

Department of Computer Science & Information Technology

Syllabus

1.	B.Tech (CS) Bachelor of Computer Science	2
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B.Tech (CSE) Syllabus

Third Semester

Code	Paper	L	T/P	C
CSE211	Electrical Science –I	3	1	4
CSE212	Mathematics- III	3	1	4
CSE213	Computer Programming –II	3	1	4
CSE214	Mechanic of solids	3	1	4
CSE215	Measurement Technique	3	1	4
CSE216	Technical Report Writing	3	1	4
CSE217	Object Oriented Programming Lab.	-	2	1
CSE218	Electrical Science Lab	-	2	1

Fourth Semester

Code	Paper	L	T/P	C
CSE221	Structure and Properties of Materials	3	1	4
CSE222	Electrical Science – II	3	1	4
CSE223	Data Structure & Algorithm	3	1	4
CSE224	Numerical Analysis	3	1	4
CSE225	Digital Electronics	3	1	4
CSE226	Discrete Structure for Computer Science	3	1	4
CSE227	DSA Lab.	-	2	1
CSE228	Electrical Science – II Lab.	-	2	1
CSE229	Digital Electronics Lab			

Fifth Semester

Code	Paper	L	T/P	C
CSE31	Optimization	3	1	4
CSE31	Principle of Management	3	1	4
CSE31	Data Base Management Systems	3	1	4
CSE31	Java	3	1	4
CSE31	Operating Systems	3	1	4
CSE31	Java Lab.	-	2	1
CSE31	Software Engineering Lab.	-	2	1
CSE31	DBMS Lab.			

Sixth Semester

Code	Paper	L	T/P	C
CSE321	Operation Research	3	1	4
CSE322	Control System	3	1	4
CSE323	Theory of Computation	3	1	4
CSE324	Computer Network	3	1	4
CSE325	Advanced Algorithm & Complexity	3	1	4
CSE326	Advanced Computer Organization			
CSE327	Control System Lab			
CSE328	Computer Network Lab			

Seventh Semester

Code	Paper	L	T/P	C
CSE411	Data Mining	3	1	4
CSE412	Computer Graphics	3	1	4
CSE413	Programming Language & Compiler			
CSE414	Real Time Systems			
CSE415	Web Development			
CSE416	Microprocessor	3	1	4
CSE417	Microprocessor Lab.	-	2	1
CSE418	Web Development Lab.	-	2	1
CSE419	Minor Project	-	-	7
CSE419*	Summer Training (Conducted at the end of the 6th	-	-	1

Eighth Semester

Code	Paper	L	T/P	C
CSE421	Major Project (Report)		-	8
CSE422	Viva – Voce (On major project)		-	2
CSE422*	Seminar and progress report		-	1

B.TECH

(COMPUTER SC. & ENGG.)

Semester III

1. CA2101 Electrical Science- I

Introduction; basic circuit elements; sources (dependent and independent); Kirchoff's current and voltage law, source representation and conversion; Network theorems; response of RL, RC and RLC circuits; diodes and its applications; transistors - BJT & FETs; amplifiers: biasing and small signal analysis; OPAMPS; Digital Logic gates; Basics of Combinational and Sequential circuits.

2. CA2102 Mathematics -III

Eigen-values and eigen-vectors. Inner product space and orthonormal bases. Elementary differential equations. Hyper geometric equations, LENGENDRE Polynomials, Bessel functions; Fourier series; Sturm-Liouville problem, series solution for differential equation, systems of first order equations; Laplace transformation and application to differential equations; one dimensional wave equation, one dimensional heat equation and laplace equation in rectangular form.

3.CA2103 Computer Programming-II

Shell programming in Unix; use of advanced filters and other tools like sed and awk; system calls; advanced programming concepts; macro definition and usage, recursion and problem solving; concept of pointers, dynamic data structure using pointers, advanced usage of pointers; bit operations; handling command line arguments, dynamic memory allocation and management; file management; problem solving using simple data structures like stacks, queues, linked lists and binary trees. This course will focus on non-trivial problem solving using the various programming tools available in Unix and the C programming language.

4. CA2104 Mechanics of Solids

Fundamental principles of mechanics; introduction of mechanics of deformable bodies; forces and moments transmitted by slender members; stress and strain; stress-strain-temperature relations; torsion; stresses and deflections due to bending; stability of equilibrium.

5. CA2105 Measurement Techniques

A laboratory course that covers the lab. Components associated with six core science courses in the integrated first degree structure. While the exact component and assignments may vary from time to time the assignments would invariably be illustrative of the theory covered in this portion as well as aim to emphasize the aspects of measurement as a theme in experimental science.

This course is a compulsory requirement for all students who have to compulsorily do the six core science courses. Other students may be permitted to register in this course with prior approval.

6. CA2106 Technical Report Writing

Elements of effective writing; art of condensation; business letter writing; memos; formal reports; technical proposals; conduct and participating, meetings; notices, agenda and minutes; strategies for writing technical descriptions, definitions and classifications; oral presentation; use of graphic and audio-visual aids; editing.

Semester IV

1. CA2201 Structure and Properties of Materials

Study of the basic properties of materials in relation to their molecular structure; emphasis on the structure of metallic, polymeric and ceramic materials in relation to their mechanical, electrical, electronic and chemical properties, methods of imparting desirable properties to materials by inducing changes in molecular structure; property requirements and material selection, criteria for widely ranging service conditions.

2. CA2202 Electrical Sciences-II

Introduction; sinusoidal steady state analysis of circuits; three phase circuits; magnetic circuits; transformers; basics of rotating machines; DC machines; synchronous machine; induction machine.

3. CA2203 Measurement Techniques-II

Measurement of basic electrical and non-electrical quantities; system performance measurements; analysis of experimental data. The course shall aim to train the student in this skill of operation of instruments in the electrical and electronics, chemical, civil and mechanical engineering applications, Precise lab. Exercises will be prescribed from time to time.

4. CA2104 Principal of Management

Fundamental concepts of management – planning; organizing ; staffing; directing and controlling ; production, financial; personnel legal and marketing functions; accounting and budgeting , balance sheets.

5. EC2209 Microprocessor Programming & Interfacing

Elements of digital electronics; PC organization; 80X86 as CPU : Instruction set register set, timing diagrams, modular assembly programming using procedures & macros, assembler, linker & loader concepts; concept of interrupts: hardware interrupts, software interrupts, BIOS and DOS interrupts; disk organization: boot sector, boot partition, root directory & FAT; memory interfacing & timing diagrams; I/O interfacing; programmable I/O devices such as 8255, 8253, 8259, etc.

6. CS2211 Discrete Structure for Computer Science

Introduction to discrete mathematical structures; formal logic and predicate calculus; sets, relations and functions; proof techniques; graphs and trees; primes, factorization, greatest common divisor residues and application to cryptology; Boolean algebra; permutations, combinations and partitions; recurrence relations and generating functions; introduction to error correcting codes; formal languages and grammars, finite state machines.

SU2200 Industrial Training - I

Semester V

1. CA 3101 Optimization

Introduction to optimization; linear programming; simplex methods; duality and sensitivity analysis; transportation model and its variants; integer linear programming nonlinear programming; multi-objective optimization; evolutionary computation techniques

2. CA 3102 Numerical Analysis

Solution of non linear algebraic equations, Interpolation & Approximation, differentiation & integration, system of linear equations, Eigen values & Eigen vectors problems, round off and conditioning.

3. CS3103 Digital Electronics and Computer Organization

Number systems and machine representation, Boolean algebra combinational and synchronous sequential circuits, logic minimization, programmable logic devices state diagrams, digital integrated circuits, asynchronous circuits, arithmetic operations and

algorithms, introduction to computer organization and algorithms, introduction to computer organization and architecture, speed considerations, memory organizations, I/O design, implementation issues. The course will also consist of laboratory practice.

4. CS3104 Data Base Systems

Introduction to data bases and management; data files and structures; hierarchical relational network models; distributed data bases; query languages; concepts of security and protection; case study of a data base system.

5. CS3105 Data Structures and Algorithms

Introduction to software design principles, modularity abstract , data types, data structures and algorithms analysis of algorithms; linear data structure –stacks, arrays, lists, queue and linked representations , pre-fix, in-fix and fix expressions; recursions set operations, hashing and hash functions; binary and other trees. Traversal algorithms Huffman codes, search trees, priority queues, heaps and balanced trees; sorting techniques; graphs and digraphs, Algorithmic design techniques; data strictures for external multi-way store search and B-trees.

6. CS 3105 Operating System

Introduction to operating systems; Various approaches to design of operating systems; Overview of hardware support for operating systems; Process management: process synchronization and mutual exclusion, inter process communication, process scheduling; CPU scheduling approaches; Memory management: paging, segmentation, virtual memory, page replacement algorithms; File systems: design and implementation of file systems; Input/Output systems; device controllers and device drivers; Security and protection; Case studies on design and implementation of operating system modules.

Semester VI

1. CA 3201 Operation Research

Introduction to operations research; dynamic programming; network models- including CPM and PERT; probability distributions; inventory models; queuing systems; decision making – under certainty, risk, and uncertainty; games theory; simulation techniques, systems reliability.

2. CA 3202 Control System

Mathematical models of physical systems, feedback characteristics of control system components, time response analysis, stability, frequency response, state space analysis, compensation.

3. CS 3203 Theory of Computation

Finite automata and regular languages – equivalences, closure properties. context free languages & push-down automata – equivalences, closure properties, concepts in parsing; turing machines; computability & decidability – universal turing machine, recursive functions, church-turing hypothesis; complexity classes – P, NP, reducibility and NP-completeness.

4. CS 3204 Computer Networks

Evolution of communication and computer networks, protocol layering, network reference models, multiple access protocols, local area networks, packet and circuit switching, switching fabrics, network performance analysis and simulation techniques; addressing, routing, flow and congestion control, IP protocol; Broadband Integrated Services Digital Network (B-ISDN); Asynchronous Transfer Mode (ATM) reference models; network interoperability, traffic management and quality of service in integrated network protocol design and implementation strategies

5. CS 3205 Advanced Algorithms & Complexity

Randomized algorithms basic tools from probability theory and probabilistic analysis required in algorithmic applications : game theoretic techniques; occupancy problems & tail inequalities ; data structures for randomized algorithms; skip list & hash tables; randomized graph algorithms; all pairs shortest paths & minimum spanning trees; optimization problems ; simplex algorithm & duality primal dual algorithm for shortest paths; NP-Completeness; the classes P& NP, NP- hard problems, approximation algorithms.

6. CS 3206 Advanced Computer Organization

Memories and memory module design; sample CPU design- instruction set, addressing modes, instruction formats, instruction fetching and execution; instruction and execution

cycles, timing realization and documentation; floating point arithmetic operations FPAU design topics such as microprogramming & bus structures, simple design examples.

Semester VII

1. CS 4101 Data Mining

Data Mining – Introduction, fundamental concepts motivation and applications; role of data warehousing in data mining; challenges and issues in data mining , knowledge discovery in Databases (KDD), role of data mining, tasks like decision tree construction, finding association rules, sequencing, classification and clustering, applications of neural networks and machine learning for tasks of classification and clustering.

2. CS 4102 Graphics

Generation of dots, lines, arcs and polygons; color graphics, shades and levels; image transformation, windowing and clipping; 2-D and 3-D graphics; data structures, algorithms and optimization methods; case studies using GKS, CORE, etc; graphic languages and compilers

3. CS 4103 Programming Languages & Compiler Constructions

Overview of programming languages, concepts and constructs, programming paradigms introduction to compiler process phases and passes, bootstrapping of compilers; formal languages, grammars and abstract machines, lexical analysis regular expressions and finite automata, context free grammar and push down semantic analysis attribute grammar type checking intermediate representation runtime environments code optimization and code generation.

4. CS 4104 Telecommunication Switching Systems & Networking

Introduction, electromechanical switching, pulse dialing and DTMF dialing, stored program control, space division switching, speech digitization and transmission, time division switching, fundamentals of traffic engineering, telephone networks, signaling, data networks, layered architecture and protocols, LANs, packet switching networks, TCP/IP, ISDN, ATM networks.

5. CS 4105 Real Time Systems

Introduction to real-time systems, clock synchronization, task assignment and scheduling, programming language with real-time support, ADA, real-time communication protocols, real-time databases, fault tolerant techniques, reliability evaluation methods; case studies in real-time operating systems, simulation of real-time systems, embedded system programming.

6. CS 4106 Computer and Programming

Computer structures instruction execution addressing techniques; computer system organization, microprogramming and interpreters; symbolic coding; programme segmentation and linkage; laboratory work as several computer projects to illustrate basic machine structure and programming techniques.

Semester VIII

SU 4201 Industrial Training -II

B.Tech (IT) Syllabus

Third Semester

Code	Paper	L	T/P	C
IT211	Electrical Science –I	3	1	4
IT212	Mathematics- III	3	1	4
IT213	Computer Programming –II	3	1	4
IT214	Mechanic of solids	3	1	4
IT215	Measurement Technique	3	1	4
IT216	Technical Report Writing	3	1	4
IT217	Object Oriented Programming Lab.	-	2	1
IT218	Electrical Science Lab	-	2	1

Fourth Semester

Code	Paper	L	T/P	C
IT221	Structure and Properties of Materials	3	1	4
IT222	Electrical Science – II	3	1	4
IT223	Data Structure & Algorithm	3	1	4
IT224	Numerical Analysis	3	1	4
IT225	Digital Electronics	3	1	4
IT226	Discreate Structure for Computer Science	3	1	4
IT227	DSA Lab.	-	2	1
IT228	Electrical Science – II Lab.	-	2	1
IT229	Digital Electronics Lab			

Fifth Semester

Code	Paper	L	T/P	C
IT311	Optimization	3	1	4
IT312	Principle of Management	3	1	4
IT313	Data Base Management Systems	3	1	4
IT314	Java	3	1	4
IT315	Operating Systems	3	1	4
IT316	Java Lab.	-	2	1
IT317	Software Engineering Lab.	-	2	1
IT318	DBMS Lab.			

Sixth Semester

Code	Paper	L	T/P	C
IT321	Operation Research	3	1	4
IT322	Control System	3	1	4
IT323	Management of Information System	3	1	4
IT324	Computer Network	3	1	4
IT325	Advanced Algorithm & Complexity	3	1	4
IT326	Multimedia Application			
IT327	Control System Lab			
IT328	Computer Network Lab			
IT329	Multimedia Application			

Seventh Semester

Code	Paper	L	T/P	C
IT411	Data Mining	3	1	4
IT412	Software Testing	3	1	4
IT413	Graphic User Interface (GUI)			
IT414	Real Time Systems			
IT415	Web Development			
IT416	Microprocessor	3	1	4
IT417	Microprocessor Lab.	-	2	1
IT418	Web Development Lab.	-	2	1
IT418	Software Testing Lab.			
IT419	Minor Project	-	-	7
IT419*	Summer Training (Conducted at the end of the 6th	-	-	1

Eighth Semester

Code	Paper	L	T/P	C
IT421	Major Project (Report)		-	8
IT422	Viva – Voce (On major project)		-	2
IT422*	Seminar and progress report		-	1



SINGHANIA UNIVERSITY

(Established by the Govt. of Rajasthan & recognized as per section 2f of UGC Act, 1956)
Pacheri Bari, Dist. Jhunjhunu (Rajasthan) - 333515

School of Computer Science and Information Technology

Information brochure

For

Master of Technology in Information Technology

MASTER OF TECHNOLOGY IN INFORMATION TECHNOLOGY

Program Structure

SEMESTER I

Course Code	Course of Study
IT 111	Operations Research
IT 112	Data Structures and Algorithm Design
IT 113	Advanced Computer Architecture
IT 114	Advanced Computer Network
	Elective-I

SEMESTER II

Course Code	Course of Study
IT 121	Object Oriented Analysis and Design
IT 122	Distributed System
IT 123	Advances in Databases
IT 124	Software Quality Assurance
	Elective - II

SEMESTER III

Course Code	Course of Study
IT211	Synopsis/Seminar/Presentation

SEMESTER IV

Course Code	Course of Study
IT221	Project Phase -II

List of Electives

Course Code	Course of Study
IT612	Advanced Digital Signal Processing
IT613	Ad hoc and Sensor Networks
IT614	Enterprise Resource Planning
IT615	Software Reliability Metrics
IT616	Scientific Computing
IT617	Ontology and Semantic Web
IT618	Bioinformatics
IT619	Soft Computing
IT620	Natural Language Processing
IT621	Embedded Systems
IT622	Data Warehousing and Data Mining
IT623	Supply Chain Management
IT624	Integrated Software Project Management
IT625	Digital Image Processing
IT626	Multi-Core Programming
IT627	Cloud Computing
IT628	Virtualization Techniques
IT629	Service Oriented Architecture
IT630	Information Retrieval Techniques
IT631	Mobile and Pervasive Computing
IT632	Human Resource Management
IT633	Multicore Architecture

1. OPERATIONS RESEARCH

UNIT I QUEUEING MODELS

Poisson Process – Markovian Queues – Single and Multi-server Models – Little's formula – Machine Interference Model – Steady State analysis – Self Service Queue.

UNIT II ADVANCED QUEUEING MODELS

Non- Markovian Queues – Pollaczek Khintchine Formula – Queues in Series – Open Queuing Networks – Closed Queueing networks.

UNIT III SIMULATION

Discrete Event Simulation – Monte – Carlo Simulation – Stochastic Simulation – Applications to Queuing systems.

UNIT IV LINEAR PROGRAMMING

Formulation – Graphical solution – Simplex method – Two phase method Transportation and Assignment Problems.

UNIT V NON-LINEAR PROGRAMMING

Lagrange multipliers – Equality constraints – Inequality constraints – Kuhn – Tucker conditions – quadratic Programming.

TEXT BOOKS

1. Winston.W.L. "Operations Research", Fourth Edition, Thomson – Brooks/Cole, 2003.
2. Taha, H.A. "Operations Research: An Introduction", Ninth Edition, Pearson Education Edition, Asia, New Delhi, 2002.

REFERENCES

1. Robertazzi. T.G. "Computer Networks and Systems – Queuing Theory and Performance Evaluation", Third Edition, Springer, 2002 Reprint.
2. Ross. S.M., "Probability Models for Computer Science", Academic Press, 2002.

2. ADVANCED COMPUTER NETWORKS

UNIT I Networks, Queues and Performance Modeling

Introduction, Network types, Multiple-access protocols, Discrete-time queues, Performance measures

UNIT II Probability, Random Variables and Distributions

Probability, Random variables, Distributions and Conditional distributions

UNIT III Stochastic Process and Markov Chains

Poisson process and its properties, Markov chains and Markov chain models.

UNIT IV Discrete-Time Queues

Performance measures and Little's result, Discrete-time queuing conventions, Discrete-time M/M/1 queue, Discrete-time M/M/1/J queue, Discrete-time $M^{an}/M/1$, Discrete-time $M^{an}/M^{dm}/\infty$ queue, S-queues

UNIT V Discrete-Time Queuing Networks

Tandem S-queues, Network of S-queues, Discrete-time queuing network models for multiple access protocols, Equilibrium point analysis, Different customer classes.

UNIT VI Satellite Networks

Time-division multiple access, Slotted Aloha, Code division multiple access, Buffered slotted Aloha

UNIT VII Local Area Networks

Carrier sensing networks, Token passing networks, Slotted rings.

References:

1. Woodward, M. E., "Communication and Computer Networks: Modeling with discrete-time queues", Systems Publication Date: January 1994, Wiley-IEEE Computer Society Pr, ISBN: 0818651725.

3. DATA STRUCTURES AND ALGORITHM DESIGN

UNIT I INTRODUCTION

Linear Skip list, Hash table representation Binary Trees, Heaps, Height and weight balanced trees, Tournament Trees.

UNIT II SEARCH TREES

Binary Search Trees, AVL Trees, Red-Black Trees, B- Trees and case studies.

UNIT III GRAPHS

Graphs, Graph Search Methods, Applications of Graphs – Path finding, Spanning Trees, connecting graphs and components.

UNIT IV ALGORITHM ANALYSIS AND DESIGN

Algorithm Analysis - Design Techniques - Asymptotic notations – Properties of big oh notation- solving recurrence equations- Divide & Conquer - Greedy – Dynamic Programming

UNIT V BACKTRACKING AND BRANCH & BOUND TECHNIQUES

Knapsack - Traveling Salesman Problem - Graph coloring- 8 Queens problem, Sum of Subsets – NP Hard and complete problems.

TEXT BOOKS

1. Aho, Hopcroft, Ullman, Data Structure & Algorithms, Addison Wesley pub Company 1985.
2. Sartaj Sahni, Data Structures, Algorithms and Applications in C++, McGraw Hill International Edition, 1998.

REFERENCES

1. M.A. Weiss, Data Structures & Algorithm analysis in C++, Benjamin Cummings, 1994.
2. Sara Baase, Computer algorithms - Introduction to design and analysis, AW, 1988.
3. Sahni, Data Structures, Algorithms and applications in Java, McGraw Hill, 2000.
4. E. Horowitz, S. Sahni, and S. Rajasekaran , COMPUTER ALGORITHMS , W.H. Freeman Press, 1997.

4. ADVANCED COMPUTER ARCHITECTURE

UNIT I PIPELINING AND ILP

Fundamentals of Computer Design - Measuring and Reporting Performance - Instruction Level parallelism and Its Exploitation - Concepts and Challenges - Overcoming Data Hazards with Dynamic Scheduling – Dynamic Branch Prediction - Speculation - Multiple Issue Processors – Case Studies.

UNIT II ADVANCED TECHNIQUES FOR EXPLOITING ILP

Compiler Techniques for Exposing ILP - Limitations on ILP for Realizable Processors - Hardware versus Software Speculation - Multithreading: Using ILP Support to Exploit Thread-level Parallelism - Performance and Efficiency in Advanced Multiple Issue Processors - Case Studies.

UNIT III MULTIPROCESSORS

Symmetric and distributed shared memory architectures – Cache coherence issues - Performance Issues – Synchronization issues – Models of Memory Consistency - Interconnection networks – Buses, crossbar and multi-stage switches.

UNIT IV MULTI-CORE ARCHITECTURES

Software and hardware multithreading – SMT and CMP architectures – Design issues – Case studies – Intel Multi-core architecture – SUN CMP architecture – IBM cell architecture.- hp architecture.

UNIT V MEMORY HIERARCHY DESIGN

Introduction - Optimizations of Cache Performance - Memory Technology and Optimizations Protection: Virtual Memory and Virtual Machines - Design of Memory Hierarchies - Case Studies.

REFERENCES

1. John L. Hennessey and David A. Patterson, "Computer Architecture – A quantitative approach", Morgan Kaufmann / Elsevier, 4th edition, 2007.
2. David E. Culler, Jaswinder Pal Singh, "Parallel Computing Architecture: A hardware/ software approach" , Morgan Kaufmann / Elsevier, 1997.
3. William Stallings, "Computer Organization and Architecture – Designing for Performance", Pearson Education, Seventh Edition, 2006.

5. OBJECT ORIENTED ANALYSIS AND DESIGN

UNIT I

Introduction to System Concepts - Managing Complex Software — Properties – Object Oriented Systems Development – Object Basics – Systems Development Life Cycle - Rumbaugh Methodology - Booch Methodology - Jacobson Methodology – Unified Process

UNIT II

Unified Approach – Unified Modeling Language – Static behavior diagrams – Dynamic behavior diagrams – Object Constraint Language

UNIT III

Inception – Evolutionary Requirements – Domain Models – Operation Contracts - Requirements to Design – Design Axioms – Logical Architecture - Designing Objects with Responsibilities – Object Design – Designing for Visibility

UNIT IV

Patterns – Analysis and Design patterns – GoF Patterns - Mapping designs to code – Test Driven development and refactoring – UML Tools and UML as blueprint

UNIT V

More Patterns – Applying design patterns – Architectural Analysis – Logical Architecture Refinement – Package Design – Persistence framework with patterns

REFERENCES

1. Craig Larman. "Applying UML and Patterns – An introduction to Object-Oriented Analysis and Design and Iterative Development", 3rd ed, Pearson Education, 2005.
2. Fowler, Martin. UML Distilled. 3rd ed. Pearson Education. 2004.
3. Michael Blaha and James Rumbaugh, "Object-oriented modeling and design with UML", Prentice-Hall of India, 2005.
4. Booch, Grady. Object Oriented Analysis and Design. 2nd ed. Pearson Education. 2000.
5. Ali Bahrami, " Object Oriented Systems Development", Tata McGrawHill, 1999.

6. DISTRIBUTED SYSTEMS

UNIT I INTRODUCTION AND COMMUNICATION

Introduction – Distributed Operating Systems – Network Operating System – Middleware – Client-Server Model – Remote Procedure Call – Remote Object Invocation –Message-Oriented Communication – Threads in Distributed Systems – Code Migration.

UNIT II DISTRIBUTED OPERATING SYSTEMS

Clock Synchronization – Logical Clocks – Global States – Election Algorithms – Mutual Exclusion – Distributed Transactions – Consensus and Related Problems – Distributed Deadlocks.

UNIT III DISTRIBUTED SHARED MEMORY AND FAULT TOLERANCE

Introduction – Data-Centric Consistency Models – Client-Centric Consistency Models –Distribution Protocol – Consistency Protocol – Sequential Consistency and Ivy, Release Consistency and Munin – Introduction to Fault Tolerance – Distributed Commit.

UNIT IV DISTRIBUTED FILE SYSTEMS

Introduction to Distributed File Systems – File Service Architecture – Sun Network File System – The Andrew File System – Recent Advances.

UNIT V CASE STUDIES

CORBA – Mach – JINI.

TEXT BOOKS:

1. A.S. Tanenbaum, M. VanSteen, "Distributed Systems", Pearson Education 2004.
2. George Coulouris, Jean Dollimore, Tim Kindberg, "Distributed Systems Concepts and Design", Third Edition, Pearson Education, 2002.

REFERENCES:

1. Mukesh Singhal, "Advanced Concepts In Operating Systems", McGraw Hill Series in Computer Science, 1994.
2. P.K.Sinha, "Distributed Operating Systems".

7. ADVANCES IN DATABASES

UNIT I QUERY AND TRANSACTION PROCESSING

Data Storage and Querying : Storage and File Structure - Indexing and Hashing – Physical Database Design and Tuning - Query Processing Algorithms – Query Optimization Techniques – Transaction Management: Transaction Processing Concepts – Concurrency Control – Recovery Techniques – Database Security.

UNIT II PARALLEL AND DISTRIBUTED DATABASES

Database System Architectures: Centralized and Client-Server Architectures – Server System architectures – Parallel Systems- Distributed Systems – Parallel Databases: I/O

Parallelism – Inter and Intra Query Parallelism – Inter and Intra operation Parallelism – Distributed Database Concepts - Distributed Data Storage – Distributed Transactions – Commit Protocols – Concurrency Control – Distributed Query Processing – Three Tier Client Server Architecture- Case Studies.

UNIT III OBJECT AND OBJECT RELATIONAL DATABASES

Concepts for Object Databases: Object Identity – Object structure – Type Constructors – Encapsulation of Operations – Methods – Persistence – Type and Class Hierarchies – Inheritance – Complex Objects – Object Database Standards, Languages and Design: ODMG Model – ODL – OQL – Object Relational and Extended – Relational Systems : Object Relational features in SQL / Oracle – Case Studies.

UNIT IV ENHANCED DATA MODELS

Active Database Concepts and Triggers – Temporal Databases – Spatial Databases – Multimedia Databases – Deductive Databases – XML Databases: XML Data Model – DTD - XML Schema - XML Querying - Geographic Information Systems - Genome Data Management.

UNIT V EMERGING TECHNOLOGIES

Mobile Databases: Location and Handoff Management - Effect of Mobility on Data Management - Location Dependent Data Distribution - Mobile Transaction Models - Concurrency Control - Transaction Commit Protocols – Web Databases - Information Retrieval - Data Warehousing - Data Mining.

REFERENCES

1. R. Elmasri, S.B. Navathe, “Fundamentals of Database Systems”, Fifth Edition, Pearson Education/Addison Wesley, 2007.
2. Thomas Cannolly and Carolyn Begg, “ Database Systems, A Practical Approach to Design, Implementation and Management”, Third Edition, Pearson Education, 2007.
3. Henry F Korth, Abraham Silberschatz, S. Sudharshan, “Database System Concepts”, Fifth Edition, McGraw Hill, 2006.
4. C.J.Date, A.Kannan and S.Swamynathan,“An Introduction to Database Systems”, Eighth Edition, Pearson Education, 2006.
5. Raghu Ramakrishnan, Johannes Gehrke, “Database Management Systems”, McGraw Hill, Third Edition 2004.

8. SOFTWARE QUALITY ASSURANCE

UNIT I

Introduction to software quality - challenges – objectives – quality factors – components of SQA – contract review – development and quality plans – SQA components in project life cycle – SQA defect removal policies – Reviews

UNIT II

Basics of software testing – test generation from requirements – finite state models – combinatorial designs - test selection, minimization and prioritization for regression testing – test adequacy, assessment and enhancement

UNIT III

Testing strategies – white box and black box approach – integration testing – system and acceptance testing – performance testing – regression testing - internationalization testing – ad-hoc testing – website testing – usability testing – accessibility testing Test plan – management – execution and reporting – software test automation – automated testing tools

UNIT IV

Hierarchical models of software quality – software quality metrics –function points -Software product quality – software maintenance quality – effect of case tools – software quality infrastructure – procedures – certifications – configuration management – documentation control.

