

## **MCA 101 DISCRETE MATHEMATICS**

### **Unit-I:**

Function: Definition, type of functions, one to one, into and onto function, inverse function, composition of functions, recursively defined functions. Algebraic Structures: Definition, Properties, types: Semi Groups, Monoid, Groups, Abelian group, properties of groups, Subgroup, cyclic groups, Cosets, factor group, Permutation groups, Normal subgroup, Homomorphism and isomorphism of Groups, example and standard results, Rings and Fields: definition and standard results.

### **Unit-II:**

Posets, Hasse Diagram and Lattices: Introduction, ordered set, Hasse diagram of partially, ordered set, isomorphic ordered set, well ordered set, properties of Lattices, and complemented lattices.

Combinatorics: Basic Counting Technique, Pigeon-hole Principle, Recurrence Relation, Generating function, Polya's Counting Theorem Paths and Circuits : Isomorphism, Subgraphs, Walks, Paths and Circuits, Connected and disconnected graphs, Euler graphs, Operations on graphs, Hamiltonian graphs, Travelling salesman problem.

### **Unit-III:**

Introduction and Basic Concepts : Definition, Representation of graphs, Finite and infinite graphs, Directed graphs, Incidence and degree, Bipartite graph, Planar graphs, Matrix representation of graphs, Applications of graph in computer science. Graphs: Simple graph, multi graph, graph terminology, representation of graphs, Bipartite, Regular, Planar and connected graphs, connected components in a graph, Euler graphs, Hamiltonian path and circuits, Graph coloring, chromatic number, isomorphism and Homomorphism of graphs.

Trees and Fundamental Circuits : Definition, Properties of trees, Spanning trees, Fundamental circuits and cut-sets, Connectivity and separability, Minimal spanning tree and connected algorithms, Rooted and Binary trees, Applications of trees.

### **Unit-IV:**

Tree: Definition, Rooted tree, properties of trees, binary search tree, tree traversal. Shortest Path Problems : Shortest path algorithms, Generalized shortest path algorithms, Applications of shortest path problems.

Network Flow Problems : Flows in network, formulation, Max-flow min-cut theorem, Minimum cost flow problems, Ford-Fulkerson algorithm for maximum flow.

### **Unit-V:**

Propositional Logic: Proposition, First order logic, Basic logical operation, truth tables, tautologies, Contradictions, Algebra of Proposition, logical implications, logical equivalence, predicates, Universal and existential quantifiers.

### **Text books**

1. Discrete Mathematics and Its Applications, By Kenneth H Rosen, McGraw Hill, Sept.2002.
2. Discrete Mathematical Structures with Applications to Computer Science, By J. P.Tremblay, R.Manohar, McGraw Hill Pub, 1975.
3. "Graph Theory With Applications to Engineering and Computer Science" Prentice Hall, Englewood Cliffs, 1974
4. Combinatorics: Theory and Applications, By V. Krishnamurthy, East-West Press Pvt. Ltd., New Delhi, 1986.
5. K. L. P. Mishra, N. Chandrasekaran, "Theory of Computer Science: Automata, Languages and Computation, PHI Publication

**MCA 102: PROBABILITY AND STATISTICS**

**UNIT I:**

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

**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,  $\chi^2$ -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 univariate 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, 6<sup>th</sup> 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, 5<sup>th</sup> edition, Wiley, 2000.*
6. Grant E.L. and Leavenworth R.S. *Statistical Quality Control 7<sup>th</sup> 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 Programming – 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.

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**UNIT IV:**

Classes, and Objects in C++, Constructors, and Destructors, Operator overloading. Type conversions, inheritance. Pointers, Memory management – new, and delete operators, Dynamic objects

**UNIT V:**

Binding, Polymorphism, Virtual functions, Templates, Exception handling, C++ STL- Container classes-Iterators-Programming with predefined template classes.

**Text Books:**

- 1.Kamthane A.N. Object-oriented Programming with ANSI & Turbo C++ Pearson Education 2003.
2. Ray Lischener,C++ in a Nutshell, Oreilly

**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. Pohl I, Object-Oriented Programming Using C++ 2nd edition, Addison – Wesley, 1997.
4. Deitel and Deitel, C++ How to Program 3rd edition Pearson Education, 2001.
5. Chandra B. Object-Oriented Programming in C++, Narosa Publishing House, 2002.
6. Ravichandran D, Programming with C++, Tata McGraw-Hill, 2003.

**MCA104: 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 – Multiplexers – PLDs – sequential circuits. Basic Structure of Computers: Functional Units - Basic operational concepts – Bus structures – performance – Multi processors and Multi computers: Functional Units – Basic operational concepts – Bus structures – performance – Multiprocessors and Multi computers – Historical Perspective.

**UNIT II:**

Machine Instructions and programs: Numbers, Arithmetic operations and characters – Memory locations and address, operations – instructions and instruction, sequencing – addressing modes.

**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 - Read only memories – cache memories – performance considerations – virtual memories management requirements – secondary storage Arithmetic: Addition and subtraction of sign 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 – micro programmed 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, 5<sup>th</sup> edition, Mc Graw – Hill, 2002.

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**Reference Books:**

1. Stallings W, Computer Organization and Architecture, 6<sup>th</sup> edition. Parson Education, 2003.
2. Mano M.M. Computer System Architecture, 3<sup>rd</sup> 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, ACCOUNTING AND FINANCIAL MANAGEMENT**

**UNIT I :**

Fundamentals of Management – Management Thought- The Concept, Nature of and Process of planning – Objectives of Business – Instrument of Planning. Decision Making – Organisation and organization Structures – process of organizing – Departmentation – Line – staff and lateral relations.

**UNIT II:**

Delegation and decentralization – Directing and problems in Human relations – Motivation. Communication – Leadership –Coordination – Management control – Control techniques. Dynamic Personnel Management – staffing policies and process – wage and salary administration.

**Unit III:**

Accounting Concepts – Double Entry System – Journal – Ledger – Trial Balance – Subsidiary Books – Final accounts. Cost Accounting: Nature and significance – Cost classification and Analysis – Marginal Costing.

**Unit IV:**

Budget – Budgetary control – standard costing – Finance Function. Financial Decision Making – Financial Analysis – Working Capital Management – Capital Budgeting.

**Unit V:**

Funds flow Analysis – Cash flow Analysis - Ratio Analysis-

**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, 5<sup>th</sup> 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, 3<sup>rd</sup> edition, Tata Mc Graw – Hill Publishing Company Ltd., New Delhi, 2004.
5. Rajeswara Rao K and Prasad G, Accounting & Finance (MCA), Jai Bharat Publishers, Guntur
6. Jain and Narang, *Accountany Vol.* Kalyani Publishers.
7. Jain and Narang, *Cost Accounting*, Kalyani Publishers.
8. Sharma R K, and Gupta S K, *Management Accounting*, Kalyani Publishers.
9. Pandey I M, *Financial Management*, Vikas Publication.

