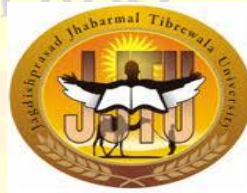


SHRI JAGDISHPRASAD JHABARMAL TIBREWALA

UNIVERSITY CHUDELA JHUNJHUNU

RAJASTHAN



INSTITUTE OF ENGINEERING

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

TEACHING, EXAMINATION SCHEME AND DETAILED

SYLLABUS

FOR

MCA (MASTER OF COMPUTER APPLICATION)

EFFECTIVE FROM ACADEMIC SESSION 2015 – 2016

Year: I

Semester: I

S. No.	Code	Subject Name	Hrs./Week			Exam Hrs.	Maximum & Minimum Marks		
			L	T	P		Internal/Min. Pass Marks	External/Min. Pass Marks	Total/Min. Pass Marks
Theory									
1	MCA-101	Computer Architecture	3	1	-	3	30/12	70/28	100/40
2	MCA-102	Programming in C	3	1	-	3	30/12	70/28	100/40
3	MCA-103	Algorithms and Data Structures Using C	3	1	-	3	30/12	70/28	100/40
4	MCA-104	Web Design and Development	3	1	-	3	30/12	70/28	100/40
5	MCA-105	Discrete Mathematics	3	1	-	3	30/12	70/28	100/40
6	MCA-106	Business Accounting Fundamentals	3	1	-	3	30/12	70/28	100/40
Practical's									
7	MCA-107	Programming in C Lab	-	-	2	3	40/16	60/24	100/40
8	MCA-108	Data Structure Lab	-	-	2	3	40/16	60/24	100/40
9	MCA-109	Web Authoring Tools Lab	-	-	2	3	40/16	60/24	100/40
10	MCA-110	Office Management Lab	-	-	2	3	40/16	60/24	100/40
Total			18	6	8				1000
Total Teaching Load			32						

Year: I

Semester: II

S. No.	Code	Subject Name	Hrs./Week			Exam Hrs.	Maximum & Minimum Marks		
			L	T	P		Internal/Min. Pass Marks	External/Min. Pass Marks	Total/Min. Pass Marks
Theory									
1	MCA-201	Object Oriented Programming Using C++	3	1	-	3	30/12	70/28	100/40
2	MCA-202	Operating System Fundamentals	3	1	-	3	30/12	70/28	100/40
3	MCA-203	Computer Oriented Numerical Methods	3	1	-	3	30/12	70/28	100/40
4	MCA-204	Data Communication and Computer Networks	3	1	-	3	30/12	70/28	100/40
5	MCA-205	Database Management Systems	3	1	-	3	30/12	70/28	100/40
6	MCA-206	Computer Graphics	3	1	-	3	30/12	70/28	100/40
Practical's									
7	MCA-207	Programming in C++ Lab	-	-	2	3	40/16	60/24	100/40
8	MCA-208	CONM Lab	-	-	2	3	40/16	60/24	100/40
9	MCA-209	DBMS Lab	-	-	2	3	40/16	60/24	100/40
10	MCA-210	Computer Graphics Lab	-	-	2	3	40/16	60/24	100/40
Total			18	6	8				1000
Total Teaching Load			32						

Year: II

Semester: III

S. No.	Code	Subject Name	Hrs./Week			Exam Hrs.	Maximum & Minimum Marks		
			L	T	P		Internal/Min. Pass Marks	External/Min. Pass Marks	Total/M in. Pass Marks
Theory									
1	MCA-301	Programming in Java	3	1	-	3	30/12	70/28	100/40
2	MCA-302	System Analysis & Designing Concepts	3	1	-	3	30/12	70/28	100/40
3	MCA-303	Linux OS and Shell Programming	3	1	-	3	30/12	70/28	100/40
4	MCA-304	Application Development Using .NET Framework	3	1	-	3	30/12	70/28	100/40
5	MCA-305	Data Warehousing & Data Mining	3	1	-	3	30/12	70/28	100/40
6	MCA-306	Theory of Computing	3	1	-	3	30/12	70/28	100/40
Practical's									
7	MCA-307	Programming in Java Lab	-	-	2	3	40/16	60/24	100/40
8	MCA-308	Linux OS and Shell Programming Lab	-	-	2	3	40/16	60/24	100/40
9	MCA-309	.NET Lab	-	-	2	3	40/16	60/24	100/40
10	MCA-310	Data Warehousing & Data Mining Lab	-	-	2	3	40/16	60/24	100/40
Total			18	6	8				1000
Total Teaching Load			32						

Year: II

Semester: IV

S. No.	Code	Subject Name	Hrs./Week			Exam Hrs.	Maximum & Minimum Marks		
			L	T	P		Internal/Min. Pass Marks	External/Min. Pass Marks	Total/M in. Pass Marks
Theory									
1	MCA-401	Computer Based Optimization Techniques	3	1	-	3	30/12	70/28	100/40
2	MCA-402	Advanced Java Programming & Technology	3	1	-	3	30/12	70/28	100/40
3	MCA-403	Advanced Database Systems	3	1	-	3	30/12	70/28	100/40
4	MCA-404	Software Engineering	3	1	-	3	30/12	70/28	100/40
5	MCA-405	E-Commerce	3	1	-	3	30/12	70/28	100/40
6	MCA-406	Mobile Communication & Network	3	1	-	3	30/12	70/28	100/40
Practical's									
7	MCA-407	Advanced Java Lab	-	-	2	3	40/16	60/24	100/40
8	MCA-408	Advanced DBMS Lab	-	-	2	3	40/16	60/24	100/40
9	MCA-409	Software Engineering Lab	-	-	2	3	40/16	60/24	100/40
10	MCA-410	Mini Project	-	-	2	3	40/16	60/24	100/40
Total			18	6	8				1000
Total Teaching Load			32						

Year: III

Semester: V

S. No.	Code	Subject Name	Hrs./Week			Exam Hrs.	Maximum & Minimum Marks		
			L	T	P		Internal/Min. Pass Marks	External/Min. Pass Marks	Total/Min. Pass Marks
Theory									
1	MCA-501	Information Security & Cryptography	3	1	-	3	30/12	70/28	100/40
2	MCA-502	Wireless Technology	3	1	-	3	30/12	70/28	100/40
3	MCA-503	Analysis and Design of Algorithms	3	1	-	3	30/12	70/28	100/40
4	MCA-504	Simulation & Modeling	3	1	-	3	30/12	70/28	100/40
5	MCA-505	ERP Systems	3	1	-	3	30/12	70/28	100/40
Practical's									
6	MCA-506	Wireless Technology Lab	-	-	2	3	40/16	60/24	100/40
7	MCA-507	ADA Lab	-	-	2	3	40/16	60/24	100/40
8	MCA-508	Seminar	-	-	2	3	40/16	60/24	100/40
9	MCA-509	Major Project	-	-	2	3	80/32	120/48	200/80
Total			15	5	8				1000
Total Teaching Load			28						

Year: III

Semester: VI

S. No.	Code	Subject Name	Hrs./Week			Exam Hrs.	Maximum & Minimum Marks		
			L	T	P		Internal/Min. Pass Marks	External/Min. Pass Marks	Total/Min. Pass Marks
1	MCA-601	Industrial Project	-	-	-	3	200/80	300/120	500/200

MCA-101: Computer Architecture

Unit-1

Combinational Digital Circuits: Gates, Boolean Functions and Expressions, Designing Gate Networks, Useful Combinational Parts, Programmable Combinational Parts, Timing and Control, Latches, Flip-Flops and Registers, Sequential Circuits, Useful Sequential Parts, Programmable Sequential Parts, Clocks and Timing of Events.

Unit-2

Computer System Technology: Components to Applications, Computer Systems and their Parts, Generations, Processor and Memory Technologies, Peripherals I/O and Communications, Software Systems and Applications. Instruction and addressing, instruction formats, types, addressing modes.

Unit-3

Assembly Language Programs, Assembler Directives, Pseudo Instructions, Macroinstructions, Linking and Loading, 8085 Instruction Set.

Arithmetic/Logic Unit: Number Representation, Arithmetic Operations, Floating-Point Arithmetic.

Unit-4

Memory System Design: Main Memory Concepts, Cache Memory Organization, Mass Memory Concepts, Virtual Memory and Paging. Input / Output and Interfacing, Input / Output Devices, Input/ Output Programming, Interrupts.

