecture, Data Independence, DBMS languages and interfaces, The Database System Environment, classification of DBMS.

Unit II:

10Hrs

ER MODEL

Entity Types ,entity sets, attributes and keys, Relationships, Relationship types, Roles and constraints, Weak entities, ER Diagrams Naming Conventions and Design Issues, ER Diagram for company Database, Case Studies: Insurance policy management system, Library Management system.

The Relational Data Model, Relational Constraints: Relational model concepts, Relational Constraints and Relational Database Schemas.

Relational Algebra Operation: Introduction, unary relational operation-select and project, Relation algebra operations from Set Theory-Union, intersection and minus operation, Cartesian product operation, Binary relational operations: Join and division, The Division operation.

Unit III

10Hrs

SQL Schema Definition, constraints, queries and views : SQL Data Definition and data types, specifying constraints in SQL, schema Change statement in SQL, basic queries in SQL, more complex SQL queries, INSERT, DELETE, AND UPDATE statements in SQL. Specifying constraints and assertions and triggers.

Functional Dependencies and Normalization of Relational Databases: Informal Design guidelines for Relation Schemas, functional dependencies, Normal Forms: 1NF, 2NF, 3NF AND BCNF, Multi valued Dependencies and fourth Normal Form, Join Dependencies and fifth Normal form.

Unit IV

10Hrs

Introduction to transaction processing concepts and theories: Introduction to transaction processing, transaction and system concepts, Desirable properties of transaction, characterizing schedules based on recoverability, characterizing schedules based on serializability.

Concurrency control techniques: Lock based concurrency control, Deadlocks, implementation of locking, Multiversion concurrency control techniques, and validation concurrency control Techniques.

Unit V

08Hrs

Database Recovery Techniques: Recovery concepts, recovery techniques based on Deferred update.

Database security: Introduction to database security, discretionary access control, mandatory access control, statistical database

Suggested Reading:

1. Fundamentals of “Database System” Elmasri and S.B.Navathe, Pearson education, 5th Edition
2. Database Management Systems, Prof .S. Nandagopalan.
3. Database Management Systems by PatriciaWard George Dufoulas publisher Jhon Yates, series editors, edition 2006.
4. “Database Management Systems”P.S.Gill, I.K.International,, 2008 edition
5. “Database Management Systems” Rajesh Narang,Prentice hall of India Pvt Ltd, 2004.

MCA-303 CG & DBMS LAB

Credits: 3
Contact Hrs (L:T:P): 4 (0:0:4)

IA: 40 Marks
End Exam: 60 Marks

Laboratory assignment shall be carried out to include the features studied in MCA-302 (DBMS) and MCA-306 (CG).

MCA – 304.1 MULTIMEDIA SYSTEMS AND APPLICATIONS

Credits: 3
Contact Hrs (L:T:P): 4 (3:1:0)

IA: 40 Marks
End Exam: 60 Marks

Unit-I: 10Hrs

Introduction: Multimedia elements, multimedia applications, system architecture evolving technologies defining objects data interface standards need for data compression multimedia databases

Unit -II 10Hrs

Multimedia data compression: types of compression, binary image compression color, gray scale and still video image compression, video image compression, audio compression, fractal compression. Data and file formats: RTF, TIFF, RIFF, MIDI, JPEG, AVI video file formats, MPEG standards.

Unit-III 10Hrs

Multimedia I/O technologies: pen input, video and image display systems, print output technologies, image scanners, digital voice and audio, digital camera, video images and animation full motion video. Multimedia storage and retrieval technologies: magnetic media technology, optical media, hierarchical storage management, cache management for storage systems.

Unit-IV 10Hrs

Multimedia application design: types of multimedia systems, virtual reality design components of multimedia systems, organizing multimedia databases, application work flow design issues. Multimedia authoring systems: hypermedia application design considerations user interface design information access object display / playback issues.

Unit-V 8Hrs

Distributed multimedia systems: components, distributed client-server operation multimedia object servers multi,server network topologies distributed multimedia databases managing distributed objects.

Suggested Reading:

1. Prabhat K. Andleigh, KiranThakrar, Multimedia Systems Design , PHI 2002.
2. Tay Vaughan, Multimedia Making It Works Fifth Edition, TMH, 2001.
3. Jeffery Jefcoat, Multimedia Systems And Application , TMH.
4. Fred Halsall, Multimedia Communication Application Networks, Protocols And Standards , Addison Wesley, 2001.

MCA-304.2 MANAGEMENT INFORMATION SYSTEM

Credits: 3

Contact Hrs (L:T:P): 4 (3:1:0)

IA: 40 Marks

End Exam: 60 Marks

Unit -I

10Hrs

Management Information System in a Digital Firm: Management Information System(MIS): Concept, MIS: Definition, Role of the Management Information System, impact of the Management Information System, MIS and the User, Management as a Control System, MIS: A Support to the Management, Management Effectiveness and MIS, Organization as a System, MIS: Organization Effectiveness, MIS for a Diagram Firm.

Unit -II

10Hrs

E-Business Enterprise: A Digital Firm: Introduction to 'E-Business Enterprise: A Digital Firm', Organization of Business in a Digital Firm, E-Business, E-Commerce, E- Communication, E-Collaboration, Real Time Enterprise, What are the Technology Options for Becoming a Real Time Enterprise?
Information Security Challenges in E-Enterprises: Introduction, Security Threats and Vulnerability, Controlling Security Threat and Vulnerability, Managing Security Threat in E-Business, Disaster Management, Information Security

Unit -III

10Hrs

Decision Making: Decision Making Concepts, Decision Making Process, Decision Analysis by Analytical Modeling, Behavioral Concepts in Decision Making, MIS and Decision Making.
Information, Knowledge, Business Intelligence: Information Concepts, Information: A Quality Product, Classification of the Information, Methods of Data and Information Collection, Value of the Information
System Engineering: Analysis and Design: System Concepts, System Control, Types of System, Handling System Complexity, Classes of Systems, General Model of MIS, The Need for System Analysis, System Analysis of the Existing System, System Analysis of a New Requirement

Unit -IV

10Hrs

Development Process of MIS: Development of Long Range Plans of the MIS, Ascertaining the Class of Information, Determining the Information Requirement, Development and Implementation of the MIS, Management of the Information Quality in the MIS, Organization for the Development of MIS, MIS: Development Process Model
Business Process Re-Engineering (BPR): Introduction, Business Process, Process Model of the Organization, Value Stream Model of the Organization, What Delays the Business Process?, Relevance of Information Technology(IT)
Unified Communication and Networks: Introduction to Network, Network Topology, Features of Network, Data Communication, Examples of Network Applications, Components of Unified Communication (UC), Communications Enabled Business Processes (CEBP), WiMAX Technology.

Unit -V

8 Hrs

Database and Client Server Architecture: Database Concepts, Database Models, Database Design, Conceptual Model and Physical Model, RDBMS, Client-Server Implementation Strategies, MIS and RDBMS
E-Business Technology: Introduction to E-Business, Models of E-Business, Internet and World Wide Web(WWW), Intranet/Extranet, Security in E-business, Electronic Payment System, Impact of Web on Strategic Management, Web Enabled Business Management, Enterprise: Content Management System(CMS), Enterprise Portal, MIS in Web Environment

Suggested Reading:

1. Management Information System By Waman S Jawadekar, McGraw Hill 4th Edition
2. Agarwal R.D., Organization and Management, Tata McGraw Hill-86.
3. Azhar Kazmi, Business Policy and Strategic Management, Tata McGraw-Hill Publishing Company Limited, New Delhi 2008.
4. Everett E. Adam and Jr. Ronald J. Abert, Production and Management Concepts, Model And Behavior PHI-95.

MCA- 304.3 ENTERPRISE RESOURCE PLANNING

Credits: 3

Contact Hrs (L:T:P): 4 (3:1:0)

IA: 40 Marks

End Exam: 60 Marks

Unit -I

10Hrs

Integrated management information seamless integration, supply chain management, integrated data model, benefits of ERP, business engineering and ERP, definition of business engineering, principles of business engineering, business engineering with Information technology.

Unit -II

10Hrs

Building the business model, ERP implementation an overview role of Consultant, vendors and users, customization, precautions, ERP post implementation options, ERP implementation technology guidelines for ERP implementation.

Unit -III

10Hrs

ERP domain, MPG/PROIFS/avalon, industrial and financial systems, baanIV sapmarket dynamics and dynamic strategy.

Unit -IV

10Hrs

Description multi, client server solution, open technology, user interface, application integration.

Unit -V

8Hrs

Basic architectural concepts, the system control interfaces, services, presentation interface database interface.

Suggested Reading:

1. Vinod Kumar Garg And N.K.Venkita Krishnan, Enterprise Resource Planning concepts And Practice , Phi,2nd Edition,2004.
2. Jose Antonio Fernandz, The Sap R/3 Handbook , Tata Mcgraw Hill Publications,2006.

MCA -304.4 NEURAL NETWORKS

Credits: 3

Contact Hrs (L:T:P): 4 (3:1:0)

IA: 40 Marks

End Exam: 60 Marks

Unit-I

10Hrs

Introduction, characteristics of artificial neural networks, learning in biological, Systems and machines, brain and computers, differences in simple neurons.

Unit-II

10Hrs

Perception and representation, learning, linear separability, problems with the Perception training algorithms, multilayer perception, back propagation training algorithm, learning difficulties, applications.

Unit-III

10Hrs

Counter propagation networks, normal operation, training, full counter propagation networks, applications to data compression, khonen network algorithm, neighborhoods. Hopfield nets, learning, the energy landscape, storing and recall of patterns, learning in boltzman machines, learning, applications.

Unit-IV

10Hrs

Statistical methods, training, application to general non-linear optimization problem. Adaptive resonance theory, architecture, classification, implementation, training aids, characteristics.

Unit-V

8Hrs

Associative memory, bi-directional associative memory, structure of types. Optical neural networks, vector matrix multipliers, holographic correlators, hopfield net using electro optical matrix multipliers and volume holograms. The cognitron structure, training, lateral inhibition, the neocognitron structure, generalization, training, application of neural nets, pattern recognition, decision making system, medical Diagnosis. Recent trends in neural nets.

Suggested Reading:

1. Philip D Wasserman, Neural Computing Theory And Practice , Van Nostrand And Reinhold, 1989.
2. James A Freeman And David M Skapura, Neural Networks Algorithms, Application And Programming Techniques , Addison Wesley Publishing Company, 1991.

MCA-304.5 INFORMATION SECURITY

Credits: 3

Contact Hrs (L:T:P): 4 (3:1:0)

IA: 40 Marks

End Exam: 60 Marks

Unit -I:

10Hrs

Security Models and Assessment, Security Evaluation, Vulnerability Analysis, Need for security awareness, Definitions, Data Versus Information, Identification and Authentication Essentials, Access Control and Access Control Structures, Security Policies, Security Models and Confidentiality, Organization Security Architecture, Security Audit, Network Audit, Security Policy, Risk Mitigation, Incident Handling, Legal Support, Computer Forensics, Risk Analysis, Vulnerability Analysis, Security Audits and Risk Management, Security Assurance and Evaluation Criteria.