**Reference Books :**

1. Mirza S Saiyadain Human Resource Management, 3<sup>rd</sup> edition, Tata Mc Graw Hill, New Delhi, 2003.
2. Weihrich H, and Koontz H, Management – A Global Perspective, 10<sup>th</sup> edition, Mc Graw – Hill, 1994.
3. Robbins SP. And DeCenzo D, Fundamentals of Management, 4<sup>th</sup> edition, Prentice Hall, 2003.
4. Dessler G, Management: Principles and Practices for Tomorrow’s Leaders, 3<sup>rd</sup> Edition, Prentice Hall, 2003.
5. Chandan J S, Management Concepts and Strategies, Vikas Publishing House, 2002.
6. Ivencevich. John M., Human Resource Management 9<sup>th</sup> edition, Tata McGraw Hill, New Delhi, 2003.

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7. Decenzo David, A., Robins Stephon P., Human Resource Management, 7<sup>th</sup> Edition, John Wiley & Sons (Asia) Pte. Ltd, Singapore 2002.
8. Dessler Gary Human Resource Management, 8<sup>th</sup> edition, Pearson Education, New Delhi, 2002.
9. Grewal Ts. *Introduction to Accountancy*, S Chand & Company Ltd, 1999.
10. Khan M K. and Jain P K, *Financial Management*, 3<sup>rd</sup> edition, Tata McGraw-Hill, 1999.
11. Van Horne J C, *Financial management and Policy*, 12<sup>th</sup> edition, PHI, 2002.
12. Khan M K, and Jain R K, *Management Accounting*, 3<sup>rd</sup> edition, Tata McGraw-Hill, 1999.

**MCA 201: COMPUTER ORIENTED OPERATIONS RESEARCH**

**UNIT-I:**

Origin and Development of Operations Research - Nature and Scope of Operations Research- Models and Modeling in Operations Research- Computer Software for Operations Research- Applications of Operations Research-Linear Programming-Model formulation, Graphical Method, Simplex Method, Duality, Revised Simplex Method-Integer Programming Problem using Excel solver.

**UNIT-II:**

Transportation Problem-Transshipment Model-Assignment Problem-Goal Programming - Network Techniques: Shortest-Path Model, Minimum Spanning Tree Problem, Maximum Flow Problem.

**UNIT-III:**

Non-Linear Programming-Unconstrained Optimization, Constrained Optimization with and without inequalities-Kuhn-Tucker Conditions-Graphical Solution of Non-Linear Programming Problem-Quadratic Programming-Separable Programming-Convex and Non-Convex Programming.

**UNIT-IV:**

Queuing Theory-Basic structure of Queuing System-Classification of Queuing Models-Single-Server Queuing Models-Multi-Server Queuing Models-Applications of Queuing Theory-Simulation-Monte-Carlo Simulation-Role of Computers in Simulation-Applications of Simulation.

**UNIT-V:**

Decision Theory-Steps in Decision Theory Approach-Decision-Making Environments-Decision Making under Certainty, Uncertainty and Risk-Decision Tree Analysis-Game Theory.

**Reference Books:**

1. Taha H.A., Operations Research: An Introduction, Printice-Hall of India
2. S.D.Sharma., Operations Research, Kedar Nath Ram Nath, Delhi
3. R.Pannerselvam., Operations Research, Prentice-Hall of India
4. J.K.Sharma., Operations Research -Theory and Applications, Macmillian India Ltd
5. Kanti Swarup., P.K.Gupta and Mam Mohan, Sultan chand& Sons

**MCA 202: PROGRAMMING WITH JAVA**

**UNIT – I: Object Oriented Programming Fundamentals & Java:**

Java Features, Object Oriented Programming Concepts –Abstraction, Encapsulation, Inheritance, and Polymorphism. Java Fundamentals: Data Types, variables, arrays, Inheritance to classes: class fundamentals, Objects, References, Constructors, Overloading of methods, Access control, Nested and Inner classes. Inheritance: Inheritance basics, Using super, multilevel hierarchy, method overriding, dynamic method dispatch, abstract classes, final with inheritance.

**UNIT-II: Packages, Exceptions and Threads:**

Packages and Interfaces: Packages, Access protection, Importing packages, interfaces, Exception Handling: fundamentals, exception types, uncaught exceptions, using try, nested

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try statements, throw, throws, Java built-in exceptions, user defined exceptions. Multithreading: Thread model, main thread, creating a thread, multiple threads, thread priorities, synchronization, Inter thread communication, String handling.

**UNIT-III: Java Utilities:**

Type wrappers: Number, Double, Float, Byte, Short, Integer and Long, Character, Boolean, Math class. Collections: Collection interfaces, collection classes, legacy classes and interfaces: Enumeration interface, Vector, Stack, Dictionary, Hash table. More utility classes: String Tokenizer, Bit set, Date, And Calendar Input/output: File, Stream classes, Byte Streams, Character Streams.

**UNIT-IV: GUI Programming Features**

Applets: Applet basics, Applet architecture, an applet skeleton, Applet display method, Repainting, Using Status window, HTML APPLET tag, passing parameters to applet, Audio Clip interface. Even Handling; two event handling mechanisms, Event model, Event classes, sources of events, Event Listener interfaces, Adapter classes. Introduction to SWING: Window Fundamentals, working with frame windows, creating window programs, working with color, fonts, SWING Controls, Layout Managers and Menus: Control fundamentals, Labels, Using buttons, check boxes, checkbox group, choice controls, lists, scroll bars, text field, layout managers, menu bars, and menus.

**UNIT-V: Networking in Java**

Network Programming with Java, Networking classes and Interfaces, InetAddress, Factory method, Instance Methods, Sockets, Knowing IP address, URL-URL Connection class. Creating a server that sends data, creating a client that receives data, two way communication between server and client, Stages in a JDBC program, registering the driver, connecting to a database, Preparing SQL statements, improving the performance of a JDBC program.

**Text Book**

1. Herbert Schildt : “The Complete Reference Java 2”(Fifth Edition),TMH.

**Reference Books**

1. Dietel & Dietel : “Java2 How to Program”, Prentice Hall.
2. Thamus Wu: “An Introduction to Object Oriented Programming With Java.” TMH
3. Balagurusamy:”Programming With Java”: TMH.

**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.

**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

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structure, and implementation, Directory implementation, Allocation methods. Free space management, Efficiency and performance, Recovery.

**UNIT IV:**

**I/O Systems:** overview, I/O hardware, Application I/O interface, Kernel I/O subsystem, Transforming I/O to Hardware 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. **Protection:** Goals, Domain of protection, Access matrix and implementation, Access rights, capability – based systems, Language – based protection.

**UNIT V:**

User authentication, program threats, system threats, security systems Facilities,. **Linux system:** History, Design principles, Kernel modules, process management, Scheduling Memory Management, File Systems, Input and output, IPC, Network structure, security.

**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. Flynn 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. Remy Card, Eric Dumas, Linux Kernel Book , Orielly

**MCA 204: DATA STRUCTURES**

**UNIT I**

LINEAR DATA STRUCTURES : Abstract Data Types - Asymptotic Notations: Big-Oh, Omega and Theta – Best, Worst and Average case Analysis: Definition and an example – Arrays and its representations – Stacks and Queues – Linked lists – Linked list based implementation of Stacks and Queues – Evaluation of Expressions – Linked list based polynomial addition.