Unit-5

Vector And Array Processing, Shared-Memory, Multiprocessing, Distributed Multi Computing. Programming in 8085 Microprocessor.

Text/References:

1. Computer Organization and Architecture - William Stallings (Pearson Education Asia)
2. Computer Organization and Architecture -John P. Hayes (McGraw -Hill)
3. Computer Organization -V. Carl. Hamacher (McGraw-Hill)
4. Computer Organization & Design, Patterson & Hennessy, ELSEVIER

MCA-102: Programming in C

Unit-1

Problem Solving with Computers: Algorithms, and Flowcharts. Data types, constants, variables, operators, data input and output, assignment statements, conditional statements, string and character handling, data validation examples.

Unit-2

Iteration, arrays, strings processing, defining function, types of functions, function prototype, passing parameters, recursion.

Unit-3

Storage class specifiers, pre-processor, header files and standard functions.

Unit-4

Pointers: Definition and uses of pointers, pointer arithmetic, pointers and array, pointers and functions, pointer to pointer.

Unit-5

Structures, union, pointers to structures, user-defined data types, enumeration. Datafiles: Opening, closing, creating, processing and unformatted data files. Introduction to Dynamic Memory Allocation, command line arguments, systems calls.

Text/References:

1. C Programming Language, Kernighan & Ritchie, PHI.
2. C How to Program, Dietel&Dietel, PHI
3. The Complete Reference C, Schildt, TMH

MCA-103: Algorithms and Data Structures Using C

Unit-1

Algorithms, Pseudo-Code, efficiency of algorithms, analyzing algorithms and problems, complexity measures, basic time analysis of an algorithm, space complexity, Data abstraction and basic data structures, data type and abstract data types.

Unit-2

Basic data structure- Arrays, Stack, Queues and their applications, linked and sequential representation of arrays stacks & queue. Linked lists, representation of linked list in memory, insertion, deletion and searching of linked list, two way lists. Arithmetic expression, Polish notations, dequeue and priority queues.

Unit-3

Trees: Basic concept, linked representation, representation in continuous memory. Binary and N-ary trees, Searching, insertion and deletion in binary search tree, traversing algorithms using stacks, header node threads.

Unit-4

Graphs and their representation, sequential representation o– Adjacency matrix, linked representation of graphs, operations on graph, traversing a graph. DFS and BFS algorithms, Heap structure, heap sort algorithm.

Unit-5

Searching and sorting, use of various data structures for searching and sorting, Internal and external sorting techniques Linear and Binary search, Hash tables and hashed searching, Bubble sort, Insertion sort, Selection sort, Merge sort, Radix sort, Bubble, Quick sort.

Text/References:

- 1.S. Lipschutz: Data Structures;McGraw Hill International Edition, 2008.
- 2.A.V. Aho., J.E. Hopcroft, and J.D. Ullman, Data Structures and Algorithms, 3rd Edition; Pearson Education Asia, 2008.
- 3.Salaria R.S.; Data Structure and Algorithms Using C/C++; 4th Edition; Khanna.
- 4.Patel R.B.; Expert Data Structures with C; 2nd Edition; Khanna.
- 5.A. Michael Berman: Data Structures via C++. Oxford University Press.
- 6.Jean-Paul Tremblay and Paul G. Sorenson, An Introduction to Data structures with applications, TMH Publishing Co.Ltd.

MCA-104: Web Design and Development

Unit-1

The internet: history of the World Wide Web, hardware and software trend, object technology –java script object, scripting for the web-browser portability.

Unit-2

Introduction of HTML: introduction, markup language, editing HTML : common tags, headers, text styles, linking, images, formatting text, horizontal rules and more line breaks, unordered lists, nested and ordered lists, tables tag, basic HTML forms, more complex HTML forms, internal linking, creating and using image maps.

Unit-3

Java script – introduction to scripting: introduction- memory concepts- arithmetic-decision making. Java script control structures, Java script functions: introduction – program modules in java script - function definitions, duration of identifiers, scope rules, recursion, javascript global functions. Java script objects: introduction, math, string, data, Boolean and number objects.

Unit-4

Dynamic HTML: CSS: introduction – inline styles, creating style sheets with the style element, conflicting styles, linking external style sheets, positioning elements, backgrounds, element dimensions, text flow and the box model, user style sheets.

Event model: introduction, event ON CLICK, event ON LOAD – error handling with ON ERROR, tracking the mouse with event, more DHTML events.

Unit-5

Introduction to PHP – Advantages of PHP – Functions – Data types – Arrays – SQL – Connecting Databases using ODBC – Files – Forms – Images –Imap objects.

Text/References:

1. Internet & World Wide Web How to Program, Dietel & Dietel, Pearson.
2. Web Programming, Bai wt.al, Thomson

MCA-105: Discrete Mathematics

Unit-1

Introduction to Discrete Mathematical Structures, Formal Methods: Introduction and Analogy, Abstraction.

Unit-2

Fundamentals: Sets & Relations- Sets, Types of Sets, Multi Sets, Operations on Sets, Relations and Properties of Relations, Representation of Relations, Equivalence Relation, Closures of Relations, Methods of Proof-Direct Proofs, Indirect Proofs, Mathematical Induction, Method of Contradiction.

Unit-3

Combinatorics: Permutations and Combinations, Pigeon Hole Principle, Principle of Inclusion and Exclusion, Sequence and Series, Generating Functions. Mathematical Logic, Posets and Lattices: Partial Order Set, Bounding Elements, Well Ordered Set, Topological Sorting, Lattices, Principle of Duality, Bounded, Distributed, and Complemented Lattices, Proposition and Propositional Calculus.

Unit-4

Graphs and Group Theory: Basic Introduction of Graphs- Types of Graphs, Path and Circuits, Eulerian Path and Circuits, Hamiltonian Path and Circuits, Shortest Path Algorithms, Group, Definitions and Properties, Coset & Subgroup, Normal subgroup, Homomorphism of groups, Cyclic Group, Permutation Group.

Unit-5

Finite State Machines and Languages: Grammar and Languages- Phrase structure Grammar, Types of Grammars and Languages, Finite State Machines and Languages, Minimization of Finite State Machines.

Text/References:

1. Kenneth H. Rosen, "Discrete Mathematics and Its Applications", TMH
2. C.L. Liu, "Elements of Discrete Mathematics", TMH.
3. Kolman, Busby & Ross, "Discrete Mathematical Structures", PHI.
4. Narsingh Deo, "Graph Theory With Application to Engineering and Computer Science", PHI
5. Tremblay J.P. & Manohar P., "Discrete Mathematical Structures with Applications to Computer Science", McGraw Hill.

MCA-106: Business Accounting Fundamentals

Unit-1

Definition of Accounting and its advantages & limitations, Scope of accounting, Branches of Accounting – Financial Accounting – Cost Accounting – Management Accounting, users of Accounting information, Methods of Accounting, Double Entry Accounting System, Types of Accounts and Rules for Debit and Credit. Cash and Credit Transaction, Cash discount and Trade discount.

Unit-2

Preparation of Journal, Ledger and Trial Balance. Final Accounts and Accounting Ratios, Preparation of Final Accounts (Sole Proprietorship only), Preparation of Trading A/c, Profit & Loss A/c and Balance Sheet covering simple adjustments.

Unit-3

Accounting Ratios: Meaning, Advantages and Limitations of Accounting ratios Computation of following ratios only: Gross Profit Ratio, Net Profit Ratio, Stock Turnover Ratio, Operating Ratio, Current Ratio, Liquid Ratio, Debtors Ratio, Creditors Ratio, Return on Capital Employed, Earning Per Share, Return on shareholders fund.

Unit-4

Cost Accounting: Meaning and definition of Cost Accounting – its Advantages & Limitations Budgetary Control, Definitions – Advantages – Limitations, Procedure for setting up Budgetary Control, Different types of budgets, Advantages and limitations of Cash Budget and preparation of Cash Budget.

Unit-5

Marginal Costing: Meaning-Advantages- Limitations, Break Even Point, Margin of Safety, Profit Volume Ratio, Application of Marginal Costing including simple problems on make or buy and product mix.