UNIT V

Project progress control – costs – quality management standards – project process standards – management and its role in SQA – SQA unit

REFERENCES

1. Daniel Galin, Software quality assurance – from theory to implementation , Pearson education, 2009.
2. Aditya Mathur, Foundations of software testing, Pearson Education, 2008
3. Srinivasan Desikan and Gopaldaswamy Ramesh, Software testing – principles and practices , Pearson education, 2006
4. Ron Patton, Software testing , second edition, Pearson education, 2007
5. Alan C Gillies, “Software Quality Theory and Management”, Cengage Learning, Second edition, 2003

ELECTIVES

1. ADVANCED DIGITAL SIGNAL PROCESSING

UNIT I

Basic elements of DSP – concepts of frequency in Analog and Digital Signals – sampling theorem – Discrete – time signals, systems – Analysis of discrete time LTI systems – Z transform – Convolution (linear and circular) – Correlation.

UNIT II

Introduction to DFT – Properties of DFT – Filtering methods based on DFT – FFT Algorithms - Decimation – in – time Algorithms, Decimation – in – frequency Algorithms – Use of FFT in Linear Filtering – DCT-wavelets

UNIT III

Structures of IIR – Analog filter design – Discrete time IIR filter from analog filter – IIR filter design by Impulse Invariance, Bilinear transformation, Approximation of derivatives – (HPF, BPF, BRF) filter design using frequency translation

UNIT IV

Structures of FIR – Linear phase FIR filter – Filter design using windowing techniques, Frequency sampling techniques – Finite word length effects in digital Filters

UNIT V

Multirate signal processing – Speech compression – Adaptive filter – Musical sound processing – Image enhancement.

REFERENCES

1. John G. Proakis & Dimitris G.Manolakis, "Digital Signal Processing – Principles, Algorithms & Applications", Fourth edition, Pearson education / Prentice Hall, 2007.
2. Emmanuel C..Ifeachor, & Barrie.W.Jervis, "Digital Signal Processing", Second edition, Pearson Education / Prentice Hall, 2002.
3. Sanjit K. Mitra, "Digital Signal Processing – A Computer Based Approach" ,Tata McGraw Hill, Third Edition, 2007 .
4. Alan V.Oppenheim, Ronald W. Jchafer & Hohn. R.Back, "Discrete Time Signal Processing", PHI / Pearson Education, Second Edition, 2001.

5. Andreas Antoniou, "Digital Signal Processing", Tata McGraw Hill.

6. Michael weeks "Digital signal processing using matlab and wavelets" Infinity Science press

2. AD-HOC AND SENSOR NETWORKS

UNIT I AD-HOC MAC

Introduction – Issues in Ad-Hoc Wireless Networks. MAC Protocols – Issues, Classifications of MAC protocols, Multi channel MAC & Power control MAC protocol.

UNIT II AD-HOC NETWORK ROUTING & TCP

Issues – Classifications of routing protocols – Hierarchical and Power aware. Multicast routing – Classifications, Tree based, Mesh based. Ad Hoc Transport Layer Issues. TCP

Over Ad Hoc – Feedback based, TCP with explicit link, TCP-BuS, Ad Hoc TCP, and Split TCP.

UNIT III WSN -MAC

Introduction – Sensor Network Architecture, Data dissemination, Gathering. MAC Protocols – self-organizing, Hybrid TDMA/FDMA and CSMA based MAC.

UNIT IV WSN ROUTING, LOCALIZATION & QOS

Issues in WSN routing – OLSR, AODV. Localization – Indoor and Sensor Network Localization. QoS in WSN.

UNIT V MESH NETWORKS

Necessity for Mesh Networks – MAC enhancements – IEEE 802.11s Architecture – Opportunistic routing – Self configuration and Auto configuration – Capacity Models – Fairness – Heterogeneous Mesh Networks – Vehicular Mesh Networks.

REFERENCES

1. C.Siva Ram Murthy and B.Smanoj, " Ad Hoc Wireless Networks – Architectures and Protocols", Pearson Education, 2004.
2. Feng Zhao and Leonidas Guibas, "Wireless Sensor Networks", Morgan KaufmanPublishers, 2004.
3. C.K.Toh, "Ad Hoc Mobile Wireless Networks", Pearson Education, 2002.
4. Thomas Krag and Sebastin Buettrich, "Wireless Mesh Networking", O'Reilly Publishers, 2007.

3. ENTERPRISE RESOURCE PLANNING

UNIT I INTRODUCTION TO ERP

Overview – Benefits of ERP – ERP and Related Technologies – Business Process Reengineering – Data Warehousing – Data Mining – On–line Analytical Processing – Supply Chain Management.

UNIT II ERP IMPLEMENTATION

Implementation Life Cycle – Implementation Methodology – Hidden Costs – Organizing Implementation – Vendors, Consultants and Users – Contracts – Project Management and Monitoring.

UNIT III BUSINESS MODULES

Business Modules in an ERP Package – Finance – Manufacturing – Human Resource – Plant Maintenance – Materials Management – Quality Management – Sales and Distribution.

UNIT IV ERP MARKET

ERP Market Place – SAP AG – PeopleSoft – Baan Company – JD Edwards World Solutions Company – Oracle Corporation – QAD – System Software Associates.

UNIT V ERP – PRESENT AND FUTURE

Turbo Charge the ERP System – EIA – ERP and E–Commerce – ERP and Internet – Future Directions in ERP.

REFERENCES:

1. Alexis Leon, “ERP Demystified”, Tata McGraw Hill, 1999.
2. Joseph A. Brady, Ellen F. Monk, Bret J. Wangner, “Concepts in Enterprise Resource Planning” , Thomson Learning, 2001.
3. Vinod Kumar Garg and N.K .Venkata Krishnan, “Enterprise Resource Planning – concepts and Planning”, Prentice Hall, 1998.
4. Jose Antonio Fernandez, “ The SAP R /3 Hand book”, Tata McGraw Hill

4. SOFTWARE RELIABILITY AND METRICS

UNIT I INTRODUCTION TO SOFTWARE RELIABILITY

Basic Concepts – Failure and Faults – Environment – Availability –Modeling –uses.

UNIT II SOFTWARE RELIABILITY MODELING

Concepts – General Model Characteristic – Historical Development of models – Model Classification scheme – Markovian models – General concepts – General Poisson Type Models – Binomial Type Models – Poisson Type models – Fault reduction factor for Poisson Type models.

UNIT III COMPARISON OF SOFTWARE RELIABILITY MODELS

Comparison Criteria – Failure Data – Comparison of Predictive Validity of Model Groups – Recommended Models – Comparison of Time Domains – Calendar Time Modeling – Limiting Resource Concept – Resource Usage model – Resource Utilization – Calendar Time Estimation and confidence Intervals.

UNIT IV FUNDAMENTALS OF MEASUREMENT

Measurements in Software Engineering – Scope of Software metrics – Measurements theory – Goal based Framework – Software Measurement Validation.

UNIT V PRODUCT METRICS

Measurement of Internet Product Attributes – Size and Structure – External Product Attributes – Measurement of Quality – Reliability Growth Model – Model Evaluation

REFERENCES

1. John D. Musa, Anthony Iannino, Kazuhira Okumoto, "Software Reliability – Measurement, Prediction, Application, Series in Software Engineering and Technology", McGraw Hill, 1987.
2. John D. Musa, "Software Reliability Engineering", Tata McGraw Hill, 1999.
3. Norman E. Fenton, Shari Lawrence Pfleeger, "Software metrics", Second Edition, International Student Edition, 2003.

5. SCIENTIFIC COMPUTING

UNIT I INTRODUCTION TO SYSTEM MODELING

Modeling and General Systems Theory-Concepts of Simulation-Types of Simulation-Experimental Design Consideration- Comparison and Selection of Simulation

Languages-Development of Simulation Models Using any one of the Languages for Some Problems - Stochastic Simulation - Randomness and Random Numbers - Random Number Generators - Software for Generating Random Numbers.

UNIT II APPROXIMATIONS IN SCIENTIFIC COMPUTING

General Strategy - Approximations in Scientific Computation - Mathematical Software - Mathematical Software Libraries - Scientific Computing Environments - Extended Arithmetic Packages

UNIT III OPTIMIZATION

Optimization Problems - Existence and Uniqueness - Convexity - Optimization in One Dimension- Multidimensional Unconstrained Optimization - Constrained Optimization - Linear Programming

UNIT IV ROOTS OF EQUATION ,LINEAR ALGEBRAIC EQUATION AND

INTERPOLATION

Graphical Method – Iterative Methods- Newton-Raphson Method- Break-Even Analysis-Gauss Elimination-Solution Of Linear Systems By Gaussian, Gauss-Jordan, Jacobi And Gauss Seidel Methods- Matrix Inversion-Gauss-Jordan Method. Least-Square Regression -Newton’s Divided-Difference Interpolating Polynomials-Lagrange’s polynomials-Newton’s Forward and Backward Difference Formula- Stirling’s and Bessel’s Central Difference Formula.

UNIT V NUMERICAL ORDINARY AND PARTIAL DIFFERENTIATION AND INTEGRATION

Numerical Differentiation: Runge-Kutta Methods, Boundary-Value and Eigen value Problems.Partial Differential Equation-Elliptic Equation, Parabolic Equations.Numerical Integration: Trapezoidal and Simpson’s Rules – Two and Three Point Gaussian Quadrature Formula – Double Integral Using Trapezoidal and Simpson’s Rule.

TEXT BOOKS:

1. Jerry Banks and John Carson, “Discrete Event System Simulation”, Third Edition, PHI, 2002.
2. Steven C. Chapra, Raymond P. Canale, “Numerical Methods for Engineering”, Second Edition, McGraw-Hill, 1989.

REFERENCES:

- 1.Sastry S.S ”Introductory Methods of Numerical Analysis”, Third Edition, Prentice Hall India, 1998
2. Geoffery Gordon, “System Simulation”, Second Edition, PHI, 2002.

6. ONTOLOGY AND SEMANTIC WEB

UNIT I INTRODUCTION

Components – Types – Ontological Commitments – Ontological Categories – Philosophical Background - Sample - Knowledge Representation Ontologies – Top Level Ontologies – Linguistic Ontologies – Domain Ontologies – Semantic Web – Need – Foundation – Layers – Architecture.

UNIT II LANGUAGES FOR SEMANTIC WEB AND ONTOLOGIES

Web Documents in XML – RDF - Schema – Web Resource Description using RDF- RDF Properties – Topic Maps and RDF – Overview – Syntax Structure – Semantics – Pragmatics - Traditional Ontology Languages – LOOM- OKBC – OCML - Flogic Ontology Markup Languages – SHOE – OIL - DAML + OIL- OWL

UNIT III ONTOLOGY LEARNING FOR SEMANTIC WEB

Taxonomy for Ontology Learning – Layered Approach – Phases of Ontology Learning – Importing and Processing Ontologies and Documents – Ontology Learning Algorithms - Evaluation

UNIT IV ONTOLOGY MANAGEMENT AND TOOLS

Overview – need for management – development process – target ontology – ontology mapping – skills management system – ontological class – constraints – issues. volution – Development of Tools and Tool Suites – Ontology Merge Tools – Ontology based Annotation Tools.

UNIT V APPLICATIONS

Web Services – Semantic Web Services - Case Study for specific domain – Security issues – current trends.

REFERENCES

1. Asuncion Gomez-Perez, Oscar Corcho, Mariano Fernandez-Lopez “Ontological Engineering: with examples from the areas of Knowledge Management, eCommerce and the Semantic Web” Springer, 2004
2. Grigoris Antoniou, Frank van Harmelen, “A Semantic Web Primer (Cooperative Information Systems)”, The MIT Press, 2004
3. Alexander Maedche, “Ontology Learning for the Semantic Web”, Springer; 1 edition, 2002
4. John Davies, Dieter Fensel, Frank Van Harmelen, “Towards the Semantic Web:Ontology – Driven Knowledge Management”, John Wiley & Sons Ltd., 2003.
5. John Davies (Editor), Rudi Studer (Co-Editor), Paul Warren (Co-Editor) “Semantic Web Technologies: Trends and Research in Ontology-based Systems”Wiley Publications, Jul 2006
6. Dieter Fensel (Editor), Wolfgang Wahlster, Henry Lieberman, James Hendler, “Spinning the Semantic Web: Bringing the World Wide Web to Its Full Potential”, The MIT Press, 2002
7. Michael C. Daconta, Leo J. Obrst, Kevin T. Smith, “The Semantic Web: A Guide to the Future of XML, Web Services, and Knowledge Management”, Wiley, 2003
8. Steffen Staab (Editor), Rudi Studer, “Handbook on Ontologies (International Handbooks on Information Systems)”, Springer 1st edition, 2004
9. Dean Allemang (Author), James Hendler (Author) “Semantic Web for the Working Ontologist: Effective Modeling in RDFS and OWL” (Paperback), Morgan Kaufmann, 2008

7. **BIOINFORMATICS**

UNIT I INTRODUCTORY CONCEPTS

The Central Dogma – The Killer Application – Parallel Universes – Watson’s Definition – Top Down Versus Bottom up – Information Flow – Convergence – Databases – Data Management – Data Life Cycle – Database Technology – Interfaces – Implementation – Networks – Geographical Scope – Communication Models – Transmissions Technology – Protocols – Bandwidth – Topology – Hardware – Contents – Security – Ownership – Implementation – Management.

UNIT II SEARCH ENGINES AND DATA VISUALIZATION

The search process – Search Engine Technology – Searching and Information Theory – Computational methods – Search Engines and Knowledge Management – Data Visualization – sequence visualization – structure visualization – user Interface – Animation Versus simulation – General Purpose Technologies.

UNIT III STATISTICS AND DATA MINING

Statistical concepts – Microarrays – Imperfect Data – Randomness – Variability – Approximation – Interface Noise – Assumptions – Sampling and Distributions – Hypothesis Testing – Quantifying Randomness – Data Analysis – Tool selection statistics of Alignment – Clustering and Classification – Data Mining – Methods – Selection and Sampling – Preprocessing and Cleaning – Transformation and Reduction – Data Mining Methods – Evaluation – Visualization – Designing new queries – Pattern Recognition and Discovery – Machine Learning – Text Mining – Tools.

UNIT IV PATTERN MATCHING

Pairwise sequence alignment – Local versus global alignment – Multiple sequence alignment – Computational methods – Dot Matrix analysis – Substitution matrices – Dynamic Programming – Word methods – Bayesian methods – Multiple sequence alignment – Dynamic Programming – Progressive strategies – Iterative strategies – Tools – Nucleotide Pattern Matching – Polypeptide pattern matching – Utilities – Sequence Databases.

UNIT V MODELING AND SIMULATION

Drug Discovery – components – process – Perspectives – Numeric considerations – Algorithms – Hardware – Issues – Protein structure – AbInitio Methods – Heuristic methods – Systems Biology – Tools – Collaboration and Communications – standards - Issues – Security – Intellectual property.

REFERENCES

1. Bryan Bergeron, “Bio Informatics Computing”, Second Edition, Pearson Education, 2003. 26
2. T.K.Attwood and D.J. Perry Smith, “Introduction to Bio Informatics, Longman Essen, 1999.

8. **SOFT COMPUTING**

UNIT I INTRODUCTION TO SOFT COMPUTING AND NEURAL NETWORKS

Evolution of Computing - Soft Computing Constituents – From Conventional AI to Computational Intelligence - Machine Learning Basics

UNIT II GENETIC ALGORITHMS

Introduction to Genetic Algorithms (GA) – Applications of GA in Machine Learning - Machine Learning Approach to Knowledge Acquisition.

UNIT III NEURAL NETWORKS

Machine Learning Using Neural Network, Adaptive Networks – Feed forward Networks – Supervised Learning Neural Networks – Radial Basis Function Networks - Reinforcement Learning – Unsupervised Learning Neural Networks – Adaptive Resonance architectures – Advances in Neural networks.

UNIT IV FUZZY LOGIC

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

UNIT V NEURO-FUZZY MODELING

Adaptive Neuro-Fuzzy Inference Systems – Coactive Neuro-Fuzzy Modeling – Classification and Regression Trees – Data Clustering Algorithms – Rulebase Structure Identification – Neuro-Fuzzy Control – Case studies.

TEXT BOOKS

1. Jyh-Shing Roger Jang, Chuen-Tsai Sun, Eiji Mizutani, “Neuro-Fuzzy and Soft Computing”, Prentice-Hall of India, 2003.
2. George J. Klir and Bo Yuan, “Fuzzy Sets and Fuzzy Logic-Theory and Applications”, Prentice Hall, 1995.
3. James A. Freeman and David M. Skapura, “Neural Networks Algorithms, Applications, and Programming Techniques”, Pearson Edn., 2003.

REFERENCES

1. Mitchell Melanie, “An Introduction to Genetic Algorithm”, Prentice Hall, 1998.
2. David E. Goldberg, “Genetic Algorithms in Search, Optimization and Machine Learning”, Addison Wesley, 1997
3. S. N. Sivanandam, S. Sumathi and S. N. Deepa, “Introduction to Fuzzy Logic using MATLAB”, Springer, 2007.
4. S.N.Sivanandam · S.N.Deepa, “ Introduction to Genetic Algorithms”, Springer, 2007.
5. Jacek M. Zurada, “Introduction to Artificial Neural Systems”, PWS Publishers, 1992.

9. NATURAL LANGUAGE PROCESSING

UNIT I INTRODUCTION

Natural Language Processing – Linguistic Background- Spoken language input and output Technologies – Written language Input - Mathematical Methods - Statistical Modeling and Classification Finite State methods Grammar for Natural Language Processing – Parsing – Semantic and Logic Form – Ambiguity Resolution – Semantic Interpretation.

UNIT II INFORMATION RETRIEVAL

Information Retrieval architecture - Indexing- Storage – Compression Techniques –Retrieval Approaches – Evaluation - Search engines- commercial search engine features- comparison- performance measures – Document Processing - NLP based Information Retrieval – Information Extraction.

UNIT III TEXT MINING

Categorization – Extraction based Categorization- Clustering- Hierarchical Clustering-Document Classification and routing- finding and organizing answers from Text search – use of categories and clusters for organising retrieval results – Text Categorization and efficient Summarization using Lexical Chains – Pattern Extraction.

UNIT IV GENERIC ISSUES

Multilinguality – Multilingual Information Retrieval and Speech processing - Multimodality – Text and Images – Modality Integration - Transmission and Storage – Speech coding- Evaluation of systems – Human Factors and user Acceptability.

UNIT V APPLICATIONS

Machine Translation – Transfer Metaphor - Interlingua and Statistical Approaches - Discourse Processing – Dialog and Conversational Agents – Natural Language Generation – Surface Realization and Discourse Planning.

TEXT BOOKS

1. Daniel Jurafsky and James H. martin, “ Speech and Language Processing” , 2000.
2. Ron Cole, J.Mariani, et.al “Survey of the State of the Art in Human Language Technology”, Cambridge University Press, 1997.
3. Michael W. Berry “ Survey of Text Mining: Clustering, Classification and Retrieval”, Springer Verlag, 2003.
4. Christopher D.Manning and Hinrich Schutze, “ Foundations of Statistical Natural Language Processing “, MIT Press, 1999.

REFERENCES

1. James Allen “ Natural Language Understanding “, Benjamin/ Cummings Publishing Co. 1995.
2. Gerald J. Kowalski and Mark.T. Maybury, “Information Storage and Retrieval systems”, Kluwer academic Publishers, 2000.
3. Tomek Strzalkowski “ Natural Language Information Retrieval “, Kluwer academic Publishers, 1999.

10. EMBEDDED SYSTEMS

UNIT I EMBEDDED COMPUTING

Challenges of Embedded Systems – Embedded system design process. Embedded processors – ARM processor – Architecture, ARM and Thumb Instruction sets

UNIT II EMBEDDED C PROGRAMMING

C-looping structures – Register allocation – Function calls – Pointer aliasing – structure arrangement – bit fields – unaligned data and endianness – inline functions and inline assembly – portability issues.

UNIT III OPTIMIZING ASSEMBLY CODE

Profiling and cycle counting – instruction scheduling – Register allocation – conditional execution – looping constructs – bit manipulation – efficient switches – optimized primitives.

UNIT IV PROCESSES AND OPERATING SYSTEMS

Multiple tasks and processes – Context switching – Scheduling policies – Interprocess communication mechanisms – Exception and interrupt handling - Performance issues.

UNIT V EMBEDDED SYSTEM DEVELOPMENT

Meeting real time constraints – Multi-state systems and function sequences. Embedded software development tools – Emulators and debuggers. Design methodologies – Case studies – Complete design of example embedded systems.

REFERENCES

1. Andrew N Sloss, D. Symes, C. Wright, “ ARM System Developers Guide”, Morgan Kaufmann / Elsevier, 2006.
2. Michael J. Pont, “Embedded C”, Pearson Education , 2007.
3. Wayne Wolf, “Computers as Components : Principles of Embedded Computer System Design”, Morgan Kaufmann / Elsevier, 2nd edition, 2008.

4. Steve Heath, "Embedded System Design" , Elsevier, 2nd edition, 2003.

11. DATA WAREHOUSING AND DATA MINING

UNIT I

Data Warehousing and Business Analysis: - Data warehousing Components –Building a Data warehouse – Mapping the Data Warehouse to a Multiprocessor Architecture – DBMS Schemas for Decision Support – Data Extraction, Cleanup, and Transformation Tools –Metadata – reporting – Query tools and Applications – Online Analytical Processing (OLAP) – OLAP and Multidimensional Data Analysis.

UNIT II

Data Mining: - Data Mining Functionalities – Data Preprocessing – Data Cleaning – Data Integration and Transformation – Data Reduction – Data Discretization and Concept Hierarchy Generation. Association Rule Mining: - Efficient and Scalable Frequent Item set Mining Methods – Mining Various Kinds of Association Rules – Association Mining to Correlation Analysis – Constraint-Based Association Mining.

UNIT III

Classification and Prediction: - Issues Regarding 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 Section.

UNIT IV

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 HighDimensional Data – Constraint-Based Cluster Analysis – Outlier Analysis.

UNIT V

Mining Object, Spatial, Multimedia, Text and Web Data: Multidimensional Analysis and Descriptive Mining of Complex Data Objects – Spatial Data Mining – Multimedia Data Mining – Text Mining – Mining the World Wide Web.

REFERENCES

1. Jiawei Han and Micheline Kamber "Data Mining Concepts and Techniques" Second Edition, Elsevier, Reprinted 2008.

3. Alex Berson and Stephen J. Smith "Data Warehousing, Data Mining & OLAP", Tata McGraw – Hill Edition, Tenth Reprint 2007.
4. K.P. Soman, Shyam Diwakar and V. Ajay "Insight into Data mining Theory and Practice", Easter Economy Edition, Prentice Hall of India, 2006.
5. G. K. Gupta "Introduction to Data Mining with Case Studies", Easter Economy Edition, Prentice Hall of India, 2006.
6. Pang-Ning Tan, Michael Steinbach and Vipin Kumar "Introduction to Data Mining", Pearson Education, 2007.

12. SUPPLY CHAIN MANAGEMENT

UNIT I FUNDAMENTALS OF SUPPLY CHAIN MANAGEMENT

Supply chain networks, Integrated supply chain planning, Decision phases in a supply chain, process view of a supply chain, supply chain flows, Overview of supply chain models and modeling systems, Supply chain planning: Strategic, operational and tactical, Understanding supply chain through process mapping and process flow chart.

UNIT II SCM STRATEGIES, PERFORMANCE

Supply chain strategies, achieving strategic fit, value chain, Supply chain drivers and obstacles, Strategic Alliances and Outsourcing, purchasing aspects of supply chain, Supply chain performance measurement: The balanced score card approach, Performance Metrics. Planning demand and supply: Demand forecasting in supply chain, Aggregate planning in supply chain, Predictable variability.

UNIT III PLANNING AND MANAGING INVENTORIES

Introduction to Supply Chain Inventory Management. Inventory theory models: Economic Order Quantity Models, Reorder Point Models and Multiechelon Inventory Systems, Relevant deterministic and stochastic inventory models and Vendor managed inventory models.

UNIT IV DISTRIBUTION MANAGEMENT

Role of transportation in a supply chain - direct shipment, warehousing, cross-docking; push vs. pull systems; transportation decisions (mode selection, fleet size), market channel structure, vehicle routing problem. Facilities decisions in a supply chain. Mathematical foundations of distribution management, Supply chain facility layout and capacity planning,

UNIT V STRATEGIC COST MANAGEMENT IN SUPPLY CHAIN

The financial impacts, Volume leveraging and cross docking, global logistics and material positioning, global supplier development, target pricing, cost management enablers, Measuring service levels in supply chains, Customer Satisfaction/Value/Profitability/Differential Advantage.

REFERENCES

1. David Simchi-Levi, Philip Kaminsky, and Edith Simchi-Levi Designing and Managing the Supply Chain: Concepts, Strategies, and Case Studies, Second Edition, , McGraw-Hill/Irwin, New York, 2003.
2. Sunil Chopra and Peter Meindel. Supply Chain Management: Strategy, Planning, and Operation, Prentice Hall of India, 2002.
3. Sunil Chopra & Peter Meindl, Supply Chain Management , Prentice Hall Publisher, 2001
4. Robert Handfield & Ernest Nichols, Introduction to Supply Chain Management , Prentice hall Publishers, 1999.

13. INTEGRATED SOFTWARE PROJECT MANAGEMENT

UNIT I PROJECT MANAGEMENT CONCEPTS

Evolution of Software Economics – Software Management Process Framework (Phases, Artifacts, Workflows, Checkpoints) – Software Management Disciplines (Planning / Project Organization and Responsibilities / Automation / Project Control) – Modern Project Profiles

UNIT II SOFTWARE ESTIMATION & COSTING

Problems in Software Estimation – Algorithmic Cost Estimation Process, Function Points, SLIM (Software Life cycle Management), COCOMO II (CONstructive COSt MOdel) – Estimating Web Application Development – Concepts of Finance, Activity Based Costing and Economic Value Added (EVA) – Balanced Score Card.

UNIT III RISK MANAGEMENT

Risk Definition – Risk Categories – Risk Assessment (Identification / Analysis / Prioritization) – Risk Control (Planning / Resolution / Monitoring) – Failure Mode and Effects Analysis (FMEA)

UNIT IV METRICS

Need for Software Metrics – Classification of Software Metrics: Product Metrics (Size Metrics, Complexity Metrics, Halstead’s Product Metrics, Quality Metrics), and Process metrics (Empirical Models, Statistical Models, Theory-based Models, Composite Models, and Reliability Models).

UNIT V PEOPLE MANAGEMENT

Team Management – Client Relationship Management.

REFERENCES

1. McConnell, S. “Software Project: Survival Guide”, Microsoft Press, 1998.
2. Royce, W. “Software Project management: A Unified Framework”, Addison-Wesley, 1998.

3. Cooper, R., "The Rise of Activity-Based Costing- PartOne: What is an Activity-Based Cost System?" Journal of Cost Management, Vol.2, No.2 (Summer 1988), pp.45 – 54. 32
4. Grant, J.L. "Foundations of Economic Value Added", John Wiley & Sons, 1997.
5. Kaplan, R.S., Norton, D.P. "The Balanced Scorecard: Translating Strategy into Action", Harvard Business School Press, 1996.
6. Boehm, B. W. "Software Risk Management: Principles and Practices" in IEEE Software, January 1991, pp32-41.
7. Fenton, N.E., and Pfleeger, S.L.. "Software Metrics: A Rigorous and Practical Approach, Revised" Brooks Cole, 1998.
8. Demarco, T. and Lister, T. "Peopleware: Productive Projects and Teams, 2nd Ed.", Dorset House, 1999.

14. DIGITAL IMAGE PROCESSING

UNIT I FUNDAMENTALS OF IMAGE PROCESSING

Introduction – Elements of visual perception, Steps in Image Processing Systems – Image Acquisition – Sampling and Quantization – Pixel Relationships – Colour Fundamentals and Models, File Formats. Introduction to the Mathematical tools.

UNIT II IMAGE ENHANCEMENT AND RESTORATION

Spatial Domain Gray level Transformations Histogram Processing Spatial Filtering – Smoothing and Sharpening. Frequency Domain: Filtering in Frequency Domain – DFT,FFT, DCT, Smoothing and Sharpening filters – Homomorphic Filtering., Noise models, Constrained and Unconstrained restoration models.

UNIT III IMAGE SEGMENTATION AND FEATURE ANALYSIS

Detection of Discontinuities – Edge Operators – Edge Linking and Boundary Detection – Thresholding – Region Based Segmentation – Motion Segmentation, Feature Analysis and Extraction.

UNIT IV MULTI RESOLUTION ANALYSIS AND COMPRESSIONS

Multi Resolution Analysis: Image Pyramids – Multi resolution expansion – Wavelet Transforms, Fast Wavelet transforms, Wavelet Packets. Image Compression: Fundamentals – Models – Elements of Information Theory – Error Free Compression – Lossy Compression – Compression Standards – JPEG/MPEG.

UNIT V APPLICATIONS OF IMAGE PROCESSING

Representation and Description, Image Recognition- Image Understanding – Image Classification – Video Motion Analysis – Image Fusion – Steganography – Colour Image Processing.

REFERENCES

1. Rafael C.Gonzalez and Richard E.Woods, “Digital Image Processing”, Third Edition, Pearson Education, 2008.
2. Milan Sonka, Vaclav Hlavac and Roger Boyle, “Image Processing, Analysis and Machine Vision”, Third Edition, Third Edition, Brooks Cole, 2008.
3. Anil K.Jain, “Fundamentals of Digital Image Processing”, Prentice-Hall India, 2007.
4. Madhuri A. Joshi, ‘Digital Image Processing: An Algorithmic Approach’, Prentice-Hall India, 2006.
5. Rafael C.Gonzalez , Richard E.Woods and Steven L. Eddins, “Digital Image Processing Using MATLAB”, First Edition, Pearson Education, 2004.

15. MULTI-CORE PROGRAMMING

UNIT I INTRODUCTION TO MULTIPROCESSORS AND SCALABILITY ISSUES

Parallel computer models -- Symmetric and distributed shared memory architectures – Performance Issues. Multi-core Architectures - Software and hardware multithreading – SMT and CMP architectures – Design issues – Case studies – Intel Multi-core architecture – SUN CMP architecture – IBM cell processor.