**UNIT II**

NON-LINEAR DATA STRUCTURES

;Trees – Binary Trees – Binary tree representation and traversals – Threaded binary trees – Binary tree representation of trees – Application of trees: Set representation and Union-Find operations – Graph and its representations – Graph Traversals – Connected components.

**UNIT III**

SEARCH STRUCTURES AND PRIORITY QUEUES: AVL Trees – Red-Black Trees – Splay Trees – Binary Heap – Leftist Heap

**UNIT IV**

SORTING: Insertion sort – Merge sort – Quick sort – Heap sort – Sorting with disks – k-way merging – Sorting with tapes – Polyphase merge.

**UNIT V**

SEARCHING AND INDEXING: Linear Search – Binary Search - Hash tables – Overflow handling – Cylinder Surface Indexing – Hash Index – B-Tree Indexing.

**TEXT BOOKS:**

1. Ellis Horowitz and Sartaj Sahni, Fundamentals of Data Structures, Galgotia Book Sorce, Gurgaon, 1976.
2. Gregory L. Heilman, Data Structures, Algorithms and Object Oriented Programming, Tata Mcgraw-Hill, New Delhi, 2002.

**REFERENCES:**

1. Jean-Paul Tremblay and Paul G. Sorenson, An Introduction to Data Structures with Applications, Second Edition, Tata McGraw-Hill, New Delhi, 1991.
2. Alfred V. Aho, John E. Hopcroft and Jeffry D. Ullman, Data Structures and Algorithms, Pearson Education, New Delhi, 2006.

**MCA 205: 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. ORACLE Backup and recovery utilities.

**Text Book:**

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

**Reference Books:**

1. Date C J, *An Introduciton to Database Systems*, 7<sup>th</sup> edition, Pearson Educaiton, 2000.
2. Elmasri R, and Navathe S B, *Fundamentals of Database Systems*, 4<sup>th</sup> edition, Pearson Education, 2004.



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3. Ramakrishnan R, and Gehrke J, *Database Management Systems, 2<sup>nd</sup> edition, McGraw-Hill, 2000.*
4. *Mannino M V, Database Application Development and Design, McGraw-Hill, 2001.*

**MCA 301: Management Information Systems**

**UNIT I:**

Managing the digital firm

Why information system? Perspectives on information system Contemporary approach to Information system Learning to use information systems: New opportunities with technology. Information System in the Enterprise Major types of system in organization Systems from functional perspectives Integrating functions and business processes: Introduction to Enterprise application.

**UNIT II:**

Information Systems, Organizations, management and Strategy Organisations and Information Systems How information system impact organizations and business firms The impact of IT on management decision making Information business and business strategy. Decision making Decision making concepts Decision methods, tools and procedures Behavioral concepts in decision making Organizational decision making MIS and Decision Making Concepts.

**UNIT III:**

Information Concepts Information: a quality product Classification of information Methods of data and Information collection Value of information General model of a human as a information processor Summary of information concepts and their implications Organization and information MIS and Information concepts. Development of MIS Development of Long Range Plans of MIS Ascertaining the class of Information Determining the Information Requirement Development and Implementation of MIS Management of Quality in MIS Organisation for development of MIS MIS : the factors for Success and Failure.

**UNIT IV:**

Choice of Information Technology Introduction: Nature of IT decision Strategic decision Configuration decision Evaluation Information Technology Implementation plan Choice of the Information Technology and the Management Information System. Enterprise Applications and Business Process Integration Enterprise Systems Supply chain management systems Customer relationship management systems Enterprise Integration trends.

**UNIT V:**

Decision Support System DSS: Concept and Philosophy DSS : Deterministic Systems AI Systems Knowledge based expert system MIS and Role of DSS.

**References:**

1. Management Information System, Oz Thomson Learning 5th edition
2. Management Information System, W.S.Jawadekar, 3rd edition, TMH
3. Management Information System, James O'Brien, 7th edition, TMH
4. Information Systems the foundation of E-Business, Steven Alter, 4th Edition Person education
5. Information Technology for management, Turban, McLean, Wetherbe, 4th edition, Wiley
6. Management Information Systems, Loudon and Loudon, 10th edition, Pearsons Educations
7. Management Information Systems, Jaswal Oxford Press Case based approach can be adopted to explain various concepts during tutorials (Internal Evaluation)

**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

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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, Channelization, 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, Satellite networks, Virtual circuit switching, Frame relay, ATM.

**UNIT – III:**

Network Layer: Inter-networks, Addressing, Routing, Network layer Protocols – ARP, IP, ICMP. 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. Communication Security, Authentications Protocols, E-mail Security, Web security, Social Issues.

**UNIT – V:**

Application Layer: Design issues, file transfer, access and management. Client-Server model, Socket interface Introduction to DNS, Distribution of name space, . DNS in the Internet. Electronic mail, SMTP, File Transfer, FTP, HTTP, World Wide web.

**Text Books:**

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

**Reference Books:**

1. Stallings W, *Data and Computer Communications*, 7<sup>th</sup> 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*, 4<sup>th</sup> edition, Pearson Education, 2004.
4. Kurose J F, and Ross K W, *Computer Networking – A Top-down Approach Featuring 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.

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**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-based software engineering, Critical systems development, Software reuse, User interface design**, 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<sup>5</sup> 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, reengineering, Security engineering, Service-oriented software engineering, Aspect-oriented software development.

**TEXT BOOK:**

1. Roger, S, Pressman, Software Engineering, A Practitioner's Approach, Six Edition, McGraw-Hill, International Edition, 2005.
2. Ian Sommerville, Software Engineering, Pearson Education, 8<sup>th</sup> Edition.

**REFERENCE BOOKS:**

1. James F Peters, Software Engineering, John Wiley
2. Waruan S Jawadekar, Software Engineering, Tata McGraw Hill, 2004.
3. Carlo Ghezzi, Mehdi Jazayeri, Dino Manrioli, Fundamentals of Software Engineering, PHI, 2001 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, the Fast Fourier Transform and its Applications.

**TEXT BOOKS:**

1. Eills Horowliz, Sartaj sahani 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

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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, 3<sup>rd</sup> edition, Pearson Education Asia, 2001.
2. Johnson D.G. Computer Ethics 3<sup>rd</sup> edition, Pearson Education Asia. 2001.
3. Bansal R.K. and Harrison J.B. Spoken English 2<sup>nd</sup> Edition, Orient Longman, 1994.
4. Fleddermann C.B. Engineering Ethics 2<sup>nd</sup> 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 3<sup>rd</sup> Edition Tata Mc-Gray-Hill, 1996.
3. Division of Humanities and Social Sciences, Anna University, English for Engineer and Technologists, Vols, 1and 2<sup>nd</sup> 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 2<sup>nd</sup> 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.