Text/References:

1. Accounting for Management – Vijay Kumar, Tata McGraw-Hill.
2. Accounting: Text and Cases(SIE) - Anthony, N. Robert, Hawkins and Merchant, McGrawHill.
3. Advanced Management Accounting, Vol. 1&2 – S. N. Maheshwari, and S. K. Maheshwari, Vikas Publishing House.
4. Advanced Management Accounting - Kaplan and Atkinson, 3rd
5. Cost Accounting and Costing Methods - H. J. Weldon, Macdonald and Evans.ed. Prentice Hall.
6. Managerial Finance - Weston, John. Fred. Thomas, E. Copeland, Dryden press.
7. Basic Business Finance: A Text. R. D. Irwin - Pearson Hunt, Charles Marvin Williams, Gordon Donaldson.
8. Basic Financial Management - Khan & Jain, Tata McGraw-Hill.
9. Financial Decision Making: Concepts, Problems and Cases - Hampton, J. John, Prentice –Hall International.
10. Financial Management - Periasamy, Tata McGraw-Hill.

MCA-201: Object Oriented Programming Using C++

Unit – I

Need of Object Oriented Programming, Advantages of OOP, Comparison of Functional Programming and OOP Approach, Essentials of OOP (Objects, classes, Encapsulation, Data abstraction, Inheritance, Reusability, Polymorphism, Delegation, Message Communication).

C++ Basics : Preprocessors, Comments, Data types, Operators, Expressions, Loops and Decisions, Arrays and String handling, Modular Programming with Functions, Structure and Unions.

Unit – II

Pointers and Run time binding, Dynamic memory allocation, Storage class specifiers. Classes, Member functions, Objects, Arrays of objects. Pointers : Addresses and pointers, pointer & arrays, pointer & functions, use of pointers in strings and pointers to objects. and Classes, Nested classes, Constructors, Destructors, Inline member functions, Friend Functions, Static member function.

Inheritance, Single Inheritance, types of base classes, types of derivations, multiple inheritance, container classes, member access control.

Unit – III

Functions Overloading, Operator Overloading, polymorphism, early binding, polymorphism with pointers, Unary and Binary Operator Overloading, Overload Assignment Operator, Copy Constructor, Data Conversion between Objects of different classes. C++ Free Store.

Virtual Function : Virtual function, late binding, pure virtual functions, Abstract classes, Generic Programming with Templates, Friend functions, Overloaded Function Templates, Multiple Arguments function Template.

Unit – IV

Stream Computation with Console, Stream Computation with Files, opening and closing of files, stream state member functions, binary file operations, structures and file operations, classes and file operations, random access file processing. Exception handling : Exception handling mechanism, Throwing mechanism, Catching mechanism. Implementation of basic data structures in C++ such as arrays, stack, queues, linked list and sequential representation.

Recommended Books

1. Herbert Schildt; C++ : The Complete Reference; 4thEdn; TMH, 2003.
2. Robert Lafore; Object Oriented Programming in C++; 4th Edition; Techmedia
3. Balagurusamy E.; Object Oriented Programming C++; 4th Edition; TMH, 2009.
4. Venugopal, Rajkumar; Mastering C++; Tata Mcgrow Hill, 2006.
5. Kanetkar Y.; LET US C++; BPB; 2009.
6. Deitel and Deitel: How to Program C++, addison Wesley, Pearson Education Asia
7. John R. Hubbard, Programming with C++, McGraw Hill International.

MCA-202: Operating System Fundamentals

Unit – I

Necessity of an Operating system, Operating system structure, Evolution of Operating Systems (multiprogramming systems, batch systems, timesharing system, distributed systems and Real-time system). Operating system structure, Operating system components and services. System calls, system programs, Virtual machines.

Unit – II

Process Management: Process concept, Process scheduling, Cooperating processes, Threads, Inter-process communication, CPU scheduling criteria, Scheduling algorithms, Multiple-processor scheduling, Real-time scheduling and Algorithm evaluation.

Process Synchronization and Deadlocks: The Critical-Section problem, synchronization hardware, Semaphores, Classical problems of synchronization, Critical regions, Monitors, Deadlocks-System model, Characterization, Deadlock prevention, Avoidance and Detection, Recovery from deadlock, Combined approach to deadlock handling.

Unit – III

Storage management: Memory Management-Logical and Physical Address Space, Swapping, Contiguous Allocation, Paging, Segmentation with paging, Virtual Memory, Demand paging and its performance, Page replacement algorithms, Allocation of frames, Thrashing, Page Size and other considerations, Demand segmentation, File systems, secondary Storage Structure, File concept, access methods, directory implementation, Efficiency and performance, recovery, Disk structure, Disk scheduling methods, Disk management, Recovery, Disk structure, disk scheduling methods, Disk management, Swap-Space management, Disk reliability.

Unit – IV

Goals of Protection, Domain of protection, The Security problem, Program threats, Authentication, One Time passwords, Program threats, System threats, Threat Monitoring, Encryption. Computer Security techniques.

Case Study : Windows NT – Design principles, System components, Environmental subsystems, File system, Networking and program interface.

Recommended books:

1. Galvin P.B., Silberschatz ; Operating System Principles; (Seventh Edition);J. Wiley, 2008.
2. Willium Stalling; Operating Systems : Internal & Design Principles; Sixth Edn; Pearson., 2009.
3. Gary Nutt: Operating Systems-A Modern Perspective (Second Edition), Pearson Education, 2008.
4. Tanenbaum A.S., Modern Operating Systems, 2ndEdn., PHI Publ,2003.
5. D.M. Dhamdhare: Systems Programming and Operating Systems (Second Edition), Tata Mc-Graw Hill Publishing Company Limited.
6. Harvey M. Deitel, Operating Systems, Pearson Education.

MCA-203: Computer Oriented Numerical Methods

Unit – I

Floating Point Arithmetic- Representation, Operation, Normalization; Pitfalls of Floating-point Representation, Errors in Numerical computation, Measures of Accuracy.

Locating Roots of Equations: Bisection Method, Newton's Method, Secant Method, Muller's Method.

Unit – II

Interpolation and Numerical Differentiation: Newton's Forward Difference Interpolation, Newton's Backward Difference Interpolation, Lagrange's Interpolation Formula.

Numerical Integration Definite Integral, Trapezoid Rule, Simpson's Rule, Romberg Algorithm, Adaptive Simpson's Scheme, Gaussian Quadrature Formulas.

Unit – III

Solution of Linear Equations: Gaussian Elimination, Gaussian Elimination with Scaled Partial Pivoting, Iterative Solution of Linear Systems, Gauss-Seidel Iteration Method, Power Methods, Eigen values and Eigenvectors.

Ordinary Differential Equations Initial-Value Problem: Analytical vs. Numerical Solution, Taylor Series Methods, Runge-Kutta Methods, Euler method.

Unit – IV

Smoothing of Data and the Method of Least Squares, Least Squares curve fitting, Straight line and non-linear curve fitting, Cubic Splines, Chebyshev polynomials.

Random Numbers, Estimation of Areas and Volumes by Monte Carlo Techniques.

Recommended Books:

1. Rajaraman V : Computer Oriented Numerical Methods, 3rd Edition; PHI,2005.
2. R.S. Salaria ; Computer Oriented Numerical Methods; 4th Edition; KhannaPubl,
3. Balagurusamy E.; Numerical Methods; I Edition; McGraw Hill., 2010.
4. Sastri; Introductory methods of Numerical Analysis; 3rdedition;PHI, 2001.
5. K.SankaraRao, Numerical Methods for Scientists and Engineers, Prentice Hall India.
6. Cheney and David Kincaid, *Numerical Methods and Computing*, Brooks/le, 2004
7. Krishnamurthy E. V. , Sen S. K. : Computer Based Numerical Algorithms, East-West Press

MCA-204: Data Communication and Computer Networks

Unit – I

Overview of Data Communication and Networks : Basic concept -Computer communication methods, Data Transmission modes, Signals; Modulation - Principles of Modulation, AM and FM Modulator Circuits, Pulse Code Modulation, signaling and decoding. Digital Band-pass Modulation. Demodulation - detection, signals and Noise, Detection of Binary Signal in Gaussian Noise, Demodulation of shaped Pulses, Digital Band Pass Demodulation.

Network Models : Internet model, OSI seven layer network model, Functions of OSI layers, LAN technologies - protocols and standards, LAN hardware, TCP/IP (Protocols, architecture, layers, services).

Unit – II

Data transmission : Data Communication Systems, DTE-DCE Interface, Modems, Transmission media(Guided & Unguided). Multiplexing - FDM, WDM, TDM, Digital Subscriber Line (Operation, Layers, Traffic control), FTTC, Error detection and correction; Microwave- Electromagnetic spectrum, Characteristics, use of MIW in communications; PM Microwave Radio Repeaters. Satellite - Artificial Satellite, Geosynchronous Satellites, Orbital classification, Spacing and Frequency allocation, Multiple accessing.