UNIT II PARALLEL PROGRAMMING

Fundamental concepts – Designing for threads. Threading and parallel programming constructs – Synchronization – Critical sections – Deadlock. Threading APIs.

UNIT III Openmp Programming

OpenMP – Threading a loop – Thread overheads – Performance issues – Library functions. Solutions to parallel programming problems – Data races, deadlocks and livelocks – Non-blocking algorithms – Memory and cache related issues.

UNIT IV MPI PROGRAMMING

MPI Model – collective communication – data decomposition – communicators and topologies – point-to-point communication – MPI Library.

UNIT V MULTITHREADED APPLICATION DEVELOPMENT:

Algorithms, program development and performance tuning.

REFERENCES

1. Michael J Quinn, "Parallel programming in C with MPI and OpenMP", Tata McGraw Hill, 2003.
2. Shameem Akhter and Jason Roberts, "Multi-core Programming", Intel Press, 2006.
3. John L. Hennessey and David A. Patterson, "Computer architecture – A quantitative approach", Morgan Kaufmann/Elsevier Publishers, 4th. edition, 2007.
4. David E. Culler, Jaswinder Pal Singh, "Parallel computing architecture : A hardware/ software approach", Morgan Kaufmann/Elsevier Publishers, 2004.
5. Wesley Petersen and Peter Arbenz, "Introduction to Parallel Computing", Oxford University Press, 2004.

16. CLOUD COMPUTING

UNIT I UNDERSTANDING CLOUD COMPUTING

Cloud Computing – History of Cloud Computing – Cloud Architecture – Cloud Storage – Why Cloud Computing Matters – Advantages of Cloud Computing – Disadvantages of Cloud Computing – Companies in the Cloud Today – Cloud Services

UNIT II DEVELOPING CLOUD SERVICES

Web-Based Application – Pros and Cons of Cloud Service Development – Types of Cloud Service Development – Software as a Service – Platform as a Service – Web Services – On-Demand Computing – Discovering Cloud Services Development Services and Tools – Amazon Ec2 – Google App Engine – IBM Clouds

UNIT III CLOUD COMPUTING FOR EVERYONE

Centralizing Email Communications – Collaborating on Schedules – Collaborating on To-Do Lists – Collaborating Contact Lists – Cloud Computing for the Community – Collaborating on Group Projects and Events – Cloud Computing for the Corporation

UNIT IV USING CLOUD SERVICES

Collaborating on Calendars, Schedules and Task Management – Exploring Online Scheduling Applications – Exploring Online Planning and Task Management – Collaborating on Event Management – Collaborating on Contact Management – Collaborating on Project Management – Collaborating on Word Processing - Collaborating on Databases – Storing and Sharing Files

UNIT V OTHER WAYS TO COLLABORATE ONLINE

Collaborating via Web-Based Communication Tools – Evaluating Web Mail Services – Evaluating Web Conference Tools – Collaborating via Social Networks and Groupware – Collaborating via Blogs and Wikis

REFERENCES

1. Michael Miller, Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online, Que Publishing, August 2008.
2. Haley Beard, Cloud Computing Best Practices for Managing and Measuring Processes for On-demand Computing, Applications and Data Centers in the Cloud with SLAs, Emereo Pty Limited, July 2008.

17. VIRTUALIZATION TECHNIQUES

UNIT I OVERVIEW OF VIRTUALIZATION

Basics of Virtualization - Virtualization Types – Desktop Virtualization – Network Virtualization – Server and Machine Virtualization – Storage Virtualization – System-level or Operating Virtualization – Application Virtualization-Virtualization Advantages - Virtual Machine Basics – Taxonomy of Virtual machines - Process Virtual Machines - System Virtual Machines – Hypervisor - Key Concepts

UNIT II SERVER CONSOLIDATION

Hardware Virtualization – Virtual Hardware Overview - Server Virtualization – Physical and Logical Partitioning - Types of Server Virtualization – Business cases for Server Virtualization – Uses of Virtual server Consolidation – Planning for Development – Selecting server Virtualization Platform

UNIT III NETWORK VIRTUALIZATION

Design of Scalable Enterprise Networks - Virtualizing the Campus WAN Design - WAN Architecture - WAN Virtualization - Virtual Enterprise Transport Virtualization–VLANs and Scalability - Theory Network Device Virtualization Layer 2 - VLANs Layer 3 VRF Instances Layer 2 - VFI's Virtual Firewall Contexts Network Device Virtualization - DataPath Virtualization Layer 2: Trunking Generic Routing Encapsulation - IPsec L2TPv3 Label Switched Paths - Control-Plane Virtualization–Routing Protocols- VRF - Aware Routing Multi-Topology Routing.

UNIT IV VIRTUALIZING STORAGE

SCSI- Speaking SCSI- Using SCSI buses – Fiber Channel – Fiber Channel Cables – Fiber Channel Hardware Devices – iSCSI Architecture – Securing iSCSI – SAN backup and recovery techniques – RAID – SNIA Shared Storage Model – Classical Storage Model – SNIA Shared Storage Model – Host based Architecture – Storage based architecture – Network based Architecture – Fault tolerance to SAN – Performing Backups – Virtual tape libraries.

UNIT V VIRTUAL MACHINES PRODUCTS

Xen Virtual machine monitors- Xen API – VMware – VMware products - VMware Features – Microsoft Virtual Server – Features of Microsoft Virtual Server

REFERENCES

1. William von Hagen, Professional Xen Virtualization, Wrox Publications, January, 2008.
2. Chris Wolf , Erick M. Halter, Virtualization: From the Desktop to the Enterprise, APress 2005.
3. Kumar Reddy, Victor Moreno, Network virtualization, Cisco Press, July, 2006.
4. James E. Smith, Ravi Nair, Virtual Machines: Versatile Platforms for Systems and Processes, Elsevier/Morgan Kaufmann, 2005.
5. David Marshall, Wade A. Reynolds, Advanced Server Virtualization: VMware and Microsoft Platform in the Virtual Data Center, Auerbach Publications, 2006. 37

18. SERVICE ORIENTED ARCHITECTURE

UNIT I

Software Architecture – Types of IT Architecture – SOA – Evolution – Key components – perspective of SOA – Enterprise-wide SOA – Architecture – Enterprise Applications – Solution Architecture for enterprise application – Software platforms for enterprise Applications – Patterns for SOA – SOA programming models

UNIT II

Service-oriented Analysis and Design – Design of Activity, Data, Client and business process services – Technologies of SOA – SOAP – WSDL – JAX – WS – XML WS for .NET – Service integration with ESB – Scenario – Business case for SOA – stakeholder objectives – benefits of SPA – Cost Savings

UNIT III

SOA implementation and Governance – strategy – SOA development – SOA governance – trends in SOA – event-driven architecture – software as a service – SOA technologies – proof-of-concept – process orchestration – SOA best practices

UNIT IV

Meta data management – XML security – XML signature – XML Encryption – SAML – XACML – XKMS – WS-Security – Security in web service framework - advanced messaging

UNIT V

Transaction processing – paradigm – protocols and coordination – transaction specifications – SOA in mobile – research issues

REFERENCES

1. Shankar Kambhampaly, "Service –Oriented Architecture for Enterprise Applications", Wiley India Pvt Ltd, 2008.
2. Eric Newcomer, Greg Lomow, "Understanding SOA with Web Services", Pearson Education.
3. Mark O' Neill, et al. , "Web Services Security", Tata McGraw-Hill Edition, 2003.

19. INFORMATION RETRIEVAL TECHNIQUES

UNIT I INTRODUCTION

Basic Concepts – Retrieval Process – Modeling – Classic Information Retrieval – Set Theoretic, Algebraic and Probabilistic Models – Structured Text Retrieval Models – Retrieval Evaluation –Word Sense Disambiguation

UNIT II QUERYING

Languages – Key Word based Querying – Pattern Matching – Structural Queries – Query Operations – User Relevance Feedback – Local and Global Analysis – Text and Multimedia languages

UNIT III TEXT OPERATIONS AND USER INTERFACE

Document Preprocessing – Clustering – Text Compression - Indexing and Searching – Inverted files – Boolean Queries – Sequential searching – Pattern matching – User Interface and Visualization – Human Computer Interaction – Access Process – Starting Points –Query Specification - Context – User relevance Judgment – Interface for Search

UNIT IV MULTIMEDIA INFORMATION RETRIEVAL

Data Models – Query Languages – Spatial Access Models – Generic Approach – One Dimensional Time Series – Two Dimensional Color Images – Feature Extraction

UNIT V APPLICATIONS

Searching the Web – Challenges – Characterizing the Web – Search Engines – Browsing – Meta-searchers – Online IR systems – Online Public Access Catalogs – Digital Libraries – Architectural Issues – Document Models, Representations and Access – Prototypes and Standards

REFERENCES

1. Ricardo Baeza-Yate, Berthier Ribeiro-Neto, "Modern Information Retrieval", Pearson Education Asia, 2005.

2. G.G. Chowdhury, "Introduction to Modern Information Retrieval", Neal-Schuman Publishers; 2nd edition, 2003.

3. Daniel Jurafsky and James H. Martin, "Speech and Language Processing", Pearson Education, 2000

4. David A. Grossman, Ophir Frieder, "Information Retrieval: Algorithms, and Heuristics", Academic Press, 2000

5. Charles T. Meadow, Bert R. Boyce, Donald H. Kraft, "Text Information Retrieval Systems", Academic Press, 2000

20. MOBILE AND PERVASIVE COMPUTING

UNIT I

Wireless networks- emerging technologies- Blue tooth, WiFi, WiMAX, 3G, WATM.-Mobile IP protocols - WAP push architecture-Wml scripts and applications.

UNIT II

Mobile computing environment—functions-architecture-design considerations, content architecture - CC/PP exchange protocol, context manager. Data management in WAECoda file system- caching schemes- Mobility QOS. Security in mobile computing.

UNIT III

Handoff in wireless mobile networks-reference model-handoff schemes. Location management in cellular networks - Mobility models- location and tracking management schemes- time, movement, profile and distance based update strategies. ALI technologies.

UNIT IV

Pervasive Computing- Principles, Characteristics- interaction transparency, context aware, automated experience capture. Architecture for pervasive computing- Pervasive devices-embedded controls.- smart sensors and actuators -Context communication and access services

UNIT V

Open protocols- Service discovery technologies- SDP, Jini, SLP, UpnP protocols—data synchronization- SyncML framework - Context aware mobile services -Context aware sensor networks, addressing and communications. Context aware security.

REFERENCES

1. Ivan Stojmenovic , Handbook of Wireless Networks and Mobile Computing, John Wiley & sons Inc, Canada, 2002.
2. Asoke K Taukder, Roopa R Yavagal, Mobile Computing, Tata McGraw Hill Pub Co. , New Delhi, 2005.
3. Seng Loke, Context-Aware Computing Pervasive Systems, Auerbach Pub., New York, 2007.
4. Uwe Hansmann etl , Pervasive Computing, Springer, New York, 2001.

21. HUMAN RESOURCE MANAGEMENT

UNIT I PERSPECTIVES IN HUMAN RESOURCE MANAGEMENT

Evolution of human resource management – the importance of the human factor – objectives of human resource management – role of human resource manager – human resource policies – computer applications in human resource management.

UNIT II THE CONCEPT OF BEST FIT EMPLOYEE

Importance of human resource planning – forecasting human resource requirement – internal and external sources. Selection process – screening – tests – validation – interview – medical examination – recruitment introduction – importance – practices – socialization benefits.

UNIT III TRAINING AND EXECUTIVE DEVELOPMENT

Types of training, methods, purpose, benefits and resistance. Executive development programmes – common practices – benefits – self development – knowledge management.

UNIT IV SUSTAINING EMPLOYEE INTEREST

Compensation plan – reward – motivation – theories of motivation – career management – development, mentor – protégé relationships.

UNIT V PERFORMANCE EVALUATION AND CONTROL PROCESS

Method of performance evaluation – feedback – industry practices. Promotion, demotion, transfer and separation – implication of job change. The control process – importance – methods – requirement of effective control systems grievances – causes – implications – redressal methods.

TEXT BOOKS

1. Decenzo and Robbins, Human Resource Management, Wilsey, 6th edition, 2001.
2. Biswajeet Pattanayak, Human Resource Management, Prentice Hall of India, 2001.

REFERENCES

1. Human Resource Management, Eugence Mckenna and Nic Beach, Pearson Education Limited, 2002.
2. Dessler Human Resource Management, Pearson Education Limited, 2002.
3. Mamoria C.B. and Mamoria S. Personnel Management, Himalaya Publishing Company, 1997.
4. Wayne Cascio, Managing Human Resource, McGraw Hill, 1998.
5. Ivancevich, Human Resource Management, McGraw Hill 2002.

22. MULTICORE ARCHITECTURE

UNIT I

Fundamentals of SuperScalar Processor Design, Introduction to Multicore Architecture – Chip Multiprocessing, homogeneous Vs heterogeneous design - SMP – Multicore Vs Multithreading.

UNIT II

Shared memory architectures– synchronization – Memory organization – Cache Memory – Cache Coherency Protocols - Design of Levels of Caches.

UNIT III

Multicore programming Model – Shared memory model, message passing model, transaction model – OpenMP and MPI Programming.

UNIT IV

PowerPC architecture – RISC design, PowerPC ISA, PowerPC Memory Management Power 5 Multicore architecture design, Power 6 Architecture.

UNIT V

Cell Broad band engine architecture, PPE (Power Processor Element), SPE (Synergistic processing element), Cell Software Development Kit, Programming for Multicore architecture.

TEXT BOOK:

1. Hennessey & Pateterson, "Computer Architecture A Quantitative Approach", Harcourt Asia, Morgan Kaufmann, 1999
2. Joseph JaJa, Introduction to Parallel Algorithms, Addison-Wesley, 1992.
3. IBM Journals for Power 5, Power 6 and Cell Broadband engine architecture.

REFERENCES

1. Kai Hwang, "Advanced Computer Architecture: Parallelism, Scalability a Programmability" McGraw-Hill, 1993
2. Richard Y. Kain, "Advanced Computer Architecture: A System Design Approach", PHI, 1999
3. Rohit Chandra, Ramesh Menon, Leo Dagum, and David Kohr, Parallel Programming in OpenMP, Morgan Kaufmann, 2000.



SINGHANIA UNIVERSITY

(Established by the Govt. of Rajasthan & recognized as per section 2f of UGC Act, 1956)
Pacheri Bari, Distt. Jhunjhunu (Rajasthan) - 333515

School of Computer Science and Information Technology

Information brochure

For

Master of Technology in Computer Science and Engineering

**Master of Technology in Computer Science and Engineering
Course Structure**

SEMESTER I

Course Code	Course of Study
CSE111	Advanced Concepts in Operating Systems
CSE112	Parallel Computer Architecture
CSE113	Advanced Data Structures And Algorithms
CSE114	Software Systems Laboratory
	Elective - 1
	Elective - 2

SEMESTER II

Course Code	Course of Study
CSE121	Advanced Concepts in Database Systems
CSE122	Distributed Systems
CSE123	Introduction to logic and functional programming
	Elective - 3
	Elective - 4

SEMESTER III

Course Code	Course of Study
CSE211	Synopsis/Seminar/Presentation

SEMESTER IV

Course Code	Course of Study
CSE221	Major Project – Part-II

LIST OF ELECTIVES

Course Code	Course of Study
CSE611	Data Mining
CSE612	Compiler Design
CSE613	Fault Tolerant Computing Systems
CSE614	Design and analysis of parallel algorithms
CSE615	Advanced network principles and protocols
CSE616	Real-time systems
CSE617	Network security
CSE618	Mobile Network Systems
CSE619	Wireless Sensor Networks
CSE620	Neural Network
CSE621	Artificial Intelligence
CSE622	Computer Graphics
CSE623	Software Engineering

CSE601 ADVANCED CONCEPTS IN OPERATING SYSTEMS

Multiprocessor operating system - Multiprocessor system architecture, structure, processor scheduling and allocation, memory management.

Distributed operating system- characteristics - Design issues communication models - clock

Synchronization - Mutual exclusion Election Algorithms.

Distributed Deadlocks detection - Distributed scheduling - Distributed File system -Distributed shared memory.

Multimedia Files, Video compression, Process Scheduling, File System, File placement, Caching, Disk Scheduling.

Real Time Operating System: Scheduling mechanisms, Interrupts, Memory management, I/O & networking, resource reservation.

Case studies: Open source software, LINUX, Open SOLARIS

TEXT BOOK

1. M Singhal and NG Sivaratri, Advanced Concepts in Operating Systems, Tata McGraw Hill Inc., 2001

2. A.S. Tanenbaum, Distributed Operating system, Pearson Education Asia, 2001.

REFERENCE BOOK

1. *SILBERSCHATZ and P. GALVIN, Operating System Concepts, VI edition, Addison Wesley 2004.*

CSE602 PARALLEL COMPUTER ARCHITECTURE

Task of a Computer Designer - Measuring and Reporting Performance Quantitative Principles of Computer Design.

Shared-memory and distributed memory architectures - Taxonomy of MIMD computers Parallel processing applications - Performance metrics - Speedup performance laws.

Instruction set architecture - Design considerations - CISC & RISC processors -Virtual Memory - Cache memory organization.

Review of the ABCs of Cache Performance **issues** - Main Memory and Organization for Improving Performance - Memory Technology.

Instruction Level **Parallelism** - Concepts and Challenges - Dynamic Scheduling: Examples and Algorithm - Dynamic Hardware Prediction - Multiple Issue - Hardware Based Speculation .Basic Compiler Techniques for Exposing ILP-Static Branch Prediction - the VLIW Approach - Advanced Compiler Support of Exposing ILP Hardware Support for Exposing More Parallelism at Compile Time Hardware Vs Software Speculation.

TEXT BOOK

1. D.A. Patterson, J.L.Hennessy, "Computer Architecture: A Quantitative approach" Elsevier 3rd Edition 2003.

2. K.Hwang, Advanced Computer Architecture, Parallelism, Scalability, Programmability,"McGraw Hill, 1993".

CSE603 ADVANCED DATA STRUCTURES AND ALGORITHMS

Development of Algorithms - Notations, Concepts. Storage structures for arrays-Stacks,Queues: Representations and applications.

Linked lists - Linked stacks and queues - Operations on Polynomials Dynamic storage management - Garbage collection and compaction.

Trees - Tree Traversing - Operations on Binary Trees -height balanced trees - graphs and representative graph algorithms.

Selection, Bubble, Insertion, Merge, Heap, Quick, Radix and address calculation - Linear and Binary Searching - Related analysis -Some advanced data structures.
Divide and Conquer method - Greedy Method - Dynamic Programming – Backtracking Branch and Bound Techniques for Lower Bound, Game Trees.

TEXT BOOK

1. T. H Cormen, C.E. Leiserson, R. L. Rivest, C. Stein, "Introduction to Algorithms ", Prentice Hall of India, 2001.
2. G. Brassard and Bratley, Fundamentals of Algorithmic, Prentice. Hall 1996.

REFERENCE BOOK

1. Sara Baase, Allen Van Gelder, "Computer Algorithms: Introduction to design and Analysis ", 31 Edition, Addison Wesley, 2000.

CSE604 SOFTWARE SYSTEMS LABORATORY

Object-Oriented Programming: Lab exercises in C++/Visual C++, MFCS. Design of Object oriented Software, Lab exercises in shell programming. LINUX Tools: Grep, AWK., TR, MAKE, System calls, Network Programming - Client Server Programming Using Sockets Web Programming.

REFERENCE BOOKS

1. Chris H.Pappas & William Murray-Hill, "Visual C++ 6 The Complete Reference ", TMH Publishers, 2001.
2. Steven Prata, "Advanced UNIX-A Programmer's Guide ", BPB Publications, 1992.
3. D.E. Comer, David, I. Stevens, Internetworking with TCP / IP, Vol-3, Client Sover Programming and Application, Prentice Hall of India, 2000.
4. W.R. Stevens, UNIX, Networking Programming, Prentice Hall of India 1999.

CSE605 ADVANCED CONCEPTS IN DATABASE SYSTEMS

Memory hierarchy - Data formats - file structures - Indexes -B-trees Hash tables – external sorting.
Evaluation of relational operators - Algorithms. Query optimization Use of Heuristics – Cost Estimations.
Transaction concept - Schedules - Serializability. Concurrency control techniques: Timestamp based - Lock based - Optimistic - Multiversion.
Guidelines for index selection - Clustering and indexing - Index tuning, Conceptual Schema tuning, Tuning queries and views.
Log based recovery - undo, redo, undo/redo - logging - Shadow paging - media recovery.
Applications: Data Mining, Data warehousing, Web databases.

TEXT BOOKS

1. A.Silberschaiz, HF. Korth, S.Sudarshan, "Database System Concepts ", 3rd edition, McGraw Hill, 1997
2. R. Elmasri and S. B. Navathe, "Fundamentals of Database System", 2nd edition, The Benjamin /Cummings Publishing Co., 1994.

REFERENCE BOOK

1. CJ Date, "Database an Introduction to Database Systems ", 8th edition, Addison Wesley, 2003.

CSE606 DISTRIBUTED SYSTEMS

Distributed Systems: Goal, Advantages, Organization of Multiprocessor Systems and related Hardware and Software Concepts, Design Issues. Communication - Layered protocols, RPC, RMI, Message oriented communication, Stream oriented communication, Process - Threads, Clients, Servers, Code Migration, Software agents, Naming - entities, locating mobile entities, removing unreferenced entities

Security, Distributed database systems - CORBA, Distributed COM, Distributed GLOBE, Comparison of CORBA, DCOM, and GLOBE, Distributed File Systems - SUN network file system, CODA file system, other distributed file systems and their comparison. Distributed document based systems- Word Wide Web, Lotus notes, Distributed Coordination based systems – Introduction, TIB / RENDEZVOUS, JINI and their comparison.

Case Studies : From the Internet - OPEN SOURCE Security, Distributed database systems - CORBA, Distributed database systems, CORBA, Distributed COM, GLOBE, Comparison of CORBA, DCOM, and GLOBE

TEXT BOOK

1. Andrew S. Tanenbaum, Maarten Van Steen, "Distributed System Principles and Paradigms", Pearson education, 2002.

REFERENCE BOOK

1. G Coulouris, J. Dollimore, "T. Kindberg, "Distributed System Concepts and Design, 4th Edition, Addison Wesley, 2005.
2. M. Reynal, "Distributed Algorithms and Protocols", John Wiley, 1988.

CSE607 INTRODUCTION TO LOGIC AND FUNCTIONAL PROGRAMMING

Introduction to declarative programming paradigms . The functional style of programming, paradigms of development of functional programs, use of higher order functionals and pattern-matching. Types, type-checking and their relationship to logic. Logic as a system for declarative programming. The use of pattern-matching and programming of higher order functions within a logic programming framework. Introduction to symbolic processing. The use of resolution and theorem-proving techniques in logic programming. The relationship between logic programming and functional programming . Laboratory exercises will focus on the following: unification, resolution, theorem proving, pattern matching and type inferencing.

REFERENCE BOOKS:-

- 1) John Kelly, "The Essence of Logic", Prentice-Hall India.
- 2) Saroj Kaushik, "Logic and Prolog Programming", New Age International Ltd., Publisher

CSE608 MAJOR PROJECT –Part-I

Research and development projects based on problems of practical and theoretical interest. First part of a two semester long project activity. Problem definition, background research, development of overall project plan (detailed design, milestones, etc.), and meeting the research and development targets set up for the first part. Evaluation will be based on student seminars, written reports, and evaluation of the developed system and/or theories.

CSE609 MAJOR PROJECT –Part-II

Second part of the two semester project. The primary objective is to meet the milestones defined in the first part. Evaluation will be held periodically, and will be based on written reports, oral presentations and demonstration of results. The project will culminate in the production of a thesis by each individual student. Final evaluation will be according to the M.Tech. project evaluation guidelines.

ELECTIVES

CSE 611 DATA MINING

Introduction to Data Mining, Data Cleaning and transformation, Data Warehousing architecture, Front end data warehousing operations, data cubes and other visualizations, data synchronization with operational databases, Classificatory knowledge Extraction and prediction, Decision Trees, Association Rule Mining, Error analysis, LIFT charts and ROC curves, Bagging and Boosting, Clustering, Sequence analysis, Design of parallel and distributed data mining systems, mining complex data. Laboratory assignments: Implementation of the above concepts.

Text Books:

1. M.H. Dunham, "Data Mining Introductory and Advanced Topics", Pearson Education.
2. Han, Kamber, "Data Mining Concepts and Techniques", Morgan Kaufmann
3. Pieter Adriaans, Dolf Zantinge , "Data Mining", Pearson Education Asia

REFERENCE BOOKS:

1. Ralph Kimball, "The Data Warehouse Lifecycle toolkit", John Wiley.
2. M Berry and G. Linoff, "Mastering Data Mining", John Wiley.
3. W.H. Inmon, "Building the Data Warehouses", Wiley Dreamtech.
4. R. Kimball, "The Data Warehouse Toolkit", John Wiley.
5. E.G. Mallach, "Decision Support and Data Warehouse systems", TMH.

CSE 612 COMPILER DESIGN

Compilers and translators; lexical and syntactic analysis, top-down and bottom up parsing techniques, internal form of source programs; semantic analysis, symbol tables, error detection and recovery, code generation and optimization. Type checking and static analysis. Algorithms and implementation techniques for type-checking, codegeneration and optimization. Students will design and implement translators, static analysis, typechecking, and optimization.

Text Book:

1. Alfred V. Aho, Monica S. Lam, Ravi Sethi, and Jeffrey D. Ullman Compilers: Principles, Techniques, and Tools (a.k.a Dragon Book) 2nd Edition, Addison-Wesley, 2006.

REFERENCE BOOKS:

1. Henk Alblas and Albert Nymeyer, "Practice and Principles of Compiler Building with C", PHI, 2001.
2. Kenneth C. Louden, "Compiler Construction: Principles and Practice", Thompson Learning, 2003
3. <http://nptel.iitm.ac.in/courses/Webcourse-contents/IIT-KANPUR/compiler-desing/ui/TOC.htm>

CSE613 FAULT TOLERANT COMPUTING SYSTEMS

Introduction: Computer and Computation Distribution, System models and Fault models. Test generation for combinational circuits, sequential circuits and Fault simulation. Fault Tolerance Concepts- Recovery in time, Fault detection techniques, Modeling Fault tolerant systems - Rollback modular redundancy and Exception Handling. Fault Tolerant in Real time Systems - Architecture of Fault - tolerant computers general purpose commercial systems - High availability systems - Critical computations Fault Tolerant multiprocessor - Communication Architectures, Shared memory Interconnections, loop architectures, Tree Networks, Graph Network and in Binary cube interconnection. Fault Tolerant Software - Design of fault Tolerant software - Reliability Models, Construction of acceptance tests, validation of Fault tolerant software.

TEXT BOOKS

1. Israel & Krishnan, "Fault Tolerant Systems" Elsevier Publications, 2007.
2. D. K. Pradhan, "Fault Tolerant computing - Theory and Techniques "Prentice Hall.Inc. 1986.

REFERENCE BOOKS

1. Levi & Agrawala, "Fault Tolerant Systems Design, McGraw hill, 1994.
2. MA. Breuer and A.D.Friedman, "Diagnosis and Reliable design of Digital Systems", Computer Sci. Press, 1976.

CSE614 DESIGN AND ANALYSIS OF PARALLEL ALGORITHMS

Introduction to Parallel computers - SIMD - EREW, CREW SM-SIMD algorithms – shared memory SIMD, Tree and mesh interconnection computers. Sorting - Sorting **on a Linear Array**, **Sorting on a Mesh**, **Sorting on EREW SIMD computer**, **MIMD Enumeration Sort**, **MIMD Quick sort**. Sorting on other Networks. Matrix operations - Mesh Transpose, Shuffle Transpose, EREW transpose - Mesh multiplication, Cube multiplication - Matrix by vector Multiplication Tree Multiplication. Numerical problems- Linear. Equations - SIMD algorithm- Roots of Nonlinear Equations - MIMD algorithm- partial Differential Equations, computing Eigen values. Graph Theoretical Problems - computing the connectivity matrix. Finding connected components, Traversing. The minimal Alpha-Beta Tree, Storage requirements.

TEXT BOOKS

1. S.G. Akl, "The Design and Analysis of Parallel Algorithms", Prentice Hall of India. 1989.
2. S. G. Akl, "Parallel Sorting Algorithms ", Academic Press, 1985.

REFERENCE BOOKS

1. S. Lakshmivaran and S.Kdhal, "Analysis and Design of Parallel Algorithms -Arithmetic and Matrix Problems ", McGraw Hill, 1990.

CSE615 ADVANCED NETWORK PRINCIPLES AND PROTOCOLS

Introduction to Networks -Application of Networks - Architecture Topology Switching - SLIP, PPP -ALOHA protocols, CSMA/CD, IEEE 802.3, 802.4, 802.5 Network Layer **Issues**- Routing, Congestion control- Internetworking - Issues, Address Learning Bridges, Spanning tree, Source routing, Bridges, Routers, Gateway. Network Protocol- IP datagram - hop by hop routing, ARP, RARP, DHCP -Sub net Addressing, Address Masking, ICMP, RIP, RIPv2, OSPF, DNS, LAN and WAN Multicast. Transport Layer- Design issues, Connection Management, transmission Control Protocol (TCP) - User Datagram Protocol (UDP). Application Layer Protocol- Telnet - TFTP - FTP - SMTP - Ping Finger, Bootstrap Network Time Protocol- SNMP.

TEXT BOOK

1. S. Tanenbaum, "Computer Networks ", Third Edition, Prentice Hall India, 1997.

REFERENCE BOOK

1. W Richard Stevens, "TCP/IP Illustrated -Volume I, The protocols ", Addison-Wesley Professional Computing Series, 1994.