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9. Nurnberg M, and Rosenblum M, Howto Bulid a Better Vocabulary, Warner Books, 1989.
10. Paul V.Anderwon, Techical Communication, Thomson,5<sup>th</sup> edition,2004.

**MCA 401: OBJECT ORIENTED SYSTEMS DEVELOPMENT**

**Unit 1:**

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, oo analysis : use – case driven – object – oriented analysis process – identifying use cases :, use case driven oo analysis : the unified approach, use case model and documentation. Object analysis : classification : theory, approaches for identifying classes, noun phrase, common class pattern, use case driven 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 layer classes. View layer: designing interfacing objects and, designing view layer classes, macro and micro – level process,

**UNIT IV :**

Software quality: Software Quality Assurance Tests, strategies, impact & object orientation on testing text courses, text plan, continuous testing , users debugging principle, (case studies may be considered for better understanding).  
Software Architecture: Introduction to Software Architecture – Architecture Business Cycle, Features, Architectural Styles.

**UNIT V:**

Design patters introduction – definition, move, describing design pattern, the catalog and its organization. Solving design problem, select and use a design pattern, design pattern catalog internet, motivation, applicability, structure, participants, collaborations, consequences, implementation, sample code, known use and related patterns 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. Software Architecture Perspective: On an emerging Discipline, Mary Show, David garlan, 1996, PHI.

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4. 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 402: DATA WAREHOUSING AND DATAMINING**

**Unit – I:**

**Chapter – I:** Data Warehousing & OLAP Technologies [**Kambler** –chapter 3 (3.1,3.2,3.3)]

**Chapter –II:** Basic Data Mining Tasks:Classification-Regression-Time series Analysis-Prediction-Clustering-Summarization-Association rules-Sequence discpvery-Datamining Versus Knowledge discovery in databases-the development of Data Mining-Data Mining issues-Data mining Metrics-Social Implications of Data Mining-The future. [M.H.Dunhum – chapter 1(1.1 to 1.7)]

**Chapter- III:** Data Preprocessing [**Kambler** –chapter 2(2.1 to 2.6)]

**UNIT II:**

**Chapter –I: Basic** Data mining Tasks [M.H.Dunhum –chapter 1(1.1 to 1.7)]

**Chapter –II:** Principles of dimensional modeling-design decisions,Dimensional Modeling basics,E-R Modeling versus Dimensional modeling-use of case tools-The star shema-Review of a simple STAR schema,inside a Dimension table,inside the fact table,the factless fact table,Dat Granularity.Star Scheam keys-primary keys,surrogate keys,foreign keys.Advantages of star schema.

**Chapter –III:** Dimensional Modeling: Updates to the dimensional tables-Miscellaneous Dimensions-The Snowflake shema-Aggregate fact tables-Families of stars

**UNIT-III:**

**Chapter –I :** Classification: Introduction-Issues in classification-Statistical\_Based Algorithm-Regression-Bayesian Classification-Distance based algorithm-Simple approach-K nearest approach-Decision tree based algorithms-ID3-C4.5 & C5.0-CART-Scalable DT Techniques-Nueral network based algorithms-Propogation-NN Supervised Learning-Radial basis function works-Perceptrons-Rule based algorithms [M.H.Dunhum –chapter 4(4.1 to 4.6)]

**UNIT – IV:**

**Chapter –I:**

**Clustering:** Introduction-Similarity & distance measures-outliers-Hierarchial algorithms-agglomerative algorithms-Divisive clustering-Partitional algorithms-Minimum spanning tree-Squared error clustering algorithm-K-means clustering-nearest neighbour algorithm-PAM algorithm-Bond energy algorithm-Clustering with Genetic algorithms-Clustering with neural networks-Clustering large databases-BIRCH- DBSCAN-CURE algorithm-Clustering with categorical attributes. [M.H.Dunhum –chapter 5(5.1 to 5.7)]

**UNIT-V:**

**Chapter –I:**

**Associate Rules:-** Introduction-Large Itemsets-Basic Algorithms-Apriori Algorithm-Sampling algorithm-Partitioning- Parallel and Distributed algorithms-Data Parallelism-Task parallelism-Comparing Approaches- Incremental Rules- Advanced Association Rule Technique-Generalized association rules-Multiple level association rules-Multiple –level Association rules-Quantitative association rules-Using multiple minimum supports-Measuring the Quality of a Rules. [M.H.Dunhum chapter 6(6.1 to 6.8)]

**Chapter –II:** Mining objects-spatial, multimedia & text mining, www mining [Kambler chapter10 (10.1 to 10.5)]

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**Text Books:**

1. Data Mining – Introductory & Advanced topics by Margaret H. Dunham,. Pearson Education publishers.
2. Data mining concepts & techniques-Jiawei Han & Micheline Kamber
3. Fundamentals of Data warehousing –Paul raj Ponniah

**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-Browser Architecture-IE, Chrome-Search Engines-Introduction to HTML-5-HTML-5 Tags-Audio, Video Tags – HTML-5 Forms-Controls-CSS Styling-CSS Tags-Attributes.

**UNIT-II**

Java Script-JQuery- JavaScript Programming Scripts- Control structures- Functions- Document, Browser, Date, Math, String objects-Events- JQuery Libraries-JQuery Objects, Functions – JQuery Events-Animations.

**UNIT-III**

AJAX Concepts- Simple AJAX objects-Ajax Libraries-Examples, Webservers IIS, Tomcat-Hosting Website in a Webservers

**UNIT-IV**

Introduction to PHP-Control Structures-Arrays-Functions-Database connectivity-Introduction to ZEND Framework and applications

**UNIT-V**

Introduction to Java Servlets, Servlet classes and interfaces - Java Database Connectivity-Introduction to JSP-Java Server Page scriptlets -JSP Objects-JSP Web applications

**TEXT BOOK:**

1. Deitel, Deitel and Goldberg Internet & World Wide Wide how to program”by End. Pearson Education
2. Ivan Bayross, Webenabled commercial Application Development in Java 2.0 BPB.
3. Nicholas C. Zakas.,Jeremy McPeak,Joe Fawcett, Professional AJAX,2nd Edition, Willey publishing
4. HTML 5 Black book, Kogent Learning Solutions Inc.

**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.

**MCA 404A: 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

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backward reasoning Symbolic reasoning under uncertainty – Non monotonic reasoning.  
Statistical reasoning.

**UNIT – III:**

Different knowledge representation schemes – Semantic nets. Marvin Minsky'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. Dan W.Patterson, "Introduction to Artificial Intelligence & Expert Systems".1999.

**Reference Books:**

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

**MCA 404 B: 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:**

- Ajani and Pradeep Oak, Software Testing, Tata Mc Graw Hill.



**MCA 404C: AUTOMATA THEORY**

**UNIT-I**

Fundamentals: Strings, Alphabet, Language, Operations, Finite state machine, definitions, finite automaton model, acceptance of strings, and languages, deterministic finite automaton and non deterministic finite automaton, transition diagrams and language recognizers.