Unit -II:

10Hrs

Physical Security: Traditional Security, Access Control Systems using Swipe Cards, RFID, Biometrics

Unit -III:

10Hrs

Operating System and Application Security: PGP, Security Protocols such as IPsec, PKI, Digital Signatures, Web Server Security, Access Control of objects, Authentication, Processes, Files, Users, Buffer Overflow Attacks, Kernel Flaws, Logging, Backups

Unit -IV:

10Hrs

Network Security : TCP/IP Security, Internet Security Procedures, PPP, ECP, TLS EAP, DESE,BIS, Firewall, IP Sec Architecture and Protocols, Dial in Operations, RAS PAP, CHAP, RADIUS, DIAMETER, Key distribution, IKE, Certification and Management, Intrusion Detection Systems, VLANs and VPNs, Email security, Network Attacks and DNS protection, DMZ setup, Proxy services etc. Encryption techniques: Cryptography Techniques, RSA, DES, 3DES

Unit -V:

8Hrs

Databases and Distributed Systems Security: Relational Databases, Statistical Database Security, Multi-level Secure Databases, Concurrency Control and Multi-Level Security, Authentication, Secure APIs, CORBA Security.

Suggested Reading:

1. Hatch and Lee , Hacking Exposed Linux , Tata McGraw Hill
2. Garfinkel and Spafford, Practical UNIX and Internet Security,Oreilly
3. Matt Bishop ,Computer Security , Pearson Publications, 2003.
4. Uyles Black, Internet Security Protocols, Pearson Publications,2000.
5. Dieter Gollmann, Computer Security , John Wiley and Sons, 1999.
6. Caelli,J, Longley D. and Shain M., Information Security Handbook, MacMillan 1991.
7. Macclure S., Scambray J. and Kurtz G., Hacking Exposed : Network Security Secrets and Solutions ,McGraw,Hill, 1999.
8. Davice and Price, Security of Computer Networks,Wiely 1989.

MCA -304.6 MICROPROCESSOR ARCHITECTURE

Credits: 3

Contact Hrs (L:T:P): 4 (3:1:0)

IA: 40 Marks

End Exam: 60 Marks

Unit -I

10Hrs

Introduction to the microprocessor: history , microprocessor based personal computer system, number systems, computer data formats – architecture & addressing: microprocessor architecture, real mode memory addressing, protected mode memory addressing, memory paging , addressing modes.

Unit-II

10Hrs

8086/8088 : pin-outs and pin functions , clock generator (8284a) , bus buffering and latching , bus timing , ready and the wait state, minimum mode verse maximum mode .alp instructions : data movement arithmetic and logic program control. Assembly language with C/C++ .

Unit -III

10Hrs

Memory interface: memory devices , address decoding, 8088 and 80188 (8-bit), Memory interface, dynamic RAM, Basic I/O interface: introduction to I/O interface, I/O port address decoding, the programmable peripheral interface, the 8279 programmable keyboard/display interface, 8254 programmable interval timer, analog-to-digital (ADC) and digital-to-analog (DAC) conversions.

Unit-IV

12Hrs

Interrupts: Basic interrupts processing, hardware interrupts, expanding the interrupt structure, 8259a programmable interrupt controller, interrupt examples.

Direct memory access and DMA-controlled I/O : basic DMA operation, the 8237 DMA controller, shared-bus operation, disk memory systems, video displays. bus interface: the ISA bus, the peripheral component interconnect(PCI)bus, the parallel printer (LPT1) interface, the serial com ports, the universal serial bus (USB), accelerated graphics port (AGP).

Unit-V: 80186, 80188, and 80286, the Pentium and Pentium pro microprocessors. **6Hrs**

Suggested Reading:

1. Barry B. Brey-The Intel Microprocessors 8086/ 8088, 80186/ 80188, 80286,80386, 80486, Pentium & Pentium Pro Processors , Seventh Edition.
2. Gaonkar, Microprocessor Architecture, Programming And Applications, Wiley Eastern Ltd., 1987.

MCA-305.1 MOBILE COMPUTING

Credits: 3

Contact Hrs (L:T:P): 4 (3:1:0)

IA: 40 Marks

End Exam: 60 Marks

Unit-I

10Hrs

Introduction to Mobile Computing, Novel Application of Mobile Computing, Limitations of Mobile Computing, Evolution of Mobile Communication Services.

Mobile Communication: Architectural models for Mobile Computing systems, Mobile Devices, Wireless Networks, Introduction to Mobile Ad-hoc Network and its Application , Data Dissemination, Mobile Management ,Security.

Unit-II

10Hrs

Cellular Network: Cellular Architecture, Call Set-up, Frequency Reuse and Co-channel Cell, Cell Design, Interference in Cellular system, Channel Assignment, Handoff, Grade of Service, Capacity Improving Methods, User Validation in Cellular Communication.

Cellular Network Standards: Multiple Access Techniques, GSM: System Architecture, OSI Layers in GSM, Services and Features, Handover, GSM Channels, Establishment and Channel Usage during GSM Call, User Validation in GSM. IS-95: System Architecture, Protocol Layers and Channel in IS-95.

Wireless Local Area Network: Application, Data Transfer, WLAN Categories, WLAN Architecture, Protocol Stack, Roaming in WLAN, WLAN Security.

Unit-III

10Hrs

Wireless Data Service: Initiative on Data Services: HSCSD, CDPD. General Packet Radio Service: GPRS Architecture, Protocol Stack, GPRS Services and Channels, Mobility Management and Data Routing, GPRS User Validation. Wireless Application Protocol: WAP Architecture, WAP Protocol Stack. Mobile IP: Architecture, Working of Mobile IP, Security.

Unit-IV

10Hrs

Mobile Transport Layer: Conventional TCP/IP Transport Layer Protocols, Indirect TCP, Snooping TCP, Mobile TCP, Other Methods of TCP-layer.

Unit-V

08Hrs

Databases: Database Hoarding Techniques, Data Caching, Client-Server Computing and Adaptation, Transactional Models, Query Processing, Data Recovery, Issues relating to Quality of Service.

Information Management: Data-Delivery Mechanisms (Push based, Pull based and Hybrid based Mechanisms), Mobile File Systems, Bluetooth-Enabled Devices Network, Issues and Challenges in Mobile computing Environment.

Suggested Reading:

1. Mobile Computing, Rajkamal - Oxford University Press, 2007
2. Mobile Computing S ipra DasBit and Biplab K.Sikdar , Eastern Economy Edition, PHI Learning Private Ltd,2009 .
3. "Mobile Communications",Jochen Schiller, Addison-Wesley, 2000.
4. "Mobile Ad hoc Networking", Basagni, Conti, Giordano and Stojmenovic, Eds., IEEE/Wiley Press, 2004.
5. Ad hoc Networking", Charles Perkins, Ed., Addison-Wesley, 2000.

MCA-305.2 CLIENT SERVER SYSTEMS

Credits: 3

Contact Hrs (L:T:P): 4 (3:1:0)

IA: 40 Marks

End Exam: 60 Marks

Unit-I

10Hrs

Client/server system concepts: introduction, concepts, N-tier vs 2-tier, client/server architecture, 2-tier architecture, 3-tier architecture, case study of n-tier architecture, client/server models, gartner classifications, middleware, database connectivity and its need, upsizing, downsizing, right sizing, characteristics, types of servers and clients.

Unit-II

10Hrs

Client/server system architecture: client/server building blocks, hardware, software, middleware, types of middleware, DLE, MOM, transaction processing monitors, ODBC, need for database connectivity, design overview of ODBC, architecture, components, applications, driver managers, drivers, data sources, ODBC 2.5 and ODBC 3.0, operating system services, base services, external services, server scalability.

Unit-III

10Hrs

Client/server databases: SQL database servers, server architecture, multithread architecture, hybrid architecture, stored procedures, triggers, rules of client/server transaction processing, transaction models, chained and nested transactions, transaction management standards, distributed database characteristics, data warehousing, data mining.

10Hrs

Unit-IV

Client/server protocols: RPC, IPC.

8Hrs

Unit -V

Recent trends in client/server computing: intranet, extranet, internet, CORBA, etc.

Suggested Reading:

1. Robert Orfali, Dan Harkey, Jerri Edwards "The Essential Client Server Survival Guide, III Edition, Wiley Publications,1999.
2. Alex Berson, Client/Server Architecture , Tata Mcgrawhill Publications,1992.
3. Neil Jenkins Et Al., Client/Server Unleashed ,1996.

MCA-305.3 ATM NETWORKS

Credits: 3
Contact Hrs (L:T:P): 4 (3:1:0)

IA: 40 Marks
End Exam: 60 Marks

Unit-I 10Hrs

Introduction: ATM historical perspective, protocol architecture, logical connections, cells transmission of ATM cells, SDH sonnet switches.

Unit -II 10Hrs

ATM protocol: connection setup, routing switching, signaling, ATM service categories QoS parameters, adaptation layer.

Unit-III 10Hrs

Routing issues: routing for high speed networks rsvp, traffic and congestion control achieving QoS traffic shaping generic cell rate algorithms rate based congestion control connection admission control.

Unit-IV 10Hrs

High speed LANS: fast Ethernet, ATM.

Unit-V 8Hrs

Protocols over ATM: multiple protocols over ATM, IP over ATM, TCP over atm real time transport protocol, wireless ATM, current trends.

Suggested Reading:

1. Rainer handel, manfredn.huber, stefanschroder, atm networks , addisonwesley,1999.
2. William stallings, high speed networks tcp/ip and atm design principles ,prentice hall international ,1998.
3. Uyles Black, "Mobile and Wireless Networks", Prentice Hall, 1996.
4. William stallings, isdn with broad lane isdn with frame relay and atm ,phi,fourth edition,1999.

MCA-305.4 COMPONENT SOFTWARE

Credits: 3

Contact Hrs (L:T:P): 4 (3:1:0)

IA: 40 Marks

End Exam: 60 Marks

Unit-I

10Hrs

Components are for composition, components custom, made versus standard software inevitability of components, standards, importance of standards, foundation, components, objects, modules, interfaces, component weight, object vs class composition, inheritance, approaches to disciplined inheritance.

Unit -II

10Hrs

Patterns, framework, architecture, component models and platforms, object and component using standards, from procedures to objects, specification of interfaces and object interface relationships and polymorphism, CORBA, CORBA component model, java component technology, applet, servlets, beans, enterprise beans.

Unit-III

10Hrs

The microsoft way, COM object range, COM object creation, from COM to DCOM component document and OLE, contextual composition and services, COM apartments, MTS, COM+.

Unit -IV

10Hrs

Component architecture, component frameworks, component framework vs connectors, component frameworks vs aspect oriented programming, framework for contextual composition, black box component framework.

Unit -V

8Hrs

Component development, component oriented programming, problem of asynchrony, multithreading, inheritance, component distribution and acquisition, component assembly.

Suggested Reading:

1. George Shepard Brad Kisg ,”INSIDE COM, Inside ATL “ ,Microsoft press- 2000 ., WP publishers and distributors.
2. Clemens Szperski ,”Component Software – Beyond Object Oriented Programming –, Pearson Education- 2nd edition ,2004

MCA-305.5 DISTRIBUTED DATABASE SYSTEMS

Credits: 3
Contact Hrs (L:T:P): 4 (3:1:0)

IA: 40 Marks
End Exam: 60 Marks

Unit-I

10Hrs

Introduction : distributed data processing, distributed database design, distributed query processing, distributed directory management, distributed concurrency control, distributed deadlock management, reliability of distributed DBMS, operating system support, heterogeneous databases. overview of relational DBMS

Unit-II

10Hrs

Review of computer networks : data communication concepts, types of networks, protocol standards, broadband networks, wireless networks, internet. Distributed DBMS architecture :DBMS standardization, architectural model for distributed DBMS, distributed DBMS architecture : client/server systems, peer-to-peer distributed systems.

