SRI VENKATESWARA UNIVERSITY:: TIRUPATI – 517502

MASTER OF COMPUTER APPLICATIONS

(With Effect from the Academic Year 2009-10

SCHEME OF INSTRUCTION AND EXAMINATION

Semester	Course Number	Course Title	Instruction Periods per week L	T	P	Total	Max. Marks Sess.	Univ	Total Marks
FIRST	MCA 101	Discrete Mathematics	3	1		4	30	70	100
	MCA 102	Probability and Statistics	3	1		4	30	70	100
	MCA 103	Introductory Programming	3	1		4	30	70	100
	MCA 104	Computer Organization	3	1		4	30	70	100
	MCA 105	Organization and Management	3	1		4	30	70	100
	MCA 106P	Software Lab1			3	3	30	70	100
	MCA 107P	Programming Lab			3	3	30	70	100
	MCA 108P	PC Hardware and ALP Lab			3	3	30	70	100
SECOND	MCA 201	Computer Oriented Operations Research	3	1		4	30	70	100
	MCA 202	Data Structures	3	1		4	30	70	100
	MCA 203	Operating System	3	1		4	30	70	100
	MCA 204	File Structures	3	1		4	30	70	100
	MCA 205	Accounting and Financial Management	3	1		4	30	70	100
	MCA 206P	Software Lab2			3	3	30	70	100
	MCA 207P	DS Lab			3	3	30	70	100
	MCA 208P	File Structures Lab			3	3	30	70	100
THIRD	MCA 301	DBMS	3	1		4	30	70	100
	MCA 302	Data Communication and Computer Networks	3	1		4	30	70	100
	MCA 303	Software Engineering	3	1		4	30	70	100
	MCA 304	Design and Analysis of Algorithms	3	1		4	30	70	100
	MCA 305	Technical Communication and computer ethics	3	1		4	30	70	100
	MCA 306P MCA 307P	Software Lab3 Software Engineering Lab			3 3	3 3	30 30	70 70	100 100
	MCA 308P	DBMS Lab			3	3	30	70	100

FOURTH	MCA 401	Production and Marketing Management	3	1		4	30	70	100
	MCA 402	Data Warehousing and Data Mining	3	1		4	30	70	100
	MCA 403	Web Programming	3	1		4	30	70	100
	MCA 404 MCA 405	Elective I Elective II	3 3	1 1		4 4	30 30	70 70	100 100
	MCA 406	Software Lab4(Elective I &II)			3	3	30	70	100
	MCA 407P	Web Programming Lab			3	3	30	70	100
	MCA 408P	Data Mining Lab			3	3	30	70	100
	MCA 408S	Seminar		2		2	50		50
FIFTH	MCA 501	Computer Graphics				4	30	70	100
	MCA 502	OOSD	3	1		4	30	70	100
	MCA 503	System Programming	3	1		4	30	70	100
	MCA 504	Elective III	3	1		4	30	70	100
	MCA 505	Elective IV	3	1		4	30	70	100
	MCA 506P	Software Lab5			3	3	30	70	100
	MCA 508P	Software Lab6			3	3	30	70	100
	MCA 507P	Mini Project			3	3	30	70	100
	MCA 508	Seminar		2		2	50		50
SIXTH	PROJECT				40	40	100	200	300

MCA 404 Elective:

1. UID
2. Artificial Intelligence.
3. Computer System Performance and Evaluation
4. PPL

MCA 504 Elective:

1. ERP
2. DSS
3. Distributed Systems
4. Distributed Operating System
5. Mobile Computing

MCA 405 Elective:

1. E-Commerce
2. Network Security.
3. Advanced Computer architecture
4. Network Managements Systems

MCA 505 Elective:

1. Image Processing
2. Multimedia System
3. Real Time System
4. Software Testing
5. Software Project Management

MASTER OF COMPUTER APPLICATIONS (MCA)

SEMESTER I

MCA 101: DISCRETE MATHEMATICAL STRUCTURES

UNIT I: Logic and Proof, Sets and Functions – Logic Propositional equivalence, Predicates and Quantities, Nested quantifiers, Methods of Proof, sets, set operations, functions.

UNIT II: The Integers and Division, Integers and Algorithms, Applications of Number theory, Mathematical reasoning, Induction and Recursion–Proof strategy, Sequences and Summations, Mathematical induction. Recursive definitions and Structural induction, Recursive algorithms, Program correctness.

UNIT III: The basics of counting, the pigeonhole principle, Permatations and Combinations, Binomial coefficients, Generalized permutations and combinations, Generating permutations and combinations, Recurrence relations, Solving recurrence relations.

UNIT IV: Relations – Relations and their properties, n-ary Relations and their applications, Representing Relations, Closures of relations, Equivalence relations, Partial orderings. Languages and Grammers, Finite state machines with output, Finite state machines with no output, Language recognition, Turing machines.

UNIT V: Graphs – Introduction to Graphs, Graph terminology, Representing graphs and Graph isomorphism, Connectivity, Euler and Hamilton Faths, Shortest Path problems, Planar graphs, Graph coloring.

Text Book: Rosen K.H. Discrete Mathematics and its Applications, 5th edition, Tata McGraw – Hills, 2003.

REFERENCE BOOKS:

1. Johnson Baugh R, and Carman R, Discrete mathematics, 5th edition, Person Education, 2003.
2. Kolman B, Busoy R.C, and Ross S.C, Discrete Mathematical Structures, 5th edition, Pretitice – Hall, 2004.
3. Mott J.L, Kandel A, and Bake T.P, Discrete Mathematics for Computer Scientists & Mathematicians, 2nd edition, Prentice-Hall of India, 2002.
4. Gary Haggard, John Schlipf and sue Whitesides, Discrete Mathematics for Computer Science, Thomson, 2005.

MCA 102: PROBABILITY AND STATISTICS

UNIT I: Probability: Sample space and events – Probability – The axioms of probability – some elementary theorems – conditional probability – Bayes Theoroem.

UNIT II: Random variables – Discrete and continuous – Distribution – Distribution, function. Binomial Poisson and Normal distributions – related properties.

UNIT III: Sampling distribution: Population and samples – sampling distributions of mean (Known and unknown) proportions, sums and differences: Point estimation – interval estimation – Bayesian estimation.

UNIT IV: Test of hypothesis – mean and proportions – Hypothesis concerning one and two means – Type I and Type II errors. One tail, two-tail tests. Test of significance – students t-test, f-test, x^2-test. Estimation of proportions.

UNIT V: Curve fitting: The method of least squares – Inferences based on the least squares estimation Curvilinear regression – multiple regressions – correlation for univiarivate and bivariate distributions.

TEXT BOOKS:

1. W. Mendenhall, R.J. Beaver and B. M. Beaver, Introduction to Probability and Statistics, Twelfth Edition, Thomson, 2007
2. Erwin Miller and John E. freund. *Probability and Statistics for engineers, 6th edition, Pearson*

EDUCATION/PHI REFERENCE BOOKS:

1. Hogg R V, and Craig A L, *Introduction to Mathematical Statistics, American Publishing.*
2. Blake I E, *An Introduction to Applied Probability*, John Wiley.
3. Lipschutz S, *Probability (*Schaum Series) Mc Graw-Hill.
4. Montgomery D C, *Introduction to Statistical Quality* Control, Wiley.
5. Montgomery D C, *Design and Analysis of Experiments, 5th* edition, Wiley, 2000.
6. Grant E.L. and Lcavenworth R.S. Statistical Quality Control 7th edition, Mc Graw – Hill 2003.
7. Dr. Shahnaz Bathul, Text Book of Probability and Statistics, VGS Publishers, 2003.

MCA 103: INTRODUCTORY PROGRAMMING

UNIT I: Software Overview, Software development process, Introduction to C++, The character set, Data types, Operators, C++ declarations. Input/Output statements, Expression evolution, Assignment statement, Control structures, Pre-processor directives.

UNIT II: Functions – Parameter passing Function prototypes, Scope rules: Arrays, Strings, I/O formatting, Files.

UNIT III: Basic concepts of Object Oriented Programing – Objects, Classes, Data abstraction, Data encapsulation, Inheritance, Polymorphism, Dynamic binding, Message passing: Object oriented software development – Class diagram, Object diagram, Use case diagram, State chart diagram, Activity diagram.

UNIT VI: Classes, and Objects in C++, Constructors, and Destructors, Operator overloading. Type conversions, inheritance.

UNIT V: Pointers, Memory management – new, and delete operators, Dynamic objects: Binding, Polymorphism, Virtual functions, Templates, Exception handing.

Text Books:

1. Kamthane A.N. Object-oriented Programming with ANSI & Turbo C++ Pearson Education 2003.

References Books:

1. Stroustrup B, The C++ Programmin Language, Special Edition, Addison Wesley, 2000.
2. Wang P.S, Standard C++ with Object Oriented Programming, 2nd edition, Thomson Learning, 2001.
3. Booch G, Rumbaugh J, and Jacobson I, The Unified Modeling Language User Guide, Addison Wesley, 1999 (For Unit III)
4. Pohl I, Object-Oriented Programming Using C++ 2nd edition, Addison – Wesley, 1997.
5. Lippman and Lajoie, C++ Primer, 3rd Edition Addison, Wesley, 1998.
6. Deitel and Deitel, C++ How to Program 3rd edition Pearson Education, 2001.
7. Lafore R, Object-Oriented Programming in Turbo C++, Galgotia Publications, 1998.
8. Lawlor S C, The Art of Programming: Computer Science with C++, Thomson Learning, 1998.
9. Chandra B. Object-Oriented Programming in C++, Narosa Publishing House, 2002.
10. Ravichandran D, Programming with C++, Tata MeGraw-Hill, 2003.

MCA 104: COMPUTER ORGANIZATION

UNIT I: Logic Circuits: Logic functions – synthesis of logic functions – Minimizations of logic - Synthesis with NAND and NOR gates Implementation of Logic gates - Flip-flops – Registers and shift registers – counters – decoders – Multiplexesrs – PLDs – sequential circuits. Basic Structure of Computers: Functional Units - Basic operational concepts – Bus structures – performance – Multiprocewessors and Multi computers: Functional Units – Basic operational concepts – Bus structures – performance – Multiprocessors and Multicomputers – Historical Perspective.

UNIT II: Machine Instructions and programs: Numbers, Arithmetic operations and characters – Memory locations and address, operations – instructions and instruction, sequencing – addressing modes - assembly language – basic input/output operations – subroutines – encoding of Machine instructions. Instructions – Assembly language –O/I operations – Registers and addressing – Instructions language – program flow control – I/O operations logic instructions of 6300 and Intel Pentium.

UNIT III: Input / Output organization: accessing I/O Devices – Interrupts – direct memory access – buses 240-interface circuits – Standard I/O Interfaces.

UNIT IV: Memory System, Concepts – semiconductor RAM memories - Resdonly memories – cache memories – performance considerations – virtual memories management requirements – secondary storage Arithmetic: Addition and subtraction of signel members – design of fast adders – multiplication of positive members – signed operand multiplication – fast multiplication – integer division – floating point numbers and operations.

UNIT V: Basic Processing Unit: Concepts – execution of a complete instruction – Multiple – Bus organization – hardware control – microprogrammed control. Pipelining: Concepts – Data hazards – instruction hazards – influence on Instruction sets - data path and control constructions – supers cal operation- ultra SPARC II – Performance considerations.

Text Books: Hamacher C, Vranesic Z, and Zaky S. Computer Organization, 5th edition, Mc Graw – Hill, 2002.

Reference Books:

1. Stallings W, Computer Organization and Architecture, 6th edition. Parson Education, 2003.
2. Mano M.M. Computer System Architecture, 3rd edition. PHI, 1993.
3. Yarbrough JM, Digital Logic – Applications and Design, Thomas Lernig, 1997.
4. Heuring VP, and Jordan HF, Computer Systems Design and Architecture, Pearson Education, 1997.

MCA 105: ORGANIZATION AND MANAGEMENT

UNIT I : Fundamentals of Management – Management Thought- The Concept, Nature of And Process of planning – Objectives of Business – Instrument of Planning.

UNIT II: Decision Making – Organisation and organization Structures – process of organizing – Departmentation – Line – staff and lateral relations.