**UNIT-II**

Finite Automata: NFA with  $\epsilon$  transitions - Significance, acceptance of languages. Conversions and Equivalence: Equivalence between NFA with and without  $\epsilon$  transitions, NFA to DFA conversion, minimization of FSM, equivalence between two FSM's, Finite Automata with output-Moore and Melay machines.

**UNIT-III**

Regular Languages: Regular sets, regular expressions, identity rules, Constructing finite Automata for a given regular expressions, Conversion of Finite Automata to Regular Expressions, Pumping lemma of regular sets, closure properties of regular sets (proofs not required)

**UNIT-IV**

Grammar Formalism: Regular grammars - right linear and left linear grammars, equivalence between regular linear grammar and FA, inter conversion, Context free grammar, derivation trees, sentential forms Rightmost and leftmost derivation of strings.

Context Free Grammars: Ambiguity in context free grammars, Minimization of Context Free Grammars, Chomsky normal form, Greiback normal form, Pumping Lemma for Context Free Languages. Enumeration of Properties of CFL (proofs omitted).

**UNIT - V**

Push down automata: Push down automata, definition, model, acceptance of CFL, Acceptance by final state and acceptance by empty state and its equivalence. Equivalence of CFL and PDA, interconversion. (Proofs not required), introduction to DCFL and DPDA.

Turing Machine: Turing Machine, definition, model, design of TM, Computable functions, recursively enumerable languages. Church's hypothesis, counter machine, types of Turing machines (Proofs not required).

**TEXT BOOKS:**

T1 : Hopcroft H.E. & Ullman J.D., „Introduction to Automata Theory Languages and Computation’ - Pearson Education

T2 : Thomson, ‘Introduction to theory of computation’,-Sipser 2 nd edition

**REFERENCE BOOKS:**

R1 : Daniel I.A. Cohen, John Wiley, ‘Introduction to languages and the Theory of Computation’.

R2 : John C Martin, ‘Introduction to languages and the Theory of Computation’ - McGraw Hill.

R3 : Lewis H.P. & Papadimition ‘Elements of Theory of Computation’ - C.H. Pearson/PHI.

R4 : Mishra and Chandrashekar, ‘Theory of computer science - Automata, Languages, and Computation’, 2nd edition, PHI

**MCA 404D REMOTE SENSING &GIS**

**UNIT 1**

INTRODUCTION:

Geospatial data, Spatial data infrastructure, three important geospatial technologies, Spatial elements.

**UNIT II**

COORDINATES & COORDINATE SYSTEMS:

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Coordinates and coordinate systems, Datums and geodetic systems, Coordinate transformations Basic electromagnetic radiation.

DATUMS & GEODETIC SYSTEMS:

Geodetic datums, Geodetic reference system, Applications

**UNIT III**

GLOBAL POSITIONING SYSTEMS:

Introducing the Global Positioning System, Fundamentals of GPS signals and data, GPS mathematical models, GPS projects : some planning issues.

**UNIT IV**

PHOTOGRAMMETRY & REMOTE SENSING:

Definition and Scope, History of Photogrammetry and Remote Sensing, Principle, remote Sensing data acquisition, Remote Sensing data analysis methods, Advantages and Limitations, Hardware and Software required.

**UNIT V**

GEOGRAPHIC INFORMATION SYSTEMS(GIS):

Geographic Information Systems (GIS) and science, Fundamentals of Geographic Information Systems, Geographic data structures, Processing of spatial data Unit.

GIS DATA ANALYTICAL METHODS:

Spatial data and modeling, TIN, DTM, Overlay, Spatial Measurement etc.,

OVERVIEW OF GST APPLICATIONS:

GST for Environmental, Social, Local Government and Commercial applications.

**Books:**

1. Manual of Geospatial Science & Technology edited by John D. Bossler (Taylor & Francis ).
2. Textbook of Remote Sensing and Geographical Information Systems M. Anji Reddy, BS Publication.
3. Fundamentals of GIS by MICHAEL N DEMERS. Published By John Wiley & Sons Inc.
4. Environmental Modeling with GIS, Michael F. Goodchild, Bradley O. Parks, Louis T. Stewart
5. Geographic Information Systems: A Management Perspective by Stan Arnoff.

**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 Mile: Local Roads and Access Ramps; Global Information Distribution: Networks: Public Policy Issues Shaping the I-Way. Case study: B2B ecommerce

**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. Case study: E-Commerce/High Security (Pci)

**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

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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.Case study: Social Media Marketing

**UNIT – IV:**

Intra organization 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.Case study: Email Marketing, Email Personalization

**UNIT-V:**

**M-Commerce:** Introduction to Mobile Commerce, Limitations, history, applications, architecture, transaction models, payment methods, advantages, disadvantages Case study: Mobile app marketing case study: O2 Priority Moments gets small businesses on side

**TEXT BOOK:**

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
5. PaulM-Commerce: Book Your Business with the Power of Mobile Commerce

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

**UNIT – V:**

Mobile Security, Risk Model, EcoSystem, Service Risks, App Risks, Countermeasures- Cloud Computing Security- Threats-Security in Cloud-Security at service layers.

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**TEXT BOOK**

1. "Cryptography and Network Security" by John Wiley, Edn., 2001
2. Neil Bergman (Author), Mike Stanfield (Author), Jason Rouse (Author), Joel Scambray "Hacking Exposed Mobile: Security Secrets & Solutions", McGraw Hill Ltd.
3. James Ritting House, Ransome, Cloud Computing, Implementation, Management and security, CRC Press

**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, TataMcGraw Hill. 2004
4. Cheswick, Wand Bellovin, S. Fire walls and Internet Security, Addison-Wisley, 1994.

**MCA 405C: CYBER SECURITY**

**UNIT I**

FUNDAMENTALS OF CYBER SECURITY

Introduction-Cyber Security and its problem-Intervention Strategies: Redundancy, Diversity and Autarchy.

**UNIT II**

ISSUES IN CYBER SECURITY

Private ordering solutions, Regulation and Jurisdiction for global Cyber security, Copy Right-source of risks, Pirates, Internet Infringement, Fair Use, postings, criminal liability, First Amendments, Data Loss.

**UNIT III**

INTELLECTUAL PROPERTY RIGHTS

Copy Right-Source of risks, Pirates, Internet Infringement, Fair Use, postings, Criminal Liability, First Amendments, Losing Data, Trademarks, Defamation, Privacy-Common Law Privacy, Constitutional law, Federal Statutes, Anonymity, Technology expanding privacy rights.

**UNIT IV**

PROCEDURAL ISSUES

Duty of Care, Criminal Liability, Procedural issues, Electronic Contracts & Digital Signatures, Misappropriation of information, Civil Rights, Tax, Evidence.

**UNIT V**

LEGAL ASPECTS OF CYBER SECURITY

Ethics, Legal Developments, Late 1990 to 2000, Cyber security in Society, Security in cyber laws case. Studies, General Law and Cyber Law-a Swift Analysis.

**REFERENCES:**

1. Jonathan Rosenoer, "Cyber Law: The law of the Internet", Springer-Verlag, 1997.
2. Mark F Grady, Fransesco Parisi, "The Law and Economics of Cyber Security", Cambridge University Press, 2006.