Unit-III

10Hrs

Distributed database design : alternative design strategies : top-down design process, bottom-up design process, distribution design issues : reasons for fragmentation, fragmentation alternatives, degree of fragmentation, correctness rules of fragmentation, allocation alternatives, information requirements, fragmentation : horizontal fragmentation, vertical fragmentation, hybrid fragmentation.

Semantic data control : view management: views in centralized DBMS, updates through views, views in distributed DBMS.

Data security: centralized authorization control, distributed authorization control.

Unit-IV

10Hrs

Distributed concurrency control: locking-based concurrency control algorithm, Timestamp, based concurrency control algorithms: basic to algorithm, conservative to algorithm, optimistic concurrency control algorithms, Deadlock management : deadlock prevention, deadlock avoidance, deadlock detection and resolution.

Distributed DBMS reliability: system, state and failure, reliability and availability, mean time between failures/mean time to report, failure and fault tolerance in distributed systems : reasons for failures, basic fault tolerance approaches and techniques.

Unit-V

8Hrs

Distributed object database management: object, abstract data types, composition, class, collection, subtyping and inheritance, object distribution design : horizontal class partitioning, vertical class partitioning , path partitioning, class partitioning algorithms, allocation, replication.

Suggested Reading:

1. M.Tamer Ozsu,Patric Valduriez, "Principles of Distributed Database System" IIEdition, Pearson Education.
2. Abraham Silberschatz, Henry F.Korth, Sudarshan,"Database System Concepts",4th Edition – McGrawHill.
3. M.Tamer Ozsu , Patrick Ualduriel, "Principles of Distributed Database Systems", Second Edition, Pearson Education, 2003.
4. Ramez Elmasri & Shamkant B.Navathe, "Fundamentals of Database Systems", Fourth Edition, Pearson Education , 2004.

MCA-305.6 ARTIFICIAL INTELLIGENCE AND EXPERT SYSTEMS

Credits: 3

Contact Hrs (L:T:P): 4 (3:1:0)

IA: 40 Marks

End Exam: 60 Marks

Unit -I

10Hrs

Problem solving and AI, puzzles and games, problem states and operators, heuristic programming, state space representations, state descriptions, graph notations, non-Deterministic programs.

Unit-II

10Hrs

State space search methods, breadth first and depth first search, heuristic, admissibility, optimality of algorithms, performance measures, problem reduction representations, and/or graphs and higher level state space.

Unit-III

10Hrs

Problem reduction search methods, cost of solution trees ordered search, alpha beta and Minimum procedure, theorem proving in predicate calculus, syntax, Semantics, Her brand universe: variables, qualifiers, unification, resolvents.

Unit-IV

10Hrs

Predicate calculus in problem solving, answer extraction process, resolution, automatic program writing, predicate calculus, proof finding methods.

Unit-V

8Hrs

Expert systems: expert systems and conventional programs, expert system organization, knowledge engineering: knowledge representation techniques, knowledge acquisition, acquiring knowledge from experts, automating knowledge acquisition. Building an expert system: architecture of an expert system, ask in building an expert system, difficulties in developing an expert system.

Suggested Reading:

1. E.Charniak,C.K.Reiesbeck And D.V.Mcdermet, Artificial Intelligence Programming, Lawrence Erlbaum Associates, N.J., 1987.
2. N. J. Nilsson, Principles Of Artificial Intelligence , Tiega Press, Polo Alto, 1986.
3. Elaine Rich And Kevin Knight, Artificial Intelligence , Mcgraw Hill, 1991.
4. Donald A. Waterman, A Guide To Expert Systems , Tech Knowledge Series In Knowledge Engineering, 1986.

MCA-305 COMPUTER GRAPHICS AND VISUALIZATION

Credits: 3

Contact Hrs (L:T:P): 4 (3:1:0)

IA: 40 Marks

End Exam: 60 Marks

Unit-I

10Hrs

Introduction: Computer graphics and its applications in various fields. Hardware system for graphics working of different input devices, visual display devices and hard copy device. Introduction to different coordinate systems.

Raster Scan display: Concepts of resolution, aspect ratio refresh rate and frame buffer.

Random scan displays: Concepts of display file and display file interpreted comparison between raster scan and random scan. Implementation of graphics in 'C' language and study of various graphics functions.

Unit-II

10Hrs

Line drawing methods: DDA algorithm and Bresenham's algorithm for different slope conditions, midpoint method for line generation.

Two-dimensional transformation: Mathematical treatment of basic transformation such as translation scaling and rotation. Development of composite transformation matrices using homogeneous coordinates. General fixed point scaling and pivot point rotation.

Clipping: Study of Cohen Sutherland line clipping procedure and Sutherland Hodgmen polygon clipping procedure.

Windows and view ports: Derivation of generalized window to view port transformation matrix. Introduction to interrupt driven programming in 'C' and interacting with the mouse.

Unit-III

10Hrs

Three-dimensional Computer Graphics: Introduction to left and right hand coordinate systems. Basic 3D transformation. Hidden line removal.

Projection: Study of orthographic and oblique parallel transformation equations for them.

Unit-IV

10Hrs

Graphic software standards: GKS and PHIGS. Study of various attributes of output primitives such as line attributes, area fill attributes and character attributes.

Graphics Software Study: DirectX and Open GL

Unit-V

08Hrs

Segments: Concepts and advantages. Segment table various operations on segments. Data structures for the display file arrays on segment, linked list and paging schemes
miscellaneous topics – Brief introduction to Bezier curves and their application, fractal morphing and animation.

Suggested reading:

1. Hearn Donald Pauling Baker .M: Computer Graphics EEE PHI, 1998.
2. Newman and Sproull: Principles of Interactive Computer Graphics McGraw Hill, 1996.
3. S. Harrington: Computer graphics McGraw Hill, 1997.
4. Yeshwant Kanetkar: Graphics under "C" BPB, 1995.
5. Yeshwant Kanetkar: C Pearls BPB, 1996.

MCA-307 COMPUTER ETHICS

Credits: 3

Contact Hrs (L:T:P): 4 (3:1:0)

IA: 40 Marks

End Exam: 60 Marks

Unit I

10hrs

Founding Computer and Information Ethics: A cybernetic view of human nature, Wiener's underlying metaphysics, Justice and human flourishing, A refutation of ethical relativism, Methodology in information ethics, Defining Computer Ethics, The "uniqueness debate", An agenda-setting textbook, An influential computer ethics theory, Computing and human values, Professional ethics and computer ethics.

Unit II

10hrs

Computer crime and computer security, Software theft and intellectual property rights, Introduction to Internet World Wide Web, E-mails, Chat, Search Engines, Networking Protocols.

Unit III

10hrs

IPR Overview: Concept & Meaning of Intellectual Property, Nature and Characteristics of Intellectual Property, Origin and Development of Intellectual Property, Kinds of Intellectual Property. Contemporary Issues in IPR (Relevant Cases)

Unit IV

10hrs

Invasion of privacy. Privacy in the Workplace and on the Internet. Email Security. Computer hacking and the creation of viruses, Hacker attack techniques, methodologies, and tools Computer and information system failure, Network Security – Threats, Vulnerabilities, Access Control, Virus, Trojans, etc.

Unit V

8hrs

Social implications of artificial intelligence and expert systems, The information technology salesman issues, IT Act 2009 Overview, (Relevant Cases)

Suggested Reading:

1. Prashant Mali, Cyber law and Cyber Crimes, Snowwhite Publication
2. Terrell Ward Bynum, Simon Rogerson, Computer Ethics and professional responsibility, 2nd edition.
3. Computer Ethics, Second Edition by Deborah G. Johnson (Prentice Hall, 1994).

MCA-401 THEORY OF COMPUTATION

Credits: 4
Contact Hrs (L:T:P): 4 (3:1:0)

IA: 40 Marks
End Exam: 60 Marks

Unit-I

10Hrs

Introduction To Finite Automata: Introduction to Finite Automata, the central concepts of Automata theory, deterministic finite automata, non-deterministic finite automata, an application. Finite automata with Epsilon-transitions.

Unit-II

10 Hrs

Regular Expressions and Languages, Properties Of Regular Languages: Regular expression, Finite Automata and Regular Expressions, Applications of Regular Expressions, Proving languages not to be regular, Closure properties of Regular languages, Decision properties of Regular languages. Equivalence and minimization of automata.

Unit-III

10 Hrs

Context-Free Grammars And Languages: Context-free grammars. Parse trees, Applications, Ambiguity in grammars and languages.

Pushdown Automata: Definition of the Pushdown automata, The languages of a PDA, Equivalence of PDA's and CFG's, Deterministic Pushdown Automata.

Unit-IV

10Hrs

Properties Of Context-Free Languages: Normal forms for CFGs, The pumping lemma for CFGs, Closure properties of CFLs.

Introduction To Turing Machines: Problems that computers cannot solve. The Turing Machine, Programming techniques for Turing Machines, Extensions to the basic Turing Machine, Restricted Turing Machines, Turing Machine and Computers.

Unit-V

08 Hrs

Undecidability: A Language that is not recursively enumerable, An Undecidable problem that is RE, Post's Correspondence problem. Other undecidable problems.

Suggested Reading:

1. J.P. Hopcroft, Rajeev Motwani, J.D. Ullman, Introduction to automata Theory, Languages and Computation, II edition, Pearson Education, 2001.
2. Introduction to Formal Languages and Automata, Peter Linz, Narosa Publ.
3. Languages & Machine An Introduction to Computer Science, Thomds A Sud Kamp, Addison Wesley.
4. Elements of theory of Computation, H.R. Lewis, Shistor H, Papadimitroce, Prentice Hall, New Delhi 199
5. Introduction to Language and Theory of Computation, John Mastin TMH New Delhi, 1998.
6. Theory Of Computation, Rajesh K Shukla,Cengage/ Delmar Learning India Pvt, 1, 2009

MCA-402 SOFTWARE ENGINEERING

Credits: 4

Contact Hrs (L:T:P): 4 (3:1:0)

IA: 40 Marks

End Exam: 60 Marks

Unit-I

10Hrs

The Product and The Process: Evolving role of software, software characteristics and components, Crisis, Software Myths, Software Engineering-A Layered Technology, Software process, linear sequential model, Prototyping model, RAD model, Evolutionary software process model.

Project Management Concepts: The Management Spectrum, The People, The Product, The Process, and The Project .W5HH Principle.

Software Process and Project Metrics: Measures, Metric Indicators, Metric in process and the Project Domains ,Software Measurement, Metrics for software quality.

Unit-II

10 Hrs

Software Project Planning: Project Planning Objectives, Software Project Estimation, decomposition Techniques, Empirical Estimation Models.

Risk Analysis and Management: Software Risks, Risk Identification, Risk Projection, Risk Refinement and Risk Mitigation, Monitoring, and Management.

Unit-III

10 Hrs

Analysis Concepts and Principles: Requirement analysis, communication techniques, analysis principles, software prototyping and specification.

Analysis Modeling: Elements of analysis model, data modeling, functional modeling, behavioral modeling, the mechanics of structured analysis, data dictionary, other classical analysis methods.

Unit-IV

10 Hrs

Design Concepts and Principles: Software design and software engineering design process, design principles, design concepts, design methods, data design, architectural design and process, transform and transaction mappings, design post processing, architectural design optimization, interface design, procedural design.

Unit-V

08hrs

Software Testing Techniques and Strategies: Fundamentals, Test case design, White box testing, Basis path testing, Control structure testing, Black box testing, Software testing strategies.