UNIT III: Delegation and decentralization – Directing and problems in Human relations – Motivation

UNIT IV: Communication – Leadership –Coordination – Management control – Control techniques.

UNIT V: Dynamic Personnel Management – staffing policies and process – wage and salary administration.

Text Book:

1. Agarwal R D, "Organisation and Management". Tata Mc Graw – Hill publishing Company Limited, New Delhi.
2. Kootz H, and Weihrich H, Essentials of Management, 5th edition, Tata Mc Graw – Hill, 1998.
3. Biswajeet Pattanayak, Human Resource management – Prentice – Hall India Private Ltd, New Delhi, 2001.
4. Aswathappa K., Human Resource and Personnel Management, Text and Cases, 3rd edition, Tata Mc Graw – Hill Publishing Company Ltd., New Delhi, 2004.

Reference Books:

1. Mirza S Saiyadain Human Resource Management, 3rd edition, Tata Mc Graw Hill, New Delhi, 2003.
2. Weihrich H, and Koontz H, Management – A Global Perspective, 10th edition, Mc Graw – Hill, 1994.
3. Robbins SP. And DeCenzo D, Fundamentals of Management, 4th edition, Prentice Hall, 2003.
4. Dessler G, Management: Principles and Practices for Tomorrow's Leaders, 3rd Edition, Prentic Hall, 2003.
5. Chandan J S, Management Concepts and Strategies, Vikas Publishing House, 2002.
6. Ivencevich. John M., Human Resource Management 9th edition, Tata McGraw Hill, New Delhi, 2003.
7. Decenzo David, A., Robins Stephon P., Human Resource Management, 7th Edition, John Wiley & Sons (Asia) Pte. Ltd, Singapore 2002.
8. Dessler Gary Human Resource Management, 8th edition, Pearson Education, New Delhi, 2002.

SEMESTER II

MCA 201: COMPUTER ORIENTED OPERATIONS RESEARCH

UNIT I: Overview of Operations Research Modeling Approach, Decision Analysis and Games Decision environments, Decision making under Certainty, Decision making under Risk, Decision under Uncertainly, Game Theory.

UNIT II: Linear Programming – Formulation, Graphical method, Simplex method, Duality, Revised Simplex method. Transportation, Assignment and Transshipment models. Goal Programming – Formulation, Weighting and Preemptive methods.

UNIT III: Nonlinear Programming – Sample applications, Graphical illustration of Nonlinear Programming Problems, Types of Nonlinear Programming problems, One-variable Unconstrained Optimization, Multivariable Unconstrained Optimization, Karush-Kuhn-Tucker Conditions for Constrained Optimization, Quadratic Programming, Separable Programming, Convex Programming and Non-Convex Programming.

UNIT IV: Queuing Theory – Basic Structure of Queuing Models, Examples of Real queuing Systems, Role of Exponential Distribution, Birth-and Death Process based on Queuing Models, Models involving Non-Exponential Distributions, Priority – Discipline Queuing Models and Queuing networks.

Applications of Queuing Theory – Examples, Decision Making, Formulation of Waiting Cost Functions and Decision Models.

UNIT V: Introduction to Simulation, Simulation examples, Random – Number generation, Random-Variate generation, Verification and Validation of Simulation Models, Output Analysis for a Single Model, Comparison and evaluation of Alternative System designs, Simulation Packages.

TEXT BOOKS:

1. Taha H.A., Operations Research: An Introduction, 7th Edition, Prentice-Hall of India, 2003. (For Unit II, Chapters 2,3,4,5,7 and S: for part of Unit I Chapter 14)
2. Frederick H.S. and Lieberman G.J. Introduction to Operations Research, 7th edition, Tata McGraw-Hill, 2002. (For part of Unit I chapter 2, for Unit III Chapter 13, and for Unit IV Chapters 17 and 18).
3. Banks, J, Carson II J. S., Nelson B.L., and Nicol D.M. Discrete – Event System Simulation. Pearson Education Asia, 3rd edition, 2002. (for Unit V Chapters 1,2,7,8,10,11 and 12; and Section 4.7).

MCA 202: DATA STRUCTURES

UNIT I: Concept of Abstract Data Types (ADTs), Data Types, Data Structures, Storage Structures, and File Structures, Primitive and Non-primitive Data structures. Linear and Non-linear Structures.

Linear lists – ADT, Array and Linked representations, Simulated Pointers. Arrays – ADT. Mappings, Representations, Spares Matrices. Sets – ADT, Operations.

UNIT II: Stacks – Definition, ADT, Array and Linked representations, Implementations, and Applications. Queues – Definition, ADT, Array and Linked representations, Circular Queues, Dequeues, Implementations and Applications. – Sorting and searching techniques using Java.

UNIT III: Binary Trees – Definition, Properties, Representation, ADT Implementations and Applications. Priority Queues – Definition, ADT, Heaps, Leftist Trees and Applications. Binary Search Trees (BST) – Definition, ADT, Operations and Implementations, BST with Duplicates, indexed BST and Applications.

UNIT IV: Balanced Search Tress – AVL, Red – Black and Splay Trees. Graphs – Problems, Representation, Basic Searching Techniques, Minimum Spanning Tree, Topological Sorting and Shortest Paths.

UNIT V: Sorting – Selection, Insertion, Shell, Bubble. Merge, Quick, Heap, Radix and Address Calculation Sorting Techniques. Searching – Sequential and Binary Searching.

TEXT BOOKS:-

1. Heilman G.L., Data Structures, Algorithms and Object – Oriented Programming, Tata McGraw – Hill, 2002. (Chapters 1 and 14).
2. Tremblay J. P., and Sorenson P.G., Introduction to Data Structures and Applications, Tata McGraw-Hill, 1995 (Sections 6-1, 6-2.1, and 6-22).
3. Sahni S, Data Structures, Algorithms and Applications in JAVA, McGraw-Hill, 2000. (Chapters 5,6,7,8,9,10,12,13, and 15: Sections 16.1., 16.2. and 16.3).

REFERENCES BOOKS:

1. Drzdek A, Data Structures and Algorithms in C++, 2nd edition, Vikas Publishing House, 2002.
2. Samantha D. Classic Data Structures, Prentice-Hall of India, 2001.
3. Sahni S, Data Structures, Algorithms and Applications in C++, McGraw-hill, 2002.
4. Kanetkar Y.P., Data Structures through C++, BPB Publications, 2003.
5. D.S. Malik, Data Structures Using C++, Thomson, India Edition 2006.

MCA 203: OPERATING SYSTEMS

UNIT I: Introduction to Operating Systems, Types of Operating Systems, Computing Environments, Computer system operation, I/O structure, and Hierarchy, Hardware protection, Network structure, Operating system components and services – system calls, Systems programs, System Structure, Virtual machines, System design and Implantation.

UNIT II: CPU Scheduling: Scheduling criteria, Scheduling Algorithms, Multiple processor Scheduling, Real-time scheduling.
Process Synchronization:- The critical-section problem, Synchronization hardware, Semaphores, Classic problems of Synchronization, Critical regions, Monitors. Operating System Synchronization, Atomic transactions.
Dead Locks: Deadlock characterization, Deadlock handling, Deadlock prevention, Deadlock avoidance, Deadlock detection, and Recovery.

UNIT III: Memory Management: Swapping, Contiguous memory allocation, Paging, Segmentation with paring Concept of Virtual memory Demand paging Page replacement, Allocation of frames, Thrashing. File System Interface & Implementation: File concept, Access methods, Directory structure, File System Mounting File sharing Protection, File system structure, and implementation, Directory implementation, Allocation methods. Free space management, Efficiency and performance, Recovery, Log-structured file system, NFS.

UNIT IV: I/O Systems: overview, I/O hardware, Application I/O interface, Kernel I/O subsystem, Transforming I/O to Hard ware operations, STREAMS, Performance of I/O.
Mass Storage Structure:- Disk Structure Disk Scheduling, Disk management, Swap-space Management, RAID Structure, Disk Attachment, Stable – Storage implementation, Tertiary – storage structure.
Distributed System Structure: Background, Topology, Network Types, Communication Protocols, Robustness, Design issues.
Protection: Goals, Domain of protection, Access matrix and implementation, Access rights, capability – based systems, Language – based protection.

UNIT V: The Security Problem: User authentication, program threats, system threats, security systems Facilities Intrusion detection, Cryptography, Computer – security classification. Linux system: History, Design principles, Kernel modules, process management, Scheduling Memory Management, File Systems, Input and output, IPC, Network structure, security.

WINDOWS 2000: History, Design principles, System components, Environmental subsystems, file system, Networking, Programming interface.

TEXT BOOKS:

1. Silberschatz A, Galvin P.B, and Gaghe G. Operating System Concepts, 6th edition, John Wiley, 2002.
2. Tenenbaum A.S., Modern Operating Systems, 2nd edition, Pearson Education, 2001.

REFERENCE BOOKS:

1. Dhamdhere D.M., Operating Systems – A concept based Approach, Tata McGraw-Hill, 2002.
2. Flym I M, and Mc Hoes A.M., Understanding Operating Systems, 3rd edition, Thomson Brooks/Cole, 2001.
3. Bhatt P.C.P., An Introduction to Operating Systems – Concepts and Practice, PHI, 2003.
4. Harris J.A., Operating Systems, Tata McGraw-Hill (Schaum's Outlines series), 2002.
5. Solomon D.A. and Russinovich M.E., Inside Microsoft Windows 2000, 3rd edition, Microsoft Press/WP Publishers & Distributors Pvt. Ltd., 2000.
6. Bach M.J., the Design of the Unix Operating System, PHI, 1986.

Note: Operating System concepts are to be discussed using examples from Unix/Linux and Windows 2000 Operating Systems.

MCA 204: FILE STRUCTURES

UNIT I: Introduction to the Design and Specification of File structures, of File structures, Fundamental File Structure Concepts.

UNIT II: Managing Files of Records, Organizing files for Performance, Indexing, Consequential Processing, Sorting of Large Files.

UNIT III: Multi-Level indexing, B-Trees, Indexed Sequential File access, Prefix B Trees, Hashing, Extendible Hasting.

UNIT IV: COBOL Fundamentals, Sequential File Processing, Sorting and Merging.

UNIT V: Indexed File Processing, Relative File Processing, Interactive Processing, Array Processing – Defining initializing, accessing, and searching of arrays, Report generation, Sub programs.

Text Books:

1. Folk M.J., Zoellick B, and Riccardi G, File Structures – an object oriented Approach with C++, Pearson Education, 1998. (for Units, I, II and III)
2. Stern N, and Stern R, Structured COBOL Programming, 7th edition, John Wiley, 1995.

MCA 205: ACCOUNTING AND FINANCIAL MANAGEMENT

Unit I: Accounting Concepts – Double Entry System – Journal – Ledger – Trial Balance – Subsidiary Books – Final accounts

Unit II: Cost Accounting: Nature and significance – Cost classification and Analysis – Marginal Costing

Unit III: Budget – Budgetary control – standard costing – Finance Function

Unit IV: Financial Decision Making – Financial Analysis – Working Capital Management – Capital Budgeting.

Unit V: Funds flow Analysis – Cash flow Analysis - Ratio Analysis-

Text Books:

1. Rajeswara Rao K and Prasad G, Accounting & Finance (MCA), Jai Bharat Publishers, Guntur
2. Jain and Narang, *Accountany Vol.* Kalyani Publishers.
3. Jain and Narang, *Cost Accounting*, Kalyani Publishers.
4. Sharma R K, and Gupta S K, *Management Accounting*, Kalyani Publishers.
5. Pandey I M, *Financial Management*, Vikas Publication.

Reference Books:

1. Grewal Ts. *Introduction to Accountancy*, S Chand & Company Ltd, 1999.
2. Khan M K. and Jain P K, *Financial Management, 3rd* edition, Tata McGraw-Hill, 1999.
3. Van Horne J C, *Financial management and Policy*, 12th edition, PHI, 2002.
4. Khan M K, and Jain R K, *Management Accounting*, 3rd edition, Tata McGraw-Hill, 1999.