CSE616 REAL-TIME SYSTEMS

Introduction to Real-time computing - Structure of a Real-Time System Characterization of Real-Time Systems and tasks - Performance **measures**. Task Assignment and Scheduling- Uniprocessor scheduling Algorithms - Task Assignment - Mode Changes - Fault Tolerant Scheduling. Real-Time Communication - Network topologies and Architecture **Issues** – Protocols Contention-based, Token-based, polled bus and Fault Tolerant routing. Real-Time Databases - Transaction Priorities and Aborts - Concurrency control Issues Scheduling Algorithms - Two-phase approach to improve predictability. Programming Languages and Tools - Hierarchical decomposition - RunTime error handling - Overloading - Timing specification - Recent trends and developments.

TEXT BOOK

1. CM Krishna and Kang G Shin, "Real-Time Systems", International Editions, ISBN-0- 07114243-6, McGraw Hill Companies, Inc., New York, 1997

CSE617 NETWORK SECURITY

Introduction to Classical and Modern techniques - Attacks, services and mechanisms, classical encryption techniques, DES, Block cipher design principles and modes of operation. Encryption Algorithms and Hash Functions - Triple DES, RC5, key management, Public key. Cryptography RSA Algorithm, Digital signatures and authentication protocols. System Security - Backups, integrity management, protecting against programmed threats, viruses and worms, physical security, personnel security. Network Security - Protection against eavesdropping, security for modems, IP security, web security, electronic mail security, authentication applications. Security tools - Firewalls, wrappers, proxies, discovering a break-in, denial of service attacks and solutions, Cryptographic security tools: KERBEROS, PGP, SSH, SRP, PIE.

TEXT BOOKS

1. William Stallings, "Cryptography and Network Security Principles and Practice ", 11 Edition, Pearson Education Asia Publishers (Low priced Edition), 2000, Ch 1 to 16.
2. Simson Garjainkal, and Gene Spafford, "Practical UNIX and Internet Security" 2nd edition O'Reilly Pule Pvt. Ltd. 2000

REFERENCE BOOK

1. Steve Burnett and Stephene Paine, "RSA Security 's official guide to cryptography", RSA Press, Tata McGraw Hill Edition, 2001.

CSE618 MOBILE NETWORK SYSTEMS

Introduction to wireless, mobile and cellular mobile systems- cellular mobile telephone systems, analog and digital cellular systems- - fre.,quency reuse, co-channel interference. Medium access control - MAC, SDMA,

FDMA, TDMA, CDMA, Hand offs and dropped calls-initiation of handoff, power difference, mobile assisted cell-site and Intersystem handoff. Mobile Telecommunication standards, satellite and broadcast systems - GSM, DECT, TETRA, IMT-2000, CTEO, LEO and MEO, - IEEE 802.11, HIPERLAN, Bluetooth. Network support for mobile systems - Cellular analog, MTSO interconnection, reverse tunneling, IPV6, DHCP, Wireless ATM-W ATM services, functions, radio access layer.

Mobile transport and application layer protocol - Review of traditional TCP, fast retransmit/fast recovery, transmission/timeout freezing, file systems, W W W, W AP.

TEXT BOOK

1. Jochen Sciiiller, "Mobile Communications ", Pearson Education Asia Publications (Low Price Edition), 2000, Ch 1 to 11.

REFERENCE BOOK

1. William C.Y Lee, "Mobile Cellular Telecommunications ", McGraw Hill International 'Editions, 1995, Ch 1, 2, 8, 9, 11.

CSE 619 WIRELESS SENSOR NETWORKS

Introduction : Fundamentals of wireless communication technology, the electro magnetic spectrum radio propagation, characteristics of wireless channels, modulation techniques, multiple access techniques, wireless LANs, PANs, WANs, and MANs, Wireless Internet. Introduction to adhoc/sensor networks: Key definitions of adhoc/ sensor networks, unique constraints and challenges, advantages of ad-hoc/sensor network, driving applications, issues in adhoc wireless networks, issues in design of sensor network, sensor network archeitecture, data dissemination and gathering. MAC Protocols : Issues in desiging MAC protocols for adhoc wireless networks, design goals, classification of MAC protocols, MAC protocols for sensor network, location discovery, quality, other issues, S-MAC, IEEE 802.15.4.

Routing Protocols : Issues in designing a routing protocol, classification of routing protocols, table-driven, on-demand, hybrid, flooding, hierarchical, and power aware routing protocols. QoS and Energy Management : Issues and Challenges in providing QoS, classifications, MAC, network layer solutions, QoS frameworks, need for energy management, classification, battery, transmission power, and system power management schemes.

TEXT BOOK

1. C. Siva Ram Murthy, and B. S. Manoj, "AdHoc Wireless networks ", pearson Education - 2008.

REFERENCE BOOK

1. Feng Zhao and Leonides Guibas, "Wireless sensor networks ", Elsevier publication - 2004.
2. Jochen Schiller, "Mobile Communications ". Pearson Education, 2nd Edition, 2003.
3. William Stallings, "Wireless Communications and Networks ", Pearson Education - 2004

CSE620 NEURAL NETWORKS

Introduction to Biological Neural Networks; Basic anatomy and physiology of a nerve cell; mathematical models of a biological neuron; networks of neurons; a simple model of a neuron and its application to a classification problem; linear separability and linear dichotomies; nonlinearly separable problems; learning with layered networks; backpropagation; recurrent neural networks; the Hopfield network; application to optimization tasks; unsupervised learning – both cooperative and competitive; Oja and Sanger's rules; Principal Component Analysis; Kohonen's Self Organizing Feature Map; applications of unsupervised learning; Reinforcement Learning; Support Vector Machines; Hardware Realization of Neural Systems; Current Trends and Future Directions.

TEXT BOOK

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

CSE621ARTIFICIAL INTELLIGENCE

Problem solving, search techniques, control strategies, game playing (minimax), reasoning, knowledge representation through predicate logic, rule based systems, semantics nets, frames, conceptual dependency. Planning. Handling uncertainty: probability theory, Bayesian Networks, Dempster-Shafer theory, Fuzzy logic, Learning through Neural nets - Back propagation, radial basis functions, Neural computational models - Hopfield Nets, Boltzman machines. PROLOG programming. Expert Systems.

TEXT BOOK

1. Artificial Intelligence: a modern approach, S. Russell and P. Norvig, Prentice Hall, ISBN0-13-080302-2
2. Artificial Intelligence, Elaine Rich, Kevin Knight, Shivashankar B Nair, Third Edition, Mc Graw Hill

CSE622 COMPUTER GRAPHICS

Graphics pipeline; Graphics hardware: Display devices, Input devices; Raster Graphics: line and circle drawing algorithms; Windowing and 2D/3D clipping: Cohen and Sutherland line clipping, Cyrus Beck clipping method; 2D and 3D Geometrical Transformations: scaling, translation, rotation, reflection; Viewing Transformations: parallel and perspective projection; Curves and Surfaces: cubic splines, Bezier curves, B-splines, Parametric surfaces, Surface of revolution, Sweep surfaces, Fractal curves and surfaces; Hidden line/surface removal methods; illuminations model; shading: Gouraud, Phong; Introduction to Ray-tracing; Animation; Programming practices with standard graphics libraries like OpenGL.

TEXT BOOKS:

- 1) Computer Graphics C version, Donald Hearn & M. Pauline Baker, Pearson Education, New Delhi, 2004 (Chapters 1-12 except 10-9 to 10-22).

REFERENCE BOOKS:

- 1) Procedural Elements for Computer Graphics, David F. Rogers, TATA McGraw Hill Book Company, New Delhi, 2003.
- 2) Computer Graphics: Principles & Practice in C, JD Foley, S. K. Fetner, A. Van Dam, F.H. John Pearson Education, 2004.
- 3). Computer Graphics using Open GL, Francis S. Hill Jr, Pearson Education, 2004.

CSE623 SOFTWARE ENGINEERING

Concepts and techniques relevant to production of large software systems: Structured programming. Requirements specification and analysis. Top-down design and development. Information hiding, abstraction, modularity, object-oriented techniques. Separate compilation, configuration management, program libraries. Design patterns; UML. Documentation. Validation. Quality assurance, safety. Testing and test case generation.

Software metrics. Cost analysis and estimation, manpower and time management. Organization and management of large software design projects.

TEXT BOOKS:

1. Roger S.Pressman, Software engineering- A practitioner's Approach, McGraw-Hill International Edition, 5th edition, 2001.

REFERENCE BOOKS:

1. Ian Sommerville, Software engineering, Pearson education Asia, 6th edition, 2000.

2. Pankaj Jalote- An Integrated Approach to Software Engineering, Springer Verlag, 1997.

3. James F Peters and Witold Pedrycz, "Software Engineering – An Engineering Approach", John Wiley and Sons, New Delhi, 2000.

4. Ali Behforooz and Frederick J Hudson, "Software Engineering Fundamentals", Oxford University Press, New Delhi, 1996.

SINGHANIA UNIVERSITY

M.Tech (Software Engineering)

Semester – Ist

Sr.No	Code	Name of Subject
1	MTSE-111	Software Process and Project Management
2	MTSE-112	Software Requirements and Estimation
3	MTSE-113	Software Quality Assurance and Testing
4	MTSE-114	Software Lab-1
5	MTSE-115	Elective-1
6	MTSE-116	Elective-2

Semester – IInd

Sr.No.	Code	Name of Subject
1	MTSE-121	Information Security
2	MTSE-122	Software Architecture and Design Pattern
3	MTSE-123	Wireless Networks and Mobile Computing
4	MTSE-124	Software Lab-II Elective-4
5		Elective-3
6		Elective-4

Semester – IIIrd

Sr.No.	Code	Name of Subject
1	MTSE-211	Synopsis/Seminar/Presentation

Semester – IVth

Sr.No.	Code	Name of Subject
1	MTSE-221	THESIS / PROJECT /SEMINAR

LIST OF ELECTIVES

Serial No.	Code	Course of Study
1	MTSE601	Web Technologies
2	MTSE602	Data Warehousing and Mining
3	MTSE603	Neural Networks
4	MTSE604	Unix Network Programming
5	MTSE605	Cloud Computing
6	MTSE606	Supply Chain Management
7	MTSE607	Compiler Design
8	MTSE608	Human Resource Management
10	MTSE609	Advanced network principles and protocols
11	MTSE610	Real-time systems
12	MTSE611	Network security

DETAILED SYALLABUS

Semester First's Core Papers

SOFTWARE PROCESS AND PROJECT MANAGEMENT

UNIT I

Software Process Maturity Software maturity Framework, Principles of Software Process Change, Software Process Assessment, The Initial Process, The Repeatable Process, The Defined Process, The Managed Process, The Optimizing Process.

UNIT II

Process Reference Models Capability Maturity Model (CMM), CMMi, PCMM, PSP, TSP, IDEAL, Process Definition Techniques.

UNIT III

Software Project Management Renaissance Conventional Software Management, Evolution of Software Economics, Improving Software Economics, The old way and the new way.

UNIT IV

Managing Software Projects Project Management and the CMM, Project Management and CMMi, Project Management Process Framework.

UNIT V

Project Planning Software Life Cycle Models, Project Organizations and Responsibilities, Artifacts of the Project Management Process, Cost and Scheduling estimation, Establishing Project Environment, Risk Management, Quality Assurance and Configuration Management

UNIT VI

Project Tracking and Control Defect Tracking, Issue Tracking, Status Reports, Milestone Analysis, Defect Analysis and Prevention Methods, Process monitoring and audit, Reviews, Inspections and Walkthroughs, Seven Core Metrics, Management indicators, Quality Indicators

UNIT VII

Project Closure Analysis, Role of Closure Analysis in a project, Performing Closure Analysis, Closure Analysis Report

UNIT VIII

CCPDS-R Case Study and Future Software Project Management Practices Modern Project Profiles, Next-Generation software Economics, Modern Process Transitions

Text Books

1. Managing the Software Process by Watts S. Humphrey, published by Pearson Education
2. Software Project Management, by Walker Royce, published by Pearson Education

SOFTWARE REQUIREMENTS AND ESTIMATION

UNIT I

Software Requirements: What and Why Essential Software requirement, Good practices for requirements engineering, Improving requirements processes, Software requirements and risk management

UNIT II

Software Requirements Engineering Requirements elicitation, requirements analysis documentation, review, elicitation techniques, analysis models, Software quality attributes, risk reduction through prototyping, setting requirements priorities, verifying requirements quality,

UNIT III

Software Requirements Management

Requirements management Principles and practices, Requirements attributes, Change Management Process, Requirements Traceability Matrix, Links in requirements chain

UNIT

Software Requirements Modeling
Use Case Modeling, Analysis Models, Dataflow diagram, state transition diagram, class diagrams, Object analysis, Problem Frames

IV

UNIT V

Software Estimation

Components of Software Estimations, Estimation methods, Problems associated with estimation, Key project factors that influence estimation

UNIT VI

Size Estimation

Two views of sizing, Function Point Analysis, Mark II FPA, Full Function Points, LOC Estimation, Conversion between size measures,

UNIT VII

Effort, Schedule and Cost Estimation

What is Productivity? Estimation Factors, Approaches to Effort and Schedule Estimation, COCOMO II, Putnam Estimation Model, Algorithmic models, Cost Estimation

UNIT VIII

Tools for Requirements Management and Estimation

Requirements Management Tools: Benefits of using a requirements management tool, commercial requirements management tool, Rational Requisite pro, Caliber “ RM, implementing requirements management automation, Software Estimation Tools:

Desirable features in software estimation tools, IFPUG, USC’s COCOMO II, SLIM (Software Life Cycle Management) Tools

Text Book

1. Software Requirements and Estimation by Rajesh Naik and Swapna Kishore, published by Tata Mc Graw Hill

SOFTWARE QUALITY ASSURANCE AND TESTING

UNIT I

Software Quality Assurance Framework and Standards

SQA Framework: What is Quality? Software Quality Assurance, Components of Software Quality Assurance “ Software Quality Assurance Plan: Steps to develop and implement a Software Quality Assurance Plan “ Quality Standards: ISO 9000 and Companion ISO Standards, CMM, CMMI, PCMM, Malcom Balridge, 3 Sigma, 6 Sigma

UNIT II

Software Quality Assurance Metrics and Measurement

Software Quality Metrics: Product Quality metrics, In-Process Quality Metrics, Metrics for Software Maintenance, Examples of Metric Programs “ Software Quality metrics methodology: Establish quality requirements, Identify Software quality metrics, Implement the software quality metrics, analyze software metrics results, validate the software quality metrics “ Software quality indicators “ Fundamentals in Measurement theory

UNIT III

Software Testing Strategy and Environment

Establishing testing policy, structured approach to testing, test factors,
Economics of System Development Life Cycle (SDLC) Testing

UNIT IV

Software Testing Methodology

Defects hard to find, verification and validation, functional and structural testing, workbench concept, eight considerations in developing testing methodologies, testing tactics checklist

UNIT V

Software Testing Techniques

Black-Box, Boundary value, Bottom-up, Branch coverage, Cause-Effect graphing, CRUD, Database, Exception, Gray-Box, Histograms, Inspections, JADs, Pareto Analysis, Prototyping, Random Testing, Risk-based Testing, Regression Testing, Structured Walkthroughs, Thread Testing, Performance Testing, White-Box Testing

UNIT VI

Software Testing Tools

Taxonomy of Testing tools, Methodology to evaluate automated testing tools, Load Runner, Win runner and Rational Testing Tools, Java Testing Tools, JMetra, JUNIT and Cactus.

UNIT VII

Testing Process

Eleven Step Testing Process: Assess Project Management Development Estimate and Status, Develop Test Plan, Requirements Phase Testing, Design Phase Testing, Program Phase Testing, Execute Test and Record Results, Acceptance Test, Report test results, testing software installation, Test software changes, Evaluate Test Effectiveness.

UNIT VIII Testing Specialized Systems and Applications

Testing Client/Server “ Web applications, Testing off the Shelf Components, Testing Security, Testing a Data Warehouse

Text Books

1. Effective Methods for Software Testing, 2nd Edition
by William E. Perry , Second Edition, published by Wiley
2. Software Quality, by Mordechai Ben-Menachem/Garry S. Marliss, by Thomson Learning publication

Second Semester's Core Papers

INFORMATION SECURITY

UNIT I

Security Attacks (Interruption, Interception, Modification and Fabrication),

Security Services (Confidentiality, Authentication, Integrity, Non-repudiation, access Control and Availability) and Mechanisms, A model for Internetwork security, Internet Standards and RFCs, Buffer overflow & format string vulnerabilities, TCP session hijacking, ARP attacks, route table modification, UDP hijacking, and man-in-the-middle attacks.

UNIT II

Conventional Encryption Principles, Conventional encryption algorithms, cipher block modes of operation, location of encryption devices, key distribution Approaches of Message Authentication, Secure Hash Functions and HMAC,

UNIT III

Public key cryptography principles, public key cryptography algorithms, digital signatures, digital Certificates, Certificate Authority and key management Kerberos, X.509 Directory Authentication Service

UNIT IV

Email privacy: Pretty Good Privacy (PGP) and S/MIME.

UNIT V

IP Security Overview, IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations and Key Management

UNIT VI

Web Security Requirements, Secure Socket Layer (SSL) and Transport Layer Security (TLS), Secure Electronic Transaction (SET)

UNIT VII

Basic concepts of SNMP, SNMPv1 Community facility and SNMPv3, Intruders, Viruses and related threats

UNIT VIII

Firewall Design principles, Trusted Systems, Intrusion Detection Systems

Text Books

1. Network Security Essentials (Applications and Standards) by William Stallings Pearson Education.
2. Hack Proofing your network by Ryan Russell, Dan Kaminsky, Rain

Forest Puppy, Joe Grand, David Ahmad, Hal Flynn Ido Dubrawsky, Steve W.Manzuik and Ryan Permeh, wiley Dreamtech,

SOFTWARE ARCHITECTURE AND DESIGN PATTERN

UNIT I

Envisioning Architecture

The Architecture Business Cycle, What is Software Architecture? Designing the Architecture, Documenting the architecture, Reconstructing Software Architecture

UNIT II

Creating an Architecture

Quality Attributes, Moving from quality to Architecture, Architectural styles and patterns, UNIT Operations, Achieving qualities, designing the Architecture, Documenting the architecture, Reconstructing Software Architecture, shared information systems

UNIT III

Analyzing Software Architecture

Analyzing development qualities at the architectural level, SAAM, ATAM, CBAM, Architecture Reviews

UNIT IV

Moving from Architecture to Systems

Software Product Lines, Building systems from off the shelf components, Reuse of Architectural assets within an organization.

UNIT V

Patterns

What is pattern? Pattern categories, Pattern Description, Patterns and Software Architecture, Pattern Systems, Classification, Selection

UNIT VI

Design Patterns Catalog

Creational Pattern, Structural Pattern, Behavioral Patterns, Pattern Community, Designing a document editor

UNIT VII

Case Studies

Key word in Context, The World Wide Web - a case study in interoperability, Instrumentation software, cruise control, three vignettes in mixed styles, CORBA - a case study on Industry Standard computing infrastructure, Flight Simulation “ a case study in architecture for integration, Celsius Tech “ a case study in product line development,

Text Books

- 1 Software Architecture in Practice, 2nd Edition by Len Bass, Paul Clements, Rick Kazman, published by Pearson Edition
2. Design Patterns, by Erich Gamma, Pearson Education

WIRELESS NETWORKS AND MOBILE COMPUTING

UNIT I

Introduction to Network Technologies and Cellular Communications:
HIPERLAN: Protocol architecture, physical layer, Channel access control sub-layer, MAC sub-layer, Information bases and networking
WLAN: Infrared vs. radio transmission, Infrastructure and ad hoc networks, IEEE 802.11. Bluetooth.: User scenarios, Physical layer, MAC layer, Networking, Security, Link management
GSM: Mobile services, System architecture, Radio interface, Protocols, Localization and calling, Handover, Security, and New data services.
Mobile Computing (MC): Introduction to MC, novel applications, limitations, and architecture

UNIT II

(Wireless) Medium Access Control:

Motivation for a specialized

MAC (Hidden and exposed terminals, Near and far terminals), SDMA, FDMA, TDMA, CDMA.

UNIT III

Mobile Network Layer:

Mobile IP (Goals, assumptions, entities and terminology, IP packet delivery, agent advertisement and discovery, registration, tunneling and encapsulation, optimizations), Dynamic Host Configuration Protocol (DHCP).

UNIT IV

Mobile Transport Layer:

Traditional TCP, Indirect TCP, Snooping TCP, Mobile TCP, Fast retransmit/fast recovery, Transmission /time-out freezing, Selective retransmission, Transaction oriented TCP.

UNIT V

Database Issues:

Hoarding techniques, caching invalidation mechanisms, client server computing with adaptation, power-aware and context-aware computing, transactional models, query processing, recovery, and quality of service issues.

UNIT VI

Data Dissemination:

Communications asymmetry, classification of new data delivery mechanisms, push-based mechanisms, pull-based mechanisms, hybrid mechanisms, selective tuning (indexing) techniques.

UNIT VII

Mobile Ad hoc Networks (MANETs):

Overview, Properties of a MANET, spectrum of MANET applications, routing and various routing algorithms, security in MANETs.

UNIT VIII

Protocols and Tools:

Wireless Application Protocol-WAP. (Introduction, protocol architecture, and treatment of protocols of all layers), Bluetooth (User scenarios, physical layer, MAC layer, networking, security, link management) and J2ME.

Text Books

1. Jochen Schiller, "Mobile Communications", Pearson Education. (Chapters 4, 7, 9, 10, 11), second edition, 2004.
2. Stojmenovic and Cacute, "Handbook of Wireless Networks and Mobile Computing", Wiley, 2002, ISBN 0471419028.(Chapters 11, 15, 17, 26 and 27)

Electives

WEB TECHNOLOGIES

UNIT I

HTML Common tags- List, Tables, images, forms, Frames; Cascading Style sheets;

UNIT II

Introduction to Java Scripts, Objects in Java Script, Dynamic HTML with Java Script

UNIT III

XML: Document type definition, XML Schemas, Document Object model, Presenting XML, Using XML Processors: DOM and SAX

UNIT IV

Java Beans: Introduction to Java Beans, Advantages of Java Beans, JDK Introspection, Using Bound properties, Bean Info Interface, Constrained properties
Persistence, Customizes, Java Beans API, Introduction to EJB™s

UNIT V

Web Servers: Introduction to Servlets: Lifecycle of a Servlet, JDK, The Servlet API, The javax.servelet Package, Reading Servlet parameters, Reading Initialization parameters. The javax.servelet HTTP package, Handling Http Request & Responses, Using Cookies-Session Tracking, Security Issues,

UNIT VI

Introduction to JSP: The Problem with Servlet. The Anatomy of a JSP Page, JSP Processing. JSP Application Design with MVC Setting Up and JSP Environment: Installing the Java Software Development Kit, Tomcat Server & Testing Tomcat

UNIT VII

JSP Application Development: Generating Dynamic Content, Using Scripting Elements Implicit JSP Objects, Conditional Processing “
Displaying Values Using an Expression to Set an Attribute, Declaring Variables and Methods Error Handling and Debugging Sharing Data

Between JSP pages, Requests, and Users Passing Control and Data between Pages “ Sharing Session and Application Data “ Memory Usage Considerations

UNIT VIII

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

Text Books

1. Web Programming, building internet applications, Chris Bates 2nd edition, WILEY
Dreamtech (UNIT s 1,2 ,3)
2. The complete Reference Java 2 Fifth Edition by Patrick Naughton and Herbert Schildt. TMH (Chapters: 19, 20, 21, 22, 25, 27) (UNIT 4)
3. Java Server Pages “ Hans Bergsten, SPD Oâ€™TMReilly (UNITs 5,6,7,8)

DATA WAREHOUSING AND MINING

UNIT I

Introduction: Fundamentals of data mining, Data Mining Functionalities, Classification of Data Mining systems, Major issues in Data Mining, Data Warehouse and OLAP Technology for Data Mining Data Warehouse, Multidimensional Data Model, Data Warehouse Architecture, Data Warehouse Implementation, Further Development of Data Cube Technology, From Data Warehousing to Data Mining,

UNIT II

Data Preprocessing: Needs Preprocessing the Data, Data Cleaning, Data Integration and Transformation, Data Reduction, Discretization and Concept Hierarchy Generation,

UNIT III

Data Mining Primitives, Languages, and System Architectures: Data Mining Primitives, Data Mining Query Languages, Designing Graphical User Interfaces Based on a Data Mining Query Language Architectures of Data Mining Systems,

UNIT IV

Concepts Description: Characterization and Comparison:Data
Generalization and Summarization-Based Characterization, Analytical
Characterization: Analysis of Attribute Relevance, Mining Class
Comparisons: Discriminating between Different Classes, Mining Descriptive
Statistical Measures in Large Databases.

UNIT V

Mining Association Rules in Large Databases: Association Rule Mining,
Mining Single-Dimensional Boolean Association Rules from Transactional
Databases, Mining Multilevel Association Rules from Transaction
Databases, Mining Multidimensional Association Rules from Relational
Databases and Data Warehouses, From Association Mining to Correlation
Analysis, Constraint-Based Association Mining.

UNIT VI

Classification and Prediction: Issues Regarding Classification and
Prediction, Classification by Decision Tree Induction, Bayesian
Classification, Classification by Backpropagation, Classification Based on
Concepts from Association Rule Mining, Other Classification Methods,
Prediction, Classifier Accuracy.

UNIT VII

Cluster Analysis Introduction :Types of Data in Cluster Analysis, A
Categorization of Major Clustering Methods, Partitioning Methods, Density-
Based Methods, Grid-Based Methods, Model-Based Clustering Methods,
Outlier Analysis.

UNIT VIII

Mining Complex Types of Data: Multidimensional Analysis and Descriptive
Mining of Complex, Data Objects, Mining Spatial Databases, Mining
Multimedia Databases, Mining Time-Series and Sequence Data, Mining
Text Databases, Mining the World Wide Web.

Text Books

1. Data Mining “ Concepts and Techniques - Jiawei Han & Micheline
Kamber Harcourt India.
2. Data Mining Introductory and advanced topics “Margaret H Dunham,
Pearson education

UNIX NETWORK PROGRAMMING

UNIT I

Review of Unix Utilities and Shell Programming-File handling utilities, security by file permissions, process utilities, disk utilities, networking commands, backup utilities, text processing utilities, Working with the Bourne shell-What is a shell, shell responsibilities, pipes and input redirection, output redirection, here documents, the shell as a programming language, shell meta characters, shell variables, shell commands, the environment, control structures, shell script examples.

UNIT II

Unix Files: Unix file structure, directories, files and devices, System calls, library functions, low level file access, usage of open, creat, read, write, close, lseek, stat, fstat, octl, umask, dup, dup2.

The standard I/O (fopen, fclose, fflush, fseek, fgetc, getc, getchar, fputc, putc, putchar, fgets, gets), formatted I/O, stream errors, streams and file descriptors, file and directory maintenance (chmod, chown, unlink, link, symlink, mkdir, rmdir, chdir, getcwd), Directory handling system calls (opendir, readdir, closedir, rewinddir, seekdir, telldir)

UNIT III

Unix Process, Threads and Signals: What is process, process structure, starting new process, waiting for a process, zombie process, process control, process identifiers, system call interface for process management-fork, vfork, exit, wait, waitpid, exec, system, Threads-Thread creation, waiting for a thread to terminate, thread synchronization, condition variables, canceling a thread, threads vs. processes, Signals- Signal functions, unreliable signals, interrupted system calls, kill and raise functions, alarm, pause functions, abort, sleep functions.

UNIT IV

Interprocess Communication Overview: Introduction to IPC, IPC between processes on a single computer system, IPC between processes on different systems, file and record locking, other Unix locking techniques, pipes, FIFOs, streams and messages, namespaces, introduction to three types of IPC (system-V)-message queues, semaphores and shared memory.

UNIT V

Message Queues-Unix system-V messages, Unix kernel support for

messages, Unix APIs for messages, client/server example.

UNIT VI

Semaphores-Unix system-V semaphores, Unix kernel support for semaphores, Unix APIs for semaphores, file locking with semaphores. Shared Memory-Unix system-V shared memory, Unix kernel support for shared memory, Unix APIs for shared memory, semaphore and shared memory example.

UNIT VII

Sockets: Berkeley sockets, socket system calls for connection oriented protocol and connectionless protocol, example-client/server program, advanced socket system calls, socket options.

UNIT VIII

Remote Procedure Calls-RPC Model, transparency issues, sun RPC

Text Books

1. Unix Network Programming, W.R.Stevens Pearson/PHI.
2. Unix Concepts and Applications, 3rd Edition, Sumitabha Das, TMH.