Optical fiber communication : Basic concept of light propagation, Fiber Cables, Light sources, Optical Detectors, Fiber cable losses, wave division multiplexing, fiber distributed data interface, the fiber channel.

Unit – III

Internet : Internet Architecture, Internet protocol and datagram, Routing protocols, UDP, Internet standard services, DNS. Networking Technologies, ISDN(Services, Channels, Layers, Broadband ISDN), Cable Modem System, SMDS, Frame relay, fast Ethernet, 100VG-anyLAN and Gigabit Ethernet, FDDI and CDDI, Asynchronous Transfer, SONET(architecture, layers, frame, applications), DWDM Switching and Virtual LAN, Non-ATM Virtual LANs, IEEE 802.1Q VLAN standard, X.25 protocols, ATM (architecture, layers, classes, services).

Networking and Internetworking Devices : Repeaters, Bridges, Routers, Gateways and roles of these devices in communication.

Unit – IV

Network Performance, Analytical approaches, simulation, traffic monitoring. Network Management - SNMP, RMON and RMONv2, TMN, Directory services and network management. Issues related to network reliability and security, SSL and VPN, Introduction only to firewalls and Kerberos, Cyber Laws.

Recommended Books :

1. Behrouz A Foruzan, Data Communication and Networking; 3rd Edition; Tata McGraw Hill., 2004.
2. Behrouz A Foruzan, TCP/IP Protocol Suite; 2nd Edition; Tata McGraw Hill., 2003.
3. Stalling William ;Data and Computer Communication; 8th Edition; Pearson, 2009.
4. Tannenbaum ; Computer Networks;4th edition; PHI, 2008.
5. Wayne Tomasim Electronic Communications Systems, Pearson, Education Asia.
6. M.A. Miller, Data and Network Communications, Thomosn Learning.
7. Gilbert Held, Understanding Data Communication, Techmedia.
8. Fred Harshal, Data Communications Communications Networks, Pearson Education Asia.

MCA-205: Database Management Systems

Unit - I

Overview of DBMS : Basic concepts, Database system architecture, Schemas, Instances, Components, Database users, Three-tier architecture, Centralized, Distributed and Client/Server architecture, Data independence. Database models: Entity relationship model, hierarchical model, relational model, network model, Object-Oriented data model.

Data Modeling using ER Model : ER model concepts, ER diagram, mapping constraints, Keys, Generalization, aggregation, reduction of ER diagrams to tables, extended ER model, Relationship of higher degree. Enhanced ER Model : Concepts, Specialization, Generalization, Data abstraction, Knowledge representation and University EER Model as example.

Unit - II

Relational Model : Concepts, Constraints, languages, Relational database design by ER & EER mapping; Relational algebra, relational calculus.

Normalization : Functional dependencies, Normal forms – First, second, third and BCNF, inclusion dependencies, loss less join & decompositions, normalization using FD, MVD, and JDs, Alternative approach to database design.

Unit - III

Data storage : Magnetic disk and flash storage, RAID technology, tertiary storage. Indexing structure- Single and multiple level.

Transaction processing : Transactions atomicity, durability, serializability and isolation. Concurrency control techniques – Two phase locking, timestamp ordering, multiversion, granularity locking techniques. Database recovery techniques based on deferred & immediate updates and shadow paging.

Unit - IV

SQL: Characteristics of SQL, advantages, data types in SQL, SQL Operators, types of SQL commands, Tables, Indexes, Views, Nulls, Aggregate Functions, Select statement, Sub queries, Insert, Update and Delete operations, Joins, Unions. Introduction to Embedded SQL, Dynamic SQL & SQLJ. Data security, integrity and concurrency, Backup and recovery, numeric and text data in SQL, dealing with dates, Synonyms, Snapshots, Programming with SQL.

Reference Books:

1. Korth H F and Silberschatz A, Database System Concepts, Sixth Edition; McGraw Hill, 2006.
2. Navathe S.B., Elmasri R.; Fundamentals of Database Systems, Fifth Edition; Pearson. 2009.

MCA-206: Computer Graphics

Unit – I

Introduction: Elements of graphics workstation. Video Display Devices. Raster Scan Systems. Random Scan systems. Input devices. Graphics Software Coordinate Representations,

Algorithms: Line drawing algorithms- DDA Algorithm. Bresenham's Line Algorithm. Frame buffers. Midpoint Circle Algorithm. Midpoint Ellipse Algorithm, Scan-line polygon fill algorithm. Inside-Outside tests. Scan-Line fill of curved Boundary Areas. Boundary fill Algorithm. Flood fill Algorithm.

Unit – II

Graphics Primitives: Primitive Operations, The display file interpreter, Normalized Device Coordinates. Attributes of output primitives: Line attributes, Color and gray scale levels. Color-tables. Gray scale. Area- Fill Attributes, Fill styles. Pattern fill. Soft fill. Character Attributes.

Geometric Transformations: Matrices. Scaling Transformations. Sin and Cos Rotation. Homogeneous Co-ordinates and Translation. Co-ordinate Translations. Rotation about an arbitrary point. Inverse Transformations, Scaling Transformation, Reflection and Shear transformations, Transformations Routines.

Unit – III

2-D Viewing- The viewing pipeline. Viewing co-ordinate, Reference Frame. Windows to view ports . co-ordinate transformation 2-D Viewing functions. Clipping operations point clipping. Line clipping. Cohen- Sutherland. Line Clipping. Polygon clipping. Sutherland Hodge man clipping.

3-D concepts: Three dimensional Display Methods, Parallel projection. Perspective projection. Visible line and surface identification. Surface rendering. Three Dimensional Object representations. Bezier curves and surfaces. B-Spline curves and surfaces. Visibility, Image and Object Precision Z-buffer algorithm.

Unit – IV

Computer Animation : Design of Animation Sequence. General Computer Animation Function – Raster animations, Key Frame system, Morphing, Simulating Accelerations, Motion Specifications, Kinematics and Dynamics.

Recommended Books:

1. Hearn D., Baker P.D.; Computer Graphics; 2nd edition; Pearson, 2003.
2. Foley J.D.; Van D.A.; Fundamentals of Interactive Computer Graphics; 2nd Edition; Addison-Wiley, 2000.
3. Rongier D.F.; Elements of Computer Graphics;
4. Giloi W K ; Interactive Computer Graphics; PHI
5. Mewman W, Sproul R.F.; Principles of Interactive Computer Graphics; McGraw Hill.

MCA-301: Programming in Java

Unit I

Introduction to OOP, Paradigms of programming languages- Basic concepts of object oriented programming, objects and classes, data abstraction and encapsulation, inheritance, Polymorphism, Dynamic. Introduction to Java: History, Java Features, Java Environment- JDK, APL Types Of Java Programs, Creating And Executing A Java Program; Java Tokens: Keywords, Character Set, Identifiers, Literals, Separators: Java Virtual Machine (JVM); Command Line Argument; Comments In Java Program

Elements: Constants, Variable, Data Types, Scopes Of Variable, Type Casting. Operators- Arithmetic, Logical and Bitwise Operators, Increments and Decrements, Relational, Assignments, Conditional, Special Operator; Expression, Evaluation Of Expressions.

Unit II

Decision Making And Branching: If Statement And Its Types; Switch Statements; Decision Making And Looping- While Loop, Do-While, For Loop, Break, Labeled Loop, Continue Statement.

Array: One Dimensional Array, Multidimensional Array, Vectors, Wrapper Classes; String Array, String Methods, String Buffer Class.

Class And Objects : Defining A Class, Methods , Creating Objects, Accessing Class Members, Constructors, Method Overloading, Static Members, Nesting Of Methods, This Keyword, Command Line Input.

Inheritance: Defining A Subclass, Deriving A Subclass, Single Inheritance, Multilevel Inheritance, Hierarchical Inheritance, Overriding Methods, Final Variables And Methods, Final Classes, Finalizer Methods, Abstract Methods And Classes, Visibility Control- Public Access, Private Access, Friend, Protected. Interfaces- Multiple Inheritance, Defining Interface, Extending Interface, Implementing Interface, Accessing Interface Variables

Unit III

Packages: Java API Packages – System Packages< Naming Conventions, Creating And Accessing A Package, Finding Packages And CLASSPATH, Adding Class To Packages, Hiding Classes.