SEMESTER III

MCA 301: DATA BASE MANAGEMENT SYSTEMS

UNIT I: Introduction, Database- System Application – Purpose of Database Systems – View of Data – Database Languages – Relational Databases – Database Design – Object – based and Analysis – Database Architecture. Entity – Relationship mode: Structure of Relational Databases - . Relational Algebra Operations – Modification of the Database. SQL : Data Definition- Structure of SQL Queries- Set Operations- Aggregate Functions- Nested Sub queries- Complex Queries – SQL Data Types and Schemas- Integrity Constraints- Authorization- Embedded SQL- Dynamic SQL

UNIT II: The Entity – Relationship Model-Constraints-Entity-Relationship Diagrams, Design Issue-Weak Entity Sets-Database Design for Banking Enterprise- The Unified a Modeling Temporal Data- User Interfaces and Tools- Triggers-Authorization in SQL.

UNIT III: OBJECT- DATABASES AND XML: Complex Data Type-Structured Types and inheritance in SQL-Table Inheritance-Array and Multiset Types in SQL-Object-Identity and Reference Types in SQL-Implementing O-R Features-Persistent Programming Languages – Object-Oriented versus Object-Relational.

UNIT IV: Query Processing: Measures of Query Cost-Selection Operation-Sorting-Joint Operation-Evaluation of Expressions-Query Optimization: Transformation of Relational Expressions-Estimating Statistics of Expression Results-Choice of Evaluation Plans.

UNIT V: Transactions: Transaction concept, Transaction State-Implementation of Atomicity and Durability-Concurrent Executions-Serializability-Recoverability-Implementation of Isolation-Testing for Serializability, Concurrency Control: Lock Based Protocols-Timestamp-Based Protocols-Validation-Based Protocols-Multiple Granularity-Multiversion Schemes-Deadlock handling-Insert and Delete Operations-Weak Levels of Consistency-Concurrency in Index Structures, Recovery System: Failure Classification-Storage Structure-Recovery and Atomicity-Log-Based Recovery-Recovery with Concurrent Transactions-Buffer Management-Failure with lose of Nonvolatile Storage-Advanced Recovery Techniques-Remote Backup Systems.

Text Book:

1. Silberschatz A. Korth H F, and Sudarsan S, *Database System Concepts*, 5th edition, McGraw-Hill 2002. (Chapters 1to 4, 6 to 10 and 13 to 17)

Reference Books:

1. Date C J, *An Introduciton to Database Systems, 7th edition, Pearson Educaiton, 2000.*
2. Elmasri R, and Navathe S B, *Fundamentals of Database Systems,* 4th edition, Pearson Education, 2004.
3. Ramakrishnan R, and Gehrke J, *Database Management Systems, 2nd edition, McGraw-Hill, 2000.*
4. *Mannino M V, Database Application Development and Design,* McGraw-Hill, 2001.

MCA 302: DATA COMMUNICAITON AND COMPUTER NETWORKS

UNIT – I : Introduction, Network models – Internet model, OSI model Physical Layer: Signails – Analog, Digital, Digital Transmission – Coding, Sampling, Analog Transmission – Modulation of digital and analog signal, Multiplexing – FDM, WDM, TDM, Transmission Media – cable, wireless, Circuit switching and Telephone network, DSL Technology, Cable modern, SONET.

UNIT – II : Data Link Layer: Error detection and correction, Data link control and Protocols – Stop and wait, Go-back-n, Selective repeat, HDLC, Point to point access, Channelizaiton, LANS – Traditional Ethernet, Fast Ethernet, Gigabit Ethernet, Wireless LAN's – IEEE 802.11, Blue tooth, Connecting LANs – Connecting devices, Backbone networks, Virtual LANS, Cellular telephony, Satelite networks, Virtual circuit switching, Frame relay, ATM.

UNIT – III: Network Layer: Inter-networks, Addressing, Routing, Network layer Protocols – ARP, IP, JCMP. IPV6, Routing – Introduction, Unicast routing, Protocols – RIP, OSPF, BGP, Multicast Routing, Protocols – DVMRP, MOSPF, CBT, PIM.

UNIT – IV : Transport Layer: Process-to-Process Delivery, UDP, TCP, Data traffic, Congestion and Control, Quality of service (QOS) and techniques to improve QOS, Integrated services, QOS in Switched networks. Security: Introduction. Symmetric-key cryptography, Public key cryptography, Message security, Digital signature, User authentication, Key management, Kerberos, IP level security: IPSEC, Transport layer security, Application layer security: PGP, Firewalls, Virtual private networks.

UNIT – V: Application Layer: Client-Server model, Socket interface Introduction to DNS, Distribution of name space, DNS in the Internet, Resolution, DDNS, Electronic mail, SMTP, File Transfer, FTP, HTTP, World Wide web

Text Books:

1. Forouzan B A, *Data Communications and Networking*, 4th edition, Tata McGraw-Hill, 2007.
2. Tanenbaum A S, *Computer Networks*, 4th edition, Pearson Education, 2003.

Reference Books:

1. Stallings W, *Data and Computer Communications*, 7th edition, Pearson Education, 2004.
2. Gallo M A, and Hancock W M, *Computer Communications and Networking Technologies*, Thomson Brooks/Cole, 2002.
3. Comer D E, *Computer Networks – and Internets with Internet Applications*, 4th edition, Pearson Education, 2004.
4. Kutose J F, and Ross K W, *Computer Networking – A Top-down Approach Fealuring the Internet*, *Pearson Education*, *2001.*
5. *Tomasi W*, *Introduction to Data Communications and Networking*, Pearson Education, 2004.

MCA 303: SOFTWARE ENGINEERING

UNIT – I: Software Engineering – Introduction, Generic view of process, models, an agile view of process. Software Engineering practice – Software Engineering, communication, planning, modeling, construction practices and deployment.

UNIT-II: System Engineering – Computer-based systems, the system engineering Hierarchy, business process engineering, product engineering and system modeling. Building the analysis model – Requirement analysis, modeling approaches, data modeling. Behavioral model. The web engineering process, analysis models for web apps.

UNIT –III: Design Engineering-Design process and quality, design concepts the design model, and pattern-used software design. Architectural design – Software architecture, data design, architectural styles and patterns, architectural design mapping data flow into a software architecture. Component-level design-component, designing class-based components, conducting component-level design, object-constraint language, and design conventional components. Interface design – Design steps, web apps design issues and architecture design.

UNIT –IV: Testing strategies – Strategies and issues, testing strategies for and object-oriented software. Validation testing and system testing. Software testing tactics – Fundamentals, black-box and white-box testing white-box testing basis path testing. Control structure testing, black-box testing, object-oriented testing methods. Testing methods applicable at the class level inter class testing case design. Testing for specialized environments, architectures and applications, web application testing – concepts, testing process, component level testing.

UNIT – V: Product metrics – Software quality, framework, metrics for analysis model design model, source case and testing. Managing software projects – The management spectrum, the W^5 HH principle, metrics in process, software measurement, metrics for software quality integrating metrics within the software process. Estimation – observations, decomposition techniques, empirical models, estimation for object-oriented projects other estimation techniques, project scheduling, risk management, quality management, reengineering, change management, component-based development.

TEXT BOOK:

1. Roger, S, Pressman, Software Engineering, A Practitioner's Approach, Six Edition, McGraw-Hill, International Edition, 2005.

REFERENCE BOOKS:

1. James F Peters, Software Engineering, John Wiley
2. Ian Sommerville, Software Engineering, Pearson Education, 6th Edition.
3. Waruan S Jawadekar, Software Engineering, Tata McGraw Hill, 2004.
4. Carlo Ghezzi, Mehdi Jazayeri, Dino Manrioli, Fundamentals of Software Engineering, PHI, 2001
5. Pankaj Jalote, An Integrated approach to Software Engineering Narosa.

MCA 304: DESIGN AND ANALYSIS OF ALGORITHMS

UNIT I: Divide – and-Conquer and Greedy Methods.

UNIT II: Dynamic Programming; Basic Traversal and Search Technique.

UNIT III: Backtracking; and Branch-and Bound Technique.

UNIT IV: Lower bound Theory; NP-Hard and NP-Complete Problems

UNIT V: Mesh and Hypercube Algorithms.

TEXT BOOKS:

1. Eills Horowliz, Sartaj sahni and Sanguthevar Rajasekaran. Computer Algorithms Galgotia Publications, 1999.

REFERENCE BOOKS:

1. RCT Lec, SS Teang, RC Change and YT Tsai, Introduction to the Design and Analysis of Algorithms, McGraw-Hill 2005.
2. R. Jhonsonbaugh and Mschaefer, Algorithms, Pearson education 2004.
3. A. Levitin, Introduction to the Design and Analysis of Algorithms, Pearson Education 2005.
4. TH Coremen, CE Leiserson and RL Rivest, Introduction to Algorithms, PHI
5. G. Brassed and P. Bratley, Fundamentals of Algorithms, PHI.

MCA 305: TECHNICAL COMMUNICATION AND COMPUTER ETHICS

UNIT I: Phonetics and Spoken English, The Phonemes, The Syllable, Prosodic Features. The sounds of English – Voweis and Consonants, Word Accent, Features of Connected Speech, Pronunciation, spelling, Suggestions for improvement of Indian English. Effective Speaking – Oral Presentations. Listening Comprehension. Reading Comprehension.

UNIT II: Introduction to Technical Writing – Objective of technical writing Audience Recognition and Involvement, Preparation of Resume, Techniques for writing effective E-mail. Writing User Manuals, Writing Technical Reports and Summaries.

UNIT III: Introduction to Computer Ethics – Policy vacuum, Moral and Legal issues, Computer Ethics Professional Ethics – Characteristics of professions, Conflicting Responsibilities, Code of Ethics and Professional conduct. Philosophical Ethics – Ethical Relativism, Utilitarianism, Rights individual and Social Policy Ethics.

UNIT IV: Ethics Online – Hacking and Hacker Ethics computer crime Netiquetie. Privacy – Computers and Privacy issue. Proposals for better Privacy Protection property Rights in Computer Software – Current Legal Protection. Software Piracy, The Moral question.

UNIT V: Accountability – Buying and Selling Software – Accountability issues, Social Change, Democratic values in the Internet, Freedom of Speech, Future issues. The Rights and Responsibilities of Engineers – Professional Responsibilities, Ethics and Rights Ethics in Research and Experimentation.

Text Books:

1. Gerson S.J., and Gerson S.M. Technical Writing – Process and product, 3rd edition, Pearson Education Asia, 2001.
2. Johnson D.G. Computer Ethics 3rd edition, Pearson Education Asia. 2001.
3. Bansal R.K. and Harrison J.B. Spoken English 2nd Edition, Orient Longman, 1994.
4. Fleddermann C.B. Engineering Ethics 2nd edition, Pearson Education 2004.

References Books:

1. Krishna Mohan, and Meenakshi Raman, Effective English Communciation, Tata McGray Hill, 2000.
2. Martin M.W. and Schinzunger R. Ethics in Engineering 3rd Edition Tata Mc-Gray-Hill, 1996.
3. Division of Humanities and Social Sciences, Anna University, English for Engineer and Technologists, Vols, 1and 2nd edition, Orient Longman, 2002.
4. NHT Ethics and Security Management on the Web, Prentice – Hall of India 2003.
5. Rutherford A.J. Basic Communication Skills for Technology 2nd edition Pearson Education Asia, 2001.
6. jayanthi Dakshina Murthy, Contemporary English Grammar, Book Palave, Delhi, 1998.
7. Horny A.S Parnwell E.C, An English Reader's Dictionary, Oxford University Press, 2001.
8. Roget M.R and Roger J.L Roget's Thesaurus of Synonyms & Antonyms,W.RGoyal Publishers and Distributors, Delhi, 2004.
9. Nurnberg M, and Rosenblum M, Howto Bulid a Better Vocabulary, Warner Books, 1989.
10. Paul V.Anderwon, Techical Communication, Thomson,5th edition,2004.

SEMESTER IV

MCA 401: PRODUCTION AND MARKETING MANAGEMENT

UNIT I : Production Management – Production Planning and control – Maintenance Management.