Software Configuration Management: Configuration management, maintenance costs, maintenance side effects, maintenance tissues.

Software Quality Assurance: Quality Concepts, Software Quality Assurance, FTR, ISO 9001, ISO-9002, ISO-9003, Introduction to CASE, DOD standard 2167 A.

Suggested reading:

1. Software Engineering, Fifth Edition, Roger - Pressman, McGraw Hill.
2. Software Engineering , I Sommerville, International Computer Science, Series
3. Object Oriented Modeling and Design, Rumbaugh. J., Blaha M., Premerlani W., Eddy F and Lorensen W., PHI.
4. Software Engineering, Schooma, McGraw Hill
5. Object Oriented Design and Analysis, Booch, Benjamin / Cummings,

MCA-403 JAVA LAB

Credits: 3
Contact Hrs (L:T:P): 4 (0:0:4)

IA: 40 Marks
End Exam: 60 Marks

Laboratory assignment shall be carried out to include the features studied in MCA-406 (JAVA Programming).

MCA-404.1 NATURAL LANGUAGE PROCESSING

Credits: 3
Contact Hrs (L:T:P): 4 (3:1:0)

IA: 40 Marks
End Exam: 60 Marks

Unit -I

10Hrs

Introduction, knowledge in speech and language processing ambiguity models and algorithms language, thought, and understanding the state of the art and the near term future some brief history.

Unit-II

10Hrs

Morphology and finite, state transducers, survey of English morphology inflectional morphology derivational morphology finite, state morphological parsing the lexicon and morphotactics, morphological parsing with finite, state transducers orthographic rules and finite, state transducers combining FST lexicon and rules lexicon, free FSTS: the porter stemmer human morphological processing.

Unit-III

10Hrs

Word sense disambiguation and information retrieval selection restriction, based Disambiguation limitations of selectional restrictions robust word sense Disambiguation machine learning approaches dictionary, based approaches, information retrieval the vector space model term weighting term selection and creation homonymy, polysemy, and synonymy improving user queries other information retrieval tasks.

Unit-IV

10Hrs

Discourse reference resolution reference phenomena syntactic and semantic constraints on conference preferences in pronoun interpretation an algorithm for pronoun resolution text coherence the phenomenon an inference based resolution algorithm discourse structure.

Unit-V

8Hrs

Machine translation language similarities and differences the transfer metaphor syntactic transformations lexical transfer the interlingua idea: using meaning direct translation using statistical techniques quantifying fluency quantifying faithfulness search usability and system development.

Suggested Reading:

1. Daniel Jurafsky and James H. Martin, Speech and Language Processing: An Introduction To Natural Language Processing, Computational Linguistics And Speech Recognition, Pearson Education, 2002.
2. Bharathi, A., Vineet Chaitanya and Rajeev Sangal. Natural Language Processing a Paninian Perspective. Prentice Hall India, Eastern Economy Edition. 1995.

MCA-404.2 DECISION SUPPORT SYSTEM

Credits: 3

Contact Hrs (L:T:P): 4 (3:1:0)

IA: 40 Marks

End Exam: 60 Marks

Unit-I

10Hrs

Decision making, systems, modeling, and support introduction and definition systems models modeling process decision making: the intelligence phase the design phase, the choice phase evaluation: the implementation phase alternative decision making models decision support systems decision makers, case applications.

Unit-II

10Hrs

Decision support system development: introduction, life cycle methodologies prototype technology levels and tools development platform stool selection developing DSS enterprise systems: concepts and definition evolution of information. Systems information needs characteristics and capabilities comparing and integrating EIS and DSS, EIS data access, data warehouse, OLAP, multidimensional analysis, presentation and the web including soft information enterprise on systems ,organizational DSS supply and value chains and decision support supply chain problems and solutions computerized systems MRP, ERP, SCM frontline decision support systems.

Unit -III

10Hrs

Introduction organizational learning and memory knowledge management development methods, technologies, and tools success knowledge management and artificial intelligence electronic document management. Knowledge acquisition and validation: knowledge engineering scope acquisition methods, interviews tracking methods observation and other methods grid analysis.

Unit -IV

10Hrs

Inference techniques: reasoning in artificial intelligence inference with rules: the inference tree, inference with frames model, based and case, based reasoning, explanation and meta knowledge inference with uncertainty representing uncertainty probabilities and related approaches theory of certainty approximate reasoning using

Unit-V

8Hrs

Implementing and integrating management support systems implementation: the major issues , strategies system integration generic models MSS, DSS, ES integrating EIS, DSS and ES, and global integration intelligent DSS intelligent modeling and model management examples of integrated systems problems and issues in integration.

Suggested Reading:

1. Efrain Turban, Jay E.Aronson, Decision Support Systems And Intelligent Systems 6th Edition, Pearson Education, 2001.
2. Decision support systems and intelligent systems by Efraim Turban, Prentice-Hall.

MCA-404.3 INFORMATION RETRIEVAL

Credits: 3
Contact Hrs (L:T:P): 4 (3:1:0)

IA: 40 Marks
End Exam: 60 Marks

Unit-I **10Hrs**
Boolean retrieval, the term vocabulary and postings lists, dictionaries and tolerant retrieval, index constraints, index compression.

Unit -II **10Hrs**
Scoring, term weighting and the vector space model, computing scores in a complete search system, evaluation in information retrieval,

Unit -III **10Hrs**
Relevance feedback and query expansion, XML retrieval Probabilistic information, retrieval, language models for information retrieval,

Unit – IV **10Hrs**
Text classification and naïve bayes, vector space classification and machine learning on documents, flat clustering, hierarchical clustering.

Unit – V **8Hrs**
Matrix decomposition and latent semantic indexing, web search basics, web crawling and indexes, link analysis.

Suggested Reading:

1. Christopher D. Manning, PrabhakarRaghavan and HinrichSciitz, Introduction to Information Retrieval, cambridge University Press, 2008.
2. Ricardo Baeza-yates and Berthier Ribeiro – Neto, Modern Information Retrieval, Addison-Wesley.
3. C.J.Longman van Rijsbergen, Information Retrieval, Butterworths, London,1979.

MCA-404.4 EMBEDDED SYSTEMS

Credits: 3

Contact Hrs (L:T:P): 4 (3:1:0)

IA: 40 Marks

End Exam: 60 Marks

Unit-I

10Hrs

Introduction to Electronics: Analog Electronics and Components. Digital Electronics, and Components. Number System.

Core of Embedded System: Microprocessors and Microcontrollers, General Purpose and Domain Specific Processors, ASICs, PLDs and Commercial Off-The-Shelf Components.

Unit-II

10Hrs

Embedded Systems: Definition, Classification and Application of Embedded Systems. Purpose, Characteristics and Quality attributes of Embedded Systems.

Device Interfacing: I/O devices, interfacing techniques and typical devices configurations. ROM, RAM, Memory according to the type of Interface, Memory selection for Embedded Systems.

Unit-III

10Hrs

Embedded C Programming: Introduction to C programming, Function calls, passing / returning values, Arrays, Structure and Union, Dynamic memory allocation. Command line arguments and Interrupts handling.

Unit-IV

10Hrs

System Development: Embedded System development using open source hardware and Software.

Communication protocols: Computer Networks, OSI, TCP/IP, I2C, and CAN.

Socket programming case studies.

Unit-V

08Hrs

LINUX internals: Introduction to LINUX, Overview of Commands, File I/O, Process Control.

Internet of Things: Introduction to IoT and application. Open Source Cloud and Applications.

Application development using IoT and cloud.

Suggested Reading:

1. Raj Kamal, Embedded Systems, Tata Mcgraw Hill.
2. David E. Simon, An Embedded Software Primer, Pearson Education.
3. Muhammad Ali Mazidi and Janice Gillispie Mazidi, The 8051 microcontroller And Embedded Systems, Pearson Education.
4. Frank Vahid, Tony Givargis, Embedded System Design: A Unified Hardware/Software Introduction, John Wiley.
5. Craig Hollabaugh, Embedded Linux, Pearson Education
6. Daniel Lewis, Fundamentals Of Embedded Software, Pearson Education.
7. Barnett, Cox, O'cull, Embedded C Programming And The Atmel Avr, Thomson Learning
8. MykePredko, Programming And Customizing The 8051 Microcontroller, TMH

MCA-404.5 COMPUTATIONAL BIOLOGY

Credits: 3

Contact Hrs (L:T:P): 4 (3:1:0)

IA: 40 Marks

End Exam: 60 Marks

Unit -I

10Hrs

Introduction of bioinformatics : definition challenges in bioinformatics internet and bioinformatics molecular biology s central dogma DNA,RNA and proteins genes & genomes representation of DNA, RNA and protein structures codons & anticodons, open reading frames(ORF), exons &introns, software tools for bioinformatics.

Unit -II

10Hrs

Literature databases : public databases and data formats, popular gene and protein databases, sequence alignment and sequence searching, database search strategies, querying strategy , similarity searching vs homology popular tools for database searching and querying fetch, lookup, entrez, net fetch, blast, fast interpretation of results

Unit -III

10Hrs

Pairwise alignment : problem definition & biological motivation, similarity and differences, global alignment, local alignment gap penalty models substitution matrices PAM, blosum, applying dynamic programming to pair wise alignment needle man, Wunsch algorithm, Smith_ Waterman algorithm

Unit -IV

10Hrs

Multiple sequence alignment: computational challenges dynamic programming solution approximation algorithms, center star, distance from consensus, sum of pairs, progressive alignment, multiple alignment to a phylogenetic tree, tools for multiple sequence alignment, clustalw

Unit -V

8Hrs

Phylogenetic analysis : basic definitions, from MSA to phylogenetics, phylogenetic tree construction methodologies, distance based methods, upgma, neighbour joining character based methods, maximum parsimony, fitch algorithm, weighted parsimony, Sankoff s algorithm, maximum likelihood, tools for phylogenetic tree construction Paup, phylip.

Suggested Reading:

1. S.Sundararajan, R.Balaji,Introduction To Bioinformatics , Himalaya PublishingHouse,2002.
2. Andreas D.Baxevanis, B.F.Ouellette, Ouellette, B.F.Francis, Bioinformatics : A Practical Guide To The Analysis Of Genes And Proteins ,2nd Edition,2004.
3. David Mount , Bioinformatics : Sequence & Genome Analysis .
4. Cynthia Gibas, Per Jambeck, Lorrie Lejeune, Developing Bioinformatics Computer Skills

MCA-404.6 COMPUTER VISION

Credits: 3

Contact Hrs (L:T:P): 4 (3:1:0)

IA: 40 Marks

End Exam: 60 Marks

Unit - I

10Hrs

Computer vision issues : Achieving simple vision goals, high-level and low-level capabilities, a range of representations, the role of computers, computer vision research and applications, image formation, image model, image functions, imaging geometry, reflectance, spatial properties, color digital images, imaging devices for computer vision, photographic imaging, sensing range, reconstruction imaging.

Unit – II

10Hrs

Early Processing : Recovering Intrinsic Structure, Filtering the Image, Finding Local Edges, Range Information from Geometry, Surface Orientation from Reflectance Models, Optical Flow, Resolution Pyramids, Boundary Detection, On Associating Edge Elements, Searching Near an Approximate Location, The Hough Method for Curve Detection, Edge Following as Graph Searching - Edge Following as Dynamic Programming, Contour Following.