JAVA Stream: Data Flow with Java Stream. Input Stream, Output Streams

Exception Handling: Limitations Of Error Handling, Types Of Errors, Basis Of Exception Handling, Try Blocks, Throwing An Exception, Catching An Exception, Finally Statement. Declaration and Throwing Custom Exceptions.

Multithreading: Creating Threads, Life Of A Thread, Defining And Running Thread, Thread Method, Thread Priority, Synchronization, Implementing Run-Able Interface, Thread Scheduling.

Unit IV

Collection: The Collection Framework, The Collection Classes, Implementation Of Lists, Set And Map Interface, Accessing A Collection Via An Iterator, Object Ordering, The Sorted Set And Sorted Map Interface, Comparators.

GUI In Java: Applet And Its Use; Abstract Window Tool Kit, Event Listeners. AWT Controls And Event I Landing – Labels, Text Component, Action Events, Buttons, Checkboxes, Items Event, Choices, Scrollbars, Layout Managers, Input Events, Menus; Introduction To Swing

References/ Text books

1. Patrick Naughton, Herbert schildt, java. the complete reference 7 edition
2. E. Balagurusamay : programming with java – Tata McGrawhill Publishers, II edition.
3. Khalid A. Mughal, RolfW. Rasmussen; a programmer’s guide to java certification(2t Edn).
4. Cay S Horstmann, Gary Cornell: Core Java VOL I & II; The Sun Micro Systems Press.

MCA-302 System Analysis & Designing Concepts

Unit I

System concept and the information system environment. The system concept definition, system central objectives, elements of a system, environment, boundaries and the interfaces. Types of systems: physical or abstract systems, open or closed systems, roles, need and responsibility of system analyst, introduction to system development approaches- data oriented and object oriented.

System development life cycle: linear or waterfall cycle, linear cycle, phases of sw development life cycle. System planning and analysis: strategies for determining information requirement, problem definition & project initiation, background analysis, data and fact gathering techniques, feasibility studies, technical, operational, economic, cost benefit analysis, interface design tool, user interface evaluations.

Unit II

System design: process modeling, physical and logical design. Conceptual data modeling, entity relationship analysis, ER modeling, context diagram. Tool of structured analysis (DFD, data dictionary, decision tree. Decision tables, structured English). Structure chart, modules, parameter passing. Execution sequence, structured design, conversion from data flow diagram to structure charts.

Input/output forms design: requirement of forms design, user interface design, input design, CRT screen forms design , output design. File organization and database design: designing to fields, physical records, physical files, database designs, data structure, normalization, introduction to CASE tools, features advantages and limitations of CASE tools. System implementation, maintenance and documentation, testing, evaluation, maintenance activities, documentation, document configuration, maintaining a configuration.

Unit III

Introduction to MIS: Meaning and role of MIS, definition of MIS, system approach to MIS, MIS organization within a company. Concept of balanced MIS, effectiveness and efficiency criteria.

MIS planning: MIS structure and components, MIS features, problem and derivation of MIS plans, prioration and development strategies. Conceptual design of MIS: definition of problems, system objectives and system constraints, analysis of information source, alternative system design and selection optimal system.

Detailed system design and Implementation; application of basic design concepts of MIS, involvement of end user and role of MIS department and system Analyst, role of top management during design and implementation.

Unit IV

System Evaluation: System evaluation review and update, management and control of MIS function, Advanced MIS concept, Pitfalls in MIS development. Decision Support System: DSS definition, characteristics, application case stud. Expert System: Concept Structure, application and case study Application of MIS: application of MIS to E-business, application in manufacturing sector, service sector, DSS, Decision support system, Enterprise Management System.

Recommended Books:

1. System Analysis & Design by V K Jain, Dreamtech Press
2. Modern System Analysis & Design by A Hoffer, F George, S Valaciah Low Priced Edn. Pearson Education.

MCA-303 Linux OS and Shell Programming

Introduction to concept of Open source software, Linux , Linux Architecture, Linux file system (inode, Super block, Mounting and Unmounting), Essential Linux Commands, Kernel, Process Management in Linux, Signal Handling, System call, System call for Files, Processes and Signals.

Shell Programming – Introduction to Shell, Various Shell of Linux, Shell Commands, I/O Redirection and Piping, Vi and Emacs editor, Shell control statements, Variables, if-then-else, case-switch, While, Until, Find, Shell Metacharacters.

Shell Scripts, Shell keywords, Tips and Traps, Built in Commands, Shell Procedures and Reporting, Handling documents, C language programming, Prototyping, Coding, Compiling, Testing and Debugging.

Linux System Administrations – File listings, Ownership and Access Permissions, File and Directory types, Managing Files, User and its Home Directory, Booting and Shutting down (BootLoaders, LILO, GRUB, Bootstrapping, init Process, System services, Internet and Web service tools, E-mail, Remote Login and FTP, Networks and server setup, LAN, Connection with Internet, Setting up routers, Proxy Servers, Print Servers.

File Server, Mail server, FTP server, Web server and News server, DHCP and NIS, Database server.

Text/References:

- 1.A practical Guide to Linux, Sobell, Pearson.
- 2.A Practical Guide to Linux Commands, Editors, and Shell Programming, Sobell, Pearson.
- 3.A Practical Guide to Fedora and Red Hat Enterprise Linux, Sobell, 5e, Pearson.

MCA-304 Application Development Using .NET Framework

Unit-1

Introduction to .NET Framework: Genesis of .Net, Features of .Net, .Net framework class library, Microsoft Intermediate Language, Meta Data, .Net types and .net name spaces, Common Language Runtime, Common Type System, JIT compilation Common Language Specification, automatic memory management, .Net Applications using command line compiler and visual studio .net IDE. Variables Declaration , Data Type of variables, Forcing variables declarations, Scope & lifetime of a variable, Constants, Arrays, types of array, control array, Collections, Subroutines, Functions, Passing variable Number of Argument Optional Argument, Returning value from function. Control flow statements: conditional statement, loop statement. MsgBox & Inputbox.

Unit-2

Windows Programming : Loading, showing and hiding forms, controlling One form within another. GUI Programming with Windows Form: Textbox, Label, Button, Listbox, Combobox, Checkbox, PictureBox, RadioButton, Panel, scroll bar, Timer, ListView, TreeView, toolbar, StatusBar. There Properties, Methods and events. OpenFileDialog, SaveFileDialog, FontDialog, ColorDialog, PrintDialog. Link Label. Designing menus : Context Menu, access & shortcut keys.

Unit-3

ADO.NET – Overview of ADO, from ADO to ADO.NET, Accessing Data using Server Explorer. ADO. NET providers, Creating Connection, Command, Data Adapter and Data Set with OLEDB and SQLDB. Display Data on data bound controls, display data on data grid.

Unit-4

ASP.NET - Advantages of ASP.NET - ASP.NET Architecture – ASP Vs. ASP.NET - ASP.NET Page's Structure - Sample Program in ASP.NET - Page Events - HTML Server Controls - Basic Web Server Controls - Data List Web Server Controls - Validation Controls - Web User Controls in ASP.NET.

Advanced Concepts in ASP.NET: Request Object - Response Object - Code- Behind Feature of ASP.NET - Caching in ASP.NET - Output Caching - Fragment Caching - Data Caching - Session / State Management – Events and Abandon Method – Authentication in ASP.NET - Error Handling and Debugging - Tracing an Application – Accessing Data with ADO.NET – Implementing Crystal Reports in ASP.NET

Unit-5

Web Services and XML - Introduction to xml, Advantage of xml, xml Element, Naming Rules, Attributes Introduction to web service, web service Infrastructure, SOAP, UDDI, WSDL.

WEB SERVICES BUILDING BLOCK - Web Services – Definition – Web Services and EAI – Web Services Technologies – XML basics - web services Architecture – SOAP – WSDL – UDDI – WS – Addressing – WS – Routing – Web service implementation – Java based web services - .NET based web services

MCA-305 Data Warehousing & Data Mining

UNIT-1

DATA WAREHOUSE - Data Warehousing - Operational Database Systems vs Data Warehouses - Multidimensional Data Model - Schemas for Multidimensional Databases – OLAP operations – Data Warehouse Architecture – Indexing – OLAP queries & Tools.

UNIT-2

DATA MINING & DATA PREPROCESSING - Introduction to KDD process – Knowledge Discovery from Databases - Need for Data Preprocessing – Data Cleaning – Data Integration and Transformation – Data Reduction – Data Discretization and Concept Hierarchy Generation.