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

UNIT II

Learning Process “ Error Correction learning, Memory based learning, Hebbian learning, Competitive, Boltzmann learning, Credit Assignment Problem, Memory, Adaption, Statistical nature of the learning process,

UNIT III

Single layer perceptrons “ Adaptive filtering problem, Unconstrained Organization Techniques, Linear least square filters, least mean square algorithm, learning curves, Learning rate annealing techniques, perceptron “convergence theorem, Relation between perceptron and Bayes classifier for a Gaussian Environment (p. no. 117 “155)

UNIT IV

Multilayer Perceptron “ Back propagation algorithm XOR problem, Heuristics, Output representation and decision rule, Computer experiment,

feature detection, (p. noâ€™s 156 â€“201)

UNIT V

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. noâ€™s 202 â€“234)

UNIT VI

Self Organization Maps â€“ Two basic feature mapping models, Self organization map, SOM algorithm, properties of feature map, computer simulations, learning vector quantization, Adaptive pattern classification (p. noâ€™s 443 â€“469, 9.1 â€“9.8)

UNIT VII

Neuro Dynamics â€“ Dynamical systems, stability of equilibrium states, attractors, neurodynamical models , manipulation of attractors as a recurrent network paradigm
(p. noâ€™s 664 â€“680, 14.1 â€“14.6)

UNIT VIII

Hopfield Models â€“ Hopfield models, computer experiment I (p. noâ€™s 680-701, 14.7 â€“14.8)

Text Book

1. Neural networks A comprehensive foundations, Simon Haykin, Pearson Education 2nd edition 2004

CLOUD COMPUTING

UNIT I UNDERSTANDING CLOUD COMPUTING

Cloud Computing – History of Cloud Computing – Cloud Architecture – Cloud Storage – Why Cloud Computing Matters – Advantages of Cloud Computing – Disadvantages of Cloud Computing – Companies in the Cloud Today – Cloud Services

UNIT II DEVELOPING CLOUD SERVICES

Web-Based Application – Pros and Cons of Cloud Service Development – Types of Cloud Service Development – Software as a Service – Platform as a Service – Web Services – On-Demand Computing – Discovering Cloud Services Development Services and Tools – Amazon Ec2 – Google App Engine – IBM Clouds

UNIT III CLOUD COMPUTING FOR EVERYONE

Centralizing Email Communications – Collaborating on Schedules – Collaborating on To-Do Lists – Collaborating Contact Lists – Cloud Computing for the Community – Collaborating on Group Projects and Events – Cloud Computing for the Corporation

UNIT IV USING CLOUD SERVICES

Collaborating on Calendars, Schedules and Task Management – Exploring Online Scheduling Applications – Exploring Online Planning and Task Management – Collaborating on Event Management – Collaborating on Contact Management – Collaborating on Project Management – Collaborating on Word Processing – Collaborating on Databases – Storing and Sharing Files

UNIT V OTHER WAYS TO COLLABORATE ONLINE

Collaborating via Web-Based Communication Tools – Evaluating Web Mail Services – Evaluating Web Conference Tools – Collaborating via Social Networks and Groupware – Collaborating via Blogs and Wikis

REFERENCES

1. Michael Miller, Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online, Que Publishing, August 2008.
2. Haley Beard, Cloud Computing Best Practices for Managing and Measuring Processes for On-demand Computing, Applications and Data Centers in the Cloud with SLAs, Emereo Pty Limited, July 2008.

SUPPLY CHAIN MANAGEMENT

UNIT I FUNDAMENTALS OF SUPPLY CHAIN MANAGEMENT

Supply chain networks, Integrated supply chain planning, Decision phases in a supply chain, process view of a supply chain, supply chain flows, Overview of supply chain models and modeling systems, Supply chain planning: Strategic, operational and tactical, Understanding supply chain through process mapping and process flow chart.

UNIT II SCM STRATEGIES, PERFORMANCE

Supply chain strategies, achieving strategic fit, value chain, Supply chain drivers and obstacles, Strategic Alliances and Outsourcing, purchasing aspects of supply chain, Supply chain performance measurement: The balanced score card approach, Performance Metrics. Planning demand and supply: Demand forecasting in supply chain, Aggregate planning in supply chain, Predictable variability.

UNIT III PLANNING AND MANAGING INVENTORIES

Introduction to Supply Chain Inventory Management. Inventory theory models: Economic Order Quantity Models, Reorder Point Models and Multiechelon Inventory

Systems, Relevant deterministic and stochastic inventory models and Vendor managed inventory models.

UNIT IV DISTRIBUTION MANAGEMENT

Role of transportation in a supply chain - direct shipment, warehousing, cross-docking; push vs. pull systems; transportation decisions (mode selection, fleet size), market channel structure, vehicle routing problem. Facilities decisions in a supply chain. Mathematical foundations of distribution management, Supply chain facility layout and capacity planning,

UNIT V STRATEGIC COST MANAGEMENT IN SUPPLY CHAIN

The financial impacts, Volume leveraging and cross docking, global logistics and material positioning, global supplier development, target pricing, cost management enablers, Measuring service levels in supply chains, Customer Satisfaction/Value/Profitability/Differential Advantage.

REFERENCES

1. David Simchi-Levi, Philip Kaminsky, and Edith Simchi-Levi Designing and Managing the Supply Chain: Concepts, Strategies, and Case Studies, Second Edition, , McGraw-Hill/Irwin, New York, 2003.
2. Sunil Chopra and Peter Meindl. Supply Chain Management: Strategy, Planning, and Operation, Prentice Hall of India, 2002.
3. Sunil Chopra & Peter Meindl, Supply Chain Management , Prentice Hall Publisher, 2001
4. Robert Handfield & Ernest Nichols, Introduction to Supply Chain Management , Prentice hall Publishers, 1999.

COMPILER DESIGN

UNIT I INTRODUCTION TO COMPILING 9

Compilers – Analysis of the source program – Phases of a compiler – Cousins of the Compiler – Grouping of Phases – Compiler construction tools – Lexical Analysis – Role of Lexical Analyzer – Input Buffering – Specification of Tokens.

UNIT II SYNTAX ANALYSIS 9

Role of the parser –Writing Grammars –Context-Free Grammars – Top Down parsing – Recursive Descent Parsing – Predictive Parsing – Bottom-up parsing – Shift Reduce Parsing – Operator Precedent Parsing – LR Parsers – SLR Parser – Canonical LR Parser – LALR Parser.

UNIT III INTERMEDIATE CODE GENERATION 9

Intermediate languages – Declarations – Assignment Statements – Boolean Expressions – Case Statements – Back patching – Procedure calls.

UNIT IV CODE GENERATION 9

Issues in the design of code generator – The target machine – Runtime Storage management – Basic Blocks and Flow Graphs – Next-use Information – A simple Code generator – DAG representation of Basic Blocks – Peephole Optimization.

UNIT V CODE OPTIMIZATION AND RUN TIME ENVIRONMENTS 9

Introduction– Principal Sources of Optimization – Optimization of basic Blocks – Introduction to Global Data Flow Analysis – Runtime Environments – Source Language issues – Storage Organization – Storage Allocation strategies – Access to non-local names – Parameter Passing.

Text Book:

1. Alfred V. Aho, Monica S. Lam, Ravi Sethi, and Jeffrey D. Ullman Compilers: Principles, Techniques, and Tools (a.k.a Dragon Book) 2nd Edition, Addison-Wesley, 2006.

REFERENCE BOOKS:

1. Henk Alblas and Albert Nymeyer, “Practice and Principles of Compiler Building with C”, PHI, 2001.
2. Kenneth C. Loudon, “Compiler Construction: Principles and Practice”, Thompson Learning, 2003
3. <http://nptel.iitm.ac.in/courses/Webcourse-contents/IIT-KANPUR/compiler-desing/ui/TOC.htm>

HUMAN RESOURCE MANAGEMENT

UNIT I PERSPECTIVES IN HUMAN RESOURCE MANAGEMENT

Evolution of human resource management – the importance of the human factor – objectives of human resource management – role of human resource manager – human resource policies – computer applications in human resource management.

UNIT II THE CONCEPT OF BEST FIT EMPLOYEE

Importance of human resource planning – forecasting human resource requirement – internal and external sources. Selection process-screening – tests - validation – interview - medical examination – recruitment introduction – importance – practices – socialization benefits.

UNIT III TRAINING AND EXECUTIVE DEVELOPMENT

Types of training, methods, purpose, benefits and resistance. Executive development programmes – common practices - benefits – self development – knowledge management.

UNIT IV SUSTAINING EMPLOYEE INTEREST

Compensation plan – reward – motivation – theories of motivation – career management – development, mentor – protégé relationships.

UNIT V PERFORMANCE EVALUATION AND CONTROL PROCESS

Method of performance evaluation – feedback – industry practices. Promotion, demotion, transfer and separation – implication of job change. The control process – importance –

methods – requirement of effective control systems grievances – causes – implications – redressal methods.

TEXT BOOKS

1. Decenzo and Robbins, Human Resource Management, Wiley, 6th edition, 2001.
2. Biswajeet Pattanayak, Human Resource Management, Prentice Hall of India, 2001.

REFERENCES

1. Human Resource Management, Eugence Mckenna and Nic Beach, Pearson Education Limited, 2002.
2. Dessler Human Resource Management, Pearson Education Limited, 2002.
3. Mamoria C.B. and Mamoria S. Personnel Management, Himalaya Publishing Company, 1997.
4. Wayne Cascio, Managing Human Resource, McGraw Hill, 1998.
5. Ivancevich, Human Resource Management, McGraw Hill 2002.

Advanced network principles and protocols

Introduction to Networks -Application of Networks - Architecture Topology Switching - SLIP, PPP -ALOHA protocols, CSMA/CD, IEEE 802.3, 802.4, 802.5

Network Layer **Issues**- Routing, Congestion control- Internetworking - Issues, Address Learning Bridges, Spanning tree, Source routing, Bridges, Routers, Gateway.

Network Protocol- IP datagram - hop by hop routing, ARP, RARP, DHCP -Sub net Addressing, Address Masking, ICMP, RIP, RIPv2, OSPF, DNS, LAN and WAN Multicast.

Transport Layer- Design issues, Connection Management, Transmission Control Protocol (TCP) - User Datagram Protocol (UDP).

Application Layer Protocol- Telnet - TFTP - FTP - SMTP - Ping Finger, Bootstrap Network

Time Protocol- SNMP.

TEXT BOOK

1. S. Tanenbaum, "Computer Networks ", Third Edition, Prentice Hall India, 1997.

REFERENCE BOOK

1. W Richard Stevens, "TCP/IP Illustrated -Volume I, The protocols ", Addison-Wesley Professional Computing Series, 1994.

Real-time systems

Introduction to Real-time computing - Structure of a Real-Time System Characterization of Real-Time Systems and tasks - Performance **measures**.

Task Assignment and Scheduling- Uniprocessor scheduling Algorithms - Task Assignment - Mode Changes - Fault Tolerant Scheduling.

Real-Time Communication - Network topologies and Architecture **Issues** - Protocols
Contention-based, Token-based, polled bus and Fault Tolerant routing.

Real-Time Databases - Transaction Priorities and Aborts - Concurrency control Issues
Scheduling Algorithms - Two-phase approach to improve predictability.

Programming Languages and Tools - Hierarchical decomposition - RunTime error
handling - Overloading - Timing specification - Recent trends and developments.

TEXT BOOK

1. CM Krishna and Kang G Shin, "Real-Time Systems", International Editions, ISBN-0-07114243-6, McGraw Hill Companies, Inc., New York, 1997

NETWORK SECURITY

Introduction to Classical and Modern techniques - Attacks, services and mechanisms,
classical encryption techniques, DES, Block cipher design principles and modes of
operation.

Encryption Algorithms and Hash Functions - Triple DES, RC5, key management, Public
key.

Cryptography RSA Algorithm, Digital signatures and authentication protocols.

System Security - Backups, integrity management, protecting against programmed
threats, viruses and worms, physical security, personnel security.

Network Security - Protection against eavesdropping, security for modems, IP security,
web security, electronic mail security, authentication applications.

Security tools - Firewalls, wrappers, proxies, discovering a break-in, denial of service
attacks and solutions, Cryptographic security tools: KERBEROS, PGP, SSH, SRP, OPIE.

TEXT BOOKS

1. William Stallings, "Cryptography and Network Security Principles and Practice ", 11
Edition, Pearson Education Asia Publishers (Low priced Edition), 2000, Ch 1 to 16.

2. Simson Garjainkal, and Gene Spafford, "Practical UNIX and Internet Security" 2nd
edition O'Reilly Pule Pvt. Ltd. 2000

REFERENCE BOOK

1. Steve Burnett and Stephene Paine, "RSA Security 's official guide to cryptography",
RSA Press, Tata McGraw Hill Edition, 2001.

Diploma (Computer Science & Engg.)

Semester IIIrd

Sr.No.	Code	Name of Subject	L	P	U
1	DCSE 211	Programming in 'C'	3	2	4
2	DCSE 212	Computer Organization	4	0	4
3	DCSE 213	Operating System Principles	4	0	4
4	DCSE 214	Electronic Devices and Circuits	3	2	4
5	DCSE 215	Digital Electronics	3	2	4
6	DCSE 216	Basic Communication Engineering	3	2	4
7	DCSE 217	Numerical Analysis	3	2	4

Semester IVth

Sr.No.	Code	Name of Subject	L	P	U
1	DCSE 221	Data Structures Through 'C'	3	2	4
2	DCSE 222	System Programming	3	2	4
3	DCSE 223	Modern Operating System	4	0	4
4	DCSE 224	Database Management System	4	0	4
5	DCSE 225	Introduction to Microprocessor	3	2	4
6	DCSE 226	Data Communication	4	0	4
7	DCSE 227	PC Maintenance & Trouble Shooting	3	2	4

Semester Vth

Sr.No.	Code	Name of Subject	L	P	U
1	DCSE 311	Object Oriented Programming	3	2	4
2	DCSE 312	System Analysis and Design	4	0	4
3	DCSE 313	Computer Networks	4	0	4
4	DCSE 314	Advanced Database Management System	3	2	4
5	DCSE 315	Visual Programming	3	2	4
6	DCSE 316	Computer Graphics	4	0	4
7		Practical Training (24 Days)			

Semester VIth

Sr.No.	Code	Name of Subject	L	P	U
1	DCSE 321	Design and Analysis of Algorithms	4	0	4
2	DCSE 322	Software Engineering	4	0	4
3	DCSE 323	Advanced Computer Architecture	4	0	4
4	DCSE 324	System Administration	3	2	4
5	DCSE 325	Programming in Java	3	2	4
6	DCSE 326	Computer and Network Security	4	0	4
7		Practical Training (24 Days)			

Detailed Syllabus

Diploma 3rd Sem.

Code DCSE 211 Programming in C

1. Introduction
2. Elements of C
3. Console Input-Output
4. Control Flow
5. Arrays
6. Functions
7. Pointers
8. Structure, Union and Enumerated Data Types.
9. File Handling

Code DCSE 212 Computer Organization

1. Overview of Computer Organisation
2. Register and Micro-Operations
3. Basic computer organization
4. Control Logic
5. Central Processing Unit
6. Arithmetic Processor Organisation
7. Input/Output Organisation
8. Memory Organisation

Code DCSE 213 Operation system Principles

1. Introduction
2. CPU Scheduling
3. Deadlocks
4. Memory management and Virtual Memory
5. Operating System Services and File System
6. Disk Scheduling

Code DCSE 214 Electronic Devices and Circuits

1. Vacuum Tubes
2. Semiconductor and PN Junction
3. Bipolar Junction Transistor
4. Transistor Biasing and Bias Stability

5. Small Signals Transistor Amplifier
6. Field Effect Transistor
7. Rectifiers and Power Supplies

Code DCSE 215 Digital Electronics

1. Introduction
2. Number System
3. Logic Gates
4. Logic Families
5. Boolean Algebra
6. Minimization Techniques (K-Mapping)
7. Combinational Logic Design
8. Sequential System

Code DCSE 216 Basic Communication Engineering

1. Introduction
2. Noise and Cross Talk
3. Amplitude Modulation
4. Frequency Modulation
5. Radio Receivers

Code DCSE 217 NUMERIC ANALYSIS

1. Introduction
2. Interpolation
3. Numerical Calculus
4. Solution of Equation
5. Matrix

Diploma 4th Sem.

Code DCSE 221 Data Structures Through C

1. Introduction
2. Memory Allocation
3. Linked List
4. Stack
5. Queue
6. Tree
7. Graphs
8. Sorting and Searching

Code DCSE 222 System Programming

1. Introduction
2. Assemblers
3. Macro Assemblers
4. Linkers and Loaders
5. Compilers

Code DCSE 223 Modern Operating System

1. Distributed Operating System
2. Communication in Distributed System
3. Processes and Synchronization/Co-ordination.
4. Distributed File System
5. Protection and Security Issues
6. Real Time OS

Code DCSE 224 Data Base Management System

1. Introduction
2. Entity Relationship Model
3. Relational Model
4. Integrity Constraints
5. Relational Database design
6. Indexing and Hashing
7. Transaction
8. Protocols
9. Recovery System

Code DCSE 225 Introduction to Microprocessor

1. Introduction

2. 8086 Microprocessor
3. Addressing Modes
4. Instruction Set
5. Data Transfer Schemes
6. Memory Interfacing with 8086
7. Programmable Chips and Interfacing with 8086
8. Bus Standard
9. Brief Introduction of other Microprocessor

Code DCSE 226 Data Communication

1. Introduction
2. Data Transmission
3. Data Encoding
4. Data Communication Interface
5. Data Link Control
6. Multiplexing
7. Circuit Switching
8. Packet Switching
9. Frame Relay

Code DCSE 227 PC Maintenance and Trouble Shooting

1. Site Preparation
2. Safety and Security Measures
3. Study of Construction Operation and Interfacing of the following devices.
4. Hardware and Software Installation.
5. Motherboard and BIOS
6. Troubleshooting of Hardware and software Problems.
7. Servicing of Peripherals.

Diploma 5th Sem.

Code DCSE 311 Object oriented Programming

1. An overview of Object Oriented Programming
2. Object oriented programming using C++.
3. Objects and Classes
4. Inheritance, Polymorphism, Reusability Concepts.
5. Exception Handling.
6. Data Structures in C++
7. Files and Streams.

Code DCSE 312 System Analysis and Design

1. Introduction
2. The System Development Life Cycle and System Analyst.
3. System Analysis
4. System Design
5. System Implementation
6. Security and Recovery in System Development

Code DCSE 313 Computer Networks

1. Computer Network and the Internet
2. Application Layer
3. Transport Layer
4. Network Layer and Routing
5. Link Layer and Local Area Networks

Code DCSE 314 Advance Database Management System

1. Introduction
2. Database System Architecture
3. Structured Query languages (SQL)
4. PL/SQL

Code DCSE 315 Visual Programming

1. Introduction with Visual Basic
2. Elements of the Visual Basic Languages
3. Working with Forms
4. Basic ActiveX Controls
5. Database Programming with Visual Basic
6. Object Programming with Visual Basic

Code DCSE 316

Computer graphics

1. Overview of Graphics System
2. Output primitives
3. Geometric Transformation
4. 2-D Viewing
5. 3-D Geometric Transformations and Viewing

Diploma 6th Sem.

Code DCSE 321 Design and Analysis of Algorithms

1. Introduction
2. Design Techniques
3. Complexity Measures

Code DCSE 322 Software Engineering

1. Introduction
2. System Analysis
3. Requirement Analysis
4. Structured Design
5. Approaches to System Design

Code DCSE 323 Advanced Computer Architecture

1. CISC Architecture Concepts
2. RISC Architecture concepts
3. Pipelining
4. Memory Hierarchy and Organization
5. Parallel Organization and Architecture

Code DCSE 324 System Administration

1. Introduction to System Administration
2. Essential Administrative Tools
3. Startup and Shutdown
4. User Account
5. Security
6. Managing System Resources
7. Backup and Restore
8. Setting up E-Mail and Proxy server

Code DCSE 325 Programming in Java

1. An overview of Java
2. Introduction of OOP using Java
3. Packages
4. Interfaces and Inner Classes
5. Exception handling
6. Multithreaded Programming
7. Introduction to Java Library
8. Applet and event handling
9. Introduction to RMI, JDBC and Servlets.

Code DCSE 326 Data Base Administration

1. Database Administration
2. Backup and Recovery
3. Performance Tuning
4. Network Administration

Code DCSE 327 Computer and network Security

1. Introduction
2. User Authentication and Passwords
3. File Security
4. Protecting Against Threats
5. Network Security

Bachelor of Computer Application

Semester – II

Sr.No.	Code	Name of Subject
1	BCA 121	Office Automation
2	BCA 122	Maths – II
3	BCA 123	Digital Electronics
4	BCA 124	Programming Through C
5	BCA 125	Computer Organization & Architecture

Semester – III

Sr.No.	Code	Name of Subject
1	BCA 211	Object Oriented Programming with C++
2	BCA 212	Data Base Management System
3	BCA 213	Principles of Programming Language
4	BCA 214	Financial & Cost Accounting
5	BCA 215	Data Structure & Algorithm

Semester – IV

Sr.No.	Code	Name of Subject
1	BCA 221	Internet – technology
2	BCA 222	Visual Basic
3	BCA 223	Microprocessor 8085
4	BCA 224	Operating System
5	BCA 225	Oracle

Semester – V

Sr.No.	Code	Name of Subject
1	BCA 311	Theory of Computation
2	BCA 312	Networking Essentials
3	BCA 313	System Analysis & Design
4	BCA 314	E-Commerce

Semester – VI

Sr.No.	Code	Name of Subject
1	BCA 321	Software Engineering
2	BCA 322	JAVA
3	BCA 323	HTML
3	BCA 324	Project/Seminar

BCA-II**1. BCA 121 Office Automation**

Word Processor : M.S. Word – Spelling check, editing in documents, Mail Merge, Format documents, find, replace, go to, hyperlink, types of views, insert table, edit table.

Spread sheet : M.S. Excel – Formulas, editing in cell, formatting in cell, cut, copy, paste, Manage different sheets, linked with other sheets.

Power Point : Design PPT, Edit ppt, create chart , effects in Presentation.

Introduction to M.A.Access, and Front Page.

2. BCA 122 Maths – II (Calculus)

Real numbers, intervals functions, modulus function, trigonometric functions, polynomial functions, limits continuity, derivatives, and applications of derivatives, integration, application of integrations

3. BCA 123 Digital Electronics

Binary logic gates; logic circuits; Boolean algebra and K-map simplification; number systems and codes; arithmetic logic units;

Flip-flops; registers and counters; introduction to microprocessors; architecture; instruction set and programming; memory and

I/O interfacing; examples of system design.

Reference Books:

Digital Principle & Applications

Malvino Leach

Digital Electronics

T.C. Barioo

Digital Electronics Practical Using IC'S

R.P.Jain

4. BCA 124 - Programming Through C

1. Introduction:

- a. Scope of C Language
- b. Distinction and similarities with other HLLs
- c. Special features and Application areas

2. Elements of C

- a. Character Set
- b. Key Words
- c. Data Types
- d. Constants and Variables
- e. Operators

3. Console Input-Output

- a. Types of I-O
- b. Unformatted console I-O: getchar (), Gets(), Puts(),
- c. Formatted I-O : Scanf(), Printf()

4. Control Flow:

- a. Statements and blocks
- b. If
- c. Switch
- d. Loops: For, While, Do-While

5. Arrays:

- a. Basic Concepts
- b. One Dimensional Arrays
- c. Two Dimensional Arrays
- d. Three Dimensional Arrays

1. Over View of Computer Organization

- a. Evolution of Computer
- b. Von Neumann Architecture
- c. Computer Generations
- d. Microprocessor and microcomputers design methodology

2. Register and Micro-Operations:

- a. Register
- b. Logic micro operations
- c. Shift micro operations
- d. Control functions

3. Basic Computer Organization:

- a. Instruction codes
- b. Computer Instructions
- c. Timing and Control
- d. Execution of Instructions
- e. I/O and interrupt

4. Control Logic:

- a. Introduction
- b. Hardwired control
- c. Micro programmed control units
- d. Bit-sliced micro programming unit
- e. Concept of nano programming

5. Central processing organization:

- a. Processor Bus Organization
- b. ALU: Simple and floating point
- c. Stack organization
- d. Instruction formats and designs
- e. Addressing Schemes
- f. Data Transfer and manipulation

g. Program control

6. Arithmetic Processor Organization:

- a. Comparison and subtraction of unsigned binary numbers
- b. Addition and subtraction Algorithm
- c. Multiplication and division Algorithms
- d. Processor configuration
- e. Floating point operations

7. Input/Output organization:

- a. Peripheral devices
- b. I/O processors
- c. DMA
- d. Interrupt
- e. Data communication
- f. Memory management unit

Reference Books:

Computer Organization and Design	Pal Choudhary (PHI)
Structure Computers Organization	Tanenbaun (PHI)
Computer System Architecture	Morris Mano

BCA-III

1. BCA 211 Object Oriented Programming with C++

1. Concept of OOP and POP.

2. Introduction of C++.

3. Elements of C++

- a. Character Set
- b. Key Words
- c. Data Types
- d. Constants and Variables

e. Operators

4. Control Flow:

a. Statements and blocks

b. If

c. Switch

d. Loops: For, While, Do-While

5. Arrays:

a. Basic Concepts

b. Memory Representation

c. One Dimensional Array

d. Two Dimensional Array

6. Functions:

a. Basic concept

b. Declaration and prototype

c. Calling

d. Arguments

7. Pointers:

a. Basic Concepts

b. &, * Operator

8. Structure, Union and Enumerated Data Types

Basic Concepts, reference operator, structure with array

9. File Handling:

a. Types of Files

b. File Organization

c. Opening, Reading, Writing, Closing

d. Text and binary file

10. Class: Declaration, Definition, use of scope resolution operator

2. **BCA 212 Data Base Management System**

Need, purpose and goal of DBMS, Three schema architecture, ER Diagram, data models- Relational, Network, Hierarchical and Object Oriented.

Data Base Design: Conceptual data base design, Theory of Normalization

Primitive and Composite data types, concept of physical and logical databases, data abstraction and data independence, data aggregation, Relational Calculus.

SQL: DDL and DML, Relational Algebra.

Application Development using SQL: embedded SQL, Stored procedures and triggers and views, Constraints assertions.

Internal of RDBMS: Physical data organization in sequential, indexed random and hashed files.

Reference Books:

1. H.f. Korth and Silberschatz: *Database Systems Concepts*, McGraw Hill
2. Almasri and S.B. Navathe: *Fundamentals of Database Systems*,
3. C.J. Date: *Data Base Design*, Addison Wesley
4. Hansen and Hansen : *DBM and Design*, PHI

3. **BCA 213 Principles of Programming Language**

Importance of programming languages, brief history and features, attributes of good programming language. Introduction to language translator, binding and binding time.

Language translation issues: Formal translation models-BNF grammars, regular grammar, FSA.

Elementary and structured data types, their specifications, representations, and implementation of numbers, vectors and arrays, records, character string, variable size data structure, sets, input output files. Type checking and type conversion, type equivalence. Encapsulation and information hiding, sub programs.

Implicit and explicit sequence control. Subprogram sequence control. Recursive sub programs, exception and exception handlers. Co-routines and scheduled subprograms, task and concurrent exception.

Name and reference environments, static dynamic and block structure. Local data and local referencing environments.

Dynamic and static scope of shared data. Block structure, parameters and their transmission. Task and shared data storage requirement for major runtime elements. Program and system controlled storage management. Static and stack based storage management. Fixed size and variable size heap storage management.

Reference Books:

1. Ghezzi: *Programming Language Concepts*, Addison Wesley
2. Pratt, Zelkowitz: *Programming Language Design and Implementation* PHI.
3. Sebasta: *Concept of Programming Language*, Addison Wesley
4. Sethi Ravi: *Programming language Concepts & Constructs*, Addison Wesley.

4 BCA214 Financial & Cost Accounting

1. Financial accounting
Introduction, Basic accounting concepts, Double entry accounting, The accounting trial, Financial statements and their nature, The accounting equation, journal, types of secondary books, posting in ledger.
2. Bank reconciliation statement introduction, Purpose, cause of difference illustrations.
3. Trial balance and final accounts, Introduction, preparation of trial balance errors and their rectification, final accounts.

5. BCA215 Data Structure & Algorithm

1. Elementary and structure data types. Control structure, complexity

2. Liner arrays: Traversing, inserting, and deleting.
Sorting: Bubble sort, Quick Sort

Searching: Linear search, binary search
3. Generalized link list: Traversing, searching inserting, deleting.
4. Stack: Array representation of stacks; polish notation, queues, recursion, and tower of Hanoi.
5. Non Liner structures: Trees, Graph and their traversals, binary trees, binary search trees, searching, inserting and deleting in binary search trees.
6. Sorting; Insertion sort, selection sort, merge sort, radix sort, hashing

BCA - IV

1. BCA 221 Internet – Technology

Introduction:

1. Concept of Internetworking
2. Elements of internetworking
3. Elements of multimedia supported network
4. Architecture of intranet
5. Resource requirement for intranet
6. Essential components of intranet

Active server pages (ASP)

1. Introduction
2. How active server page work
3. Client side scripting versus server side scripting
4. A simple ASP example
5. Server side active x components
6. Session tracking and cookies
7. Accessing a database from an active server page

Web servers (PWS/IIS/A pache):

1. Introduction
2. Microsoft personal web server overview

3. Publishing, preparing applications on PWS
4. Microsoft internet servers
5. Apache web server

Multimedia Networking

1. Standard capability
2. Voice over net
3. Video over net
4. Multimedia supported LAN and WAN
5. Multimedia supported OS
Internetworking support in various OS
6. Security issues

Reference Books:

- | | |
|-------------------------------|-------------------|
| 1. Internet and worldwide web | H.M. Deitel |
| 2. An Internet application | HALL |
| 3. Internet security | Farmer and venema |

2. BCA 222 Visual Basic

UNIT 1: INTRODUCTION TO VISUAL BASIC

User Interface, Controls, Drawing Objects on the form, Object naming conventions, Event Procedures

UNIT 2: PROGRAMMING FUNDAMENTALS

Variables, Data Types, Modules, Procedures, Control Structures, Control Array, Arrays, Functions

UNIT 3: MENUS, MDI AND DATA FILES

Menu Editor, Writing Code for Menu Controls, Dialog Boxes, MDI Application, Menus in MDI Applications, Adding Status Bar, toolbar, Data Files

UNIT 4: ACCESSING DATABASES

Creating Database, Accessing Databases, Data Control, DAO, ADO

Adding bookmark, adding field, retrieve data from table using ADO data Control.