Unit– III

10Hrs

Region Growing, Regions, a local technique: blob coloring, global techniques: region growing via thresholding, splitting and merging, texture, structural models of texel placement, texture as a pattern recognition problem, the texture gradient.

Unit – IV

10Hrs

Motion, Motion Understanding, Understanding Optical Flow, Understanding Image Sequences, Representation of Two-Dimensional Geometric Structures, Two-Dimensional Geometric Structures, Boundary Representations, Region Representations, Simple Shape Properties,

Unit - V

8Hrs

Representations of Three-Dimensional Structures, Solids and their Representation, Surface Representations, Generalized Cylinder Representations, Volumetric Representations, Understanding Line Drawings, Knowledge Representation and Use, Representations, Semantic Nets, Semantic Net Examples, Control Issues in Complex Vision Systems.

Suggested Reading:

1. Dana Harry Ballard, Christopher M. Brown, Computer vision, Prentice-Hall, 1982
2. Richard Szeliski, Computer Vision: Algorithms and Applications, Springer, 2011
3. Pedram Azad, Tilo Gockel, R. Dillmann, Computer Vision: Principles and Practice, Elektor Electronics Publishing, 2008.

MCA-405.1 SOFTWARE ARCHITECTURES

Credits: 3

Contact Hrs (L:T:P): 4 (3:1:0)

IA: 40 Marks

End Exam: 60 Marks

Unit –I

10 Hrs

Introduction; What software architecture is and what it is not; Architectural Structures and views; Architectural patterns; What makes a “good” architecture? Why is software important?
Context of Software Architecture: Technical Context; Project life-cycle context; Business context; Professional context; Stake holders; How is Architecture influenced? What Do Architecture influence?

Unit-II

10Hrs

Understanding Quality Attributes

Architecture & Requirements; Functionality; quality attribute considerations; Specifying and achieving Quality attribute requirements; Guiding quality design decisions; Availability; Interoperability; Modifiability; Performance; Security; Testability; Usability

Unit-III

10Hrs

Quality Attribute modeling and Analysis

Modeling Architecture

to enable quality attribute analysis; Quality attribute check lists; Through experiments and Back-of-the envelope analysis; Experiments; Simulations and prototypes; Analysis at different stages of the life cycle

Unit-IV

10Hrs

Architecture and requirements Gathering ASRs from requirements documents; ASRs by interviewing stake holders; ASRs by understanding the business; capturing ASRs in a utility tree; Typing the methods together

Designing an Architecture: Design strategy; the attribute driven design methods; the steps of ADD

Unit- V

08Hrs

Documenting Software Architecture

Uses and Audiences for architecture documentation; Notations, View and Behavior; Documentation and quality attributes

Architecture, Implementation & Testing Architecture and implementation; Architecture and testing

Architectural Patterns: Introduction to patterns; From Mud to structure; Layers; Pipes and filters; Blackboard; Distributed systems; Brocker; Interactive systems; Model-view-control; Presentation-abstraction- control; Adaptable systems; Microkernel .

Suggested Reading:

1. Software Architecture in Practice, Len Bass, Paul Clements, Rick Kazman: Pearson Education,
2. Frank Buschmann, Regine Meunier, Hans Rohnert, Peter Sommerlad, Michael Stal: Pattern- Oriented Software Architecture, A System of Patterns, Volume 1, John Wiley and Sons, 2012 (chapter 2)
3. Software Architecture: Foundations, Theory, and Practice, Richard N. Taylor, Nenad Medvidovic and Eric M. Dashofy Wiley- India 2012
4. Software Architecture-Perspectives on an Emerging Discipline, Mary Shaw and David Garlan: Prentice Hall of India, 2007.
5. Software Architecture in Practice, Len Bass, Paul Clements, Rick Kazman: 3rd Edition, Pearson Education, 2013 .
6. Software Architecture: Perspectives on an Emerging Discipline : Perspectives on an
7. Emerging Discipline 1 Edition, Mary Shaw, David Gurlan, PHI Learning 2009.

MCA405.2 PATTERN RECOGNITION

Credits: 3

Contact Hrs (L:T:P): 4 (3:1:0)

IA: 40 Marks

End Exam: 60 Marks

Unit - I

10Hrs

Introduction: Applications of pattern recognition, statistical decision theory, image processing and analysis.

Probability: Introduction, probability of events, random variables, Joint distributions and densities, moments of random variables, estimation of parameters from samples, minimum risk estimators.

Unit – II

10 Hrs

Statistical Decision Making: Introduction, Baye's Theorem, multiple features, conditionally independent features, decision boundaries, unequal costs of error, estimation of error rates, the leavingone- out technique. Characteristic curves, estimating the composition of populations.

Nonparametric Decision Making: Introduction, histograms, Kernel and window estimators, nearest neighbor classification techniques, adaptive decision boundaries, adaptive discriminate Functions, minimum squared error discriminate functions, choosing a decision making technique.

Unit – III

10Hrs

Clustering: Introduction, hierarchical clustering, partitional clustering.

Artificial Neural Networks: Introduction, nets without hidden layers. nets with hidden layers, the back Propagation algorithms, Hopfield nets, an application.

Unit - IV

10 Hrs

Processing Of Waveforms And Images: Introduction, gray level sealing transfontiations, equalization, geometric image and interpolation, Smoothing, transformations, edge detection, Laplacian and sharpening operators, line detection and template matching.

Unit-V

08 Hrs

Image Analysis: Introduction, Scene segmentation and labeling, counting objects, perimeter measurement, Hough Tranforms, Morphological Operations, texture, Fourier transforms, The classification of White Blood Cells

Suggested reading:

1. "Pattern Recognition and Image Analysis", Eart Gose, Richard Johnsonburg and Steve Joust, Prentice-Hall of India-2003.
2. "Pattern recognition: Statistical, Structural and neural approaches", Robert J Schalkoff, John Wiley2007.
3. Pattern Recognition and Image Analysis 1 Edition, Earl Gose, Richard Johnsonbaugh, Steve Jost, PHI Learning,2009.
4. Pattern Recognition, Pankaj Sharma,S K Kataria & Sons,2012.
5. Pattern Recognition: An Algorithmic Approach,M Narasimha Murthy, VSusheela Devi,Universities Press 2012.

MCA405.3 DISTRIBUTED COMPUTING

Credits: 3

Contact Hrs (L:T:P): 4 (3:1:0)

IA: 40 Marks

End Exam: 60 Marks

Unit I

10Hrs

Basic concept of distributed computing, Evolution of Distributed computing, Distributed computing system models, Issues in designing Distributed operating systems.

Message Passing: Features of good message passing system, issues in IPC by message Passing, Synchronization, buffering, Multidatagram messages, Encoding and decoding of message data, Process addressing , Failure handling, Group Communication.

Unit II

10Hrs

Remote procedure calls: Introduction to RPC, The RPC model, Transparency of RPC, Implementing of RPC mechanism, Stub Generation, RPC messages, Marshaling Arguments and results, server management, Parameter passing semantics, Call Semantics, Communication protocols for RPC, Client Server Binding, Exception Handling, Security RPC in Heterogeneous Environments, Light Weight RPC, Optimizations for better performance.

Unit III

10Hrs

Distributed Shared Memory: Introduction, General architecture of DSM system, Design and implementation issues of DSM, Granularity, Structure of shared memory space, Consistency models, Replacement strategy, Thrashing, Heterogeneous DSM, Advantages of DSM.

Synchronization: Need of synchronization, Clock synchronization, Event ordering, Mutual Exclusion, Deadlock, Election Algorithms.

Unit IV

10Hrs

Resource Management: Desirable Features of Global scheduling algorithm, Task assignment approach, Load balancing approach, load sharing approach.

Process Management: Introduction, Process migration, Threads in Distributed systems.

Unit V

8Hrs

Distributed File System: Desirable features of Distributed file system, File models, File Accessing models, file sharing semantics, File caching schemes, File replication, Fault tolerance, Atomic transactions

Naming: Features of Naming system, Fundamental terminology and concepts, System oriented names, Object locating mechanisms, human oriented names, Name caches, Naming and security.

Security: Potential attacks to computer systems, cryptography, Authentication, access control, Digital signatures.

Suggested Reading:

1. Pradeep K. Sinha, Distributed Operating systems Concept and Design, Prentice-Hall
2. Andrew Tanenbaum, MarteenVen Steen, Distributed systems: Principles and paradigms, Prentice – Hall
3. G. Couloris, Distributed System, Concept & Design, Addison Wesley.
4. P. K. Sinha, Distributed Operating Systems, PHI(2005).
5. Michel J. Quinn, Parallel Computing: Theory and Practice, McGraw-Hill.
6. Jordan Harry and A. Gita, Fundamentals of Parallel Processing, PHI.

MCA-405.4 FUNDAMENTALS OF AGENT TECHNOLOGY

Credits: 3
Contact Hrs (L:T:P): 4 (3:1:0)

IA: 40 Marks
End Exam: 60 Marks

Unit-I

10Hrs

Introduction, intelligent agents, environments intelligent agents and objects agents and expert systems agents as intentional systems abstract architectures for intelligent agents how to tell an agent what to do synthesizing agents

Unit-II

10Hrs

Deductive reasoning agents, agents as theorem provers agent, oriented programming, Concurrent metatem, Practical reasoning agents, practical reasoning equals deliberation plus means, ends Reasoning means, ends reasoning implementing a practical reasoning agent, homer the procedural reasoning system Reactive and hybrid agents, brooks and the subsumption architecture the limitations of reactive agents hybrid agents

Unit-III

Multiagent interactions, utilities and preferences multiagent encounters, dominant, Strategies and nashequilibria, competitive and zero, sum interactions, the prisoner dilemma other symmetric 2x2 interactions dependence relations in multiagent systems reaching agreements mechanism design auctions negotiation argumentation communication speech acts agent communication languages ontologies for agent communication coordination languages

Unit -IV

Cooperative distributed problem solving task sharing combining task and result sharing handling inconsistency coordination multiagent planning and synchronization

Unit-V

Methodologies agent, oriented analysis and design techniques, pitfalls of agent Development mobile agents applications of agents

Suggested Reading:

1. Michael Wooldridge, An Introduction To Multiagent Systems, John Wiley & Sons Ltd.2002.
2. Gerhard Weiss, Multi,Agent Systems A Modern Approach To Distributed Artificial Intelligence, Mit Press,1999.
3. Walter Brenner Et Al, Intelligent Software Agents, Foundation And Application, Springer Verlag,1998.
4. Nicholas R. Jennings, Michael Wooldridge, Agent Technology: Foundations, Applications And Markets, Springer Verlag Publishing.

MCA-405.5 ADVANCED JAVA

Credits: 3
Contact Hrs (L:T:P): 4 (3:1:0)

IA: 40 Marks
End Exam: 60 Marks

Unit –I:

10Hrs

Java and the J2EE Platform: The Enterprise Today - System Architecture, Is Java the Answer? The J2EE Platform, J2EE Architecture – Containers.J2EE Technologies -Component Technologies Service Technologies, Communication Technologies and XML.

Distributed Computing Using RMI-RMI Alternatives, The RMI Architecture, Locating Remote Objects, RMI Exceptions Developing Applications with RMI-Defining the Remote Interface, Implementing the Remote Interface, Writing the Client That Uses the Remote Objects, Generating Stubs and Skeletons, Registering the Object, Running the Client and Server. The RMI Security Manager, Parameter Passing In RMI and the Distributed Garbage Collector.

Database Programming with JDB-Java Bean Component, Database Drivers and the JDBC 2.1 Core API Introduction to JNDI and Examples.