UNIT-3

ASSOCIATION RULE MINING - Introduction - Data Mining Functionalities - Association Rule Mining - Mining Frequent Item sets with and without Candidate Generation - Mining Various Kinds of Association Rules - Constraint-Based Association Mining.

UNIT-4

CLASSIFICATION & PREDICTION - Classification vs Prediction – Data preparation for Classification and Prediction – Classification by Decision Tree Introduction – Bayesian Classification – Rule Based Classification – Classification by Back propagation – Support Vector Machines – Associative Classification – Lazy Learners – Other Classification Methods – Prediction – Accuracy and Error Measures – Evaluating the Accuracy of a Classifier or Predictor – Ensemble Methods – Model Selection.

UNIT-5

CLUSTERING - Cluster Analysis: - Types of Data in Cluster Analysis – A Categorization of Major Clustering Methods – Partitioning Methods – Hierarchical methods – Density-Based Methods – Grid-Based Methods – Model Based Clustering Methods – Clustering High- Dimensional Data – Constraint Based Cluster Analysis – Outlier Analysis.

REFERENCE BOOKS:

1. Jiawei Han and Micheline Kamber “Data Mining Concepts and Techniques” Second Edition, Elsevier, Reprinted 2011.
2. K.P. Soman, Shyam Diwakar and V. Ajay “Insight into Data mining Theory and Practice”, Easter Economy Edition, Prentice Hall of India, 2006.
3. G. K. Gupta “Introduction to Data Mining with Case Studies”, Easter Economy Edition, Prentice Hall of India, 2006.
4. Pang-Ning Tan, Michael Steinbach and Vipin Kumar “Introduction to Data Mining”, Pearson Education, 2007.

MCA-306 Theory of Computing

Finite Automata & Regular Expression: Basic Concepts of finite state system, Deterministic and non-deterministic finite automation and designing regular expressions relationship between regular expression & Finite automata minimization of finite automation mealy & Moore Machines

Regular Sets of Regular Grammars: Basic Definition of Formal Language and Grammars. Regular Sets and Regular Grammars closure proportion of regular sets, Pumping lemma for regular sets, decision Algorithms for regular sets, Myhell_Nerod Theory & Organization of Finite Automata

Context Free Languages & Pushdown Automata: Context Free Grammars – Derivations and Languages –Relationship between derivation and derivation trees – ambiguity – simplification of CEG – Grei back Normal form –Chomsky normal forms – Problems related to COMPUTER NETWORK FA and GNF Pushdown Automata: Definitions – Moves
–Instantaneous descriptions – Deterministic pushdown automata – Pushdown automata and CFL - pumping lemma for CFL - Applications of pumping Lemma.

Turing Machines: Turing machines – Computable Languages and functions – Turing Machine constructions – Storage in finite control – multiple tracks – checking of symbols – subroutines – two way infinite tape. Undecidability: Properties of recursive and Recursively enumerable languages – Universal Turing Machines as an undecidable problem – Universal Languages – Rice's Theorems

Reference Books:

1. John E. Hopcroft, Rajeev Motwani and J.D. Ulman, Introduction to Automata theory Languages and Computation, Pearson Education
2. John C. Martin, Introduction to Languages and the Theory of Computation, TMH.
3. Cohen, Introduction to Computer Theory, Pearson Education Asia.

MCA-401 Computer Based Optimization Techniques

Unit -1

Linear Programming Problems (LPP): formulation of an LPP, Solution of an LPP using graphics method and simplex method, Slack, Surplus & Artificial Variables, Two-phase and big-M method.

Special cases in LPP: alternate optimum solution, an unbounded solution, infeasible Solution, Duality in LPP, Revised Simplex method.

Unit-2

Transportation problem Definition, methods for finding initial basic feasible solutions - North West corner rule, least cost cell entry method, Vogel's approximation method, methods for finding optimal solution - MODI Method.

Assignment Problems: Definition & concept, solution of an assignment problem for optimum solution - Hungarian Method.

Sequencing: Job-problems for processing N jobs on 2 machines, processing N jobs on 3 machines, processing N jobs on M machines. processing 2 jobs on M machines (Graphic method)

Unit -3

Inventory Models: What is inventory? Types of inventories, Inventory Decisions, Cost involved in inventory problems, Controlled & Uncontrolled variables, deterministic inventory control system, concept of an average inventory, concept of economic order quantity (EOQ). (In short Model-I, II and Model-III).

Replacement Models: introduction - The replacement of items that determine (with money value), replacement of items that fail completely (Mortality theorem)

Unit-4

Project management by PERT & CPM: Introduction-Historical development of CPM/PERT, application of PERT-CPM techniques network diagram representation rule for drawing time estimation & critical path in network analysis.

Queuing theory: introduction queuing system queuing problem transient & steady states traffic intensity distribution of queuing system (Birth & death process) queuing models-I, II & III.

Recommended books:

1. Gillette B.E: introduction to operation research- A computer oriented algorithmic approach, Tata McGraw hill pub.co, New delhi.
2. Taha H.A: A operation research an introduction fifth edn. PHI new delhi.
3. Sharma S.D.: operation research kedarnat R., Meerut 2003
4. Kapoor V.K : operation research sultan chand and sons 1999

MCA-402 Advanced Java Programming & Technology

Unit-1

Introduction to advanced java application: Networking with java networking basics socket port proxy servers internet addressing and URL java. Net networking basics and interfaces implementing TCP/IP based server and client. Classes to be covered socket server socket IP address URL connections.

JAVA applet: Introduction applet architecture: The java applet. Applets class the five stages of an applet's life cycle methods for adding UI components methods for drawing and event handling.

Unit-2

Application in distributed environment: Remote method invocation-activation models-RMI custom sockets- Object Serialization – RMI-IIOP implementation – CORBA IDL. Technology – Naming Services- CORBA programming Models – JAR file creation.

Database Application: The JDBC Connectivity Model, Database Programming , Connecting to the Database Types of JDBC Drivers , Writing JDBC applications using select, insert, delete, update, Types of Statement objects (Statement, Prepared – Statement and Callable-Statement); Result set, Result setMetadata,: Inserting and updating records, Connection Pooling.

Unit-3

Introduction to J2EE : J2EE Overview , Need of J2EE: J2EE Architecture , J2EE Apls, J2EE Containers Overview of J2ME and its Features –Building MIDlets, Interface, Event Handling, Screens , List and Forms , J2ME-Overview, MIDlets, Create User Interface , Event Handling with Command Tickers, Screen , Text Box, List and Forms.

Servlet : Web Application Basics , Architecture and challenges of Web Application , servlet life cycle, Development and Deploying Servlets, Exploring Deployment

Descriptor(web.xml), Handling Request and Response , Initializing a Servlet , Accessing Database, Servlet Chaining Session Tracking & Management Dealing with cookies, Transferring Request, Accessing Web Context, Passing INIT and CONTEXT Parameter , Sharing information using scope object , Controlling concurrent access , user Authentication , Filtering Request and Response- Programming filter, Filter Mapping , Servlet Listeners.

Java Server Pages Technology: Basic JSP Architecture, Life Cycle of JSP (Translation , Compilation), JSP Tags and Expressions, Role of JSP in MVC-2 , JSP with Database , JSP Implicit Objects, Tag Libraries , JSP Expression Language(EL). Using Custom Tag, JSP Capabilities-Exception Handling, Session Management, Directives, JSP with Java Bean.

Unit-4

Java Beans: Introduction to Java Bean, Rules for writing a Simple Bean, Java Naming Directory Interface API, Java Naming Directory Interface concept.

Enterprise JAVA Beans: Enterprise Bean overview, Types of enterprise beans, Advantages of enterprise beans, The Life Cycles of Enterprise Beans, Working with Session Beans, State full vs. Stateless Session Beans, Working with Entity Beans, Message Driven Beans.

Introduction to Struts; (A Web Application Framework) Struts-config.xml: Understanding MVC architecture: Action Servlet, Action Form, Action Mapping, Action classes

Recommended books:

1. Cay SHorsmann and Gary Comell "Core Java2, Volume 2- Advanced Features", Pearson Education, USA-2005.
2. Kathy Sierra and Bryan Basham, "Head First Servlets and JSP", Shroff publishers and Distributers, Mumbai, 2007.
3. Marty Hall and Larry-Brown, "Core servlets and Java server pages: volume 1: Core Technologies", Pearson education, USA, 2008.
4. Marty Hall and Larry Brown, "Core servlets and java server pages: volum 2: Core technologies", Pearson education, USA, 2008.
5. Enterprise javaBeans (3rd edition), O'Reilly by Richard Monson-haefel.