UNIT II: Quality Control –Inventory Control –Purchasing

UNIT III: Nature and Functions of Marketing –Marketing environment – Market Segmentation

UNIT IV: Product Strategy –Pricing objectives and policies

UNIT –V: Promotion strategies –Advertising and sales promotion –Personal selling –Publicity –Marketing research – Place – Distri8bution channels.

TEXT BOOK:

1. Agarwal R D, "Organisatiion and Management, Tata McGraw-Hill publishing Company Linited, New Delhi
2. panneerselvam R.D."organization and Management Prentice –Hall of India, 2003.
3. Rajan Saxena, Marketing Management , 2nd Edition, Tata Mc Graw –Hill, 2004.

REFERENCE BOOKS:

1. Adam Jr E.E Ebert R,J Production and Operations Management: Concept, Models and Behavior, 5th edition , Pearson Education,2003.
2. Chary S.N Production and Operations Managements, 2nd edition ,Tata McGraw – Hill,2003.
3. Krajewski L.J and Ritzman L.P Operation Management Strategy and Analysis, 5th edition, Addison Wesley, 2000.
4. Nair N.G.Production and Operations Management , Tata Mc Graw –Hill, 4th reprint,2000
5. Kotler P, Marketing, Management, 11th Edition Pearson, 2003.
6. Agarwal PK Marketing Management, 3rd Edition ,Pragati Prakasanm Meerut, 2003.
7. Stanton WJ et al., Fundamentals of Marketing,10th Edition, McGraw –Hill. 1994.
8. S.A. Sherlehar, Marketing Management, 13th reprint, Himalaya publishing, 2000, 2007

MCA 402: DATA WAREHOUSING AND DATAMINING

4.2 DATA WAREHOUSING AND MINING

Unit – I: Introduction to Data Warehouse. Data Warehouse Architecture: System Processes, Process Architecture, Hardware Architecture.

UNIT – II: Data Warehouse Design: Data Warehouse Schema, Partitioning strategy , Aggregations, Data Marting, Meta data, System & Process managers. Introduction to Data Mining and related topics.

UNIT-III: Data Mining Techniques:- Statistics, Similarity Measures, Decision Trees, Neural Networks, Genetic Algorithms.
Algorithms for Classification:- Statistical–based, Distance-based, Decision Tree- based, NN – based and Rule based.

UNIT – IV: Algorithms for Clustering:- Hierarchical Algorithms, Partitional Algorithms, Clustering large Databases, Clustering with categorical Attributes.

UNIT – V:
Associate Rules:- Basic Algorithms, Parallel and Distributed algorithms, Comparative study, Incremental Rules, Advanced Association Rule Technique, Metrics for Quality of a Rule. Web Mining:- Web Content mining, Structure Mining, Usage Mining

Text Books:

1. Data Warehousing in the real world by Sam Anahory & Murray, Pearson Education publishers.
2. Data Mining – Introductory & Advanced topics by Margaret H. Dunham,. Pearson Education publishers.

REFERENCE BOOKS:

1. Data Mining – Concepts and Techniques by Han and Kamber, 2001, Morgan Kaufmann Publishers
2. Oracle 8i – Data Warehousing by Cohen, Abbey, Taub, Tata McGraw Hill

MCA 403: WEB PROGRAMMING

UNIT – I: Introduction to Internet – Microsoft Internet Explorer – Introduction XHTML Part I and Part II (Chapters 1, 2, 4, 5)

UNIT – II: Java Script: Introduction to Scripting - Control Structures - Functions – Arrays Objects - Object model collections – Events (Chapters 7 to 10, 11, 14)

UNIT – III: Dynamic HTML: Filters and Transitions – Data Binding with Tabular Data – Introduction to XML features – DTD – XML Schemas.

UNIT – IV: Introduction to PHP – Control Structures – Arrays – Functions – Database Connectivity - Web Servers (IIS, and Apache) (Chapters 15, 16, 20, 21

UNIT – V: Advanced Java – Java Database Connectivity (JDBC) – Swing Framework - Servlets Technology (Chapters 8, 9, 10, 14, of Ivan Bayross)

TEXT BOOK:

1. Deitel, Deitel and Goldberg Internet & World Wide Wide how to program"by End. Pearson Education
2. Ivan Bayross, Webenavled commercial Application Development in Java 2.0 BPB.

REFERENCE BOOKS:

1. Raj Kamal Internet and web Technologies, Tata Mc Graw Hill, 2002.
2. Chirs Bates, Web Programming, John Wiley, 2nd Edition
3. E.V.Kumar and S.V.Subramanyam, Web Services. Tata Mc Graw Hill, 2004.

ELECTIVES

MCA 404 A: USER INTERFACE DESIGN

Unit – I: Human factors of interactive software goals of system engineering and user-interface design, motivations, accommodation of human diversity goal for out profession. Theories, principles, and guidelines – High-level theories, object-action interface model, Principle 1.2 and 3, guide links for data display and data entry, balance of automation and human control. Managing design processes – Usability, design pillars, development methodologies, ethnographic observation, usability testing, surveys, and continuing assessments – expert reviews, usability testing and laboratories, surveys acceptance tests, evaluation during active use, and controlled psychologically oriented experiments.

Unit – II: Software tolls – Specification methods, interface- building tools and evaluation and critiquing tools. Direct manipulation and virtnal environments – examples, explanations, programming, visual, thinking and icons Home automation, remote direct manipulation, visual environments. Menu selection, form fillin, and dialong boxes – Task – related organizations item presentation sequence, response time and display rate, fact movement through menus, menu layout, form fill in, and dialog boxes. Command and natural languages – Functionality to support users tasks, command – organization strategies, the benefits of structure, naming and abbreviations, command menus, natural language in computing.

Unit – III: Interaction Devices – Keyboards and function keys, pointing devices, speech recognition digitization and generation. Image and video displays, printers. Response time and display rate-Theoretical foundations, expectations and attitudes, user productivity, variability. Presentation styles: Balancing function and fashion – error messages, No anthropomorphic design, display design, color, Printed manuals, Online Help and tutorials – Reading from paper versus form displays, preparation of printed manuals, and preparation of online facilities.

Unit – IV: Multiple – Window strategies – Individual – Window design, multiple-window design, Coordinator by tightly – coupled windows. Image browsing and tightly –coupled windows, personal role management and elastic windows. Computer-supported cooperative work-goals of cooperation, Asynchronous Interaction: Different time and place, Synchronous Distributed: Different place, same time, face to face: same place, same time, Applying CSCW to Edition, Information search and visualization – Database

Query and phrase search in textual documents, multimedia document searches, information visualization. Advanced filtering. Hypermedia and the world wide web (www). Genres and goals and designers, users and their tasks, object-action interface model for web site design.

Unit – V: Introduction to Dot Net technology VB.Net Language – Control structures – GUI controls – Database GUI Controls and its connectivity to databases – ASP.Net Fundamentals and Web pages Interface designing.

TEXT BOOK:

1. Ben Shriderman, Designing the user Interface, strategies for effective human-Computer introduction Third Edition, Pearson Education, 2004, (For units I, II, III and IV).
2. Beginning .NET 2.0 by wrox publications (For Unit V).

Reference Books:

1. Hix, Deborah and Hartgon, H.RR X; Developing use Interfaces, John Wiley, 1993.
2. Galitz, Wilbert O., It's Time to Clear Your Windows: Designing GUIs that Work, John Wiley and Sons, New York(1994)
3. ASP.NET 2.0 Black Book , Dreamtech publications.
4. VB.NET 2.0 Black Book, Dreamtech publications.

MCA 404 B: PRINCIPLES OF PROGRAMMING LANGUAGES

UNIT I: Introduction t programming Language(PL), Abstractions In Programming languages, Computational paradigms, Languages definition, Language transiation, Language design. History and evolunon of PLs, Language design principles and C++: A Case study.

Lexical structure of PLs. Conte Xt-free grammars and BNFs, parse trees and Abstract syntax trees, Ambiguity, Associatively, and Precedence, EBNFs and Syntax diagrams, Parsing techniques and tools.

UNIT II: Basic Semantics: Attributes, Binding, and semantic functions, Decelarations. Blocks, and Scope, Symbol table, Name resolution and Overloading allocation. Life times and Environment, Variables and Constants, Aliases, Dangling references, Garbage Collection. Data Types: Simple types: Simple types, Type checking, Type conversion, Poiymorphic type checking, Explicit polymorphism.

UNIT III: Expressions, Statement level control structures, Exception handling.

Procedure definition and it semantics, parameter passing mechanisma, Environment, Activations and Allocation. Dynamic memory management.

Algebraic specification of Abstract data types, ADT Mechanism and modules, separate computation in C, C++ Namespaces and java packages. Ada packages, Modules in ML, Problems with ADT mechanisms.

UNIT IV: Object Oriented Programming: Software Reuse and Independence, Objects, Classes and Methods – Inheritance, Dynamic binding, OOP Concepts with respect to C++, Smalltalk, Design and implementation issues in Object Oriented Languages.

Functional Programming: Programs as functions, Functional programming in imperative languages, Overview of Scheme, ML, and Haskell.

UNIT V: Logic Programming: Logic and logic programs, Horn classes, Resolution and Unification. Introduction to PROLOG, problems with logic programming, Constraint logic programming. Parallelism in Non-imperative languages. Introduction to Operational, Denotational and Axiomatic semantics.

Text Books:

1. Louden K C, Programming Languages – Principles and Practice, 2nd edition, Thomson Brooks/Cole, 2005
2. Sebesta R W, Concepts of Programming Languages, 4th edition, Pearson Education, 1999.

Reference Books:

1.Sethi R, programming Languages, 2nd edition, Pearson Education, 1996

2. Roosta S.H.foundations of Programming Languages, 2nd edition, Pearson Edition ,1996.

3. Pratt T.W, and Zelkowitz MV programming Languages - Design and Implementation, 4th edition, PHI,2001.

4.Ghezzi C, and jazayeri M, programming Language concepts, 3rd edition john Wiley, 1997.

5.Allen B.Tucker and Robert E.Noonan, Programming Languages – Principales and paradigms, 2nd Edition, Rata McGraw-Hill Edition,2007.

MCA 404C: ARTIFICIAL INTELLIGENCE

UNIT – I: Introduction about Artificial Intelligence (AI): Problem and search – what is AI technique. Criteria for success; problems, problem space and search – Defining the problem as a state space search, Production systems, Problem characteristics. Production system characteristics.

UNIT- II: Heuristic search techniques; Knowledge representation – Knowledge representation issues, Using predicate logic, Resolution principle; Representing knowledge using rules – Forward Vs backward reasoning Symbolic reasoning under uncertainty – Non monotonic reasoning. Statistical reasoning.

UNIT – III: Different knowledge representation schemes – Semantic nets. Marvun Minsjy's frames, Conceptual dependency theory, Scripts; Understanding – what is understanding? What makes understanding hard? Understanding as constraint satisfaction Waltz's algorithm.

UNIT – IV: Natural language processing – Overview of linguistics. Grammars and languages, Basic parsing techniques, Transitional networks, Semantic analysis and representation structures, Natural language generation, Natural language systems; General concepts in knowledge acquisition - Types of learning, General learning model, Performance measures; Early work in machine learning – Perceptions, Genetic algorithms, Intelligent editors.

UNIT – V: Expert system architecture – Characteristic features of expert systems, history, Applications, Rule based system architecture, Expert system shells; Pattern recognition – The recognition and classification process, Learning classification patterns, Recognizing and understanding speech; Perception and Action; Features of AI Programming language PROLOG.

Text Books:

1. Elaine Rich and Kevin Knight " Artificial Intelligence", Tata Mc Graw – Hill, 2nd Edn, 2002
2. Dan W.Patterson,"Introduction to Artificial Intelligence & Expert Systems". PHI,1999.

Reference Books:

1. Swart Russell and Peter Norving, Artificiao Intelligence, Pearson Education.2nd Edition.
2. Patrick Henry Winston, "Artificial Intelligence" 3rd Edn,PHI,1999.
3. George F.Luger,"Artificial Intelligence – 3structures and strategies for complex Problem solving" Pearson Education, 4th Edn,2001.
4. Nils Jenison, Artificial Intelligence,Morgan Kaufmann,2000.