Unit-II:

10 Hrs

XML Beginnings: A Primer on XML, The Logical Structure of an XML Document, XML Documents with DTDs, DTD and Entities, Read Well-Known DTDs, DTDs, Parsers, and Validation, XML Namespaces ,Styling XML with CS.

Introduction to Web Containers: The HTTP Protocol, Web Containers and Web Applications, Your First Web Application, the Making of Your Web Application, Summary.

Unit-III:

10Hrs

Servlets Programming : Overview of the Java Servlet API, Servlet Implementation-The Servlet Interface ,The Generic Servlet Class, The Single Thread Model Interface, The Http Servlet Class. Servlet Configuration -The Servlet Config Interface, Obtaining a Reference to Servlet Config .Servlet Exceptions, The Servlet Lifecycle, The Servlet Lifecycle –Freak Servlet, Servlet Programming-Tech Support Application, Summary.

Servlet Sessions: Statelessness and Sessions, Approaches to Session Tracking .Session Tracking with the Java Servlet API: -Session Creation and Tracking, The Http Session Interface, Binding and Unbinding Objects to and from Sessions and A Simple Shopping Cart Using Sessions.

Unit IV:

10Hrs

JSP Basics and Architecture: Introducing JSP, The Nuts and Bolts: -JSP Directives, Scripting Elements Standard Actions, Implicit Objects, Scope, XML Equivalent Tags. JSP Design Basics,the 'Dispatcher' Approach, JSP Technical Support, Summary.

Unit V

08Hrs

Ajax: Introduction to Ajax, Pre-Ajax JavaScript Communications Techniques.

Suggested Reading:

1. Professional Java Server Programming J2EE by Subramanyam Allamaraju, Karl Avedal et al., J2EE Edition Volume I, Shroff Publishers and Distributors PVT.LTD, October 2000.
2. Professional Java Server Programming J2EE by Subramanyam Allamaraju, Karl Avedal et al., J2EE Edition Volume I, Shroff Publishers and Distributors PVT.LTD, October 2000.
3. The J2EETM 1.4 Tutorial, Eric Armstrong Jennifer Ball et al., the Complete Reference Tata McGraw Hill, For Sun Java System Application Server Platform Edition8.2 ,December 2005.
4. Ajax, the Complete Reference Tata McGraw Hill Publishing, 2008.
5. Sams Teach Yourself J2EE in 21 Days by Martin Bond ,Dan Haywood et al., Sams Publishing 2002.The Complete Reference, Book Edition 1, James Keogh Tata

MCA-405.6 COMPUTER FORENSICS AND CRYPTOGRAPHY

Credits: 3

Contact Hrs (L:T:P): 4 (3:1:0)

IA: 40 Marks

End Exam: 60 Marks

Unit I:

10Hrs

Computer Forensic: Introduction to Computer/Cyber Forensic, Cyber Forensic Steps (Identification, Seizure, Acquisition, Authentication, Presentation, Preservation), who is Computer Forensic Expert, Cyber Forensic Investigation Process, The Goal of the Forensic Investigation, Why Investigate(Internet usage exceeds norm, Using e-mail inappropriately, Use of Internet, e-mail, or PC in a non-work-related manner, Theft of information, Violation of security policies or procedures, Intellectual property infractions, Electronic tampering), Establishing a Basis or Justification to Investigate, Determine the Impact of Incident, Auditing V/s Cyber Forensic Investigations.

Unit II:

10Hrs

Incident Response: Introduction to Incident Response Process(What is Computer Security Incident, What are the goals of Incident Resonse, Who is involved in Incident Response Process, Incident Response Methodology, Formulate a Response Strategy, Investigate the Incident.),Preparing For Incident Response, Overview of Pre-incident Preparation, Identifying Risk, After Detection of an Incident.

Unit III:

10Hrs

Cyber Forensic Tools and Utilities : Introduction, Examining a Breadth of Products ,Cyber Forensic Tools Good, Better, Best: What's the Right Incident Response Tool for Your Organization? , Tool Review Forensic Toolkit, EnCase, Cyber check suites, what is disk Imaging etc. Specifications for Forensic tools Tested

Unit IV:

10Hrs

Cryptography : Classical Encryption techniques, Cipher Principles, Data Encryption Standard, Block Cipher Design Principles and Modes of Operation, Key Management , Diffie-Hellman key Exchange , Elliptic Curve Architecture and Cryptography, Introduction to Number Theory , Cryptography and RSA.

Unit V:

08Hrs

Applications of Cryptography : Types of Cryptographic Algorithms (Secret Key Cryptography, Public Key Cryptography, Hash Function),Electronic Signature, Steganography, Reversing the Stenographic Process, Cloaking Techniques(Data Hide and Seek),Renaming Files, Manipulating File System, Data Hiding on NTFS with Alternate data Stream.

Suggested Reading:

1. Incident Response and Computer Forensic by *Kevin Mandia*, TMH Publication.
2. Digital Forensics: Digital Evidence in Criminal Investigations by *Angus McKenzie Marshall*
3. Cyber Forensic A Field Manual for Collecting, Examining and Preserving Evidence of Computer
4. Cyber forensics : a field manual for collecting, examining, and preserving evidence of computer crimes / Albert J. Marcella, Jr., Doug Menendez.Auerbach Publications, c2008
5. First Responder's Gude to Computer Forensics by *Richard Nolanetal.* - Carnegi Mellon, 2005.

MCA-406 JAVA PROGRAMMING

Credits: 3
Contact Hrs (L:T:P): 4 (3:1:0)

IA: 40 Marks
End Exam: 60 Marks

Unit-I: 10Hrs

The Genesis of Java: The Java Buzzwords, Java's lineage (Needs of C and C++ and its Comparison with java), Basic Data Types Of Java and Simple programs, Command line Arguments, Why java is Important to the Internet, Java's Magic:-The Byte code.

Arrays, Strings and Vectors: Declaration, Creation and operations on One and Two-Dimensional Arrays. The String Classes and its commonly used methods, Vectors and Wrapper Classes.

Unit-II: 10Hrs

Introducing Classes and Objects: Class Fundamentals, Declaring Object, Assigning object reference variables. Static variables and Static Methods. Constructors-Its Characteristics and Features, Overloaded Constructors and the 'this' keyword.

Inheritance:- Inheritance Basics, Concepts of Sub-class and Super-class. Constructing a Sub-class with the use of the keywords extends, super and final. Method Overriding and Access Modifiers.

Unit-III: 10Hrs

Interfaces and Packages: Interfaces: Their Use in Multiple Inheritances. Defining and implementing interfaces with examples.

Packages: Java API Packages, Use of Import Statements and Package Creation.

Unit-V: 10Hrs

Exception Handling: Fundamentals, Exception Types, Using try and catch blocks. Multiple catch clauses, Use of throw, throws and finally. Java Built in Exceptions and Creating Own-Exception subclasses.

Multithreaded Programming: Concept of Parallel and Multitasking, Creating Thread, Creating Multiple Threads, Thread Priorities and Synchronization.

Unit-V: 8Hrs

Applet class: Fundamentals of Applets, Creations and Execution. Methods of applet. The HTML applet Tag, Passing parameters to applets.

Introducing the AWT: AWT Classes Windows Fundamentals, Working with Graphics and Setting fonts and colors.

Using AWT Controls

Event Handling: The Delegation Event Model, Event Classes and Event Listener interfaces.

Form Elements: Labels, Text-Fields, Buttons, Checkboxes, Checkbox Group, Choice, List and Scrollbars. Their associated Methods and events.

LIST OF SUGGESTED READING:

1. "Programming with Java" Balaguruswamy, A primer, 4/e, Tata McGraw-Hill Publications.
2. "Java Programming" Steven Holzner, BPB Publications, 2000.
3. "Java for You", Kooparkar P, Tata McGraw-Hill, 1999.
4. "Java Programmer Reference" Herbert Schildt, 1997
5. "JavaTM2 the Complete Reference" Herbert Schildt, Tata McGraw-Hill, Fifth Edition2002.

MCA-501 DATA COMMUNICATION AND COMPUTER NETWORK

Credits: 4
Contact Hrs (L:T:P): 4 (3:1:0)

IA: 40 Marks
End Exam: 60 Marks

Unit I: 10hrs

Physical Layer & Media: Analog and Digital, Periodic analog signals, Digital signals, Transmission of Digital Signals, Transmission impairment, Data rate limits, performance.

Digital Transmission: Digital-to-digital conversion, analog-to-digital conversion, transmission modes Parallel Transmission Serial Transmission

Analog Transmission: Digital-to-analog conversion, Analog-to-analog conversion

Bandwidth Utilization: Multiplexing & Spreading: Multiplexing spread spectrum

Unit II 10hrs

Transmission Media: Guided media, unguided media

Circuit-switched networks: Circuit-Switched Networks, Datagram networks, virtual-circuit networks

Data Link Layer: Error Detection and Correction, Introduction, Block Coding, Linear block codes, cyclic codes, Checksum.

Unit III 10hrs

Computer Networks and the Internet: what is the Internet? What is a Protocol?

Application Layer: Introduction, Network application architecture, process communication, HTTP, File Transfer: FTP, Electronic Mail in the Internet, SMPP, DNS

Unit-IV: 10hrs

Transport Layer: Introduction, Transport-Layer Services and Principles, Multiplexing and DE multiplexing Applications, Connectionless Transport: UDP, Principles of Reliable of Data Transfer, Connection-Oriented Transport: TCP, Principles of Congestion Control, TCP Congestion Control.

Unit-V: 8hrs

Network Layer and Routing: Introduction and Network Service Model, virtual circuits & datagrams, what is inside router? Internet protocol (IP), Forwarding & Addressing in internet, Routing Algorithms, Routing in the internet, Broad & Multicast Routing.

Wireless & Mobile Networks: Introduction: Wireless Links & Networks characteristics, Wi-Fi, Cellular Internet Access, Mobility Management, Mobile IP, Managing mobility in cellular networks, Wireless & mobility.

Suggested Reading:

1. Data Communications & Networking Fourth Edition, Behrouz A Forouzan
2. Computer Networking" Third Edition, James F. Kurose, Keith W. Ross

MCA-502 .NET FRAMEWORK AND C#

Credits: 4

Contact Hrs (L:T:P): 4 (3:1:0)

IA: 40 Marks

End Exam: 60 Marks

Unit-I

10 Hrs

Introduction: What is DOTNET ? What are C#, VB.NET and MSIL? Introduction to Visual Studio DOTNET SDK and tools.

Language Fundamentals: Console IO, Comments and Documenting, Common language runtime, Base class library, Namespaces, Syntax comparison of C# and VB DOTNET

Unit-II

10 Hrs

Type Hierarchy: Object and Basic types, References and values, Boxing.

Language Features: Object oriented programming, Inheritance, Polymorphism, Garbage collection, Iteration and flow of control, Arrays Exception handling, Interfaces.

Unit-III

10 Hrs

Windows Application Development: WinForms, Event model, Controls and Menus, DONTNET Framework: File handling, Event Handling, Thread pool and synchronization.

ADO.NET: ADO.NET objects, Connections, Data Adapters, Commands, Data Sets, Data Views, Binding to controls.

Unit-IV

10 Hrs

Code Management: Interoperability with COM, Interoperability with other DONNET modules, Private and shared assemblies, Versioning.

Unit-V

08 Hrs

ASP.NET: HTTP paradigm and ASP.NET, What are active server pages (ASP) DOTNET using ASP.NET, ASP,NET Advantages, State Management, Controls, Page Layout, Error Handling, Tracking.