UNIT 5: REPORT/API/HELP/SYSTEM FUNCTIONS

Creating Reports – Connection, Commands, Windows API, IIS Application, Library Functions

Reference Books:

Mastering in Visual Basic

3. BCA 223 Microprocessor 8085:-

1. 8085 Microprocessor

Architecture

Instruction

Memory Organization: RAM, ROM

2. Addressing modes:

2.1 Data related

2.2 Branch related

3. Instruction Set:

3.1 Data transfer instruction

3.2 Branch instruction

3.3 Setting operation instruction

3.4 Processor control instruction

4. Data transfer schemes:

4.1 Direct memory access (DMA)

4.2 Interrupt driver data transfer

5. Memory Interfacing:

- a. Introduction to ROM & RAM chips commonly used in pins
- b. Memory maps

- c. Address decoding

6. Bus standard:

- a. RS-232
- b. IEEE488 (GPIB)

7. Brief introduction of other microprocessor

- a. Motorola 6800
- b. Pentium IV
- c. Power PC
- d. SPARC

Reference Books:

Microprocessor system

Lbu & Glbson

Computer Interfacing & applications

Venugopal, BPB

4. BCA224 Operating System

Introduction: Need of Operating System, its evolution, types of operating systems, batch, multiprogramming, time-sharing systems, real time systems.

Processes and processor management: process concept, systems programmers view of processes, operating systems view of processes, Process scheduling, Schedulers, interprocess communication and synchronization, race condition, mutual exclusion, semaphores, monitors, messages. Deadlocks prevention, avoidance, detection and recovery.

Memory Management:

Contiguous allocation- partitioned memory allocation - fixed and variable partitioning, memory management with bit maps - swapping - relocation- protection and sharing.

Non-contiguous allocation -

Paging - principles, page allocation, segmentation.

Virtual memory concepts, address translation, management of virtual memory, page replacement policies, protection and sharing, working set model, hardware support.

File management: Command language user's view of file system, file system design, disk space management directory structure, shared files, file system performance. File servers, security, and protection mechanism.

Input/Output Management: Device drivers, disk scheduling.

Introduction to loaders, linkers and relocating loaders.

Case study: UNIX.

References Books:

1. A.Silberschatz and Peter B Galvin: *Operating System concepts*, Addison Wesley publishing Company.
2. Deitel H.M: *Operating Systems*, Addison Wesley.
3. Stalling W: *Operating Systems*, Prentice Hall.
4. Tanenbaum: *Operating System Concepts*, Prentice Hall.

BCA - V

1. BCA 311 Theory of Computation

Introduction to automata theory, languages, recursive definitions, regular expressions, finite automata, transition graphs and Kleen's theorem.

Non-determination, finite automata with output, regular languages, minimization of finite automata.

Chomsky classification of languages, regular grammars, context free grammars, simplification of context free grammars, Normal forms of CFG.

Push Down Automata Theory: push down automata and context free languages.

Turing hypothesis, Turing machine, Minsky's theorem, TM variation and encoding, computability and acceptability.

Elements of propositional logic and predicate calculus.

Reference Books: -

1. Aho, Hopcroft and Ullman, *Introduction to Automata Theory, Formal Languages and Computation*, Narosa

2. Cohen, *Introduction to Computer Theory*, Addison Wesley.
3. Papadimitriou, *Introduction to Theory of Computing*, Prentice Hall.
4. K.Krishnamurthy: *Theory of Computation*.

2. BCA312 Networking Essentials

Introduction:

1. Networking Background
2. Network media
3. Network topologies
4. Network protocols
5. Client servers and peers

Network Components:

1. Signal Transmission
2. Network media types
3. Cable and wireless media
4. Network adapters

Real world networks:

1. Ethernet
2. Token Ring
3. FDDI
4. ATM
5. Networks Types: LAN, MAN, WAN

Local Area Network (LAN):

1. Logic link layer
2. Hubs, Repeaters, Bridges, Routers and Gateways

Network server and clients:

1. Server Hardware and Operating System
2. Client preparation: Connection to workgroup, domains, sharing, drivers and printers.

Network Troubleshooting:

1. Preventing problems; Physical, Electrical, Virus
2. Diagnostic tools: Terminators, Cable tester

3. Security

Reference Books:

1. MCSE networking essential study guides BPB Publication
2. Computer Network Kurose And Ross

3. BCA 313 System Analysis and Design

1. Introduction
2. The System Development Life Cycle and System Analyst.
3. System Analysis
4. System Design
5. System Implementation
6. Security and Recovery in System Development

4. BCA 314 E-Commerce

1. Fundamentals of E-Commerce
2. Types of E-Commerce
3. Security of E-Commerce
4. Electronic Payment System

Reference Books: Instant E-Commerce

Kate J.Chase. BPB

BCA VI

1. BCA 321 Software Engineering

Introductory Concepts: Historical perspective, System Definition, Software Life Cycle, Software Engineering paradigms.

System analysis: Feasibility study requirement analysis, Cost benefit analysis, Planning systems, Analysis tools and techniques.

System Design: design fundamentals, Modular Design, Data and procedural design, object oriented design.

System Development: Code documentation, Program design paradigms, Efficiency Consideration.

Verification, Validation and Testing: testing methods, Formal Program Verification, Testing Strategies.

Software Maintenance: Maintenance Characteristics, Maintainability, Maintenance tasks and side effects.

Reference Books:

1. Pressman R.S: Software Engineering: A Practitioner approach, McGraw hill
2. Sommerville I: Software Engineering, Addison Wesley
3. Ghezzi C. Jazayeri M and Mandrioli: Fundamentals of software Engg. , PHI

2. BCA 322 JAVA**1. An overview of java**

Brief history

Source file, keywords and identifiers

Compiling and running java programs

2. Introduction of OOP using Java

Data types, variables, arrays

Operators and assignments

Control statements

3. Packages:

Introduction, defining and CLASSPATH

Access protection

Importing Packages

4. Interfaces and Inner classes:

Defining interfaces

Implementing interfaces

Variables in interfaces

5. Exception Handling:

Exception handling fundamentals and types

Using try and catch

Throw, throws and finally

6. Multithreaded Programming:

6.1 Java thread model, thread priorities

6.2 The main thread

6.3 Created thread

7. Introduction to Java Library:

Reading, writing and console I/O

Integer, Float, String class

8. Applet and event handling

Applet basic and architecture

Simple applet display method

Requesting replanting

Using the status window

The HTML and APPLETTAG

Reference Books:

The complete reference Java 2

Herbert(TM)

Core Java 2 Vol. I & II

Cay S. Horstmann & Gary Cornell,

Java series

Java 2.0 programming

E.Balaguruswami, (TM)

3. BCA323 HTML

Introduction , Difference between HTML & DHTML, Advantage of HTML, tags uses in HTML, table creation, list creation, input box , frames, Develop web page, Linking, use of database with html.

4. BCA 324 Project (Minor)

MCA(Computer Science & Engg.)

Semester Ist:

Sr.No.	Code	Name of Subject	L	P	U
1	MCA111	Mathematical Foundation Of Computer Science	4	0	4
2	MCA 112	Introduction to information technology	3	2	4
3	MCA 113	Computer Programming and problem Solving Through C language	3	2	4
4	MCA 114	Computer Organization and Architecture	4	0	4
5	MCA 115	Accounting and Financial Management	3	2	4

Semester IInd

Sr.No.	Code	Name of Subject	L	P	U
1	MCA 121	DBMS	4	0	4
2	MCA 122	HTML	3	2	4
3	MCA 123	Data Structure& Algorithm	3	2	4
4	MCA 124	Computer Based Numerical and statical techniques	4	0	4
5	MCA 125	System Analysis & Design	3	2	4

Semester IIIrd

Sr.No.	Code	Name of Subject	L	P	U
1	MCA 211`	Operating System	3	2	4
2	MCA 212	Opps with C++	4	0	4
3	MCA 213	Analysis Design& Algorithm	4	0	4
4	MCA 214	Computer Network	3	2	4
5	MCA 215	Advanced Computer Architecture	3	2	4

Semester IVth

Sr.No.	Code	Name of Subject	L	P	U
1	MCA 221	Management Information System	3	2	4
2	MCA 222`	Advanced Database Management System	3	2	4
3	MCA 223`	Computer Optimization Technique	4	0	4
4	MCA 224`	E-Commerce	4	0	4
5	MCA 225`	Oracle	3	2	4

Semester Vth

Sr.No.	Code	Name of Subject	L	P	U
1	MCA 311	Visual Basic	3	2	4
2	MCA 312	Artificial Intelligence	4	0	4
3	MCA 313	Software Engineering	4	0	4
4	MCA 314	Computer Graphics and Multimedia	3	2	4
5	MCA 315	Java	3	2	4

Semester VIth

Sr.No.	Code	Name of Subject	L	P	U
1	MCA321	Project/Seminar	4	0	4

Detailed Syllabus

MCA - I

1. MCA 111 MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE

Sets, Relations and Functions: Definition of Sets and Subsets; Intersection, Union and Complements: deMorgan's law; Cardinality; Relations -Equivalence relations etc; Mappings - One-One, Onto.

Calculus: Functions, Limits and Continuity; Differentiation and Integration; differential Equations.

Logic: Logic operator AND- OR etc.; truth tables; theory of Inference and Deduction; Mathematical Induction; Predicate calculus; Predicates and Quantifiers.

Linear Equations & Matrices : Row/Column operations; Gaussian Elimination; Decomposition; Inverse. Determinant: Properties of determinants; Cramer's Rule' Determinant, to transpose and inverse.

Vector Spaces: Linear independence; Bases, subspace and dimensionality.

Inner Products and Norms: Length, angle, direction cosines, Orthogonalizations.

Books:

1. Korthage, R.R. : Discrete Computational Structures, Academic Press, 1974.
2. Preparata F.P. : Yeh R-T : Introduction to Discrete Structure, Addison- Wisley, 1973.
3. Trembly JP. and Manohar R.P. : Discrete Mathematical Structure with Applications to Computer Science, McGraw Hill, 1975.
4. Lew: Computer Science: A Mathematical Introduction, Prentice Hall International, C Paperback Edition)

2. MCA 112 INTRODUCTION TO INFORMATION TECHNOLOGY

Information Concepts and Processing: Definition, Need, Qualities, Value of information. Categories of information in business organization, level of information, data concepts, logical and physical concepts, data processing, elements of data processing system, word and text processing, graphics and office automation.

An Overview of Computer : Characteristics of computers, History of Computers, Generations of computers, Classification of computers, Applications of computers, Hardware & Software,

Components of a computer System - CPU, Input/Output.Devices and Memory types, Auxiliary storage devices.

Number systems: Binary numbers, octal number, hexadecimal number, Radix-decimal, octal, hexadecimal, conversion from one form to another, representation of decimal, octal, hexadecimal numbers fractional numbers and signed numbers, and 2's complement forms, Binary arithmetic addition, subtraction, Multiplication and division.

Codes: Various types –ASCII and 8 bit EBCDI C code conversion encoding and decoding. System software: Foundations of system software, Distinction between systems software and Application software. Components of programming system-Evolution of Assemblers, loaders, linkers,compilers.

High Level Language: Different types of languages, Introduction to compilers and Interpreter, Subroutine Library, Interpreters relative merits of compilers VS interpreters. Introduction of loaders and linkers and their types.Text editors; overview of editing process, user interface: editor structure.

Operating Systems: Evolution, introduction to OS functions and facilities, single tasking as, single user and multiuser as, characteristics of MS-DOS and Unix operating systems, commands, and utilities of MSDOS. Graphical User, Interfaces- Introduction to Windows, Word processing, spread sheet, database packages and its features. Introduction to Communication services - LAN, WAN, Internet facilities etc.

Books:

1. V Rajaraman : Fundamentals of Computers
2. VK. Jain: Computer Fundamentals
3. Sanders Donald H. , Computers Today, McGraw-Hill, 19988.
4. Ritchi: Operating System, BPB Publications.
5. Sanders Donald H. , Computer concepts and applications, McGraw-Hill, 19988.
6. Taxali R.K. PC Software made simple
7. D.M. Dhamdhere : Inroduction to System Software, Tata McGraw -Hill, New Delhi, 19868.

3. MCA 113 COMPUTER PROGRAMMING AND PROBLEM SOLVING THROUGH 'C' LANGUAGE

Algorithm development: Steps in program development-Problem identification, task analysis, Data analysis, GIGO, outputs and Inputs, Pseudo codes, Algorithms, Flow Charting, Program coding, testing and debugging. Algorithms for searching(linear and binary),sorting (exchange insertion) merging of ordered lists.

Programming (Using C-Language) : Data types, variables and constants, expressions, operators and assignment statements, control statements, console I/O, Arrays, functions, Dynamic data structure in C-pointers, structures and Unions and user defined variables, File handling. The C preprocessor, C standard Library and Header files. Programming exercises.

Programming Techniques: Top down design bottom up design, Modular design and Structured programming.

Books:

1. Kernighan B.W & Ritchie D.M, The C Programming Language, Prentice Hall of India
2. Kenneth A., C Problem Solving & Programming. Prentice Hall International.
3. Jones, Robin & Stewart: The Art of C Programming.
4. N Wirth: Systematic Programming An- Introduction.
5. D Gries Programming Methodology
6. G. Dromey : How to solve it by Computer

4.MCA 114 COMPUTER ORGANIZATION

Overview of electronics: Stored program concept and Von Neumann architecture. Electronic components-Resistor, capacitor and Inductors, Semiconductor devices -Diodes, transistors (BJT and FET). Integrated circuits, Popular IC packages, Analog VS digital electronics, Transistor as a switch.

Boolean algebra and logic gates: Representation of values and complements. AND, OR, NOT operators, DeMorgan's theorem-simplifying expressions simple problems. Logic gates -Truth tables of AND, OR, NOT, XOR, XNOR, NAND, NOR gates, Combining logic circuits for expressions using NAND and NOR gates, Logic circuit families.

Combination and sequential Circuits : (Simple block diagrams, truth tables and IC packages only required) RS, JK, D and T flip flops, Master slave flip flops, counters- ripple and decade, Registers, latches and Tristate buffers.

Building blocks of a computer system: Basic building blocks I/O, Memory, ALU, Control and their interconnections, control unit and its functions- instruction set, Instruction and execution cycle, organizational sequence of operation of control registers: controlling of arithmetic operations; branch, skip, jump and shift instructions, ALU its components.

Addressing techniques and registers: Addressing techniques-Direct immediate addressing; Paging, relative, indirect and indexed addressing, Memory buffer register; accumulators: Registers-Indexed, General purpose, Special purpose; overflow, carry, shift, scratch registers; stack pointers; floating point; status information and buffer registers.

Input-Output Organization: I/O devices (Video terminals and Printers). Programmed and Interrupt control mechanisms, I/O controllers, Computer Buses, Interfacing buses, bus format & bandwidths.

Memory: Main, RAM, static and Dynamic, ROM, EPROM, EEPROM, Cache and Virtual memory, Auxiliary storage devices; hard disk, floppy disk, magnetic tape, cassette, cartridges and compact disks.

Microprocessors : Functional elements, introduction to 4 bit 8 bit, 16 bit, 32 bit microprocessors

(Intel and Motorola), Architecture of 8086 microprocessor; Intmctions of 8086, Memory interfacing, Interrupts and Interrupts controller, Timer and PIA for interfacing.

Books:

1. Mano Moris M : Computer System Architecture, PHI, 1993
2. Hayes IP : Computer Architecture and Organisation, McGraw-Hill, International Edition, 1988.
3. Tannenbaum A.S. : Structured Computer Organization
4. Bartee T.c. : Digital Computer Fundamentals
5. Malvino & Leech: Computer Architecture

5. MCA 115 ACCOUNTING AND FINANCIAL MANAGEMENT

Accounting: Principles, concepts and conventions, double entry system of accounting, introduction of basic books of accounts of sole proprietary concern, closing of books of accounts and preparation of trial balance.

Final Accounts: Trading profit and loss accounts and balance sheet of sole proprietary concer, with normal closing entries. Introduction to manufacturing account, finally accounts.

Financial Management: Meaning and role.

Ratio Analysis: Meaning, advantages, limitations, types of ratios and their usefulness.

Fund Flow Statement: Meaning of the terms-fund, flow and fund, working capital cycle, preparation and interpretation of the fund flow statement.

Costing : Nature, importance and basic principles.

Budget and Budgetary Control: Nature and scope, importance methods of finalisation of master budget and functional budgets Marginal Costing , Nature, scope and importance, Break even analysis, it's use and limitations, construction of break even chart, practical applications of marginal costing.

Standard Costing : Nature, scope computation and analysis of variances with reference to material cost, Labor cost and overhead cost, interpretation of the variances.

Introduction to computerized accounting System Coding logic and codes required, master files transaction files, Introduction to documents used for data collection, processing of different files and outputs obtained.

Books:

1. Kellock J : Elements of Accountlnu. Heinemann. 1970.
2. Levy and Sarnat . Principles of Financial Management, Prentice Hall International.
3. Pandey J.M : Financial Management, Vikas Publications. 1979.

4. Horngren and Sundem. Introduction to Financial Accounting Prentice Hall International.
5. Shukla & Aganval Advanced Accounting

MCA - II

1. MCA 121 DBMS

Need, purpose and goal of DBMS, three schema architecture, ER Diagram, data models- Relational Network, Hierarchical and Object Oriented.

Data Base Design: Conceptual data base design, Theory of Normalization Primitive and Composite data types, concept of physical and logical databases, data abstraction and data independence, data aggregation, Relational Calculus.

SQL: DDL and DML, Relational Algebra.

Application Development using SQL: embedded SQL, Stored procedures and triggers and views, Constraints assertions.

Internal of RDBMS: Physical data organization in sequential, indexed random and hashed files.

Reference Books:

1. H.f. Korth and Silberschatz: *Database Systems Concepts*, McGraw Hill
2. Almasri and S.B. Navathe: *Fundamentals of Database Systems*,
3. C.J. Date: *Data Base Design*, Addison Wesley
4. Hansen and Hansen : *DBM and Design*, PHI

2. MCA 122 HTML

Introduction , Difference between HTML & DHTML, Advantage of HTML, tags uses in HTML, table creation, list creation, input box , frames,

3. MCA 123 DATA STRUCTURE THROUGH 'C' LANGUAGE

Basic Concept of Data Structure: Abstract and System defined Data Types, Data Object, Data abstraction: Notion of an algorithm. - Complexity measures: Rate of growth, basic time analysis of an algorithm ordering notion detailed timing analysis space complexity.

Arrays and their representation: Single and multidimensional arrays, address calculation using row and column major ordering. .

Stacks and Queues: Representation and Manipulation of Stacks and queues using Arrays, Uses of Stacks and Queues Recursion, circular Queues, Conversion from infix to postfix and prefix expressions, Polish expressions. Pointers and their uses continuous VS. Linked storage.

Linked Lists: Singly and doubly linked lists, Operations on lists, Circular linked lists, representation of sparse matrices using generalized list structure and polynomials representation using linked lists.

Storage Management and Garbage Collection: Memory allocation strategies, Dynamic storage management Reclamation and compaction Boundary Tag method.

Trees: Trees-Binary and N-ary trees, Representation of trees, Tree traversal algorithms. Threaded trees :Advantages, Conversion of general trees to Binary trees. B-trees Applications: Decision trees. Game trees and expression parsing

Symbol Tables: Decision tables -Static Symbol tables, Hash tables, Binary search tree, Dynamic Tree Tables.

Graphs and their Representation: Matrix representation, List structure, Graph traversal algorithm, application of graphs.

Strings and their Features: Strings Representation and manipulation using Arrays and lists, string Matching algorithms, Boyer-Moore, Knuth-Morris-Pratt and Boyer-Moore strategies.

Sorting and Searching: Sequential, Binary and hashed searching, internal and External sorting techniques, Bubble sort, insertion sort, Shell sort, Merge sort and Quick sort comparisons.

Books:

1. Aho A.V & Ullman J.E. : Data Structure & Algorithms.
2. . Aron M. Tannenbaum & Others: Data Structures using C, Prentice Hall, 1992 .
3. Mary E.S. Loomis: Data Management & File Structure, PHI, 1991.
4. Bhagat Singh & Thomas Naps: Introduction to Data Structure
5. Trembley & Sorenson: An Introduction to Data Structure with Application, McGraw-Hill, 1984.
6. Ellis Horowitz and Sartaj Sahani : Fundamentals of data structure with Pascal. Galgotia Book Source, 1994.

4. MCA 124. **COMPUTER BASED NUMERICAL AND STATISTICAL TECHNIQUES**

Prerequisite: Mathematical Foundation of Computer Science, Probability and Statistics.

(a) Numeric Computation:

Computer Arithmetic: Floating point numbers -- Operations, Normalizations and their consequences.

Iterative Methods: Zeros of single transcendental equations and zeros of polynomials using, Bisection, False position, Newton Raphson etc., convergence of solution.

Simultaneous Linear Equations: Linear equations solutions of simultaneous linear equations -Gauss elimination method and pivoting; Illconditioned equations and refinement

of solutions, Gauss-Seidel iterative method.

Numerical Differentiation and Integration Solution of Differential equation: Runge-Kutta methods; Predictor-Corrector methods, Automatic error monitoring stability of solutions.

Interpolations and Approximation: Polynomial interpolation Newton, Lagrange etc. Difference tables. Approximation of function by Taylor series and Chebyshev polynomials

(b) Statistical Computation:

Frequency charts: Different frequency charts. .

Regression Analysis: Least square fit; polynomial and curve fitting; Linear regression and Nonlinear regression Algorithms; Multiple regression Algorithms

Time Series and forecasting: Moving averages; Smoothing of curves: Forecasting models and methods;

Statistical Quality control Methods: Factor Analysis, ANOVA, Test of significance: X-test and F-test Applications to medicine, psychology, agriculture etc.

Books:

1. Stoer, Bullrich : Computer oriented numerical Methods, Springer Verlag, 1980.
2. Rajaraman V : Computer Oriented Numerical Methods, PHI, 1980.
3. Afifi, A.A. : Statistical Analysis: A computer Oriented Approach, Academic Press Inc. 1978.
4. Krishnamurthy E. V. , Sen S. K. : Computer Based Numerical Algorithms, East-West Press 1984.
5. Scalzo, F.: Elementary computer Assisted Statistics, Van nostrand Reinherd Co. Ltd. 1978.

5. MCA 125 SYSTEM ANALYSIS AND DESIGN

Introduction: system Definition and concepts, characteristics and types of System, Real-life Business Subsystems, Systems Models, System Boundaries; Real-time and Distributed Systems, Basic principles of successful System.

Overview of system analysis and design, feasibility analysis, design, implementation, testing and evaluation- Introduction to Systems Development Life Cycle and its phases.

Project Selection : Sources of projects requests, managing project; review and selection, preliminary investigation.

Feasibility Study - Technical and economical feasibility, cost and benefit analysis.

System requirement specification and analysis: Fact finding techniques, data flow diagrams, data dictionaries, process organisation and interactions, Decision trees and tables.

Books:

1. James, A. S. : Analysis of Design of Information Systems, McGraw-Hill, 1986.
2. Awad Elias M. : System Analysis and design,
3. J. Ludeberg, M. Glkuhi G. & Hilsson, A. : Information System Development. A Systematic Approach, Prentice Hall International, 1981.
4. Lee, B.S. : Introducing System Analysis and Design Vol 1 & 2, Manchester United Kingdom, National Computer Centre, 1978.
5. Davis W. S : System Analysis and design, Addison - wesley, 1983.
6. Daniel: Practical System Design, Galgotia Pub!. Pvt. Ltd.

MCA - III

1.MCA 211 OPERATING SYSTEM

Prerequisite: Computer Organization and Assembly Language Programming, System Software and C-Programming.

Introduction: Evolution of Operating systems, Types of Operating systems, Different views of the OS, Design and implementation of operating system.

Memory Management: Address protection, Single process monitor, and Partitioned memory allocation static, partitioned memory allocation dynamic, segmentation. Virtual memory, paging. page replacement algorithms and cache memory.

Support for Concurrent Process: Mutual exclusion, Semaphores, queuing implementation of semaphores, Classical problems in concurrent programming, Critical regions.

Scheduling: Process concepts, systems programmer's view of processes, OS view of processes, OS services for process management, virtual processors, interrupt System mechanism, scheduling algorithms, implementation of concurrency primitive.

System deadlock: Prevention, detection and avoidance.

Multiprogramming system: Queue Management, I/O supervisors, memory management. File system, disk scheduling. Security mechanism, authentication, protection, access control and cryptography.

Multi Processor System: Multiprocessor interconnections, multi processor types, functions. disk scheduling. Security mechanism, authentication, protection, access control and cryptography.

Multi Processor System: Multiprocessor interconnections, Multiprocessor types, functions.

Introduction to parallel computing, multiprocessors ynchronization. Distributed operating systems - computer networks algorithms for distributed processing.

Books:

1. Peterson, James. L. and Silberschatz A. : Operating System,Addision-Wesley Publ. Comp., 1989.
2. Tanenbaum A. S. : Modern Operating System, PHI Pub!., 1995.
3. Bach, M.: Design of the UNIX operating System.
4. Melenkovic, Milan: Operating system -concept and Design, McGraw-Hill International Editions, 1992.
5. Deitel HarveyM.: An introouction to operating systems,Addition-Wesley Pub. Company, 1989.
6. Hansen Per Brinesh : Operating System Principles, PHI, 97178.
7. Madnick and Donovan: Operating System, McGraw-HiliBook co.

2. MCA 212 OOPS With C++

1. Concept of OOP and POP.

2. Introduction of C++.

3. Elements of C++

- a. Character Set
- b. Key Words
- c. Data Types
- d. Constants and Variables
- e. Operators unary, binary, ternary
- f. Operator precedence

4. Control Flow:

- a .Statements and blocks
- b. If
- c. Switch
- d. Loops: For, While, Do-While

5. Arrays:

- a. Basic Concepts
- b. Memory Representation
- c. One Dimensional Array
- d. Two Dimensional Array
- e. Three Dimensional Array

6. Functions:

- a. Basic concept
- b. Declaration and prototype
- c. Calling
- d. Arguments

7. Pointers:

- a. Basic Concepts
- b. &, * Operator

8. Structure, Union and Enumerated Data Types

Basic Concepts, reference operator, structure with array

9. File Handling:

- a. Types of Files
- b. File Organization
- c. Opening, Reading, Writing, Closing
- d. Text and binary file

10. Class: Declaration, Definition, use of scope resolution operator

7.MCA 213 ANALYSIS AND DESIGN OF ALGORITHMS

Prerequisite: Computer Programming and Problem Solving, Data and File Structure,

Review of basic data structures such as stacks, queues, linked lists trees and graphs. Concepts in algorithm analysis, asymptotic complexity. Domain independent algorithm design techniques such as divide and conquer greedy method, dynamic programming, backtracking, branch and bound techniques. Example algorithms for above techniques from sets, graphs text processing internal and external sorting, height balanced trees-trees, hashing algorithms, dynamic storage allocations, garbage collection.

Lower bound theory and NP-hard problems.

Books:

1. Aho, A. V. Hopcroft, J.E., Ullman. J.D. : The Design and analysis of Computer Algorithms, Addison-Wesley Publishing Co., 1974.
2. Horowitz, E., Sahni, S. : Fundamentals of Computer Algorithms, Galgotia Publication, 1984.
3. Goodman, S.E. & Hedetniemi, : Introduction to the Design and Analysis of Algorithms, McGraw-Hill Book Company 1977.
4. Knuth, D.E. : Fundamentals of Algorithms: The Art of computer Programming Vol. I, Narosa Publ. House, 1985.

4. MCA 215 COMPUTER NETWORKS

Introduction:

1. Networking Background
2. Network media
3. Network topologies
4. Network protocols
5. Client servers and peers

Network Components:

1. Signal Transmission
2. Network media types
3. Cable and wireless media
4. Network adapters

Real world networks:

1. Ethernet
2. Token Ring
3. FDDI
4. ATM
5. Networks Types: LAN, MAN, WAN

Local Area Network (LAN):

1. Logic link layer
2. Hubs, Repeaters, Bridges, Routers and Gateways

Network server and clients:

1. Server Hardware and Operating System
2. Client preparation: Connection to workgroup, domains, sharing, drivers and printers.

Network Troubleshooting:

1. Preventing problems; Physical, Electrical, Virus
2. Diagnostic tools: Terminators, Cable tester
3. Security

Reference Books:

1. MCSE networking essential study guides BPB Publication
2. Computer Network Kurose And Ross

5. MCA 215 ADVANCED COMPUTER ARCHITECTURE

Introduction to advanced architectures; parallel processing; pipelining and vector processing; array processing; SIMD computers and processor enhancement; performance evaluation methods, statistics and discrete math applications; modeling for evaluation of virtual memory; time sharing environments.

MCA - IV

401. MANAGEMENT INFORMATION SYSTEM

Introduction to MIS: Meaning and role of MIS, Definition of MIS, Systems 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, Prioritization and developmental strategies.

Conceptual Design of MIS: Definition of the problem, System objectives and system constraints.

Analysis of information Source, alternative system design and selection of optimal system.

Conceptual system de- sign document.

Detailed System Design and Implementation: Application of basic system design concepts to MIS, Involvement of end-user and role of MIS department and System Analyst, Role of Top Management during design and implementation. System evaluation review and update. Management and control of MIS function. Advanced MIS concept, Decision Support System. Pitfalls in MIS development. .

MIS in Operation: (see not at end): MIS for Accounting and Finance Function, MIS for Personnel Systems, MIS for Accounting and Finance Function, MIS for Personnel Systems, for Marketing Systems, Production & Inventory system.

Note: A Standard layout is to be adopted for all MIS:

(1) Key Information Needs.

(2) Transaction Processing and Management Control.

(3) Reports Design and Data Collection Methods routing, frequency; Input, Output and Control Reports .

(4) Computer System Design -Master and Transaction files, Checks & Control Reports.