MCA 404 D: COMPUTER SYSTEMS PERFORMANCE EVALUATION

UNIT I : Introduction – Computer Data processing Hardware Architecture – Fundamental Concepts and Performance Measures – general Measurement Principles.

UNIT II: Probability –Stochastic Processes –Queuing Theory – Simulation Analysis – Petri Nets

UNIT – III: hardware Test beds Instrumentation, Measurement, Data Extraction, and Analysis – System Performance Evaluation Tool Selection and Use – Analysis of Computer Architectures.

UNIT – IV: Analysis of Operating System Components – Database system performance Analysis

UNIT – V: Analysis of Computer New works Components.

TEXT BOOK

1. Paul J.Fortier and Howard E.Michel, Computer Systems Performance Evaluation and Prediction.Digial Press 2004/05 (published by Elsevier India).

REFERENCE BOOKS

1. K.Kant, Introduction to Computer System Perforation Evaluation, Mc Graw- Hill,1992.
2. German, R.Performance Analysis of Communication Systems, John Wiley,2000.
3. Haring, G.C.Lmdemann and M.Reiso, Performance Evaluation, Lecture notes in Computer ScienceSpringervaley,2000
4. Lilja,D. Measuring Computer Performance, Cambridge University Press,2000
5. Lindemann, C.Performance Modeling with Determining and Stockastic Petri Nets, John Wiley, 1998.
6. Peterson J.PetriNet, Theory and Modeling of Systems, Prentice Hall, 1981.

MCA 405 A: E-COMMERCE

UNIT – I: Electronic Commerce: Electronic Commerce Framework; Electronic Commerce and Media Convergence; The Anatomy of E-Commerce Application; Electronic Commerce Organization Applications- The Network Infrastructure for Electronic Commerce: Market Forces Influencing the I- Way; Components of the I Way; Network Access Equipment; the Last Mlle: Local Roads and Access Ramps; Global Information Distribution: Networks: Public Policy Issues Shaping the I-Way.

UNIT – II: The Internet as a Network Infrastructure: The Internet Terminology; Chronological History of the Internet NSFNET: Architecture and Components: Globalization of the Academic Internet; Internet Governance: The Internet Society –An Overview of Internet Applications – Electronic Commerce; World Wide Web(WWW) as the Architecture: Web Background: Hypertext Publishing; Technology behind the Web: Security and the Web- Consumer-Oriented Electronic Commerce: Oriented Applications; Mercantile Process Models Mercantile Models from the Consumer's Perspective; Mercantile Models from the Merchant's Perspective.

UNIT – III: Electronic Payment Systems: Types of Electronic Payment Systems; Smart Cards and Electronic Payment Systems; Credit Card-Based Electronic Payment systems: Risk and Electronic Payment Systems Designing Electronic Payment systems – Inter organizational Commerce and EDI: Legal, security, and Privacy Issues:EDI and Electronic Commerce – EDI Implementation, MIME, and Value- Added Networks : Standardization and EDI;EDI Software Implementation: EDI Envelope for Message Transport: Value- Added Networks (VANs); Internet – Based EDI.

UNIT – IV: Intraorganization Electronic Commerce: Internal Information System: Macro forces and Internal Commerce; Work-Flow Automation and Coordination; Customization and Internal Commerce; Supply Chain Management (SCM) – The Corporate Digital Library: Dimensions of Internal Electronic Commerce Systems; Making a Business Case for a Document Library; Types of Digital Document Library; Types of Digital Documents; Issues behind Document Infrastructure; Corporate Data Warehouses.

UNIT - V: Advertising and Marketing on the Internet: The New Age of Information–Based Marketing; Advertising on the Internet; Charting the On-Line Marketing Process; Market Research – Consumer Search and Resource Discovery; Search and Resource Discovery Paradigms; Information Search and Retrieval; Electronic Commerce Catalogs or Directories ; Information Filtering; Consumer – Data Interface; Emerging Tools – On Demand Education and Digital Copyrights; Computer- Based Education and Training; Technological Components of Education ON-Demand; digital Copyrights and Electronic Commerce.

TEXT BOOK:

1. Ravi Kalakota and Andrew B.Whinston.Frontiers of Electronic Commerce, Pearson Education.

REFERENCE BOOKS:

1. Henry Chan, Raymond Lee. Tharan Dillan and E.Chany,E-Commerce, Wiley,2003.
2. Danjel Minoli and Emuna Mimoli, Web Commrece Technology, Tata MicGraw Hill, 1999.
3. Marilyn Greenstein and Todd M Feinman, aElectronic Commerce, TaraMcGraw Hill Edition.
4. Craig Patridge, Gigaibit Networking, Addison – Wesley,1994

MCA 405 B: NETWORK SECURITY

UNIT I : Cryptography – Terminology, Conventional Encryption Model, Steganography, Classical Encryption Techniques, DES Data Encryption Standard, Block Cipher Design principles and Modes of Operation.

UNIT – II: Conventional Encryption Algorithms: Triples DES, International Data Encryption Algorithm, Blowfish, RC5, Characteristics of advanced symmetric Block Ciphers, Confidentiality using Conventional Encryption.

UNIT – III: Public-Key Cryptography, Introduction to Number Theory: Prime Numbers, Modular Arithmetic, Euler's Theorem, Primary and Factorization, Discrete Logarithms; Message Authentication and Hash Functions – Hash and MAC algorithms.

UNIT- IV: Digital Signatures and authentication Protocols, Digital Signature Standard, Network Security Practice, Authentication Applications.

UNIT – V: Basic overview of Electronic Mail Security: pretty Good Privacy's/MIME: IP Security, Web Security – Intruders, Viruses and Worms –Firewalls.

TEXT BOOK

1. "Cryptography and Network Security" by John Wiley, Edn,.2001

REFERENCE BOOK:

1. Bruce Schneier, Applied Cryptography, John Wiley, Second Edn,2001.
2. Charke Kaufman, Rodia Perlman and Mike Speciner, Network Security
3. R.Bragg, Markphodes-ousley, Keith Staasibers, Network security, Tata McGraw Hill.2004
4. Cheswick, Wand Bellovin,S.Fire walls and Internetr Security,Addison-Wisley,1994.
5. Pavies, and Piece WSecurity for ComputerNetwork.Newyork.Willey,1989.

MCA 405 C: ADVANCED COMPUTER ARCHITECTURE

UNIT – I: Introduction: Need for high speed computing, History computers, features of parallel computers – Solving Problem in Parallel: Utilizing temporal and data parallel processing with specialized processors, Inter task dependency – Instruction Level Parallel Processing: Pipeline of Processing elements, Delays in pipeline execution, Difficulties in pipelining, Superscalar processors, Examples – Power PC, Pentium,IA-64.

UNIT – II: Structure Parallel Computers: A generalized structure of a parallel computer, Classification of parallel computers, Vector computers, Example –Cray T90,Array processors, Systolic array processors, Shared memory parallel computers, Internet connection network ,Distributed shared ;memory parallel computers, Examples –Origin2000 ,Message passing parallel computers, Example – IBMSSP -2 Cluster of workstations, Example –CDACPARAM 10000.

UNIT –III: Parallel Algorithms: Models of computation, Analysis of parallel algorithms, Prefix computation, sorting, Searchi9ng –Parallel Programming: Message passing programming – Shared memory programming, Data parallel programming.

UNIT –IV: Compiler Transformations for Parallel Computers: Issues in complier transformations, Target architectures, Dependence analysis, Transformations, Fine-grained parallelism, Transformation framework, Optimizing compliers and their evaluation.

UNIT – V: Operating Systems for Parallel Computers :Resource management, Process management, Process synchronization, Inter –process communication, Memory management, Disk arrays –Performance Evaluation of Parallel Computers : Basics, Sources of parallel overhead, Speedup performance laws, Scalability metric, Performance measurement tools.

TEXT BOOK:

Rajaraman V.and Siva Ram Murthy C, "Parallel Computers –Architecture and Programming, PHI, 2000.

Reference Books:

1. Sima D.Fountain T.and Kacsuk P,"Adavance Computers –A design Space Approach" Pearson Education, 1997.
2. Hwang K,"Advanced Computer Architecture" Parallelism, Scalability, Programmability" TMH, 1993.
3. Rjaraman, V: Elements of Parallel Computing "1990.
4. SasikumarM Shikhare D, and Ravi Praksash P, "Introduction to Parallel Processing" PHI, 2000.
5. Hughes C, and Hughes T, "Parallel and Distributed Programming Using C++ "Pearson Education ,2004.
6. K, AParthasathy.Aramachandre and R.Purushothaman, Advanced Computer Artictecture, Thomson 2nd Edition.

MCA 405D: NETWORK MANAGEMENT SYSTEMS

UNIT I : Data communications and Network Management overview: Analogy of Telephone Network Management: Communications protocol and standards, case Histories of Networking, and Management ,Challenges of Information technology Managers, Network Management Goals, organization and functions , network and system Management, Network Management system Platform, current status and future of Network management, SNMPV1 Network Management: Organization and information and Information Models

UNIT II: Managed Network: case Histories and examples, the History of SNMP management SNMP Model. The Organisati0nm Models system Overview, The Information Model SNMPv1 Network

Management: Communication and Functional Models, the SNMP Communication Model, Functional Model

UNIT III: SNMP Management SNMPv2,:major changes in SNMPv2, SNMPv2 System Architecture, SNMPv2 Structure of Management Information, the SNMPv2 Network Management base, SNMPv2 protocol, Compatibility with SNNPv1. SNMP Management RMON what is remote Monitoring / RMON SMI and MIB, RMON1, RMON2 ATM remote monitoring. A case study of internet traffic using RMON.

UNIT IV: Telecommunication Management Network: why TMN ? Operations systems, TMN conceptual Model, TMN standards. TMN Architecture, TMN management service Architecture, an integrated view of TMN, implementation issues. Network Management Tools and Systems: Network management Tools. Network statistics Measurement systems. History of Enterprise Management Network Management systems, Commercial Network management systems, system Management systems, system Management, Enterprise Management Solutions.

UNIT V: Web-Based Management: NMS with web interface and web-based management, web interface to SNMP Management, Embedded web-based management , Desktop management interface, web-based Enterprise Management WBEM : Windows Management instrumentation, java management extension, Management of a storage area, future directions.

TEXT BOOK:

1. Mani Subramanian, Network Management, Principles and practice, Pearson Education

REFERENCES:

1. Morris, network Management, Pearson education.
2. Mark Burges, principles of network systems administration, Wiley dreamtech.
3. Paul, Distributed Network Management, Jhon wiley.

SEMESTER V

MCA 501: COMPUTER GRAPHICS

UNIT I: A survey of computer graphics, overview of graphics systems, output primitives

UNIT II: Attributes of output primitives, 2-d geometric transformations, 2-d viewing.

UNIT III: Structures and hierarchical modeling, graphical user interfaces and interactive input methods, 3-d concepts, 3-d object representations.

UNIT IV: 3-D Geometric and modeling transformations, 3d viewing, visible-surface detection methods.

UNIT V: Illumination models and surface – rendering methods, color models and color applications, computer animation.

Text Book:

1. Donald Hearn and M.Pauline Baker, Computer Graphics C Version, Second Edition, Pearson Educations.2005.

Reference Books:

1. Steven Harrington (1987), Computer Graphics – A Programming Approach, Second Edition, Mc Graw – Hill International Editions.
2. William M. Newman and Robert F. Sprowli (1979), Principles of Interactive Computer Graphics, second Edition, Mc Graw – Hill International Editions.
3. FS Hill Jr. Cmputer Graphics using Open Gl, second Editions, 2005.
4. J.D.Foley Wesley,199, second Edition in C.
5. R.C.S Asthana and N.K.Sinha "Computer Graphics for Scientists and Engineers" New Age International Limited, Second Revised Edition.

MCA 502: OBJECT ORIENTED SYSTEMS DEVELOPMENT

Unit I: OO system development – concepts: complexity the structure and design of complex systems. The object model: evolution, elements and applying the object model. Classes and objects: the nature and relationship of objects and classes, building quality classes and objects. Classification: importance, identification, abstractions and mechanisms. An overview of object – oriented systems development: object basics object oriented systems development life cycles.