**MCA 405D: NEURAL NETWORKS**

**UNIT I**

INTRODUCTION - what is a neural network? Human Brain, Models of a Neuron, Neural networks viewed as Directed Graphs, Network Architectures, Knowledge Representation, Artificial Intelligence and Neural Networks (p. no's 1 -49) LEARNING PROCESS 1 - Error Correction learning, Memory based learning, Hebbian learning, (50-55)

**UNIT II**

LEARNING PROCESS 2: Competitive, Boltzmann learning, Credit Assignment Problem, Memory, Adaption, Statistical nature of the learning process, (p. no's 50 -116) SINGLE

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LAYER PERCEPTRONS – Adaptive filtering problem, Unconstrained Organization Techniques, Linear least square filters, least mean square algorithm, learning curves, Learning rate annealing techniques, perception –convergence theorem, Relation between perception and Bayes classifier for a Gaussian Environment (p. no's 117 –155)

**UNIT III**

MULTILAYER PERCEPTRON – Back propagation algorithm XOR problem, Heuristics, Output representation and decision rule, Computer experiment, feature detection, (p. no's 156 –201)  
BACK PROPAGATION - back propagation and differentiation, Hessian matrix, Generalization, Cross validation, Network pruning Techniques, Virtues and limitations of back propagation learning, Accelerated convergence, supervised learning. (p. no's 202 –234)

**UNIT IV**

SELF ORGANIZATION MAPS – Two basic feature mapping models, Self organization map, SOM algorithm, properties of feature map, computer simulations, learning vector quantization, Adaptive patten classification, Hierarchal Vector quantilizer, contextmel Maps (p. no's 443 –469, 9.1 –9.8 )

**UNIT V**

NEURO DYNAMICS – Dynamical systems, stavility of equilibrium states, attractors, neurodynamical models, manipulation of attractors' as a recurrent network paradigm (p. no's 664 –680, 14.1 –14.6) HOPFIELD MODELS – Hopfield models, computer experiment I (p. no's 680-701, 14.7 –14.8)

**TEXT BOOK:**

1. Neural networks A comprehensive foundations, Simon Hhaykin, Pearson Education 2nd Edition 2004

**REFERENCE BOOKS:**

1. Artificial neural networks - B.Vegnanarayana Prentice Halll of India P Ltd 2005
2. Neural networks in Computer intelligence, Li Min Fu TMH 2003
3. Neural networks James A Freeman David M S kapura Pearson Education 2004

**SEMESTER V**

**MCA 501: COMPUTER GRAPHICS**

**UNIT I**

Introduction, Application areas of Computer Graphics, overview of graphics systems, video-display devices, Raster-scan systems, random scan systems, graphics monitors and work stations and input devices Output primitives: Points and lines, line drawing algorithms, mid-point circle and ellipse algorithms. Filled area primitives: Scan line polygon fill algorithm, boundary-fill and flood-fill algorithms.

**UNIT II**

2-D Geometrical transforms: Translation, scaling, rotation, reflection and shear transformations, matrix representations and homogeneous coordinates, composite transforms, transformations between coordinate systems. 2-D Viewing: The viewing pipeline, viewing coordinate reference frame, window to view-port coordinate transformation, viewing functions, Cohen-Sutherland and Cyrus-beck line clipping algorithms, Sutherland – Hodgeman polygon clipping algorithm.

**UNIT III**

3-D Object representation: Polygon surfaces, quadric surfaces, spline representation, Hermite curve, Bezier curve and B-spline curves, Bezier and B-spline surfaces. Basic illumination models, polygon rendering methods.

**UNIT IV**

3-D Geometric transformations: Translation, rotation, scaling, reflection and shear transformations, composite transformations, 3-D viewing: Viewing pipeline, viewing

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coordinates, view volume and general projection transforms and clipping.

**UNIT V**

Visible surface detection methods: Classification, back-face detection, depth-buffer, scan-line, depth sorting, BSP-tree methods, area sub-division and octree methods Computer animation: Design of animation sequence, general computer animation functions, raster animation, computer animation languages, key frame systems, motion specifications

**TEXT BOOKS:**

1. "Computer Graphics C version", Donald Hearn and M. Pauline Baker, Pearson education.
2. "Computer Graphics Principles & practice", second edition in C, Foley, VanDam, Feiner and Hughes, Pearson Education.

**REFERENCE BOOKS:**

1. "Computer Graphics Second edition", Zhigand xiang, Roy Plastock, Schaum's outlines, Tata Mc Graw Hill edition.
2. "Procedural elements for Computer Graphics", David F Rogers, Tata Mc Graw hill, 2nd edition.
3. "Principles of Interactive Computer Graphics", Neuman and Sproul, TMH.
4. "Principles of Computer Graphics", Shalini, Govil-Pai, Springer.
5. "Computer Graphics", Steven Harrington, TMH.
6. Computer Graphics, F.S.Hill, S.M.Kelley, PHI.
7. Computer Graphics, P.Shirley, Steve Marschner & Others, Cengage Learning.
8. Computer Graphics & Animation, M.C.Trivedi, Jaico Publishing House.
9. An Integrated Introduction to Computer Graphics and Geometric Modelling, R.Goldman, CRC Press, Taylor & Francis Group.
10. Computer Graphics, Rajesh K.Maurya, Wiley India.

**MCA 502: BIG DATA AND ANALYTICS FOR BUSINESS INTELLIGENCE**

**UNIT-I**

What is Big Data - Varieties of Data - Unstructured data – Trends in Data Storage- Industry Examples of Big Data.

**UNIT-II**

Big data Technology – New and older approaches- Data Discovery – Open source technologies for Big Data Analytics- Cloud and Big Data –Big Data Foundation-Computation-Limitations-Big Data Emerging Technologies

**UNIT-III**

Business Analytics- Consumption of Analytics- Creation to Consumption of Analytics-Data visualization by Organizations – 90/10 rule of critical thinking – Decision sciences and analytics-Learning over knowledge-Agility-Scale and convergence-Privacy and security in Big Data.

**UNIT-IV**

Predictive Analytics –Linear Regression – Decision trees-Neural networks-Classification trees-Ensemble methods-Association Rules-Segmentation, Sequence Rules, Social Network analytics.

**UNIT-V**

Hadoop – Components of Hadoop – Hadoop File System –Hadoop Technology Stack-Dataware housing Hadoop Concepts-Applications of Hadoop using PIG,YARN,HIVE.

**Text Books**

- 1.Micheal Minnelli,Ambiga Dhiraj,Chambers, *Big Data and Big Analytics*, Willey and Sons Inc,.
2. Bart Beasens, *Analytics in Big Data World*, Willey and Sons Inc
- 3 Sameer Wadker,Madhu Sidhalingaiah and Jason Winner,*Apache Hadoop*, APress

**MCA 503: SYSTEMS PROGRAMMING**

**UNIT I:**

Background introduction, system software and machine architecture, SIC, RISC, and CISC 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: text editors and interactive debugging systems

**UNIT-IV**

Introduction to Device Drivers, Design issues-Types of Drivers, Character driver-1 and Design issues, Character Driver-2- A/D converter and its design issues, Block driver-1 and its design issues- RAM DISK driver-Anatomy-Prologue of drivers and programming Considerations.