Unit-1

Transaction Management and Concurrency Control: Transaction-Evaluating Transaction Results, Transaction properties, transaction Management with SQL, the transaction Log; Concurrency Controls; with locking Methods; Concurrency control with time Stamping Methods-Wait/Die and Wound/ Wait Schemes, Concurrency Control with optimism Methods, database Recovery Management.

Parallel database System: concepts, Architecture of Parallel Database, Inter-Query and Intra-Query Parallelism, Inter-Operational Parallelism, Design of Parallel Database Systems.

Unit-2

Introduction to Object-Based Database: Object Oriented Database Concepts, Advantages, OODBMS Features, Groups and Languages; Object Relational database Concepts and Design. Database Performance Tuning and Query Optimization: Database performance and tuning; Statistics; Query Processing; Indexes and Query Optimization; Optimizer Choices; SQL Performance Tuning. PI/SQL: Concepts of Embedded SQL, Dynamic SQL, SQLJ, PL/SQL concepts, Elements, Structures, Cursors, Triggers, and Database stored Procedures and SQL/PSM.

Unit-3

Distributed Database management system: Evolution characteristic, DDBMS, components, Levels of data and process distribution, Distributed database, transparency features, DDBMS Design data fragmentation, Data Replication, Data allocation, Client/server Vs. DDBMS

Introduction to Data warehousing and data mining: Data warehouse- Decision support architecture styles, twelve rules that define a data warehouse, data mining concepts. OLAP-concepts, architecture relation, OLAP V/S OLTP, star V/s clouding architecture

Unit-4

Database connectivity and web technology: Database connectivity – Native SQL connectivity. ODBC, DAO and RDO. OLE-DB, ADO.NET, Java Database connectivity(JDBC), Internet database-web-to-database, middleware, server-side extension, web server interfaces, the web Browser, Clients side extension, web application servers.

Database Administrator and Security :the need for and role of a database in an organization, The evolution of the database administrator function, The database environment's human components, the DBA's managerial role, The DBA's technical role, Security-Security policies, security vulnerabilities, database security, database administration tools-the data dictionary, developing a data administration strategy.

Recommended books:

1. Raghu Ramakrishnan and Johannes Gehrke, DATABASE MANAGEMENT SYSTEMS McGraw-Hill Publisher, third Edition Pub date: 2002, ISBN: 0-07-246563-8.
2. Fundamentals of Database Systems, R. Elmasri, and S. Navathe, Benjamin Cummings.
3. Principles of Data and Knowledge Base Systems, Volume 1, J.D. Ullman, Computer Science Press.
4. Database System Concepts, 2nd Edition, H.F. Korth and A. Silberschatz, McGraw-Hill.
5. A First Course in Database Systems, J. Widom and J. D. Ullman, Prentice-Hall.

MCA-404 Software Engineering

Unit-1

Software Engineering Paradigms : Software Characteristics, Software myths, Software Applications, Software Engineering Definitions, Various Software Process Models, Process iteration, Process activities, The Rational Unified Process, Computer-aided software engineering.

Project Management, Management activities, Project planning, Project scheduling, Risk management.

Unit-2

Software Requirements, Functional and non-functional requirements, User requirements, System requirements, Interface specification, software requirement document Requirements Engineering Processes, Feasibility studies, Requirements elicitation and analysis, Requirements validation, Requirements management System Models, Critical Systems Specification, Risk-driven specification, Safety specification, Security specification, Software reliability specification

Unit-3

Software Metrics and Measures — Process Metrics, Project metrics, Software Project Planning, Empirical, Putnam, COCOMO. Risk Identification and Projection: RMMM, Project Scheduling and Tracking.

Application Architectures — Data processing systems, Transaction processing systems, Event processing systems, Language processing systems, User Interface Design — Design issues, The user interface design process, User analysis, User interface prototyping, Interface evaluation Rapid Software Development — Agile methods, Extreme programming, Rapid application development, Software prototyping. Software Reuse — Design patterns, Generator-based reuse, Application frameworks, Application system reuse, Software Evolution

Unit-4

Verification and validation,— Planning verification and validation, Software inspections, Automated static analysis, Verification and formal methods.

Software Testing — System testing, Component testing, Test case design, Test automation.

Software Cost Estimation — Software productivity, Estimation techniques, Algorithmic cost modeling, Project duration and staffing.

Unit-5

Quality Management — Process and product quality, Quality assurance and standards, Quality planning, Quality control, Software measurement and metrics

Process Improvement — Process and product quality improvement, Process classification,

Process measurement — Process analysis and modeling, Process change, The CMMI process improvement framework.

Text/References:

1. Software Engineering, Pressman, TMH
2. Software engineering, Ian Sommerville, 8th
3. Software Engineering Fundamentals, Ali Behforooz, Hudson, Oxford Ed., Addison Wesley Longman.

MCA-405 E-Commerce

Unit-1

Basic concepts: Introduction, Definition, Objectives, Advantages and disadvantages, Forces driving E-Commerce, Traditional commerce Vs , E-Commerce , E-Commerce opportunities for industries , Growth of E-Commerce

Electronic Data Interchange: Concepts of EDI and Limitation, Application of EDI , Disadvantages of EDI , EDI Implementation, MIME and Value – Added Network , Internet-based EDI

Unit-2

E-Commerce Models: B2C,B2B,C2C,C2B other models- Brokerage Model aggregator Model, Info-mediary Model, Community Model and value chain model Advertise Model

Electronic Payment Systems: Special features required in payment systems, types of E-payment systems , E Cash , E-cheque , credit card, Smart card , Electronic purses, e-billing , E-e-Micro payments, point of Sales System (POS) – meaning uses structures

Unit-3

Customer Relationship Management & Technologies: E-Transition Challenges in Indian Corporate, E-Commerce and WWW, .e. Marketing , E-Customer Relationship Management , ECRM Problems and Solutions , CRM Capabilities and Customer life cycle , E-Supply Chain Management , E- Strategy- Planning the E-Commerce Project , E-Commerce Strategy and Knowledge Management , E-Business Strategy and Data Warehousing & Mining. ERP for E-Commerce, Customer effective Web Design – Requirement Strategy and Model

Unit-4

m-Commerce : Overview of mobile-commerce, Mobile delivery Technology & Switching Methods , Attributes of m-Commerce , Drivers of m-Commerce , m-Commerce Security issues , model ATM (ICICI Bank Case Study) , Application of m- Commerce , Mobile Financial Applications , m-wallet , Mobile Shopping , Advertising and Content provision. Case-Study

Security Issues in E-Commerce: Security risk of E-Commerce, Type of Threats, Security tools and risk management approach, Cyber laws, Business Ethics, IT Acts.

Text/References:

1. Bharat Bhaskar, Electronic Commerce- Framework Technology and Application Tata McGraw Hill
2. Ravi Kalakota & A. B. Whinston, Frontiers of electronic Commerce Pearson Education.

MCA-406 Mobile Communication & Network

Unit-1

Wireless communication: cellular systems- Frequency management and channel assignment types of handoff and their characteristics, dropped call rates & their evaluation; MAC, SDMA, FDMA, TDMA, CDMA, CELLULAR Wireless networks.

Unit-2

Wireless networks: wireless sensor networks-Principles and characteristics, constraints, distributed processing, wireless LAN, IEEE 802.11 STANDARDS, Architecture, services, Mobile adhoc networks-wifi and wi MAX, wireless local loop.

Unit-3

Mobile communication system: GSM-Architecture-location tracking and call setup mobility management, handover-security; GSM SMS, INTERNATIONAL roaming for GSM, CALL RECORDING FUNCTION subscriber and service data management; mobile number portability; voip service for mobile network; GPRS-architecture, GPRS procedures-attach and detach procedures PDF context procedure-combined RA/LA Update procedure – billing.

Unit-4

Mobile network and transport layers: Mobile IP, dynamic host configuration protocol, mobile ad hoc routing protocols, multicast routing, TCP over wireless networks , indirect TCP, snooping TCP , mobile TCP, fast retransmit/fast recovery, transmission/timeout freezing , selective retransmission, transaction oriented TCP, TCP over 2.5/3g wireless networks.