Unit II: Methodology, Modeling, OO analysis and unified modeling language – oo methodologies; rum Baugh, the booch and Jacobson methodologies patterns, frameworks, and unified approach.

Unified modeling language : introduction to UML, UML diagrams and class diagram. Use –case diagram, UML dynamic modifying, model management and uml extensibility oo analysis : use – case drivers – object – oriented analysis process – identifying use cases : difficulty of oo analysis understanding the business, use case drivers oo analysis : the unifier approach, use case model and documentation. Object analysis : classification : theory, approaches for identifying classes, noun phrase, common class pattern, use case driver and classes, responsibility and collaborations. Identifying objects relationships, attributes and methods- super – sub class relationships, a – part – of relationships- aggregation, class responsibility : identifying attributes and methods, defining attributes by analysis use cases and other uml diagrams, object responsibility: methods and messages.

UNIT III: Philosophy, uml, the purpose, class visibility, refining attributor, designing methods and protocol, access layer: object storage and object interoperability : object store and persistence, review of dbms, database organization : access distributed data base and distribution object complexity, oo dbms, object-relation system, multimedia system. Designing access layerclasses. View layer : designing interfacing objects- and, designing view layer classes, macro and micro – level process, purpose, and prototyping.

UNIT IV : Software quality: squaquality assurance tests , strategies, impact & object orientation on testing text courses, text pian, continnous testing , users debugging principle, (case studies may be considered for better understanding).

UNIT V: Design patters introduction – definition, move, describing design pattern, the catalog and its organization. Solving design problem, select and use a design pattern, desingn pattern catalog internet, motivation, applicability, structure, participants, collaborations, consequences, implementation, sample code, known use and related panerns of abstract factory, builder, factory method, prototype singleton, adapter, composite, decorator, observer, strategy and template method.

Text Books:

1. Grady Booch, Object oriented Analysis and Design with applications. Second Edition. Tenth Indian reprint -2003. Pearson Education (unit-1).
2. Alibahrami , Object – Oriented Systems Development. Tata Mc Graw Hill publishing company limited. International Edition, 1999(unit II, III,IV).
3. Erich, Gamma, Richard Item, johnsonjohn vlissidy, design and patterns – elements of reusable object – oriented software, eleventh Indian print. Pearson education 2003 (unit V).

Reference Books:

1. Simon Bennett, steve Mcrobb and Ray farmer object- oriented system analysis and design using uml, second edition, tata mcgraw-hill.
2. Atul kahate, oo analysis and design, tata mcgraw hill,2004.
3. Mark priestiey, practical oo design with uml, tata mcgraw hill second edition,2003.
4. Cay horseman, object oriented design and patterns, wiley.

MCA 503: SYSTEMS PROGRAMMING

UNIT I: background introduction, system software and machine architecture, sic, cisa, and rise architecture. Assembler: basic assembler functions, machine dependent and independent assembler features, assembler design options, and implementation examples.

UNIT II: loading and linkers basic loader junction, machine dependent and independent loader features, loader design options and implementation examples.

Macro processors, basic macro processor functions machines – independent macro processor features, macro processor design options, implementation examples.

UNIT III: compilers: basic compiler functions, machine dependent and independent compiler features, compiler design options and implementation examples. Other system software: dbms, text editors and interactive debugging systems.

UNIT IV: operating systems: types of os , os design options, environment of unix process. Device drivers; grand design, details, types of device drivers, gross anatomy of a device driver, general programming considerations.

UNIT V: character driver 1: a test date generator-design issues, drivers, decapitulation. Character driver 2: an a/d converter – design issues, driver. block drivers 1: a test data generator – design issues, driver. Block drivers 2: a ram disk driver – design issues, driver.

Text Books:

1. Leland 1.Beck, System Software: An Introduction to systems Programming: 3/e, Pearson Educations Asia,2003.
2. W. Richard stevens, advanced programming in the unix environment, international student edition Addison-wesley.1999.
3. george pa jari, writing unix drivers, Addison – Wesley,1991.

Reference Books:

1. Dhamdhere, System programming and operation Systems Book 2/E, Tata Mc Graw, Hill, 1999
2. Stephen J. Bigelow, Trouble shooting Maintenance and Repairing PCs, Tata Mc Graw Hill, Millennium Edition 2000
3. A.V. Aho, Ravi Sethi and J D Ullman , "compilers, Techniques and Tools", Addison Wesley, 1986.
4. Jhon J. Donovan, System Programming Tata Mc Graw Hill 2005.

ELECTIVES

MCA 504 A: ENTERPRISE RESOURCE PLANNING

UNIT–1: Business Functions, process and Data Requirements, Development of Enterprise Resource planning.

Unit - II: Marketing Information system and the Sales order process.

Unit – III: Production and Materials Management System.

Unit – IV: Accounting and Finance.

Unit – V: Enterprises Resources Planning and World Wide Web.

TEXT BOOK:

1. Ellen F. Monk, Bret J. Wanger, Concepts in Enterprise Resource Planning Thomson Course Technology, Second Edition 2007

REFERENCE BOOK:

1. Daniel E.O' Learny, Enterprise Resource Planning Systems: Systems, Lifecycle, Electronic Commerce, and Risk, Cambridge University press, UK 2000.

MCA 504 B: DECISION SUPPORT SYSTEMS

UNIT I: Introduction to decision support systems-human decision-making processes-Systems, information quality and models-types of decision support systems.

UNIT II: DSS architecture, Hardware and operating system platforms-DSS software tools – Building and implementing decision support systems.

UNIT III: Models in decision support systems-Mathematical models and optimization.

UNIT IV: Group decision support systems-export systems.

UNIT V: Data warehousing and executive information system fundamentals-data warehouse Database analyzing the contents of the data warehouse

TEXT BOOK:

1. Efrem G. Mallach, Decision support and data warehouse systems, tata McGraw-Hill, Edition 2002.

REFERENCE BOOKS:

2. Sam Aaahory and Dennis Murray, Data warehousing in the real world-A practical guide for Building Decision support Systems, Addison-Wesley
3. George M. Marakas, Decision support systems, Second Edition, PHI, 2003
4. Ef Raim turban and jay e. arunson Decision support system and Intelligent systems, Pearson Education, Decision support system and Intelligent systems, pearson Education, 6th Edition.

MCA 504 C: DISTRIBUTED SYSTEMS

UNIT-I: Introduction: Definition, goal, hard work, software concepts and the client-server model Communication: layered protocols, RPC, ROC, message – oriented communication, stream-oriented communication.

UNIT-II: Processes: Threads, clients, servers, code migration, software agents. Naming: Naming entities, locating mobile entities, rom array, unreformed entities. Synchronization: Clock synchronization, logical clocks, global state, election algorithms, Mutual exclusion, distributed Transactions.

UNIT-III: Consistency an Replication: Introduction, Data-Centric Consistency models, client-centric consistency models, distribution protocol, consistency protocols, examples. Fault Tolerance: Introduction, process Resistance, Reliable, client-server communication, reliable group communication distributed commit, recovery.

UNIT-IV: Security: Introduction, Secure channels, access control, security management, KERBEROS, SESAME, payment system. Distributed object-Based systems: CORBA, DECOM, GLOBE comparisons

UNIT-V: Distributed File systems: Sun network file system, the code file system, other distributed files, status, comparison of distributed file systems. Distributed document-Based systems: The www.LOTUSNOTES , and comparison. Disributed coordination- Based systems: Introduction to coordination model, TIB/RENDEZVOUS, JINI and comparision of TIB\RENDEZVOUS AND JINI.

TEXT BOOK:

1. Andrew S. Tanenbaum. Maarten Van Steen, Distributed Systems, Principles and Paradigms. Prentice hall of India, Private Limied, Indian Reprint-2002.

REFERENCE BOOK:

1. George coulouries, Jean Dollimore and Tim Kindberg, Distributed systems, Pearson Education

MCA 504 D: DISTRIBUTED OPERATING SYSTEMS

UNIT I: Architectures of Distributed Systems-Theoretical Foundations

UNIT II: Distributed Mutual Exclusion – Distributed Deadlock Detection.

UNIT III: Agreement Protocols – Distributed File Systems.

UNIT IV: Distributed Shared memory-Distributed Scheduling.

UNIT V: Recovery-Fault Tolerance.

TEXT BOOK: Mukesh Singhal and Niranjan Shivaratri, Advanced Concepts in Operating Systems, Tata Mcgraw-Hill, Edition 2001.

REFERENCES:

Elective 504E: MOBILE COMPUTING

Unit I: Wireless Communication Fundamentals

Introduction – Wireless transmission – Frequencies for radio transmission – Signals – Antennas – Signal Propagation – Multiplexing – Modulations – Spread spectrum – MAC – SDMA – FDMA – TDMA – CDMA – Cellular Wireless Networks.

Unit II: TELECOMMUNICATION SYSTEMS

GSM – System Architecture – Protocols – Connection Establishment – Frequency Allocation – Routing – Handover – Security - GPRS

Unit III: Wireless Networks

Wireless LAN – IEEE 802.11 Standards – Architecture – services – HIPERLAN – AdHoc Network – Blue Tooth.

Unit IV: Network Layer

Mobile IP – Dynamic Host Configuration Protocol – Routing – DSDV – DSR – AODV – ZRP – ODMR.

Unit V: Transport and Application Layers

TCP over Wireless Networks – Indirect TCP – Snooping TCP – Mobile TCP – Fast Retransmit / Fast Recovery – Transmission/Timeout Freezing – Selective Retransmission – Transaction Oriented TCP – WAP – WAP Architecture – WDP – WTLS – WTP – WSP – WML – WML Script – WAE – WTA.

Text Books:

1. Jochen Schiller, "Mobile Communications", Second Edition, Pearson Education, 2003.

2. William Stallings, "Wireless Communications and Networks", Second Edition, Prentice Hall of India / Pearson Education, 2004.

References:

1. Kaveh Pahlavan, Prasanth Krishnamoorthy, "Principles of Wireless Networks", Pearson Education, 2003.

2. Uwe Hansmann, Lothar Merk, Martin S. Nicklons and Thomas Stober, "Principles of Mobile Computing", Springer, New York, 2003.

3. C.K.Toh, "AdHoc Mobile Wireless Networks", Pearson Education, 2002

MCA 505 A: IMAGE PROCESSING

UNIT-I: What is Digital image Processing-The Origins of Digital Image Processing-Example Fields that use digital image processing- Fundamental Steps in Digital Image Process Components of an image processing system summary-Elements of Visual Perception- I and the Electromagnetic Spectrum-image Sensing and Acquisition-Image Sampling Quantization-Some Basic Relationships between Pixels-Linear and Nonlinear Operation.

UNIT-II: Background-Some Basic Gray level Transformations-Histogram Processing-Enhancer Using Arithmetic/ Logical Operations- Basis of spatial filters – smoothing spatial Filters – smoothing spatial filter sharpening spatial filters-Combining spatial Enhancement Methods. Color Fundamental color Models-pseudo color image processing – Basis of full-color image processing- Transformations smoothing and sharpening – color segmentation – noise in color image color image compression.

UNIT – III: Fundamentals – image compression Models – Elements of information theory – Error- Compression – image Compression Standards.

UNIT-IV: Detection of Discontinuities – Edge Linking and Boundary Detection – Threshold-Regarding based Segmentation- Segmentation by morphological watersheds-the Use of Motion Segmentation.

UNIT – V : Representation – Boundary Descriptors – Regional Descriptors – Use of Principal – Common for Description – Relational Descriptors – Scope and relevance Handwriting – Finger Print – 1 Other state – of the art Technologies.

TEXT BOOK:

1. Gonzalez and Woods, Digital Image Processing, Second Edition, Pearson Education.

REFERENCE BOOKS:

1. Introductory Computer Vision & Image Processing, Mc Graw Hill.
2. Ramesh Jani et al, Machine Vision, McGraw Hill.
3. B.Chandra, D.Dutta Majmlar, Digital Image Processing PHL
4. G.W.Awlock & R.Thomas, Applied Degital Image Processing, McGraw Hill.
5. Picks, Digital Image Processing, John Wiley.
6. M.Sonka, Image Processing Analysis & Machine Design, Thomson Learning.
7. Anil K Jain, Fundamentals of Digital Image Processing, Pearson Education, 2004.