**UNIT-V**

Introduction to Linux- Linux Architecture- X-windows- Linux administration tools - Commands to use Linux OS- Executing Linux Shell scripts – Shell Programming concepts- Shell scripts.

**Text Books:**

1. Leland .Beck, System Software: An Introduction to systems Programming: 3/e, Pearson Educations Asia, 2003.
2. George pajari, Writing Unix Drivers, Addison – Wesley, 1991.
3. Richard Petersen, *Linux complete Reference*, McGraw Hill Education (India) Private Limited; 6 edition (21 November 2007)

**Reference Books:**

1. Dhamdhere, System programming and operation Systems Book 2/E, Tata Mc Graw, Hill, 1999
2. A.V. Aho, Ravi Sethi and J D Ullman , “compilers, Techniques and Tools”, Addison Wesley, 1986.
3. Jhon J. Donovan, System Programming Tata Mc Graw Hill 2005.

**MCA 504 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.

**DEPARTMENT OF COMPUTER SCIENCE**  
**MCA SYLLABUS (WITH EFFECT FROM 2015-2016)**

**Unit – II:**

Software tools – Specification methods, interface- building tools and evaluation and critiquing tools. Direct manipulation and virtual environments – examples, explanations, programming, visual, thinking and icons Home automation, remote direct manipulation, visual environments. Menu selection, form fillin, and dialog 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).

**Unit – V:**

Introduction to Dot Net technology c#.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 Shneiderman, 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 504 B: 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.



**DEPARTMENT OF COMPUTER SCIENCE**  
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**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' Learnly, Enterprise Resource Planning Systems: Systems, Lifecycle, Electronic Commerce, and Risk, Cambridge University press, UK 2000.

**MCA 504C: MOBILE APP DEVELOPMENT**

**UNIT I**

Introduction to mobile applications – Embedded systems - Market and business drivers for mobile applications – Publishing and delivery of mobile applications – Requirements gathering and validation for mobile applications

**UNIT II**

BASIC DESIGN : Introduction – Basics of embedded systems design – Embedded OS - Design constraints for mobile applications, both hardware and software related – Architecting mobile applications – User interfaces for mobile applications – touch events and gestures – Achieving quality constraints – performance, usability, security, availability and modifiability.

**UNIT III**

ADVANCED DESIGN : Designing applications with multimedia and web access capabilities – Integration with GPS and social media networking applications – Accessing applications hosted in a cloud computing environment – Design patterns for mobile applications.

**UNIT IV**

TECHNOLOGY I - ANDROID : Introduction – Establishing the development environment – Android architecture – Activities and views – Interacting with UI – Persisting data using SQLite – Packaging and deployment – Interaction with server side applications – Using Google Maps, GPS and Wifi – Integration with social media applications.

**UNIT V**

TECHNOLOGY II - IOS : Introduction to Objective C – iOS features – UI implementation – Touch frameworks – Data persistence using Core Data and SQLite – Location aware applications using Core Location and Map Kit – Integrating calendar and address book with social media application – Using Wifi - iPhone marketplace.

**REFERENCES:**

1. <http://developer.android.com/develop/index.html>
2. Jeff McWherter and Scott Gowell, "Professional Mobile Application Development", Wrox, 2012
3. Charlie Collins, Michael Galpin and Matthias Kappler, "Android in Practice", DreamTech, 2012
4. James Dovey and Ash Furrow, "Beginning Objective C", Apress, 2012
5. David Mark, Jack Nutting, Jeff LaMarche and Frederic Olsson, "Beginning iOS 6 Development: Exploring the iOS SDK", Apress, 2013.

**MCA 504D: IT IN FORENSIC SCIENCE**

**UNIT I**

Overview of Biometrics, Biometric Identification, Biometric Verification, Biometric Enrollment, Biometric System Security. Authentication and Biometrics: Secure Authentication Protocols, Access Control Security Services, Matching Biometric Samples, Verification by humans. Common biometrics: Finger Print Recognition, Face Recognition, Speaker Recognition, Iris Recognition, Hand Geometry, Signature Verification

**UNIT II**

Introduction to Information Hiding: Technical Steganography, Linguistic Steganography, Copy Right Enforcement, Wisdom from Cryptography Principles of Steganography: Framework for Secret Communication, Security of Steganography System, Information Hiding in Noisy Data , Adaptive versus non-Adaptive Algorithms, Active and Malicious Attackers, Information hiding in Written Text.

**UNIT III**

A Survey of Steganographic Techniques: Substitution systems and Bit Plane Tools, Transform Domain Techniques: - Spread Spectrum and Information hiding, Statistical Steganography, Distortion Techniques, Cover Generation Techniques. Steganalysis: Looking for Signatures: - Extracting hidden Information, Disabling Hidden Information.

**UNIT IV**

Watermarking and Copyright Protection: Basic Watermarking, Watermarking Applications, Requirements and Algorithmic Design Issues, Evaluation and Benchmarking of Watermarking system. Transform Methods: Fourier Transformation, Fast Fourier Transformation, Discrete Cosine Transformation, Mellin-Fourier Transformation, Wavelets, Split Images in Perceptual Bands. Applications of Transformation in Steganography.

**UNIT V**

Computer Forensics, Rules of evidence, Evidence dynamics, Evidence collection, Data recovery, Preservation of digital evidence, surveillance tools for future warfare,

**References:**

1. Katzendbisser, Petitcolas, " Information Hiding Techniques for Steganography and Digital Watermarking", Artech House.
2. Peter Wayner, "Disappearing Cryptography: Information Hiding, Steganography and Watermarking 2/e", Elsevier
3. Bolle, Connell et. al., "Guide to Biometrics", Springer
4. John Vecca, "Computer Forensics: Crime scene Investigation", Firewall Media
5. Christopher L.T. Brown, "Computer Evidence: Collection and Preservation", Firewall Media

**MCA 505A CLOUD COMPUTING**

**UNIT I**

CLOUD ARCHITECTURE AND MODEL : Technologies for Network-Based System – System Models for Distributed and Cloud Computing – NIST Cloud Computing Reference Architecture. Cloud Models:- Characteristics – Cloud Services – Cloud models (IaaS, PaaS, SaaS) – Public vs Private Cloud –Cloud Solutions - Cloud ecosystem – Service management – Computing on demand.

**UNIT II**

VIRTUALIZATION : Basics of Virtualization - Types of Virtualization - Implementation Levels of Virtualization - Virtualization Structures - Tools and Mechanisms - Virtualization of CPU, Memory, I/O Devices - Virtual Clusters and Resource management – Virtualization for Data-center Automation.