Books:

1. Murdick R. G., Ross JE. & Claggett J.R. : Information system for Modern Management, 3rd Edn., PHI, 1997.

2. James A.O Brien: Management Information Systems, Galgotia Pubn., 1994.

3. Wigarders K, Svensson A., Sehong L. : Structured Analysis & Design of Information Systems, McGraw-Hill book Co. 1986.

4. Locus: Analysis, Design and Implementation of Information system, 3rd Edn., McGraw-Hill Book Co.

5. Jawedker: Information System for Management.

6. Anderson Lavid L., Post Gerald V. : Management Information System; Tat McGrowhill, 3rd, 1999.

402 ADVANCED DATABASE MANAGEMENT SYSTEM

Prerequisite: Advanced Data Base Management System

Need,purpose and goal of DBMS, Three schema architecture, ER Diagram, data models- Relational, Network, Hierarchical and Object Oriented.

Data Base Design: Conceptual data base design, Theory of Normalization Primitive and Composite data types, concept of physical and logical databases, data abstraction and data independence, data aggregation, Relational Calculus.

SQL: DDL and DML, Relational Algebra.

Application Development using SQL: Host Language interface, embedded SQL programming, Stored procedures and triggers and views, Constraints assertions.

Internal of RDBMS: Physical data organization in sequential, indexed random and hashed files. Inverted and multi list structures, B trees, B+ trees, Query Optimization, Join Algorithm, Statistics and Cost Base optimization.

Transaction Processing, concurrency control, and recovery management. Transaction model properties and state serialisability .Lock base protocols, two phase locking.

Reference Books:

1. H.f. Korth and Silberschatz: *Database Systems Concepts*, McGraw Hill
2. Almasri and S.B. Navathe: *Fundamentals of Database Systems*,
3. C.J. Date: *Data Base Design*, Addison Wesley
4. Hansen and Hansen : *DBM and Design*, PHI
4. Ullman, Jeffrey D.: *PrinCiples of Database Systems*, 2nd Edn., Galgotia publ. Pvt. Ltd., 1982.
5. Majumdar A.K, BhattacharyaP.: *Database Management System*; Tata McGraw-Hill, 1996.
6. Desai Vipin : *An Introduction to DatabaseSystems*,Galgotia Publ.,1991.
7. Fadden F. M. : Hoffer I;Benjamin C.: *Modern Database Management (IV Edition)*; Narosa Pub.; 1994.
8. Pratt, P : *Database System Management and Design*, Boyd and Fraser Publ.,1987.
9. Date. C.J. : *An Introduction to Database Systems Vol I & 2*, Addison-Wesley, 1981-1983.

403 COMPUTER BASED OPTIMIZATION TECHNIQUES

Linear Programming: LP formulations, Graphical inethod for solving LPs with 2 variables.

simplex I.nethod,quality theory, Special Linear Programming problems -TransportatIons problem

(North-west-corner, Leastcost & Vogel approximation methods), Assignment problem (Hungarian Method), Transshipment model.

Network Analysis: Examples of network flow problems, Shortest route problems -Dijkstras Algorithm, Applications of shortest route problems. Max flow problem - Flow network, Labelling routine and algorithm, Mincut and max-cut and max-flow min-cut theorem.

Project Scheduling by PERT/CPM : Project management Origin and use of PERT origin and use of CPM, Applications of PERT and CPM. Project network - Diagram representation, Critical path calculations by linear programs, Critical path calculations by network analysis and critical path method (CPM), Construction of Gantt chart and resource labelling, program Evaluation and Review Technique (PERT).

Dynamic Programming: Basic concepts, Bellman's optimality principles, of D.P. models and computations. Examples of allocation, replacements, networks, sequencing and scheduling.

Queueing Models: Notations and assumptions, Queueing models with poisson input and exponential services - Birth-death queueing models, Single service counter and arrivals through multiple channels, poisson arrival & Erlang service distribution.

Sequencing Models: Sequencing problem, Johnson's Algorithm for processing jobs through TWO and THREE machines, Processing 2 jobs through n machines.

Inventory Models: Introduction to the inventory problem, Deterministic Models - The classical EOQ (Economic Order Quantity) Model, Nonzero lead time, The EOQ with shortages allowed.

Books:

1. Gillet B.E. : Introduction to Operation Research -A computer oriented Algorithmic Approach, Tata McGraw-Hill Pub. Co., New Delhi.
2. Taha Hatndy, A : Operation Research -An Introduction, Fifth Edn., PHI, New Delhi.
3. Mital K. V. and Mohan C. : optimization Methods in operations Research and Systems Analysis, 3rd Edn, New Age International Pub- Iishers, New Delhi.
- 4, Hiller, F.S. & Limerman, G. 1. : Introduction to Operations Research, 2nd Edn., holden Day Inc., London, 1974.
5. Sharma S.D. Operation Research; Kedar Nath R.& Com' Meeruth' 12th Ed, 1998.
6. Kapoor VK. : Operation Research; Sultan Chand & sons' Fifth Edision 1999.

404 E - COMMERCE

1. Fundamentals of E-Commerce

2. Types of E-Commerce
3. Security of E-Commerce
4. Electronic Payment System

Reference Books: Instant E-Commerce

Kate J.Chase. BPB

405 ORACLE

Oracle – An Introduction

1. Introduction, Features of Oracle, Object relational database management system, Introduction to SQL, Data Types, Introduction to DDL, Constraints DML commands, Operators in SQL.

2. PL/SQL

Introduction to PL/SQL, Cursors, Triggers, Subprograms and packages.

3. Database operations and structures

Database operation and structure, Introduction, Database startup and shutdown, Database structure and space management, Terms related to Oracle 8i server, Memory structure and processes of Oracle8i, Privileges and roles, Database backup and recovery, Database backups.

Reference Book:

The Complete Reference in SQL

MCA Vth Sem.

501 VISUAL BASIC

Introduction: Need of Visual languages, Integrated Development Environment (IDE), Advantages of Visual BASIC, Characteristics and features of Visual BASIC - IDE, Projects, User Interface, Objects Oriented, Visual Development and. Event-Driven Programming, Forms/Graphic controls, Data process with windows and Internet applications.

Visual BASIC Programming and Tools: An Introduction of Visual BASIC Programming, Simple program Construction, Statements, Input/Outputs, Preprocessors, Comments, Editor, Codes. Variables, Constants and Data types, Arrays, Collections, Procedures, Arguments, Functions, Subroutines, Control Flow Statements, Loop Statements, Objects, and variants. Visual BASIC debugging tools. Runtime errors handling,

Designing User Interface - Elements of User Interface, Under-standing Forms, Menus and

Toolbars, Designing Menus and Tool-bars, Building Dynamic Forms, Drag and Drop Operations, working with menus, customizing the toolbars

Activex Controls - TextBox, ComboBox, ScrollBar and Slider Controls operations, Generating Time Events, Drawing with Visual Basic using Graphics Controls, Coordinate systems and Graphic methods. Manipulating Colors and pixels with Visual Basic. Operations with Common Dialogs Control. Tree View and List View Controls.

Object Oriented Programming - Create Objects and Classes, Creating special properties of classes, Enhancing the simple and object classes, collections working with objects and collections. Recursive programming- Binary Search, Scanning folders and Building custom exploresa, Creating Printed Outputs Using the printer object and reports.

Integrating with Microsoft windows and office 97, Concepts Automation, Activex and object models, Automation with word 97, Excel 97.

Database Programming with Visual Basic - Data Access methods, Creating, reading and writing text files- Data controls creating Queries.

References Books:

1. Petroustos Evangelous; Mastering Visual Basic; BPB Publications; 1998.
2. Norton's Peter : Guide to Visual Basic; Techmedia; 1998.
3. Kurata Deborah: Doing Objects in Visual Basic; Techmedia; 1998.

502 ARTIFICIAL INTELIGENCE

Introduction of Artificial Intelligence: Simulation of So called intelligent behaviour, in different areas; Problem solving: games, natural language, question answering, visual perception, learning; Aim-oriented(heurist c) algorithms versus solution guaranteed algorithms.

Understanding Natural Languages: Parsing techniques, context free and transformational grammars, transition nets, augmented transition nets, fillmore's grammars, Shank's conceptual dependency, grammar-free analyzers, sentence generation, translation.

Knowledge Representation: First-order predicate calculus Horn's clauses; The language PROLOG; Semantic nets, Partitioned nets, Minsky's frames, case-grammar theory; production r;lles, knowledge base, the inference system, forward and backward deduction.

Expert system: Existing systems (DENDRAL, MYCIN) : dornain exploration; meta - knowledge, expertise transfer, self - explaining systems.

Pattern Recognition structured Descriptions: Symbolic description, machine perception, line finding, interpretation semantics and models, object identification, speech recognition.

The language LISP and for Prolog is to be covered in this course.

Books:

1. Charniak, E. : Introduction of Artificial Intelligence, Narosa Publishing House.
2. Winston, PH. : LISP, Narosa publishing House.
3. Marcellus: Expert Systems Programming in TURBO PROLOG, Prentice-Hall Inc. 1989.
4. Clark, K.L. & McCabe; EG. : Micro-Prolog. Prentice Hall India, 1987.
5. Elaine Rich & Kevin Knight: Artificial Intelligence; Tata McGraw Hill.
6. Dan W. Patterson: Introduction to Artificial Intelligence and Expert System; PHI.

503 SOFTWARE ENGINEERING

Prerequisite: Computer Programming & Problem Solving, Data and File structure.

Introduction to Software Engineering: Software development and life cycle; Software engineering, knowledge engineering and end-user development approaches.

System Analysis: Abstraction, partitioning and projection; Software Requirements and Specifications; Specification methods and tools. Flow based, data based and object based analysis.

Software Project Management: Project size and its categories; Planning a software project; Work breakdown structures; Integrating software design and project planing; Software project teams; Project monitoring and control.

Software Quality and Testing: Software quality assurance, Types of software testing. Debugging and Reliability- Concept of software reliability, software errors, faults, repair and availability. Program complexity analysis; Software quality and matrices.

Software cost and time estimation: Functions points. Issues in software cost estimation (Introduction to the Rayleigh curve), Algorithm cost models(COCOMO,Putnam-Slim, Watsonand Felix), Other approaches to software cost and size estimation (S/W complexity, Delphi, cost by analogy).

Software Design: Various design concepts and notations; Process oriented design (Gane & Sarson and Yourdon notations), Data-oriented design (Warnier-Orr, ER-modelling), Object-oriented design (Booch approach), Verification and validation methods; Documentation and implementation procedures; Design matrices. Role of CASE - tools in software design.

Modern Programming language Features Relevant toSoftware Engineering: Choice of programming languages. Mixed language programming and call semantics. Re-engineering legacy systems, coding standards. A brief introduction of ADA (Modula. 11) language and explanation of concepts such as data, abstraction, exception handling, concurrency mechanism, etc.

Books:

1. Pressman Roger: Software Engineering -A Practitioner's Approach; Tata McGraw Hill, N.Delhi,- 1991-
2. Jalote pankaj: An Integrated Approach to Software Engineering; Narosa, New delhi, 1991.
3. Fairley, R.E. : Software Engineering Concepts, McGraw-Hill,
4. Shooman, M. : Software Engineering, McGraw-Hill
5. Shere: Software Engineering & Management, Prectice-Hall.

504 COMPUTER GRAPHICS AND MULTIMEDIA

Generation of dots, lines, arcs and polygons; color graphics, shades and levels; image transformation, windowing and clipping; 2-D and 3-D graphics; data structures, algorithms and optimization methods; case studies using GKS, CORE, etc; graphic languages and compilers.

505 JAVA

1. An overview of java

Brief history

Source file, keywords and identifiers

Compiling and running java programs

2. Introduction of OOP using Java

Data types, variables, arrays

Operators and assignments

Control statements

3. Packages:

Introduction, defining and CLASSPATH

Access protection

Importing Packages

4. Interfaces and Inner classes:

Defining interfaces

Implementing interfaces

Variables in interfaces

5. Exception Handling:

Exception handling fundamentals and types

Using try and catch

Threw, throws and finally

6. Multithreaded Programming:

6.1 Java thread model, thread priorities

6.2 The main thread

6.3 Created thread

7. Introduction to Java Library:

Reading, writing and console I/O

Integer, Float, String class

8. Applet and event handling

Applet basic and architecture

Simple applet display method

Requesting replanting

Using the status window

The HTML and APPLET Tag

Reference Books:

The complete reference Java 2

Herbert(TM)

Core Java 2 Vol. I & II

Cay S. Horstmann & Gary Cornell,
Java series

Java 2.0 programming

E. Balaguruswami, (TM)

MCA 6th Sem.

Project (Minor)

BSC IT

Semester – II

Sr.No.	Code	Name of Subject
1	BSC.IT 121	Office Automation
2	BSC.IT 122	Maths – II
3	BSC.IT 123	Digital Electronics
4	BSC.IT 124	Programming Through C
5	BSC.IT 125	Computer Organization & Architecture

Semester – III

Sr.No.	Code	Name of Subject
1	BSC.IT 211	Object Oriented Programming with C++
2	BSC.IT 212	Data Base Management System
3	BSC.IT 213	Principles of Programming Language
4	BSC.IT 214	Financial & Cost Accounting
5	BSC.IT 215	Data Structure & Algorithm

Semester – IV

Sr.No.	Code	Name of Subject
1	BSC.IT 221	Internet – technology
2	BSC.IT 222	Visual Basic
3	BSC.IT 223	Microprocessor 8085
4	BSC.IT 224	Operating System
5	BSC.IT 225	Oracle

Semester – V

Sr.No.	Code	Name of Subject
1	BSC.IT 311	Theory of Computation
2	BSC.IT 312	Networking Essentials
3	BSC.IT 313	System Analysis & Design
4	BSC.IT 314	E-Commerce

Semester – VI

Sr.No.	Code	Name of Subject
1	BSC.IT 321	Software Engineering
2	BSC.IT 322	JAVA
3	BSC.IT 323	HTML
3	BSC.IT 324	Project/Seminar

BSC.IT-II**1. BSC.IT 121 Office Automation**

Word Processor : M.S. Word – Spelling check, editing in documents, Mail Merge, Format documents, find, replace, go to, hyperlink, types of views, insert table, edit table.

Spread sheet : M.S. Excel – Formulas, editing in cell, formatting in cell, cut, copy, paste, Manage different sheets, linked with other sheets.

Power Point : Design PPT, Edit ppt, create chart , effects in Presentation.

Introduction to M.A.Access, and Front Page.

2. BSC.IT 122 Maths – II (Calculus)

Real numbers, intervals functions, modulus function, trigonometric functions, polynomial functions, limits continuity, derivatives, and applications of derivatives, integration, application of integrations

3. BSC.IT 123 Digital Electronics

Binary logic gates; logic circuits; Boolean algebra and K-map simplification; number systems and codes; arithmetic logic units;

Flip-flops; registers and counters; introduction to microprocessors; architecture; instruction set and programming; memory and

I/O interfacing; examples of system design.

Reference Books:

Digital Principle & Applications

Malvino Leach

Digital Electronics

T.C. Barioo

Digital Electronics Practical Using IC'S

R.P.Jain

4. BSC.IT 124 - Programming Through C

1. Introduction:

- a. Scope of C Language
- b. Distinction and similarities with other HLLs
- c. Special features and Application areas

2. Elements of C

- a. Character Set
- b. Key Words
- c. Data Types
- d. Constants and Variables
- e. Operators

3. Console Input-Output

- a. Types of I-O
- b. Unformatted console I-O: getchar (), Gets(), Puts(),
- c. Formatted I-O : Scanf(), Printf()

4. Control Flow:

- a. Statements and blocks
- b. If
- c. Switch
- d. Loops: For, While, Do-While

5. Arrays:

- a. Basic Concepts
- b. One Dimensional Arrays
- c. Two Dimensional Arrays
- d. Three Dimensional Arrays

1. Over View of Computer Organization

- a. Evolution of Computer
- b. Von Neumann Architecture
- c. Computer Generations
- d. Microprocessor and microcomputers design methodology

2. Register and Micro-Operations:

- a. Register
- b. Logic micro operations
- c. Shift micro operations
- d. Control functions

3. Basic Computer Organization:

- a. Instruction codes
- b. Computer Instructions
- c. Timing and Control
- d. Execution of Instructions
- e. I/O and interrupt

4. Control Logic:

- a. Introduction
- b. Hardwired control
- c. Micro programmed control units
- d. Bit-sliced micro programming unit
- e. Concept of nano programming

5. Central processing organization:

- a. Processor Bus Organization
- b. ALU: Simple and floating point
- c. Stack organization
- d. Instruction formats and designs
- e. Addressing Schemes
- f. Data Transfer and manipulation

g. Program control

6. Arithmetic Processor Organization:

- a. Comparison and subtraction of unsigned binary numbers
- b. Addition and subtraction Algorithm
- c. Multiplication and division Algorithms
- d. Processor configuration
- e. Floating point operations

7. Input/Output organization:

- a. Peripheral devices
- b. I/O processors
- c. DMA
- d. Interrupt
- e. Data communication
- f. Memory management unit

Reference Books:

Computer Organization and Design	Pal Choudhary (PHI)
Structure Computers Organization	Tanenbaun (PHI)
Computer System Architecture	Morris Mano

BSC.IT-III

1. BSC.IT 211 Object Oriented Programming with C++

1. Concept of OOP and POP.

2. Introduction of C++.

3. Elements of C++

- a. Character Set
- b. Key Words
- c. Data Types
- d. Constants and Variables

e. Operators

4. Control Flow:

a. Statements and blocks

b. If

c. Switch

d. Loops: For, While, Do-While

5. Arrays:

a. Basic Concepts

b. Memory Representation

c. One Dimensional Array

d. Two Dimensional Array

6. Functions:

a. Basic concept

b. Declaration and prototype

c. Calling

d. Arguments

7. Pointers:

a. Basic Concepts

b. &, * Operator

8. Structure, Union and Enumerated Data Types

Basic Concepts, reference operator, structure with array

9. File Handling:

a. Types of Files

b. File Organization

c. Opening, Reading, Writing, Closing

d. Text and binary file

10. Class: Declaration, Definition, use of scope resolution operator

2. BSC.IT 212 Data Base Management System

Need, purpose and goal of DBMS, Three schema architecture, ER Diagram, data models- Relational, Network, Hierarchical and Object Oriented.

Data Base Design: Conceptual data base design, Theory of Normalization

Primitive and Composite data types, concept of physical and logical databases, data abstraction and data independence, data aggregation, Relational Calculus.

SQL: DDL and DML, Relational Algebra.

Application Development using SQL: embedded SQL, Stored procedures and triggers and views, Constraints assertions.

Internal of RDBMS: Physical data organization in sequential, indexed random and hashed files.

Reference Books:

1. H.f. Korth and Silberschatz: *Database Systems Concepts*, McGraw Hill
2. Almasri and S.B. Navathe: *Fundamentals of Database Systems*,
3. C.J. Date: *Data Base Design*, Addison Wesley
4. Hansen and Hansen : *DBM and Design*, PHI

3. BSC.IT 213 Principles of Programming Language

Importance of programming languages, brief history and features, attributes of good programming language. Introduction to language translator, binding and binding time.

Language translation issues: Formal translation models-BNF grammars, regular grammar, FSA.

Elementary and structured data types, their specifications, representations, and implementation of numbers, vectors and arrays, records, character string, variable size data structure, sets, input output files. Type checking and type conversion, type equivalence. Encapsulation and information hiding, sub programs.

Implicit and explicit sequence control. Subprogram sequence control. Recursive sub programs, exception and exception handlers. Co-routines and scheduled subprograms, task and concurrent exception.

Name and reference environments, static dynamic and block structure. Local data and local referencing environments.

Dynamic and static scope of shared data. Block structure, parameters and their transmission. Task and shared data storage requirement for major runtime elements. Program and system controlled storage management. Static and stack based storage management. Fixed size and variable size heap storage management.

Reference Books:

1. Ghezzi: *Programming Language Concepts*, Addison Wesley
2. Pratt, Zelkowitz: *Programming Language Design and Implementation* PHI.
3. Sebasta: *Concept of Programming Language*, Addison Wesley
4. Sethi Ravi: *Programming language Concepts & Constructs*, Addison Wesley.

4 BSC.IT214 Financial & Cost Accounting

1. Financial accounting
Introduction, Basic accounting concepts, Double entry accounting, The accounting trial, Financial statements and their nature, The accounting equation, journal, types of secondary books, posting in ledger.
2. Bank reconciliation statement introduction, Purpose, cause of difference illustrations.
3. Trial balance and final accounts, Introduction, preparation of trial balance errors and their rectification, final accounts.

5. BSC.IT215 Data Structure & Algorithm

1. Elementary and structure data types. Control structure, complexity

2. Liner arrays: Traversing, inserting, and deleting.
Sorting: Bubble sort, Quick Sort

Searching: Linear search, binary search
3. Generalized link list: Traversing, searching inserting, deleting.
4. Stack: Array representation of stacks; polish notation, queues, recursion, and tower of Hanoi.
5. Non Liner structures: Trees, Graph and their traversals, binary trees, binary search trees, searching, inserting and deleting in binary search trees.
6. Sorting; Insertion sort, selection sort, merge sort, radix sort, hashing

BSC.IT - IV

1. BSC.IT 221 Internet – Technology

Introduction:

1. Concept of Internetworking
2. Elements of internetworking
3. Elements of multimedia supported network
4. Architecture of intranet
5. Resource requirement for intranet
6. Essential components of intranet

Active server pages (ASP)

1. Introduction
2. How active server page work
3. Client side scripting versus server side scripting
4. A simple ASP example
5. Server side active x components
6. Session tracking and cookies
7. Accessing a database from an active server page

Web servers (PWS/IIS/A pache):

1. Introduction
2. Microsoft personal web server overview

3. Publishing, preparing applications on PWS
4. Microsoft internet servers
5. Apache web server

Multimedia Networking

1. Standard capability
2. Voice over net
3. Video over net
4. Multimedia supported LAN and WAN
5. Multimedia supported OS
Internetworking support in various OS
6. Security issues

Reference Books:

- | | |
|-------------------------------|-------------------|
| 1. Internet and worldwide web | H.M. Deitel |
| 2. An Internet application | HALL |
| 3. Internet security | Farmer and venema |

2. BSC.IT 222 Visual Basic

UNIT 1: INTRODUCTION TO VISUAL BASIC

User Interface, Controls, Drawing Objects on the form, Object naming conventions, Event Procedures

UNIT 2: PROGRAMMING FUNDAMENTALS

Variables, Data Types, Modules, Procedures, Control Structures, Control Array, Arrays, Functions

UNIT 3: MENUS, MDI AND DATA FILES

Menu Editor, Writing Code for Menu Controls, Dialog Boxes, MDI Application, Menus in MDI Applications, Adding Status Bar, toolbar, Data Files

UNIT 4: ACCESSING DATABASES

Creating Database, Accessing Databases, Data Control, DAO, ADO

Adding bookmark, adding field, retrieve data from table using ADO data Control.

UNIT 5: REPORT/API/HELP/SYSTEM FUNCTIONS

Creating Reports – Connection, Commands, Windows API, IIS Application, Library Functions

Reference Books:

Mastering in Visual Basic

3. BSC.IT 223 Microprocessor 8085:-

1. 8085 Microprocessor

Architecture

Instruction

Memory Organization: RAM, ROM

2. Addressing modes:

2.1 Data related

2.2 Branch related

3. Instruction Set:

3.1 Data transfer instruction

3.2 Branch instruction

3.3 Setting operation instruction

3.4 Processor control instruction

4. Data transfer schemes:

4.1 Direct memory access (DMA)

4.2 Interrupt driver data transfer

5. Memory Interfacing:

- a. Introduction to ROM & RAM chips commonly used in pins
- b. Memory maps

- c. Address decoding

6. Bus standard:

- a. RS-232
- b. IEEE488 (GPIB)

7. Brief introduction of other microprocessor

- a. Motorola 6800
- b. Pentium IV
- c. Power PC
- d. SPARC

Reference Books:

Microprocessor system

Lbu & Glbson

Computer Interfacing & applications

Venugopal, BPB

4. BSC.IT224 Operating System

Introduction: Need of Operating System, its evolution, types of operating systems, batch, multiprogramming, time-sharing systems, real time systems.

Processes and processor management: process concept, systems programmers view of processes, operating systems view of processes, Process scheduling, Schedulers, interprocess communication and synchronization, race condition, mutual exclusion, semaphores, monitors, messages. Deadlocks prevention, avoidance, detection and recovery.

Memory Management:

Contiguous allocation- partitioned memory allocation - fixed and variable partitioning, memory management with bit maps - swapping - relocation- protection and sharing.

Non-contiguous allocation -

Paging - principles, page allocation, segmentation.

Virtual memory concepts, address translation, management of virtual memory, page replacement policies, protection and sharing, working set model, hardware support.

File management: Command language user's view of file system, file system design, disk space management directory structure, shared files, file system performance. File servers, security, and protection mechanism.

Input/Output Management: Device drivers, disk scheduling.

Introduction to loaders, linkers and relocating loaders.

Case study: UNIX.

References Books:

1. A.Silberschatz and Peter B Galvin: *Operating System concepts*, Addison Wesley publishing Company.
2. Deitel H.M: *Operating Systems*, Addison Wesley.
3. Stalling W: *Operating Systems*, Prentice Hall.
4. Tanenbaum: *Operating System Concepts*, Prentice Hall.

BSC.IT - V

1. BSC.IT 311 Theory of Computation

Introduction to automata theory, languages, recursive definitions, regular expressions, finite automata, transition graphs and Kleen's theorem.

Non-determination, finite automata with output, regular languages, minimization of finite automata.

Chomsky classification of languages, regular grammars, context free grammars, simplification of context free grammars, Normal forms of CFG.

Push Down Automata Theory: push down automata and context free languages.

Turing hypothesis, Turing machine, Minsky's theorem, TM variation and encoding, computability and acceptability.

Elements of propositional logic and predicate calculus.

Reference Books: -

1. Aho, Hopcroft and Ullman, *Introduction to Automata Theory, Formal Languages and Computation*, Narosa

2. Cohen, *Introduction to Computer Theory*, Addison Wesley.
3. Papadimitriou, *Introduction to Theory of Computing*, Prentice Hall.
4. K.Krishnamurthy: *Theory of Computation*.

2. BSC.IT312 Networking Essentials

Introduction:

1. Networking Background
2. Network media
3. Network topologies
4. Network protocols
5. Client servers and peers

Network Components:

1. Signal Transmission
2. Network media types
3. Cable and wireless media
4. Network adapters

Real world networks:

1. Ethernet
2. Token Ring
3. FDDI
4. ATM
5. Networks Types: LAN, MAN, WAN

Local Area Network (LAN):

1. Logic link layer
2. Hubs, Repeaters, Bridges, Routers and Gateways

Network server and clients:

1. Server Hardware and Operating System
2. Client preparation: Connection to workgroup, domains, sharing, drivers and printers.

Network Troubleshooting:

1. Preventing problems; Physical, Electrical, Virus
2. Diagnostic tools: Terminators, Cable tester

3. Security

Reference Books:

1. MCSE networking essential study guides BPB Publication
2. Computer Network Kurose And Ross

3. BSC.IT 313 System Analysis and Design

1. Introduction
2. The System Development Life Cycle and System Analyst.
3. System Analysis
4. System Design
5. System Implementation
6. Security and Recovery in System Development

4. BSC.IT 314 E-Commerce

1. Fundamentals of E-Commerce
2. Types of E-Commerce
3. Security of E-Commerce
4. Electronic Payment System

Reference Books: Instant E-Commerce

Kate J.Chase. BPB

BSC.IT VI

1. BSC.IT 321 Software Engineering

Introductory Concepts: Historical perspective, System Definition, Software Life Cycle, Software Engineering paradigms.

System analysis: Feasibility study requirement analysis, Cost benefit analysis, Planning systems, Analysis tools and techniques.

System Design: design fundamentals, Modular Design, Data and procedural design, object oriented design.

System Development: Code documentation, Program design paradigms, Efficiency Consideration.

Verification, Validation and Testing: testing methods, Formal Program Verification, Testing Strategies.

Software Maintenance: Maintenance Characteristics, Maintainability, Maintenance tasks and side effects.

Reference Books:

1. Pressman R.S: Software Engineering: A Practitioner approach, McGraw hill
2. Sommerville I: Software Engineering, Addison Wesley
3. Ghezzi C. Jazayeri M and Mandrioli: Fundamentals of software Engg. , PHI

2. BSC.IT 322 JAVA**1. An overview of java**

Brief history

Source file, keywords and identifiers

Compiling and running java programs

2. Introduction of OOP using Java

Data types, variables, arrays

Operators and assignments

Control statements

3. Packages:

Introduction, defining and CLASSPATH

Access protection

Importing Packages

4. Interfaces and Inner classes:

Defining interfaces

Implementing interfaces

Variables in interfaces

5. Exception Handling:

Exception handling fundamentals and types

Using try and catch

Throw, throws and finally

6. Multithreaded Programming:

6.1 Java thread model, thread priorities

6.2 The main thread

6.3 Created thread

7. Introduction to Java Library:

Reading, writing and console I/O

Integer, Float, String class

8. Applet and event handling

Applet basic and architecture

Simple applet display method

Requesting replanting

Using the status window

The HTML and APPLETTAG

Reference Books:

The complete reference Java 2

Herbert(TM)

Core Java 2 Vol. I & II

Cay S. Horstmann & Gary Cornell,

Java series

Java 2.0 programming

E.Balaguruswami, (TM)

3. BSC.IT323 HTML

Introduction , Difference between HTML & DHTML, Advantage of HTML, tags uses in HTML, table creation, list creation, input box , frames, Develop web page, Linking, use of database with html.

4. BSC.IT 324 Project (Minor)

MSC (Computer Science & IT.)