MCA 505 B: MULTIMEDIA SYSTEMS

UNIT-I: Introduction to Multimedia: media and Data Streams: Medium Main Properties of Multimedia System-Multimedia-Traditional data streams Characteristics-Data streams Characteristics for continuous Media – Information Units-Sound/Audio: Basic Concepts-Computer Image Processing.

UNIT-II: Video and Animation: Basic Concepts-Television-Computer based Animation-Data Compression: Storage Space-Coding Requirements-Source, Entropy and Hybrid coding-some Basic Compression Techniques-JPEGH.261-MPEG_DVI.

UNIT-III: Optical storage media: Basic Technology-Video Disks and other WORMs Compact Disk Read Only Memory-CD-ROM Extended Architecture-Further CD-ROM Technologies-Computer Technology: Communication Architecture-Multimedia Workstation.

UNIT-IV: Multimedia Operating Systems: Real Time-Resource management-Process Management-File Systems-Additional Operating System issues-system Architecture.

UNIT-V: Multimedia Communication Systems: Application Subsystem – Transport Subsystem-Quality subsystem Quality of service and Resource Management-Database Systems: Multimedia Database Management System-Characteristics of MDBMS-Data Analysis – Data Structure*Operations on Data Integration in a Database Model.

Text Book: Ralf Steinmetz and Klara Nahrstedt, Multimedia: Computing, Communications and Applications, pearson Education Asia.

REFERENCE BOOKS:

Tay Vaughan, Multimedia Making it work, Tata Mc Graw-Hill, Edition, 2001

…. Jeffcoate, Multimedia in practice Technology and Application, Prentice Hall, 1995

John F. Koeel Buford, Multimedia systems, Addison Wesley, 1994.

Fred Halsall, Multimedia communications, Pearson Edition 2001.

Prabhat K Andleigh and Kiran Thatkar, Multimedia systems Design, PHI 2005.

MCA 505 C: REAL-TIME SYSTEMS

UNIT-I: Introduction-Issues in Real-time computing-structure of a Real-time system-Task classes. Characterizing Real-time systems and tasks; Introduction-Performance measures for Real-Time systems-Estimating programming run times.

UNIT-II: Task assignment and scheduling: Introduction-Real-time Scheduling algorithm, EDF algorithm-Allocating for precedence and Exclusion conditions-Using primary and alternative tasks-Utilization and balancing algorithm- A next fit algorithm for RM scheduling – A Bin-packing assignment algorithm for EDF mode changes-Fault tolerant scheduling.

UNIT-III: Programming Languages and tools: Introduction Languages characteristics-packages-Exception handling – Overioading and Generics-Multitasking – task scheduling – Timing specifications – Some experimental Languages – programming Environments. Real – Time Databases: Introduction – Basic definitions-Real Time Vs general Purpose databases-Main memory databases-Transaction properties Transaction aborts – concurrency control issues – a two phase approach to improve productivity – seriahzation consistency – databases for hard Real-time systems.

UNIT-IV: Real – time communication: introduction- network Topologies-protocols. Fauit-Tolerance techniques: Introduction- Fauit and Error containment- Redundancy-Data diversity-Reversal checks-Byzantine failures.

UNIT-V: Reliability Evaluation Techniques: Introduction-Obtaining parameter values – Reliability models for Hardware redundancy-software error models-Taking time into accent. Clock synchronization: Clocks-Nonfauit- Tolerant synchronization Algorithm-Impact of fault-Fault tolerant synchronization in Hardware Synchronization in software.

TEXT BOOK:

1. C.M. Krishna and kang G. shin, Real-Time systems, Mc Graw Hill International ditions.

REFERENCE BOOKS:

Shem Tor Live and Ashok K. Agarwal, Real-Time system Design, Mc Graw Hill publishing company.

KVKK Prasad, Embedded/Real-Time systems: Concepts, Design and Programming Wiley-Dream Tech Press.

phillip A Laplante, Real-Time systems Design and Analysis, PHI.

C. Siva Ram Murthy and G. Manimaran, Resource management in eal-Time Systems and Networks, PHI, 2005.

MCA 505 D: SOFTWARE TESTING

UNIT I: Building a software Testing strategy, software Test Design Techniques, software Testing tools and selection of Test Automation products.

UNIT II: Software Testing Life cycle and software testing process, testing Effort estimation and test planning, software test effort estimation technique.

UNIT III: Pre-Development testing: requirements and Design phase, Best practices in program phase: Unit Testing, System Testing and integration testing, case study on acceptance testing.

UNIT IV: Implementing and Effective Test Management Process, Building and Effective test organization, performance issues and optimization techniques.

UNIT V: Testing of web Based Applications, Testing of Embedded software systems, testing Applications for security, testing Metrics and Bench Marks.

TEXT BOOK: Renu Rajani and pradeep Oak,, software testing, tata Mc Graw Hill.

Elective 505 E : SOFTWARE PROJECT MANAGEMENT

Unit I:
Product: The evolving role of software-industry perspective – aging software plant software competitiveness. Soft – characteristics – components –application – crisis on the Horizon-Software myths. Process: Process-methods-tools-generic view of software Engineering – software process models-linear sequential model –proto typing model-RAD Model – incremental, spiral, component, assembly and concurrent development models.

Unit II:
Project Management concept: People – Product-Process-Project Software process and project metrics: Measures – Metrics and indicators-Software measurements-metrics for software quality-integrating metrics within the software process.

Unit III:
Software project planning: Planning objectives – software scope-resources software project estimation-Decomposition Techniques – Empirical estimation models-COCOMO model-automated estimation tools. Risk managements: software risks-risk identification-risk mitigation, monitoring and management –safety risks and hazards-RMMM plan.

Unit IV:
Project scheduling and tracking: Basic concepts-relation between people and effort defining task set for the software project-selecting software engineering task-refinement of major task-defining a task network-scheduling –project plan software quality assurance-quality concepts-software concepts -software reviews-formal technical review –Formal approaches to SQA-software reliability –SQA plan –the ISO 9000 quality standards.

Unit V:
Software configuration management: baselines – software configuration item – the SCM process identification of objects in software configuration – version control – change control configuration audit – status reporting – SCM standards.

Text Book:
1. Walker Royce, Software Project management: A unified framework, Pearson Education

References:
1. Pankaj Jalote., Software Project management in practice, Pearson Education
2. Kelkar, S.A., Software Project management: A concise study, PHI
3. Mike Cottorell and Bob Hughes, Software Project management –
4. Sommerville I, Software engineering - , Addison Wesley
5. Robert Futrell, Donald Shafer and Linda I Quality software project management, Person Education

Pressman, R.S., Software Engineering, McGraw Hill International

MCA 508: MINOR PROJECT WORK

Students shall be grouped into teams not exceeding three per team for pursuing Minor Project work. Each team shall identify a real-life problem pertaining to a Manufacturing / Service / Trading System and offer a solution in the form of a Computer – Based system.

The team should put m a combined effort of 360 student-hours (i.e, 3 students x 120 hours per student) and submit their combined report. However, the reports should reflect the contributions or individuals.

The students shall select appropriate:

Analysis and Design Methodologies for the development of Computer Based System. Operating system platform, programming Languages/ Front-End and Back-End Tools/ Packages for implementation.

The team shall follow the guidelines given below while preparing their project Report:

The report should be given a title and it should have correlation with the contents of the report.

Good quality A4 size papers shall be used of preparing the report and it shall be in the bound form.

There shall be a front page depicting the Title of the Project Report, Authors Names and other information in the suggested format.

The duly signed Certificate in the suggested format must be there and it shall follow the front page.

Acknowledgements, if any, shall follow the Certificate.

A list of contents shall be prepared denoting each chapter / section/sub-section with its number, caption and the beginning page number and of that chapter/ section/ subsection.

The report shall be divided into chapters and each chapter shall be assigned with a number and title.

Each chapter shall be further divided into sections and each section shall be assigned with a numbe and heading. For example, 3.1 refers to section 1 of chapter3.

Each section may be divided further into sub-sections and a number and sub-heading shall be given to each sub-section. For example, 3.2.1 refers to sub-section 1 of section 2 of chapter 3.

Each Figure shall be given a number and caption and it must be referred to in the text of the chapter. For example, figure 2.1 refers to figure 1 of chapter 2.

Each table shall be given a number and caption and it must be referred to in the text of the chapter. For example, Table 3.1 refers to table 1 of chapter3.

I any material, namely, text, figures, graphs, data or tables; is incorporated taking from the reported literature, namely, books monographs, articles published in Journal/ Magazines, or from any other source, the same shall be referred to following a style of reference. One style of reference. One style of reference may be as follows.

prepare the list of such references and sort the same on ascending order of the Author (s) and assign numbers. For example.

1. Daniel Minoli and Emma Minoli, web commerce Technology Handbook, Tata Mc-Grawhill, 1999.
2. Jahanian, F., and A.K.Mok, "Safety Analysis of Timing Properties of Real-Time systems" IEEE Trans. Software Engineering, vol. SE-12, no.9, September 1986, pp. 890-904.

At the end of the material taken from the repoted literatue, the appropriate number shall be given in a pair of brackets. For example, Commerce is the interchange of goods of services, especially on a large scale (1)

The list of references shall immediately succeed the last chapter.

The appendices, if any, shall follow the list of references.

MCA 509 : SEMINAR

1. Every student shall give two seminars of 30 minutes of duration each. The seminar topics should be outside the syllabus and from the emerging areas of computer Applications.
2. The student shall submit the seminar material in type written form to the teacher concerned at least two days in advance of seminar presentation date.
3. The student shall use LCD Projector for seminar presentation. He shall not use Black Board except for answering the questions after the seminar presentation, if any.

MCA 507P Software Lab 6

DSDW & Multimedia & ERP& Image Processing

Note :-(Use Questions from Appropriate Electives College chosen for 5th semester at least 15 exercises is compulsory)

Decision Support Systems and Data Warehouse

1. Given the following list of employees in a manufacturing company, develop a software to find solutions to the following queries

a. Sort the employees by department
b. Sort the employees by salary in an ascending order.
c. Sort the employees by department and sort the employees of each department by age in an ascending order
d. Calculate the average salary
e. Calculate the average salary of female employees
f. Calculate the average are in Department A
g. List the names of females who were hired after December 31,1995
h. Show the age distribution graphically(use a 5 –year grouping) as a pie chart
i. Compute the liner regression relationship for salary versus age for all employees \
j. Compute the relationship for females and independently. Is there a significant difference?

Name	Gender	Age	Date Hired	Dept.	Salary
Martin Dean	M	28	06.Jan.88	A	$22,000
Jane Hanson	F	35	15.Mar.96	D	$33,200
Daniel Smith	M	19	06.Dec.90	C	$18,500
Emily Brosmer	F	26	10.jan. 88	B	$27,000
Jessica Stone	F	45	26.May.83	A	$38.900
Tom Obudzinski	M	38	01.Dec.98	B	$29,800
KathleenBrosmer	F	32	18.Apr.92	B	$35,600
Lisa Gregory	F	48	03.Sept.91	C	$32,400
Timothy Parker	M	29	03.Aug.93	A	$21,200
Jessica Hibscher	F	53	30.July.94	D	$38,900
Adam Handel	M	62	29.Nov.97	A	$40,250
Melissa Black	F	42	01.Dec.89	B	$26,400
Ray Ernster	M	29	02.Dec.89	C	$23,200
Daniel Baim	M	38	26.Feb.88	C	$31,000
Amy Melnikov	F	45	30 Apr.86	A	$36,400
Adrienne Cam	F	30	15.June.86	A	$25,400
Steven Knowless	M	48	22.Oct.85	D	$33,400
Patricia Salisbury	F	56	26.Oct.85	B	$42,600
Matthew BroekhuizenM		44	01.Jan.88	C	$45,400
Sarah Parent	F	64	01.Jan.99	A	$38,200

2.. Design a DSS that helps in solving following queries. The demographics indicate family and gender makeup, income, education level, and other information for states, metropolitan statistical areas (MSAs), and counties. Such as data are available from various sources including books, disks, CD, ROMs, and the World Wide Web (see Internet Exercise). Take a real-world view of external but readily available data.

a. Load the state P1 data population table into a spreadsheet files (Excel if possible) and into a database file. How difficult was this? How could this have been made easier? Don't forget to delete the comments and president (if Present) at the top, . Print the table.

b. Using the state P1 population data, sort the data based on population size. What are the five most populated states and the five least populated states? Which five states have largest and smallest population densities? Which three states have the most people living on farms, and which state has the fewest lonely people> which file type (spreadsheet or database) did you use and why? What features made it easy to do these analyses? Generate reports

c. Load the state basic Table P6(household income) into a spreadsheet or database file. Which five states have the most people earning $100,000 or more per year? Which five states have the highest percentages of people earning $100,000 or more per year? Combine these data with data from table P1 to determine which five states have the most people per Square mile earning $100,000 or more per year? Which file type (spreadsheet or database) did you use and why? What features made it easy to do these analyses?