**DEPARTMENT OF COMPUTER SCIENCE**  
**MCA SYLLABUS (WITH EFFECT FROM 2015-2016)**

**UNIT III**

CLOUD INFRASTRUCTURE : Architectural Design of Compute and Storage Clouds – Layered Cloud Architecture Development – Design Challenges - Inter Cloud Resource Management – Resource Provisioning and Platform Deployment – Global Exchange of Cloud Resources.

**UNIT IV**

PROGRAMMING MODEL: Parallel and Distributed Programming Paradigms – MapReduce , Twister and Iterative MapReduce – Hadoop Library from Apache – Mapping Applications - Programming Support - Google App Engine, Amazon AWS - Cloud Software Environments - Eucalyptus, Open Nebula, OpenStack, Aneka, CloudSim

**UNIT V**

SECURITY IN THE CLOUD : Security Overview – Cloud Security Challenges and Risks – Software-as-a-Service Security – Security Governance – Risk Management – Security Monitoring – Security Architecture Design – Data Security – Application Security – Virtual Machine Security - Identity Management and Access Control – Autonomic Security.

**REFERENCES:**

1. Kai Hwang, Geoffrey C Fox, Jack G Dongarra, “Distributed and Cloud Computing, From Parallel Processing to the Internet of Things”, Morgan Kaufmann Publishers, 2012.
2. John W.Rittinghouse and James F.Ransome, “Cloud Computing: Implementation, Management, and Security”, CRC Press, 2010.
3. Toby Velte, Anthony Velte, Robert Elsenpeter, “Cloud Computing, A Practical Approach”, TMH, 2009.
4. Kumar Saurabh, “Cloud Computing – insights into New-Era Infrastructure”, Wiley India,2011.
5. George Reese, “Cloud Application Architectures: Building Applications and Infrastructure in the Cloud” O'Reilly
6. James E. Smith, Ravi Nair, “Virtual Machines: Versatile Platforms for Systems and Processes”, Elsevier/Morgan Kaufmann, 2005.
7. Katarina Stanoevska-Slabeva, Thomas Wozniak, Santi Ristol, “Grid and Cloud Computing – A Business Perspective on Technology and Applications”, Springer.
8. Ronald L. Krutz, Russell Dean Vines, “Cloud Security – A comprehensive Guide to Secure Cloud Computing”, Wiley – India, 2010.
9. Rajkumar Buyya, Christian Vecchiola, S.Thamarai Selvi, ‘Mastering Cloud Computing’, TMGH,2013.
10. Gautam Shroff,Enterprise Cloud Computing,Cambridge University Press,2011
11. Michael Miller, Cloud Computing,Que Publishing,2008
12. Nick Antonopoulos, Cloud computing,Springer Publications,2010

**MCA 505 B: 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.

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**MCA SYLLABUS (WITH EFFECT FROM 2015-2016)**

**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 Digital Image Processing, McGraw Hill.
5. Pinks, 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 C: 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
6. Pressman, R.S., Software Engineering, McGraw Hill International

**MCA 505D: NATURAL LANGUAGE PROCESSING WITH PYTHON**

**UNIT I**

Introduction and Overview What is Natural Language Processing, hands-on demonstrations. Ambiguity and uncertainty in language. The Turing test. Regular Expressions Chomsky hierarchy, regular languages, and their limitations. Finite-state automata. Practical regular expressions for finding and counting language phenomena. A little morphology. Exploring a large corpus with regex tools. Programming in Python An introduction to programming in Python. Variables, numbers, strings, arrays, dictionaries, conditionals, iteration. The NLTK (Natural Language Toolkit) String Edit Distance and Alignment Key algorithmic tool: dynamic programming, a simple example, use in optimal alignment of sequences. String edit operations, edit distance, and examples of use in spelling correction, and machine translation.

**UNIT II**

Context Free Grammars Constituency, CFG definition, use and limitations. Chomsky Normal Form. Top-down parsing, bottom-up parsing, and the problems with each. The desirability of combining evidence from both directions Non-probabilistic Parsing Efficient CFG parsing with CYK, another dynamic programming algorithms. Earley parser. Designing a little grammar, and parsing with it on some test data. Probability Introduction to probability theory Joint and conditional probability, marginals, independence, Bayes rule, combining evidence. Examples of applications in natural language. Information Theory The "Shannon game"--motivated by language! Entropy, cross-entropy, information gain. Its application to some language phenomena.

**UNIT III**

Language modeling and Naive Bayes Probabilistic language modeling and its applications. Markov models. N-grams. Estimating the probability of a word, and smoothing. Generative models of language. Part of Speech Tagging and Hidden Markov Models , Viterbi Algorithm for Finding Most Likely HMM Path , Dynamic programming with Hidden Markov Models, and its use for part-of-speech tagging, Chinese word segmentation, prosody, information extraction, etc.

**UNIT IV**

Probabilistic Context Free Grammars Weighted context free grammars. Weighted CYK. Pruning and beam search. Parsing with PCFGs A tree bank and what it takes to create one. The probabilistic version of CYK. Also: How do humans parse? Experiments with eye-tracking. Modern parsers. Maximum Entropy Classifiers The maximum entropy principle, and its relation to maximum likelihood. Maximum entropy classifiers and their application to document classification, sentence segmentation, and other language tasks

**UNIT V**

Maximum Entropy Markov Models & Conditional Random Fields Part-of-speech tagging, noun-phrase segmentation and information extraction models that combine maximum entropy and finite-state machines. State-of-the-art models for NLP.

**DEPARTMENT OF COMPUTER SCIENCE**  
**MCA SYLLABUS (WITH EFFECT FROM 2015-2016)**

Lexical Semantics Mathematics of Multinomial and Dirichlet distributions, Dirichlet as a smoothing for multinomial's. Information Extraction & Reference Resolution- Various methods, including HMMs. Models of anaphora resolution. Machine learning methods for co reference.

**TEXT BOOKS:**

1. "Speech and Language Processing": Jurafsky and Martin, Prentice Hall
2. "Statistical Natural Language Processing"- Manning and Schutze, MIT Press
3. "Natural Language Understanding". James Allen. The Benajmins/Cummings Publishing Company

**REFERENCES BOOKS:**

1. Cover, T. M. and J. A. Thomas: Elements of Information Theory. Wiley.
2. Charniak, E.: Statistical Language Learning. The MIT Press.
3. Jelinek, F.: Statistical Methods for Speech Recognition. The MIT Press.
4. Lutz and Ascher - "Learning Python", O'Reilly.

**SIXTH SEMESTER**

**MAJOR PROJECT WORK:**

- |                                                                                                     |            |
|-----------------------------------------------------------------------------------------------------|------------|
| 1. Project Seminar (Internal)                                                                       | : 50 Marks |
| 2. Project Report (Internal)                                                                        | : 50 Marks |
| 3. National / International Conference Publication Proceedings (External)                           | : 50 Marks |
| (paper based on project should be submitted to conference and published in the form of proceedings) |            |
| 4. National / International Journal Publication (External)                                          | : 50 Marks |
| (paper based on project should be submitted to the journal and should be published)                 |            |
| 5. Viva Voce (External)                                                                             | : 50 Marks |
| 6. Project Execution (External)                                                                     | : 50 Marks |