Web Services: Web service development, creating a Web Service Client.

Suggested reading:

1. An Introduction to programming using Visual Basic .Net, 5/e, David I, Scheinder, PHI (2005).
2. Using ASP.NET, Richar Leinecker, Pearson Education (2005).
3. Active Server Pages, Keith Morneau and Jill Batistick , Thomson Learning (2003).
4. Microsoft® Asp.Net Programming with Microsoft Visual Basic ® .Net, G. Andrew Duthie, Version 2003 step by step, PHI (2005).
5. OOP with Microsoft Visual Basic .Net and Microsoft Visual basic C#, Reynolds – Haertle., .Net-step by step, PHI (2005).

MCA-503 .NET Framework and C# LAB

Credits: 3

Contact Hrs (L:T:P): 4 (0:0:4)

IA: 40 Marks

End Exam: 60 Marks

Laboratory assignment shall be carried out to include the features studied in MCA-502 (.NET Framework and C#).

MCA-504.1 COMPILER DESIGN

Credits: 3

Contact Hrs (L:T:P): 4 (3:1:0)

IA: 40 Marks

End Exam: 60 Marks

Unit-I

10 Hrs

Introduction, Lexical analysis: Language processors; the structure of a Compilers; The evolution of programming languages; The science of building a compiler; Applications of Compiler technology; Programming language basics; Lexical analysis: The Role of Lexical Analyzer; Input Buffering; Specifications of Tokens; Recognition of Tokens.

Unit-II

10 hrs

Syntax Analysis – 1: Introduction; Context-free Grammars; Writing a Grammar; Top-down Parsing
Syntax Analysis – 2 : Bottom-up Parsing; Introduction to LR Parsing: Simple LR.
Syntax Analysis – 3 : More powerful LR parsers; Using ambiguous grammars; Parser Generators.

Unit-III

10hrs

Syntax-Directed Translation: Syntax-Directed definitions; Evaluation order for SDDs; Applications of Syntax-directed translation; Syntax-directed translation schemes

Unit-IV

10hrs

Intermediate Code Generation: Variants of syntax trees; Three-address code; Types and declarations; Translation of expressions; Type checking; Control flow; Back patching; Switch statements; Intermediate code for procedures.

Unit- V

08hrs

Run-Time Environments: Storage Organization; Stack allocation of space; Access to non-local data on the stack; Heap management; Introduction to garbage collection

Code Generation: Issues in the design of Code Generator; the Target language; Addresses in the target code; Basic blocks and Flow graphs; Optimization of basic blocks; A Simple Code Generator.

Suggested Reading:

1. Alfred V Aho, Monica S. Lam, Ravi Sethi, Jeffrey D Ullman: Compilers- Principles, Techniques and Tools, 2nd Edition, Addison-Wesley, 2007. (Chapters 1, 3.1 to 3.4, 4, 5.1 to 5.4, 6, 7.1 to 7.5, 8.1 to 8.6)
2. Charles N. Fischer, Richard J. LeBlanc, Jr.: Crafting a Compiler with C, Pearson Education, 1991.
3. Andrew W Apple: Modern Compiler Implementation in C, Cambridge University Press, 1997.
4. Kenneth C Loudon: Compiler Construction Principles & Practice, Thomson Education, 1997.
5. Compilers: Principles, Techniques and Tools 2 Edition, Monica S.Lam, Pearson (2008)

MCA-505.2 SOFTWARE TESTING AND QUALITY ASSURANCE

Credits: 3

Contact Hrs (L:T:P): 4 (3:1:0)

IA: 40 Marks

End Exam: 60 Marks

Unit-I

10Hrs

Software testing principles: need for testing , psychology of testing , testing economics , white box, black box, grey box testing SDLC and testing , verification & validation , weyuker's adequacy axioms.

Unit -II

10Hrs

Testing strategies: white box testing techniques, statement coverage, branch coverage, condition coverage, decision/condition coverage, multiple condition coverage, dataflow coverage, mutation testing, automated code coverage analysis, black box testing techniques, boundary value analysis, robustness testing, equivalence partitioning, syntax testing, finite state testing, levels of testing, UNIT, integration and system testing.

Unit -III

10Hrs

Testing object oriented software: challenges, differences from testing non-OO software, class testing strategies, class modality, state, based testing, message sequence specification.

Unit-IV

10Hrs

Introduction to quality and quality control, evolution of quality control, quality assurance, quality circles and quality improvement teams, benefits of quality control, quality and reliability, quality costs, measuring quality costs, total quality management.

Unit-V

8Hrs

CMM model and its stages, introduction to PCMM, CMMI and six sigma concepts. ISO 9000, ISO 9000-part3 for software quality.

Suggested Reading:

1. Roger S. Pressman, Software Engineering. A Practitioners Approach , Fifth Edition, 2001
2. William E.Perry, " Effective Methods For Software Testing (2nd Edition) ", John Wiley & Sons, 2000.
3. Robert V.Binder, " Testing Object,Oriented Systems: Models Patterns And Tools ", Addison Wesley, 2000.
4. RajneeshKapur, Getting Iso 9000 In A Software Organization , By Bpb Publications.
5. 5. Allan C Gillies, Software Quality Theory And Management , Thompson Learning.
6. Stephen H. Kan, Metrics And Models In Software Quality Engineering , Pearson Education.
7. Norman E Fenton And Shan Lawrence Pfleeger, Software Metrics , Thompson Learning.
8. Mordechan Ben, Chrissis Mike Konard And Sandy Shrum, Cmmi, Pearson Education ltd.
9. GlenfordJ.Myers, "The Art Of Software Testing ", John Wiley & Sons, 1997.
10. Boris Beizer, Black,Box Testing: "Techniques For Functional Testing Of Software And Systems ",John Wiley & Sons, 1995.
11. P.C.Jorgensen, " Software Testing , A Craftman's Approach ", Crc Press, 1995.

MCA-505.3 DATA WAREHOUSING AND DATA MINING

Credits: 3

Contact Hrs (L:T:P): 4 (3:1:0)

IA: 40 Marks

End Exam: 60 Marks

Unit -I

10 Hrs

Introduction to data warehousing – The need for data warehousing (1.2), Operational and informational Data stores(1.5), Data warehouse definition and characteristics (1.6), Data warehouse architecture (1.7)

Data warehousing component - Data warehouse Database (6.2), Sourcing, Acquisition, Cleanup and transformation tools (6.3), Metadata (6.4), Access tools (6.5), Data marts(6.6), Data warehousing administration and management (6.7), Information delivery system.

Unit-II

10 Hrs

Online analytical processing (OLAP) - Need for OLAP (13.1), Multidimensional data model (13.2), OLAP guidelines (13.3), Multidimensional vrs. Multirelational (OLAP (13.4), Categorization of OLAP tools (13.5), OLAP tools internet (13.6)

Statistics- Data counting and probability (15.1), Hypothesis testing (15.2), Contingency Tables, The chi square test, and non-causal relationship.

Unit-III

10Hrs

Introduction to data mining – The motivation (17.2), Learning from past mistake (17.3), Data mining (17.4), Measuring data mining effectiveness(17.5), Embedded data mining into business process (17.6), What is decision tree (18.1), Business score card (18.2), Where to use decision tree (18.3), The general idea (18.4), How the decision tree works (18.5). Case study: Prediction wireless communication churn with CART.

Unit-IV

10Hrs

Nearest neighbor and clustering - Where to use clustering and nearest neighbor prediction (20.2), How clustering and nearest neighbor prediction works (20.4)

Case study: Image recognition for human handwriting

Unit-V

08hrs

Genetic Algorithm - What are Genetic Algorithms (21.1), Where to use Genetic Algorithm? (21.2), the general idea (21.3), How the Genetic algorithm works (21.4)

Case study: Optimizing predictive customer segment

Suggested Reading:

1. “Principles and Implementation of Data Ware housing” by Rajeev Parida Fire Wall Media, Lakshmi Publications. 2006.
2. “Building the Data Warehouse”, W.H.Inmon, John Wiley & Sons.2002.
3. Data warehousing, Data mining and OLAP by Alex Berson& Stephon J. Smith, Tata McGraw Hill.2003
4. Data Warehousing in the Real World – A Practical Guide for Building Decision Support Systems, Sam Anahory& Dennis Murray, Pearson Education.2003.
5. Data warehousing, Data mining and OLAP by Alex Berson& Stephon J. Smith, Tata McGraw Hill.2003
6. Data Mining – Introductory and Advanced Topics, Margaret H. Dunham, Pearson Education., Prentice Hall 2003.

MCA-505.4 SOFT COMPUTING

Credits: 3
Contact Hrs (L:T:P): 4 (3:1:0)

IA: 40 Marks
End Exam: 60 Marks

Unit-I

10Hrs

Artificial neural networks: basic concepts, single layer perception, multi-layer perception, supervised and un-supervised learning back propagation networks, application

Unit-II

10Hrs

Fuzzy systems: fuzzy sets and fuzzy reasoning, fuzzy matrices, fuzzy functions decomposition, fuzzy automata and languages, fuzzy control methods, fuzzy decision making, and applications

Unit-III

10Hrs

Neuro-fuzzy modeling: adaptive networks based fuzzy interfaces classification and representation trees, data clustering algorithm rule base structure identification, neuro-fuzzy controls

Unit-IV

10Hrs

Genetic algorithm: survival of the fittest, genetic computations, cross over, mutation, reproduction, rank method, rank space method, application

Unit-V

08Hrs

Soft computing and conventional AI: AI search algorithm, predicate calculus, rules of inference, semantic networks, frames, objects, hybrid models, applications

Suggested Reading:

1. Jang J.S.R., Sun C.T And Mizutani E , Neuro Fuzzy And Soft Computing Prentice Hall New Jersey, 1998
2. Timothy J. Ross: Fuzzy Logic Engineering Applications. McGraw Hill, New York, 1997.
3. Laurene Fausett: Fundamentals Of Neural Networks. Prentice Hall India, New Delhi, 1994.
4. George J. Klir And Bo Yuan, Fuzzy Sets And Fuzzy Logic, Prentice Hall Inc., New Jersey, 1995
5. Nils J. Rasmussen Artificial Intelligence, Harcourt Asia Ltd., Singapore, 1998.

MCA-505.5 UNIX SYSTEM PROGRAMMING

Credits: 3

Contact Hrs (L:T:P): 4 (3:1:0)

IA: 40 Marks

End Exam: 60 Marks

Unit-I

10 Hrs

UNIX and ANSI Standards: The ANSI C Standard, The ANSI/ISO C++ Standards, Difference between ANSI C and C++, The POSIX Standards, The POSIX. 1 FIPS Standard, The X/Open Standards.

UNIX and POSIX APIs: The POSIX APIs, The UNIX and POSIX Development Environment, API Common Characteristics.

Unit-II

10 Hrs

UNIX Files: File Types, The UNIX and POSIX File System, The UNIX and POSIX File Attributes, Inodes in UNIX System V, Application Program Interface to Files, UNIX Kernel Support for Files, Relationship of C Stream Pointers and File Descriptors, Directory Files, Hard and Symbolic Links.

UNIX File APIs: General File APIs, File and Record Locking, Directory File APIs, Device File APIs, FIFO File APIs, Symbolic Link File APIs, General File Class, regfile Class for Regular Files, dirfile Class for Directory Files, FIFO File Class, Device File Class, Symbolic Link File Class, File Listing Program.