3. Design an expert system that helps in suggesting to select a good job when you are having more than one offer. Think that you are in job market .List the names of four or five companies that had offered you a job. write down all the factors that may influence your decision as to which job offer you will accept. Such factors may include geographic locations salary, benefits, taxes, school system and potential for carrier advancement.
Some of these factors may have sub criteria. For instance location may be subdivided into climate, urban concentration, cost of living and soon.

4. Design an expert choice software that suggest you in buying a new car.

5. Design a software to solve the traveling salesman problem:

6. Build an expert choice software to select next prime minister of India. Whom did you choose, did your solution match your expectation.

7. Design a DSS that helps you to invest 1 lakh rupees in share market. Analyze data of stocks for duration of minimum of 10 days in Daily News Papers (opening price, closing price on each day).

8.. Data on a university campus or college campus are stored in different locations for different purpose (the registrars office, the housing office or the individual departmental offices etc.
a. Design a Dataware house for above problem.

9. Design a DSS for a multinational Bank that helps the managers to view the reports regarding the performance of each branch and also helps them in making decisions

10. Design a DSS for comparing organizations and to give ranks for those organizations

Multimedia

11 Design and develop a software for Photo slideshow using Macromedia Flash.
12 Design and develop a software to show boat sailing in water using any Multimedia S/W

13.Design and develop a software for creating an advertisement using Layers, Motion Tween & Shape, tween in Macromedia flash.

14 Design and develop a software for importing an object from the library apply the zoom in effect and zoom out effect using Macromedia flash.
15 Design and develop a software for creating a Publishing Banner ads using Macromedia Flash.
16. Design and develop a software for creating a Quiz on C or Java objective questions.
17. Design and develop a software E- Harathi using Macromedia Flash.
18. Design and develop a software to design an Logo with audio effects using Macromedia Flash.
19. Design and develop a software an Interactive greeting card using Macromedia Flash.
20. Design and develop a software for a Website using Macromedia Flash.(Minimum of 6 pages).

Image Processing (use Java)

1. Design an image processing package allows the user to design 3 □□3 convolution filters. Design 3 □□3
filters to perform the following tasks:
(a) Blurring
(b) Edge detection of vertical edges
Choose one of the two filters (a) or (b) from the previous part. Explain how it works, using the
following image as an example (you may round off any calculated values to the nearest integer).

100	100	100	0	0	0
100	100	100	0	0	0
100	100	100	0	0	0
100	100	100	100	100	100
100	100	100	100	100	100
100	100	100	100	100	100

2. Design a software to store the image in , the Haar or Walsh-Hadamard encoded version

3. Design a software to implement Stegnography

4. Design a software to implement any 5 filters.

5. Design a software to implement JPEG encoder.

6. Design a software to show Image Morphing

7. Design a software to show Fourier transform of a wave in Java

8. Design a software to show Pyramid Blending for a sample Image.

9. Develop a software to display Histogram for a given sample data

10. Design and develop a software to show Image using Gaussian Pyramid in Java.

ERP

Any 5 Case studies and its implementation in ERP Package.

MCA 506P Software Lab-5

(System Programming & Computer Graphics Lab)

System Programming

1. Design and develop a software in Java to simulate ls command in Unix with options like –l,-t,-P,-R your program should be interactive to prompt options (use command line arguments.)
2. Design and develop a Software in Java to Simulate grep Command in Unix with options
   a) to print lines matching patterns in file b) Line number in file matching the pattern c)no. of times the pattern is present in file.
3. Design and develop a Software in Java Program to simulate menu driven program for commands
   a)Head b)Tail c)diff d)comm.

4. Design and develop a Software in Java to simulate a Pass-1 of an Assembler for sample ALP code.

5 Design and develop a Macro Preprocessor for a C Language in Java

6. Design and develop a Software in Java to perform Syntax and semantics checking in Compiler for Loop and If statements in C Program

7. Write Unix Shell script for a)Pipe your /etc/passwd file to awk, and print out the home directory of each user.
   b) Develop an interactive script for grep that asks for a word and a file name and then tells how many lines contain that word.

8. a)Write a Unix shell script that takes a command –line argument and reports on whether it is directory, a file, or something else.
   b)Write a Unix shell script that accepts one or more file name as arguments and converts all of them to uppercase, provided they exist in the current directory.
   c)Write a Unix shell script that determines the period for which a specified user is working on the system.

9. a)Write a Unix shell script that accepts a file name starting and ending line numbers as arguments and displays all the lines between the given line numbers.

   b)Write a Unix shell script that deletes all lines containing a specified word in one or more files supplied as arguments to

   c)Write a Unix shell script to perform the following string operations:

   i) To extract a sub-string from a given string. ii) To find the length of a given string.

10. Design a C program that takes one or more file or directory names as command line input and reports the following information on the file: (Note : Use stat/fstat system calls)
    i) File type ii)Number of links iii)Read, write and execute permissions iv)Time of last access

Computer Graphics

11. Design and develop software in Java to draw Ellipse using different algorithms
12. Design and develop software in Java to show 3 D Translations on Applet.
13. Design and develop software in Java to implement Cohen Sutherland Clipping Algorithm
14. Design and develop software in Java to show image in various Shading or blur using filters.
15. Design and develop software in Java to show Bezier curves.
16. Design and develop software in Java to display bar chart for a given student data in Array fill bars in chart using various filling algorithms.

17. Design and develop software in Java to Rotate the text by a given angle from a keyboard.
18. Design and develop software in Java to display a Wall Clock
19. Design and develop software in Java to display the text for given Font and Size from keyboard
20. Design and develop software in Java to graphically view the Solution for travelling sales man problem for a given data using Java 2D API

MCA 508 P

Minor Project

Note: - Students are instructed to develop the System by using any Object Oriented Programming Language with Oracle, MySQL, SqlServer as backend. Student should use Rational Rose Tool or any UML tools for OOA and OOD

Object Oriented Analysis (Design SRS)

Class Modeling

Purpose: Determine the classes, their attributes and their interrelationships.

Tool: Entity-Relationship Diagram

End Product: Class Model Diagram

Dynamic Modeling

Purpose: Determine the actions performed by/to each class or subclass.

Tool: Finite-State Diagram, Activitiy Diagrams

End Product: Dynamic Model Diagram

Functional Modeling

Purpose: Determine how the various parts of the product interact.

Tool: Data Flow Diagram

End Product: Functional Model Diagram

Object Oriented Design

System Design specification

Class Design

Component Design

Database Design

Interface Design

Test case Design

Object Oriented Implementation

Deployment Environment specification

Testing done on each module with sample input test data

Conclusions and Future Enhancements

Annexure User Manual

Screens

Bibliography and References used

SEMESTER VI

MCA 601: MAJOR PROJECT WORK

1. Each student shall pursue Major project work individually. Under no circumstances students shall be grouped into teams for pursuing Major Project work.
2. Each student shall identify a real-life problem pertaining to a Manufacturing / Service / Trading System and offer a solution in the form of a Computer-Based system.
3. The students shall select appropriate:
   i. Analysis and Design Methodologies for the development of Computer Based system.
   ii. Operating system platform, programming languages/Front – End and back – End Tools/ Packages for implementation.
   iii. Software Testing strategies and Technique for testing the software.
4. The student shall follow the guidelines given below while preparing the major project Report: their project Report:
   i. The report should be given a title and it should have correlation with the contents of the report.
   ii. Good quality A4 size papers shall be used for preparing the repot and it shall be in the bound form.
   iii. There shall be a front page depicting the Title of the project Report, authors Names and other information in the suggested format.
   iv. The duly signed Certificate in the suggested format must be there and it shall follow the front page.
   v. Acknowledgements, if any, shall follow the Certificate.
   vi. A list of contents shall be prepared denoting each chapter/ section/ sub-section with its number, caption and the beginning page number and of that chapter/ section/ subsection.
   vii. The report shall be divided into chapters and each chapter shall be assigned with a number and title.
   viii. Each chapter shall be further divided into sections and each section shall be assigned with a number and heading. For example, 3.1 refers to section 1 of chapter3.
   ix. Each section may be divided further into sub-sections and a number and sub-heading shall be given to each sub-section. For example, 3.2.1 refers to sub-section 1 of section 2 of chapter 3
   x. Each Figure shall be given a number and caption and it must be referred to in the text of the chapter. For example, Figure 2.1 refers to figure 1 of chapter2.
   xi. Each Table shall be given a number and caption and it must be referred to in the text of the chapter. For example, Table 3.1 refers to table 1 of chapter 3.
   xii. If any material, namely, text, figures, graphs, data, or tables; is incorporated taking from the reported literature, namely, books monographs, articles published in style of reference. One style of reference. One style of reference may be as follows.
      i. Prepare the list of such references and sort the same on ascending order of the Author (s) and assign numbers. For example,
         1. Daniel Minoli and Emma Minoli, web Commerce Technology Handbook, Tata Mc-Graw Hill, 1999.
         2. Jahanian, F., and A.K. Mok, "Safety Analysis of Timing Properties of Real-Time systems", IEEE Trans. Software Engineering, Vol. SE-12, no 9, September 1986, pp. 890-904.
      ii. At the end of the material taken from the reported literature, the appropriate number shall be given in a pair of brackets. For example, commerce is the interchange of goods of services, especially on a large scale (1).
   xiii. The list of references shall immediately succeed the last chapter.
   xiv. The appendices. If any, shall follow the list of references.

FIRST Semester
Turboc3 , Borland C++ MS-OFFICE 2003/2007, Open Office Operating Systems (Windows-XP, NT, Linux) PC-Hardware Tools TASM and MASAM Compilers for Assembly Level Programming
SECOND Semester
Data Structures – Turboc3/JAVA COBOL TALLY 9.0
THIRD Semester
Oracle 11g Rational Rose/UML Tools JAVA for DAA English Lab tools and software's
FOURTH Semester
Dot Net software – Visual Studio 2008 J2EE Informatics 8.0 Java script/vbScript/PHP/Shell/Perl Tomcat / Web Logic/ JRun/Web Sphere/IIS Servers Visual C++/Visual Basic/Dream Weaver ERP software's
FIFTH Semester
Java, C++, Visual Studio 2005 J2EE , Visual Studio 2005, J2ME Dream viewer / Abode Photoshop Software Testing Tools :- Junit, Mercury, Jmeter, Cunit Abode Flash software Tomcat / Web Logic/ JRun/Web Sphere/IIS Servers
SIXTH Semester
Front-end tools Visual Basics Java, Siwngs, JFrames Dream viewer Visual C++ J2ME, Servlets, JSP, JSF Turbo c, Turbo c++, Pascal, C#,J# Back-end tools MS-ACCESS ORACLE MYSQL MSSQL DBASE INFORMATICS WEB-SERVERS:- Tomcat / Web Logic/ JRun/Web Sphere/IIS Servers

Systems List

Servers –Systems	6 (Windows) 2 (Linux)
Clients - Systems	180
Printers	18 (Dot Matrixes Printers) 2 (HP Inkjet Printer) 1 (Laser Printer) 1 (Xerox)
LCD'S	3
Internet Connections	5 Systems (100 Mbps)
1 Server : 30 Clients 10 Systems : 1 printer	