Unit-5

Application layer: WAP model, location based services, WAP gateway, WAP protocols, WAP user agent profile, caching model, wireless bearers for WAP, WML WML scripts- WTA-iMode- syncML.

TEXT/REFERENCES BOOKS:

1. JOCHEN schiller, "mobile communication," second edition pearson education ,2003.
2. William stalling, "wireless communication and networks," person education 2002.
3. Kavehpahlavan, Prasanth Krishna moorthy, "principle of wireless network," first edition, pearson education 2003
4. uwehansmannlotharmerk, martin s. Nicklons and Thomas stober, "principles of mobile computing," springer, 2003.
5. CSR prabhu editor, "mobile computing A book of reading," univ. press.
6. C.KTOh, " AdHoc mobile wireless networks," first edition, pearson education, 2002.

Unit—1

Introduction to Computer and Cryptography, Security Attacks, Security services and Mechanism. Classical Encryption Techniques: Classical Techniques, Conventional Encryption Model, Classical Encryption Techniques.

Modern Techniques: Simplified DES, Block Ciphers Principles, DES Standards , DES strength, Differential & Linear Cryptanalysis, Block Cipher Design Principles, Block cipher Modes of operation.

Unit—2

Conventional Encryption Algorithms: Triples DES, International Data Encryption Algorithm, RC5, RC2 placement & Encryption function, key Distribution, Random Number generation, Placement of encryption function.

Public key Encryption: Public key Cryptography :Principal of public key cryptosystems, RSA algorithm, Key management, Fermat's Theorem & Euler's Theorem, The Chinese remainder theorem.

Unit—3

Hash Functions: Message Authentication & Hash Function: Authentication Requirements, Authentication function, message authentication codes, Hash function, Birthday attacks, Security of hash function & MAC's, MD5 Message Digest algorithm Secure hash algorithm (SHA) Digital Signatures: Digital Signature, Authentication Protocol, Digital Signature Standard (DSS), proof of digital signature algorithm.

Unit—4

Network and System Security: Authentication Application- Kerberos x.509, Dictionary Authentication Services, Electronic Mail Security, Pretty Good Privacy (PGP), S/mime. Security: Architecture, Authentication Header, Encapsulation security payloads, combining security association, key management. Web Security: Secure socket layer & Transport layer security, secure electronic transaction (SET). System Security: Intruders, viruses firewall Design principle, Trusted Systems.

Reference Books:

1. William Stallings; Cryptography and network security, fifth Edn, Pearson.;
2. Atul Kahate; Cryptography and network security; Tata McgrawHill.
3. V.K. Pachghare; Cryptography and Information Security; PHI.
4. Malt Bishop, Sathyanarayana; Inroduction to Computer Security; Pearson.

MCA-502 Wireless Technology

Unit—1

Introduction of Wireless communication: Overview, Frequencies for Radio transmission, Evolution of cellular systems architecture & operation, performance criteria. Multiple access schemes for wireless communication- TDMA, FDMA, CDMA, CSMA, SDMA.

Unit—2

Wireless network planning and operation: Frequencies management, channel assignments, frequency reuse, system capacity & its types roaming, co-channel & adjacent channel interference.

Digital Cellular Networks: GSM architecture & interfaces, signal accessing in GSM, frame structure of GSM, Channels used in GSM.

Unit—3

Wireless LAN Technology: Overview, WLAN technologies, infrared LANs, Spread spectrum LANs narrowband, Microwave LANs IEEE 802.11- Architecture, protocols, MAC layer, MAC frame, MAC management.

Bluetooth: Overview, architecture of Bluetooth system, radio specification, base band specification, link manager specification, Logical link control and adaptation protocol.

Unit-4

Mobile data networks: Introduction, Data oriented CDPD networks, GPRS.

Wireless access protocol: WAP Architecture, wireless datagram, wireless transport layer security, wireless transaction, wireless session, wireless application environment, WML.

Reference Books:

1. Mobile communication engineering-Lee W.C.Y
2. Wireless communication, Principles & Practice- T. S Rappaport
3. Mobile communication, Pearson education-Schiller
4. Wireless communication & Networking- William Stalling

MCA-503 Analysis and Design of Algorithms

Unit-1

Introduction: - algorithm definition and specification – Design of Algorithms, and Complexity of Algorithms, Asymptotic Notations, Growth of function, Recurrences, Performance analysis.

Divide and conquer: - General method, binary search, merges sort & Quick sort.

Unit-2

The Greedy method:-General method, knapsack problem, a task scheduling problem, minimum cost spanning tree, single source shortest path.

Dynamic Programming – general method, multistage graphs, all pair shortest path, optimal binary search trees, 0/1 Knapsack, traveling salesman problem, flow shop scheduling.

Unit-3

Advanced data structures: Threaded trees, B-trees, Heaps and heapsort, sets and relations, Graphs, Hashing.

Backtracking: - general method, 8-Queens problem, sum of subsets, graph coloring – Hamiltonian cycles, knapsack problem.

Unit-4

Branch and bound:- 0/1 Knapsack problem, traveling salesperson.

Parallel models:-Basic concepts, performance Measures, Parallel Algorithms: Parallel complexity, Analysis of Parallel Addition, Parallel Multiplication and division, parallel Evaluation of General Arithmetic Expressions.

Text/References:

1. Cormen, Leiserson, Rivest: Introduction to Algorithms, Prentice Hall of India.
2. Horowitz and Sahani: Fundamental of Computer algorithms.
3. Aho A.V , J.D Ulman: Design and analysis of Algorithms, Addison Wesley

MCA-504 Simulation & Modeling

Unit-1

System Models: Concept, Environment, Continuous and discrete systems, Types of Models; Subsystems, System Analysis, System design; System simulation Technique, Monte Carlo method, types of system simulation.

Unit-2

Continuous system simulation: Continuous system Models, Methods, Digital-Analog Simulators and feedback systems.

Dynamic System-Concepts, Elements of System Dynamic modeling, Exponential growth, Decay & modified models, generalization of growth models, system dynamic diagram, multi segment model, feedback in socio economic system, dynamo language.

Unit-3

Probability concepts in simulation: Stochastic variables and probability functions; Discrete system simulation; fixed time step v/s event-to-event model, Generation of Random numbers, Monte Carlo Computation V/S Stochastic simulation. Simulation of Queuing system, Simulation of single and two servers queue, Network Model of a project.

Unit-4

Introduction to GPSS: Elements, Events, Control statement, programs.

Case study: Simulation of an autopilot, telephones system, inventory system & supermarket.

Reference books:

1. G. Gordon "system Simulation" PHI
2. Narsingh Deo "System simulation with digital computers" PHI

MCA-505 ERP Systems

Unit-1

Introduction: Enterprise wide information system, custom built and packaged approaches, needs and evolution of ERP system common myths and evolving realities.

ERP Technologies: ERP and related technologies, business process reengineering and information technology, supply chain management, relevance to data warehousing data mining and OLAP, ERP decision support system.

Unit-2

ERP SYSTEM: ERP domain ERP benefits classification, present global and Indian market scenario, milestones and pitfalls, forecast, market players and profiles, evaluation criterion for ERP products.

ERP LIFE CYCLE: adoption decision, acquisition, implementation, use & maintenance, evaluation and retirement phases, ERP modules.

Unit-3

ERP framework: framework for evaluating ERP, analytical hierarchy processes (AHP), applications of AHP in evaluating ERP, Selection of weights role of consultants, vendors and users in ERP implementation; implementation strategies, ERP customization, ERP-A manufacturing perspective

EVALUATION OF ERP SYSTEM: critical success and failure factors for implementation, model for improving ERP effectiveness, ROI OF ERP implementation hidden costs ERP success inhibitors and accelerators, management concern for ERP success, strategic guide- useful guideline for ERP implementation.

Unit-4

ANALYSIS OF ERP IMPLEMENTATIONS: technologies in ERP system and extended ERP case studies development and analysis of ERP implementations in focusing the various issues discussed in above units through soft system approaches or qualitative analysis tools, leaning and emerging issues, ERP and E-Commerce.

CONCEPT OF E-Governance: concept, E-Governance frame work area of application like public sector, service industry.

Reference books:

1. LEXISLEON; enterprise resource planning; TMH
2. BRADY, MANU, Wegner; enterprise resource planning; THM
3. N.K. Venkita krishnan, vinod kumar garg; ; enterprise resource planning: concept and practice; PHI Learning.
4. Dimpi Srivastava, Artibatra; ERP SYSTEMS; I K International publishing house.