Unit-III

10Hrs

UNK Processes: The Environment of a UNIX Process, Introduction, main function. Process Termination, Command-Line Arguments, Environment List, Memory Layout of a C Program, Shared Libraries, Memory Allocation, Environment Variables, setjmp and longjmp Functions, getrlimit, setrlimit Functions, UNIX Kernel Support for Processes.

Process Control: Introduction, Process Identifiers, fork, vfork, exit, wait, waitpid, wait3, wait4 Functions, Race Conditions, exec Functions, Changing User IDs and Group IDs, Interpreter Files, system Function, Process Accounting, User Identification, Process Times, I/O Redirection.

Unit-IV

10 Hrs

Process Relationships: Introduction, Terminal Logins, Network Logins, Process Groups, Sessions, Controlling Terminal, tcgetpgrp and tcsetpgrp Functions, JobControl, Shell Execution of Programs, Orphaned Process Groups.

Signals and Daemon Processes Signals: The UNK Kernel Support for Signals, signal, Signal Mask, sigaction. The SIGCHLD Signal and the waitpid Function, The sigsetjmp and siglongjmp Functions, Kill, Alarm, Interval Timers, POSIX.1b Timers.

Unit-V

08 Hrs

Daemon Processes: Introduction, Daemon Characteristics, Coding Rules, Error Logging, Client-Server Model.

Interprocess Communication: Overview of JPC Methods, Pipes, popen, pclose Functions, Coprocesses, FIFOs. System V IPC, Message Queues, Semaphores, Shared Memory,

Suggested Reading:

1. Unix concepts and Applications, Sumitabha Das, Third Edition, TMH, 2003
2. Unix and Shell Programming, Behrouz A. Forouzan and Richard F. Gilberg A Text book, Thomson Edition 2003.
3. The complete reference UNIX, Kenneth Rosen, Douglas Host, James Farber & Richard Rosinski, MH, Edition 2000.
4. UNIX System Programming, K U Subhash, Pearson Higher Education, 2011
5. System Programming with C and Unix, Adam Hoover, Pearson Higher Education, 2009.

MCA-505.6 ARTIFICIAL INTELLIGENCE AND APPLICATIONS

Credits: 3

Contact Hrs (L:T:P): 4 (3:1:0)

IA: 40 Marks

End Exam: 60 Marks

Unit-I

10 hrs

Artificial Intelligence: History and applications

Knowledge representation : Reasoning, issues and acquisition –Introduction to predicate logic-Rule-based knowledge representation – the rules- representation of knowledge using rules-predicate calculus using rules unification-forward chaining and backward chaining –resolution.

Symbolic reasoning under uncertainty – Non monotonic reasoning –truth maintenance systems-sources of uncertainty probability and bayes theorem-approaching uncertainty using fuzzy set.

Unit-II

10 hrs

Heuristic search – Search as a problem solving techniques-heuristic search-hill climbing-best-first search evaluation of heuristic functions-admissibility, monotonicity and informed ness.

State space search: strategies for state space search-implementation of graph search: Depth first search, breadth first etc -production system-application of search techniques in Game playing-Game playing-minimax –alternative to minimax-iterative deepening.

Unit-III

10 hrs

Expert system- Stages in the development of expert system-probability-based expert system-expert system tools.

Fuzzy systems – Basics of fuzzy logic and fuzzy control system –justification, fuzzy inference and defuzzification

Unit –IV

10 hrs

Neural networks – Perceptrons –feed forward neural network with back propagation algorithm – self-organizing map

Unit- V

08 hrs

Genetic algorithms – Natural selection – rank method –rank space method- Genetic programming.

Other learning algorithms – Winston’s learning – version space algorithm.

Suggested Reading:

1. Artificial Intelligence by Elaine Rich and Kevin Knight,McGraw-Hill Publishing Co.; 2nd Revised edition (1 January 1991)
2. Artificial intelligence and intelligence system by N.P.Pathy-oxford publication
3. Artificial Intelligence, 3e – 2002,by WINSTON, Pearson; 3 edition (2002)
4. Artificial Intelligence by George Lugar, Pearson
5. Artificial Intelligence –A modern approach – Stuart Russell and Peter Norwig-Pearson

MCA-504.7 ELEMENTS OF SOFTWARE PROJECT MANAGEMENT

Credits: 3

Contact Hrs (L:T:P): 4 (3:1:0)

IA: 40 Marks

End Exam: 60 Marks

Unit-I

10Hrs

Introduction: defining a software development process identify the software model activities, relationship among activities document information on each activity, tailoring improving the process. Discipline need for implementing discipline attributes of successful leader. Communicating in harmony personality traits, management tools.

Unit -II

10Hrs

Project schedule planning: top down and bottom up planning, initial and final project schedule plans, types of activity relationships estimating the duration of an activity, critical path identifying milestones, activity responsibility matrix, project check list.

Unit-III

8Hrs

Project tracking: overview of project progress, project outlook occurrence of tracking, meetings, tracking meeting ground rules, recovery plans the role of escalations.

Unit-IV

10Hrs

Product requirement and specifications: product, requirement understanding the customers, problem to solve, product objectives, providing direction for the solution, product specifications, defining the final product, development, testing, UNIT test function test function test plan anticipating qualities weak link.

Unit-V

10Hrs

Marketing Issues: Vendor relationships the vendor contract process defining the vendors work performance incentives a trackable plan measure performance routinely quality system proximity to main location acceptance of deliverables is hipped product non preferential treatment selecting , replacing a vendor legal considerations subcontractors post projects review Product certification reviews.

Suggested Reading:

1. Neal Whitten, 'Managing Software Development Projects , Formula For Success', John Wiley And Sons , Inc, II Edition , 1995.
2. 2.Watts Humphrey, 'Managing The Software Process', Addison Wesley, 1989.

MCA-505: INTERNET PROGRAMMING AND WEB TECHNOLOGY

Credits: 3

Contact Hrs (L:T:P): 4 (3:1:0)

IA: 40 Marks

End Exam: 60 Marks

Unit -I

10hrs

Networks, protocols, TCP/IP protocol suites, brief history of internet, internet address, ports, sockets, name resolution, firewalls, protocol tunneling, proxy servers and internet standards. web basics: history of web, inside URLs web browsers, web servers, resources of internet, h/w and s/w requirement of internet.

Unit -II

10hrs

HTML: Anatomy of HTML document, text basics, rules, images and multimedia, document layout and webs, formatted lists, cascading style sheets, forms, tables, frames and executable content.

DHTML : Adding animation, multiplying the media, adding interactivity (dragging and dropping) , working with data and dialog boxes, working with text, understanding browser object models, working with VB script and Java script, embedding active-X controls in web document.

Unit -III

10hrs

Introduction to CGI ,PERL : Introduction to CGI, perl data structures, control structures, pattern matching and regular expressions, I/P and O/P in PERL, report formatting in PERL, PERL built in functions, custom functions, references and anonymous data structures, object oriented programming in PERL, advanced data manipulation, database programming with PERL, PERL,CGI programming, web programming with PERL script.

Unit -IV

10hrs

Servlets: Retrieving information, sending HTML information's, sending multimedia content, session tracking, security, database connectivity, Applet servlet communication, Inter servlet communication
-ASP: Basics, variables, ASP control structures, object properties, methods and events, request and response objects, Application, session, cookies and error handling objects. Scripting objects, ASP components, data store access, using Record sets and building script components for ASP.

Unit -V

8hrs

XML: Anatomy of an XML Document, markup elements and attributes, creating valid documents, developing advanced DTDs, XML objects, checking validity, creating XML links, advanced addressing, viewing XML in browsers , processing , event-driven programming , programming with DOM, metadata, styling XML with CSS.

Suggested Reading:

1. Chris Ullman, Beginning ASP 3.0 , Wrox Press Ltd, 2001.
2. Chuckmusiano and Bill Kenndy, HTML The Definite Guide , O Reilly publications, 2000.
3. J. Hunter, William Crawford, Java Servelet programming, O Reilly publications, 2000.
4. Joseph schmuller, Dynamic HTML , BPB publications,2000.
5. MichealMcmillan, Perl from the ground up , Tata Mcgraw, Hill Edition, 1999.

MCA – 601/602/603: PROJECT WORK SEMINAR, DISSERTATION & VIVA

Credits: 15

IA (Project work seminar) : 50 Marks

Exam (Project work dissertation) : 150 Marks

Exam (Project work viva-voce) : 50 Marks

PROJECT WORK: Project work will be carried out either in the department or in any Institution / Industry under the supervision of guide(s) approved by the Department of Computer Science.

- ❖ Each student shall carry out the project work individually and present the work done in the seminar conducted in the department at regular intervals (minimum two seminars must be conducted in the semester).
- ❖ The students are required to submit three copies of the project report(dissertation) based on the work done by him/her during the project period.

The project topics should be based on the syllabus or beyond.

PROJECT DISSERTATION FORMAT:

SUMMARY/ ABSTRACT: All students must submit a summary/abstract separately with the project report. Summary, preferably, should be of about 3,4 pages. The content should be as brief as is sufficient enough to explain the objective and implementation of the project that the candidate is going to take up. The write up must adhere to the guidelines and should include the following:

- Name / Title of the Project
- Statement about the Problem
- Why is the particular topic chosen?
- Objective and scope of the Project
- Methodology (including a summary of the project)
- Hardware & Software to be used
- Testing Technologies used
- What contribution would the project make?

TOPIC OF THE PROJECT: This should be explicitly mentioned at the beginning of the Synopsis. Since the topic itself gives a peep into the project to be taken up, candidate is advised to be prudent on naming the project. This being the overall impression on the future work, the topic should corroborate the work.

OBJECTIVE AND SCOPE: This should give a clear picture of the project. Objective should be clearly specified. What the project ends up to and in what way this is going to help the end user has to be mentioned.

PROCESS DESCRIPTION: The process of the whole software system proposed, to be developed, should be mentioned in brief. This may be supported by DFDs / Flowcharts to explain the flow of the information.

RESOURCES AND LIMITATIONS: The requirement of the resources for designing and developing the proposed system must be given. The resources might be in form of the hardware/software or the data from the industry. The limitation of the proposed system in respect of a larger and comprehensive system must be given.

CONCLUSION: The write-up must end with the concluding remarks briefly describing innovation in the approach for implementing the Project, main achievements and also any other important feature that makes the system stand out from the rest.

The following suggested guidelines must be followed in preparing the Final project Report:

Good quality white executive bond paper A4 size should be used for typing and duplication. Care should be taken to avoid smudging while duplicating the copies.

Page Specification :(Written paper and source code)

Left margin : 3.0cms
Right margin : 2.0 cms
Top margin : 2.54cms
Bottom margin: 2.54 cms

Page numbers , All text pages as well as Program source code listing should be numbered at the bottom center of the pages.

Normal Body Text: Font Size: 12, Times New Roman, Double Spacing, Justified. 6 point above and below para spacing

Paragraph Heading Font Size: 14, Times New Roman, Underlined, Left Aligned. 12 point above & below spacing.

Chapter Heading Font Size: 20, Times New Roman, Centre Aligned, 30 point above and below spacing.

Coding Font size :10, Courier New, Normal

Submission of Project Report to University: The student will submit his/her project report in the prescribed format. The Project Report should include:

- One copy of the summary/abstract.
- Three hard Copies of the Project Report
- Soft copy of project on CD/DVD in a thick envelope pasted inside of the back cover of the project report.
- The Project Report may be about 75 pages (excluding coding).