Semester Ist:

Sr.No.	Code	Name of Subject	L	P	U
1	MSC111	Fundamental Of Computer Science	4	0	4
2	MSC 112	Office Automation	3	2	4
3	MSC 113	Computer Programming and problem Solving Through C language	3	2	4
4	MSC 114	Computer Organization and Architecture	4	0	4
5	MSC 115	Accounting and Financial Management	3	2	4

Semester IInd

Sr.No.	Code	Name of Subject	L	P	U
1	MSC121	DBMS	4	0	4
2	MSC122	Operating System	3	2	4
3	MSC123	C++	3	2	4
4	MSC 124	Internet Technology	4	0	4
5	MSC125	System Analysis & Design	3	2	4

Semester IIIrd

Sr.No.	Code	Name of Subject	L	P	U
1	MSC211`	Mathematical Foundation of Computer Science	3	2	4
2	MSC212	Data Structure& Algorithm	4	0	4
3	MSC213	Analysis Design& Algorithm	4	0	4
4	MSC214	Computer Network	3	2	4
5	MSC215	Advanced Computer Architecture	3	2	4

Semester IVth

Sr.No.	Code	Name of Subject	L	P	U
1	MSC221	Management Information System	3	2	4
2	MSC222`	Core Java	3	2	4
3	MSC223`	Visual Basic	4	0	4
4	MSC224`	E-Commerce	4	0	4
5	MSC225`	Oracle	3	2	4

Details Of Syllabus.

MSC – I (Computer Science &It)

MSC 111 Fundamental Of Computer

Information Concepts and Processing: Definition, Need, Qualities, Value of information. Categories of information in business organization, level of information, data concepts, logical and physical concepts, data processing, elements of data processing system, word and text processing, graphics and office automation.

An Overview of Computer : Characteristics of computers, History of Computers, Generations of computers, Classification of computers, Applications of computers, Hardware & Software, Components of a computer System - CPU, Input/Output. Devices and Memory types, Auxiliary storage devices.

Number systems: Binary numbers, octal number, hexadecimal number, Radix-decimal, octal, hexadecimal, conversion from one form to another, representation of decimal, octal, hexadecimal numbers fractional numbers and signed numbers, and 2's complement forms, Binary arithmetic addition, subtraction, Multiplication and division.

Codes: Various types –ASCII and 8 bit EBCDIC code conversion encoding and decoding. System software: Foundations of system software, Distinction between systems software and Application software. Components of programming system- Evolution of Assembler, loaders, linkers, compilers.

High Level Language: Different types of languages, Introduction to compilers and Interpreter, Subroutine Library, Interpreters relative merits of compilers VS interpreters. Introduction of loaders and linkers and their types .Text editors; overview of editing process, user interface: editor structure.

Operating Systems: Evolution, introduction to OS functions and facilities, single tasking as, single user and multiuser as, characteristics of MS-DOS and Unix operating systems, commands, and utilities of MSDOS. Graphical User, Interfaces- Introduction to Windows, Word processing, spread sheet, database packages and its features. Introduction to Communication services - LAN, WAN, Internet facilities etc.

Books:

1. V Rajaraman : Fundamentals of Computers
2. VK. Jain: Computer Fundamentals
3. Sanders Donald H. , Computers Today, McGraw-Hill, 1998.
4. Ritchie: Operating System, BPB Publications.
5. Sanders Donald H. , Computer concepts and applications, McGraw-Hill, 1998.
6. Taxali R.K. PC Software made simple
7. D.M. Dhamdhare : Introduction to System Software, Tata McGraw -Hill, New Delhi, 1986.

C 112 Office Automation

1. Microsoft Word

2. Microsoft Excel

3. Power Point

3. MSC 113 COMPUTER PROGRAMMING AND PROBLEM SOLVING THROUGH 'C' LANGUAGE

Algorithm development: Steps in program development-Problem identification, task analysis, Data analysis, GIGO, outputs and Inputs, Pseudo codes, Algorithms, Flow Charting, Program coding, testing and debugging. Algorithms for searching (linear and binary), sorting (exchange insertion) merging of ordered lists.

Programming (Using C-Language) : Data types, variables and constants, expressions, operators and assignment statements, control statements, console I/O, Arrays, functions, Dynamic data structure in C-pointers, structures and Unions and user defined variables, File handling. The C preprocessor, C standard Library and Header files. Programming exercises.

Programming Techniques: Top down design bottom up design, Modular design and Structured programming.

Books:

1. Kernighan B.W & Ritchie D.M, The C Programming Language, Prentice Hall of India
2. Kenneth A., C Problem Solving & Programming. Prentice Hall International.

3. Jones, Robin & Stewart: The Art of C Programming.
4. N Wirth: Systematic Programming An- Introduction.
5. D Gries Programming Methodology
6. G. Dromey : How to solve it by Computer

4.MSC 114 COMPUTER ORGANIZATION

Overview of electronics: Stored program concept and Von Neumann architecture.

Electronic components-Resistor, capacitor and Inductors, Semiconductor devices Diodes, transistors (BJT and FET). Integrated circuits, Popular IC packages, Analog VS digital electronics, Transistor as a switch.

Boolean algebra and logic gates: Representation of values and complements. AND, OR, NOT operators, DeMorgan's theorem-simplifying expressions simple problems. Logic gates -Truth tables of AND, OR, NOT, XOR, XNOR, NAND, NOR gates, Combining logic circuits for expressions using NAND and NOR gates, Logic circuit families.

Combination and sequential Circuits : (Simple block diagrams, truth tables and IC packages only required) RS, JK, D and T flip flops, Master slave flip flops, counters-ripple and decade, Registers, latches and Tristate buffers.

Building blocks of a computer system: Basic building blocks I/O, Memory, ALU, Control and their interconnections, control unit and its functions- instruction set, Instruction and execution cycle, organizational sequence of operation of control registers: controlling of arithmetic operations; branch, skip, jump and shift instructions, ALU its components.

Addressing techniques and registers: Addressing techniques-Direct immediate addressing; Paging, relative, indirect and indexed addressing, Memory buffer register; accumulators: Registers-Indexed, General purpose, Special purpose; overflow, carry, shift, scratch registers; stack pointers; floating point; status information and buffer registers.

Input-Output Organization: I/O devices (Video terminals and Printers).

Programmed and Interrupt control mechanism, I/O controllers, Computer Buses, Interfacing buses, bus format & bandwidths.

Memory: Main, RAM, static and Dynamic, ROM, EPROM, EEPROM, EEPROM, Cache and Virtual memory, Auxiliary storage devices; hard disk, floppy disk,

magnetic tape, cassettes, cartridges and compact disks.

Miuprocessors : Functional elements, introduction to 4 bit 8 bit, 16 bit, 32 bit microprocessors (Intel and Motorola), Architecture of 8086 microprocessor; Instructions of 8086, Memory interfacing, Interrupts and Interrupts controller, Timer and PIA for interfacing.

Books:

1. Mano Morris M : Computer System Architecture, PHI, 1993
2. Hayes IP : Computer Architecture and Organisation, McGraw-Hill, International Edition, 1988.
3. Tannenbaum A.S. : Structured Computer Organisation
4. Bartee T.c. : Digital Computer Fundamentals
5. Malvino & Leech: Computer Architecture

5. MSC 115 ACCOUNTING AND FINANCIAL MANAGEMENT

Accounting : Principles, concepts and conventions, double entry system of accounting, introduction of basic books of accounts of sole proprietary concern, closing of books of accounts and preparation of trial balance.

Final Accounts: Trading profit and loss accounts and balance sheet of sole proprietary concern, with normal closing entries. Introduction to manufacturing account, finally accounts.

Financial Management: Meaning and role.

Ratio Analysis: Meaning, advantages, limitations, types of ratios and their usefulness.

Fund Flow Statement: Meaning of the terms-fund, flow and fund, working capital cycle, preparation and interpretation of the fund flow statement.

Costing : Nature, importance and basic principles.

Budget and Budgetary Control: Nature and scope, importance methods of finalisation of master budget and functional budgets Marginal Costing , Nature, scope and importance, Break even analysis, its use and limitations, construction of break even chart, practical applications of marginal costing.

Standard Costing : Nature, scope computation and analysis of variances with reference to material cost, Labor cost and overhead cost, interpretation of the

variances.

Introduction to computerized accounting System Coding logic and codes required, master files transaction files, Introduction to documents used for data collection, processing of different files and outputs obtained.

Books:

1. Kellock J : Elements of Accountlnu. Heinemann. 1970.
2. Levy and Sarnat . Principles of Financial Management, Prentice Hall International.
3. Pandey J.M : Financial Management, Vikas Publications. 1979.
4. Horngren and Sundem. JntroduCiionto Financial Accounting Prentice Hall International.
5. Shukla & Aganval Advanced Accounting

MSC-11 Sem

1. MSC 121 DBMS

Need, purpose and goal of DBMS, three schema architecture, ER Diagram, data models- Relational Network, Hierarchical and Object Oriented.

Data Base Design: Conceptual data base design, Theory of Normalization Primitive and Composite data types, concept of physical and logical databases, data abstraction and data independence, data aggregation, Relational Calculus.

SQL: DDL and DML, Relational Algebra.

Application Development using SQL: embedded SQL, Stored procedures and triggers and views, Constraints assertions.

Internal of RDBMS: Physical data organization in sequential, indexed random and hashed files.

Reference Books:

1. H.f. Korth and Silberschatz: *Database Systems Concepts*, McGraw Hill
2. Almasri and S.B. Navathe: *Fundamentals of Database Systems*,
3. C.J. Date: *Data Base Design*, Addison Wesley
4. Hansen and Hansen : *DBM and Design*, PHI

MSC122. OPERATING SYSTEM

Prerequisite: Computer Organization and Assembly Language Programming, System Software and C-Programming.

Introduction: Evolution of Operating systems, Types of Operating systems, Different views of the OS, Design and implementation of operating system.

Memory Management: Address protection, Single process monitor, and Partitioned memory allocation static, partitioned memory allocation dynamic, segmentation. Virtual memory, paging. page replacement algorithms and cache memory.

Support for Concurrent Process: Mutual exclusion, Semaphores, queuing implementation of semaphores, Classical problems in concurrent programming, Critical regions.

Scheduling: Process concepts, systems programmer's view of processes, OS view of processes, OS services for process management, virtual processors, interrupt System mechanism, scheduling algorithms, implementation of concurrency primitive.

System deadlock: Prevention, detection and avoidance.

Multiprogramming system: Queue Management, I/O supervisors, memory management. File system, disk scheduling. Security mechanism, authentication, protection, access control and cryptography.

Multi Processor System: Multiprocessor interconnections, multi processor types, functions. disk scheduling. Security mechanism, authentication, protection, access control and cryptography.

Multi Processor System: Multiprocessor interconnections, Multiprocessor types, functions. Introduction to parallel computing, multiprocessor synchronization. Distributed operating systems - computer networks algorithms for distributed processing.

Books:

1. Peterson, James. L. and Silberschatz A. : Operating System, Addison-Wesley Publ. Comp., 1989.
2. Tanenbaum A. S. : Modern Operating System, PHI Publ., 1995.
3. Bach, M.: Design of the UNIX operating System.
4. Melenkovic, Milan: Operating system -concept and Design, McGraw-Hill International Editions, 1992.

5. Deitel HarveyM.: An introouction to operating systems,Addition-Wesley Pub. Company, 1989.
6. Hansen Per Brinesh : Operating System Principles, PHI, 97178.
7. Madnick and Donovan: Operating System, McGraw-HiliBook co.

MSC123 OOPS With C++

1. Concept of OOP and POP.

2. Introduction of C++.

3. Elements of C++

- a. Character Set
- b. Key Words
- c. Data Types
- d. Constants and Variables
- e. Operators unary, binary, ternary
- f. Operator precedence

4. Control Flow:

- a Statements and blocks
- b. If
- c. Switch
- d. Loops: For, While, Do-While

5. Arrays:

- a. Basic Concepts
- b. Memory Representation
- c. One Dimensional Array
- d. Two Dimensional Array
- e. Three Dimensional Array

6. Functions:

- a. Basic concept
- b. Declaration and prototype
- c. Calling

d. Arguments

7. Pointers:

a. Basic Concepts

b. &, * Operator

8. Structure, Union and Enumerated Data Types

Basic Concepts, reference operator, structure with array

9. File Handling:

a. Types of Files

b. File Organization

c. Opening, Reading, Writing, Closing

d. Text and binary file

10. Class: Declaration, Definition, use of scope resolution operator

4. MSC124 Internet Technology

Introduction:

1. Concept of Internetworking

2. Elements of internetworking

3. Elements of multimedia supported network

4. Architecture of intranet

5. Resource requirement for intranet

6. Essential components of intranet

Active server pages (ASP)

1. Introduction

2. How active server page work

3. Client side scripting versus server side scripting

4. A simple ASP example
5. Server side active x components
6. Session tracking and cookies
7. Accessing a database from an active server page

Web servers (PWS/IIS/A pache):

1. Introduction
2. Microsoft personal web server overview
3. Publishing, preparing applications on PWS
4. Microsoft internet servers
5. Apache web server

Multimedia Networking

1. Standard capability
2. Voice over net
3. Video over net
4. Multimedia supported LAN and WAN
5. Multimedia supported OS

Internetworking support in various OS

6. Security issues¹⁵

Reference Books:

1. Internet and worldwide web H.M. Deitel

2. An Internet application HALL
3. Internet security Farmer and venema

5. MSC125 SYSTEM ANALYSIS AND DESIGN

Introduction: system Definition and concepts, characteristics and types of System, Real-life Business Subsystems, Systems Models, System Boundaries; Real-time and Distributed Systems, Basic principles of successful System.

Overview of system analysis and design, feasibility analysis, design, implementation, testing and evaluation- Introduction to Systems Development Life Cycle and its phases.

Project Selection : Sources of projects requests, managing project; review and selection, preliminary investigation.

Feasibility Study - Technical and economical feasibility, cost and benefit analysis.

System requirement specification and analysis: Fact finding techniques, data flow diagrams, data dictionaries, process organisation and interactions, Decision trees and tables.

Books:

1. James, A. S. : Analysis of Design of Information Systems, McGraw-Hill, 1986.
2. Awad Elias M. : System Analysis and design,
3. J. Ludeberg, M. Glkuhi G. & Hilsson, A. : Information System Development. A Systematic Approach, Prentice Hall International, 1981.
4. Lee, B.S. : Introducing System Analysis and Design Vol 1 & 2, Manchester United Kingdom, National Computer Centre, 1978.
5. Davis W. S : System Analysis and design, Addison - Wesley, 1983.
6. Daniel: Practical System Design, Galgotia Pub!. Pvt. Ltd.

MSC-111

1. MSC211- MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE

Sets, Relations and Functions: Definition of Sets and Subsets; Intersection, Union and Complements: deMorgan's law; Cardinality; Relations -Equivalence relations etc; Mappings - One-One, Onto.

Calculus: Functions, Limits and Continuity; Differentiation and Integration; differential Equations.

Logic: Logic operator like AND- OR etc.; truth tables; theory of Inference and Deduction; Mathematical Induction; Predicate calculus; Predicates and Quantifiers.

Linear Equations & Matrices : Row/Column operations; Gaussian Elimination; Decomposition; Inverse. Determinant: Properties of determinants; Cramer's Rule' Determinant, to transpose and inverse.

Vector Spaces: Linear independence; Bases, subspace and dimensionality.

Inner Products and Norms: Length, angle, direction cosines, Orthogonalizations.

Books:

1. Korthage, R.R. : Discrete Computational Structures, Academic Press, 1974.
2. Preparata F.P. : Yeh R-T : Introduction to Discrete Structure, Addison- Wisley, 1973.
3. Tremblay JP. and Manohar R.P. : Discrete Mathematical Structure with Applications to Computer Science, McGraw Hill, 1975.
4. Lew: Computer Science: A Mathematical Introduction, Prentice Hall International, C Paperback Edition)

MSC212-DATA STRUCTURE THROUGH 'C' LANGUAGE

Basic Concept of Data Structure: Abstract and System defined Data Types, Data Object, Data abstraction: Notion of an algorithm. - Complexity measures: Rate of growth, basic time analysis of an algorithm ordering notion detailed timing analysis space complexity.

Arrays and their representation: Single and multidimensional arrays, address calculation using row and column major ordering. .

Stacks and Queues: Representation and Manipulation of Stacks and queues using

Arrays, Uses of Stacks and Queues Recursion, circular Queues, Conversion from infix to postfix and prefix expressions, Polish expressions. Pointers and their uses
Continuous VS. Linked storage.

Linked Lists: Singly and doubly linked lists, Operations on lists, Circular linked lists, representation of sparse matrices using generalized list structure and polynomials representation using linked lists.

Storage Management and Garbage Collection: Memory allocation strategies, Dynamic storage management Reclamation and compaction Boundary Tag method.

Trees: Trees-Binary and N-ary trees, Representation of trees, Tree traversal algorithms. Threaded trees : Its Advantages, Conversion of general trees to Binary trees. B-trees Applications: Decision trees. Game trees and expression parsing

Symbol Tables: Decision tables -Static Symbol tables, Hash tables, Binary search tree, Dynamic Tree Tables.

Graphs and their Representation: Matrix representation, List structure, Graph traversal algorithm, application of graphs.

Strings and their Features: Strings Representation and manipulation using Arrays and lists, string Matching algorithms, Boyer-Moore, Knuth-Morris-Pratt and Boyer-Moore strategies.

Sorting and Searching: Sequential, Binary and hashed searching, internal and External sorting techniques, Bubble sort, insertion sort, Shell sort, Merge sort and Quick sort comparisons.

Books:

1. Aho A.V & Ullman J.E. : Data Structure & Algorithms.
2. Aron M. Tannenbaum & Others: Data Structures using C, Prentice Hall, 1992 ,
3. Mary E.S. Loomis: Data Management & File Structure, PHI, 1991.
4. Bhagat Singh & Thomas Naps: Introduction to Data Structure
5. Trembley & Sorenson: An Introduction to Data Structure with Application, McGraw-Hill, 1984.
6. Ellis Horowitz and Sartaj Sahani : Fundamentals of data structure with Pascal. Galgotia Book Source, 1994.

2. MCA 213 ANALYSIS AND DESIGN OF ALGORITHMS

Prerequisite: Computer Programming and Problem Solving, Data and File

Structure,

Review of basic data structures such as stacks, queues, linked lists trees and graphs.

Concepts in algorithm analysis, asymptotic complexity. Domain independent algorithm design techniques such as divide and conquer greedy method, dynamic programming, backtracking, branch and bound techniques. Example algorithms for above techniques from sets, graphs text processing internal and external sorting, height balanced trees-trees, hashing algorithms, dynamic storage allocations, garbage collection.

Lower bound theory and NP-hard problems.

Books:

1. Aho, A. V. Hopcroft, J.E., Ullman, J.D. : The Design and analysis of Computer Algorithms, Addison-Wesley Publishing Co., 1974.
2. Horowitz, E., Sahni, S. : Fundamentals of Computer Algorithms, Galgotia Publication, 1984.
3. Goodman, S.E. & Hedetniemi, : Introduction to the Design and Analysis of Algorithms, McGraw-Hill Book Company 1977.
4. Knuth, D.E. : Fundamental of Algorithms: The Art of computer Programming Vol. I, Narosa Publ. House, 1985.

4. MSC214 COMPUTER NETWORKS

Introduction:

1. Networking Background
2. Network media
3. Network topologies
4. Network protocols
5. Client servers and peers

Network Components:

1. Signal Transmission
2. Network media types
3. Cable and wireless media
4. Network adapters

Real world networks:

1. Ethernet
2. Token Ring
3. FDDI
4. ATM
5. Networks Types: LAN, MAN, WAN

Local Area Network (LAN):

1. Logic link layer
2. Hubs, Repeaters, Bridges, Routers and Gateways

Network server and clients:

1. Server Hardware and Operating System
2. Client preparation: Connection to workgroup, domains, sharing, drivers and printers.

Network Troubleshooting:

1. Preventing problems; Physical, Electrical, Virus
2. Diagnostic tools: Terminators, Cable tester
3. Security

Reference Books:

- | | |
|---|-----------------|
| 1. MCSE networking essential study guides | BPB Publication |
| 2. Computer Network | Kurose And Ros |

MSC 215 **ADVANCED COMPUTER ARCHITECTURE**

Introduction to advanced architectures; parallel processing; pipelining and vector processing; array processing; SIMD computers and processor enhancement; performance evaluation methods, statistics and discrete math applications; modeling for evaluation of virtual memory; time sharing environments.

MSC-1V- MSC221. MANAGEMENT INFORMATION SYSTEM

Introduction to MIS: Meaning and role of MIS, Definition of MIS, Systems 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, Prioritization and developmental strategies.

Conceptual Design of MIS: Definition of the problem, System objectives and system constraints. Analysis of information Source, alternative system design and selection of optimal system. Conceptual system design document.

Detailed System Design and Implementation: Application of basic system design concepts to MIS, Involvement of end-user and role of MIS department and System Analyst, Role of Top Management during design and implementation.

System evaluation review and update. Management and control of MIS function.

Advanced MIS concept, Decision Support System. Pitfalls in MIS development. .

MIS in Operation: (see not at end): MIS for Accounting and Finance Function, MIS for Personnel Systems, MIS for Accounting and Finance Function, MIS for Personnel Systems, for Marketing Systems, Production & Inventory system.

Note: A Standard layout is to be adopted for all MIS:

(1) Key Information Needs.

(2) Transaction Processing and Management Control.

(3) Reports Design and Data Collection Methods routing, frequency; Input, Output and Control Reports .

(4) Computer System Design -Master and Transaction files, Checks & Control Reports.

Books:

1. Murdick R. G., Ross JE. & Claggett J.R. : Information system for Modern Management, 3rd Edn., PHI, 1997.

2. James A.O Brien: Management Information Systems, Galgotia Pubn., 1994.

3. Wigarders K, Svensson A., Sehong L. : Structured Analysis & Design of Information Systems, McGraw-Hill book Co. 1986.

4. Locus: Analysis, Design and Implementation of Information system, 3rd Edn., McGraw-Hill Book Co.

5. Jawedker: Information System for Management.

6. Anderson Lavid L., Post Gerald V. : Management Information System; Tat McGrawhill, 3rd, 1999.

1. An overview of java

Brief history

Source file, keywords and identifiers

Compiling and running java programs

2. Introduction of OOP using Java

Data types, variables, arrays

Operators and assignments

Control statements

3. Packages:

Introduction, defining and CLASSPATH

Access protection

Importing Packages

4. Interfaces and Inner classes:

Defining interfaces

Implementing interfaces

Variables in interfaces

5. Exception Handling:

Exception handling fundamentals and types

Using try and catch

Throw, throws and finally

6. Multithreaded Programming:

6.1 Java thread model, thread priorities

6.2 The main thread

6.3 Created thread

7. Introduction to Java Library:

Reading, writing and console I/O

Integer, Float, String class

8. Applet and event handling

Applet basic and architecture

Simple applet display method

Requesting replanting

Using the status window

The HTML and APPLET Tag

Reference Books:

The complete reference Java 2	Herbert(TM)
Core Java 2 Vol. I & II	Cay S. Horstmann & Gary
Cornell, Java series	
Java 2.0 programming	E.Balaguruswami, (TM)

MSC223 VISUAL BASIC

Introduction: Need of Visual languages, Integrated Development Environment (IDE), Advantages of Visual BASIC, Characteristics and features of Visual BASIC - IDE, Projects, User Interface, Objects Oriented, Visual Development and. Event-Driven Programming, Forms/Graphic controls, Data processing with windows and Internet applications.

Visual BASIC Programming and Tools: An Introduction of Visual BASIC Programming, Simple program Construction, Statements, Input/Outputs, Preprocessors, Comments, Editor, Codes. Variables, Constants and Data types, Arrays, Collections, Procedures, Arguments, Functions, Subroutines, Control Flow Statements, Loop Statements, Objects, and variants. Visual BASIC debugging tools. Runtime errors handling,

Designing User Interface - Elements of User Interface, Understanding Forms, Menus and Toolbars, Designing Menus and Tool-bars, Building Dynamic Forms, Drag and Drop Operations, working with menus, customizing the toolbars

ActiveX Controls - TextBox, ComboBox, ScrollBar and Slider Controls operations, Generating Time Events, Drawing with Visual Basic using Graphics Controls, Coordinate systems and Graphic methods. Manipulating Colors and pixels with Visual Basic. Operations with Common Dialogs Control. Tree View and List View Controls.

Object Oriented Programming - Create Objects and Classes, Creating special properties of classes, Enhancing the simple and object classes, collections working with objects and collections. Recursive programming- Binary Search, Scanning

folders and Building custom explorers, Creating Printed Outputs Using the printer object and reports.

Integrating with Microsoft windows and office 97, Concepts Automation, Activex and object models, Automation with word 97, Excel 97.

Database Programming with Visual Basic - Data Access methods, Creating, reading and writing text files- Data controls creating Queries.

References Books:

1. Petroustos Evangelous; Mastering Visual Basic; BPB Publications; 1998.
2. Norton's Peter : Guide to Visual Basic; Techmedia; 1998.
3. Kurata Deborah: Doing Objects in Visual Basic; Techmedia; 1998.

MSC224 E - COMMERCE

1. Fundamentals of E-Commerce
2. Types of E-Commerce
3. Security of E-Commerce
4. Electronic Payment System

Reference Books: Instant E-Commerce

Kate J.Chase. BPB

MSC225 ORACLE

Oracle – An Introduction

1. Introduction, Features of Oracle, Object relational database management system, Introduction to SQL, Data Types, Introduction to DDL, Constraints DML commands, Operators in SQL.
2. PL/SQL
Introduction to PL/SQL, Cursors, Triggers, Subprograms and packages.
3. Database operations and structures
Database operation and structure, Introduction, Database startup and shutdown, Database structure and space management, Terms related to Oracle 8i server, Memory structure and processes of Oracle8i, Privileges and roles, Database backup and recovery, Database backups.

Reference Book:

The Complete Reference in SQL

PGDCA (Computer Science & Engg.)

Semester Ist:

Sr.No.	Code	Name of Subject	L	P	U
1	PGDCA 111	Fundamental Of Computer Science	4	0	4
2	PGDCA 112	Office Automation	3	2	4
3	PGDCA 113	Computer Programming and problem Solving Through C language	3	2	4
4	PGDCA 114	Computer Organization and Architecture	4	0	4
5	PGDCA 115	Accounting and Financial Management	3	2	4

Semester IInd

Sr.No.	Code	Name of Subject	L	P	U
1	PGDCA 121	DBMS	4	0	4
2	PGDCA 122	Operating System	3	2	4
3	PGDCA 123	C++	3	2	4
4	PGDCA 124	Internet Technology	4	0	4
5	PGDCA 125	System Analysis & Design	3	2	4

PGDCA – I

MCA 111 Fundamental Of Computer

Information Concepts and Processing: Definition, Need, Qualities, Value of information. Categories of information in business organization, level of information, data concepts, logical and physical concepts, data processing, elements of data processing system, word and text processing, graphics and office automation.

An Overview of Computer : Characteristics of computers, History of Computers, Generations of computers, Classification of computers, Applications of computers, Hardware & Software, Components of a computer System - CPU, Input/Output. Devices and Memory types, Auxiliary storage devices.

Number systems: Binary numbers, octal number, hexadecimal number, Radix-decimal, octal, hexadecimal, conversion from one form to another, representation of decimal, octal, hexadecimal numbers fractional numbers and signed numbers, and 2's complement forms, Binary arithmetic addition, subtraction, Multiplication and division.

Codes: Various types -ASCII and 8 bit EBCDIC code conversion encoding and decoding.

System software: Foundations of system software, Distinction between systems software and Application software. Components of programming system-Evolution of Assemblers, loaders, linkers, compilers.

High Level Language: Different types of languages, Introduction to compilers and Interpreter, Subroutine Library, Interpreters relative merits of compilers VS interpreters. Introduction of loaders and linkers and their types .Text editors; overview of editing process, user interface: editor structure.

Operating Systems: Evolution, introduction to OS functions and facilities, single tasking as, single user and multiuser as, characteristics of MS-DOS and Unix operating systems, commands, and utilities of MSDOS. Graphical User, Interfaces- Introduction to Windows, Word processing, spread sheet, database packages and its features. Introduction to Communication services - LAN, WAN, Internet facilities etc.

Books:

1. V Rajaraman : Fundamentals of Computers
2. VK. Jain: Computer Fundamentals
3. Sanders Donald H. , Computers Today, McGraw-Hill, 1998.
4. Ritchi: Operating System, BPB Publications.
5. Sanders Donald H. , Computer concepts and applications, McGraw-Hill, 1998.
6. Taxali R.K. PC Software made simple
7. D.M. Dhamdhare : Introduction to System Software, Tata McGraw -Hill, New Delhi, 1986.

MCA 112 Office Automation

1. Microsoft Word

2. Microsoft Excel

3. Power Point

3. PGDCA 113 COMPUTER PROGRAMMING AND PROBLEM SOLVING THROUGH 'C' LANGUAGE

Algorithm development: Steps in programme development-Problem identification, task analysis, Data analysis, GIGO, outputs and Inputs, Pseudo codes, Algorithms, Flow Charting, Program coding, testing and debugging. Algorithms for searching (linear and binary), sorting (exchange insertion) merging of ordered lists.

Programming (Using C-Language) : Data types, variables and constants, expressions, operators and assignment statements, control statements, console I/O, Arrays, functions, Dynamic data structure in C-pointers, structures and Unions and user defined variables, File handling. The C preprocessor, C standard Library and Header files. Programming exercises.

Programming Techniques: Top down design bottom up design, Modular design and Structured programming.

Books:

1. Kernighan B.W & Ritchie D.M, The C Programming Language, Prentice Hall of India
2. Kenneth A., C Problem Solving & Programming. Prentice Hall International.
3. Jones, Robin & Stewart: The Art of C Programming.
4. N Wirth: Systematic Programming An- Introduction.
5. D Gries Programming Methodology
6. G. Dromey : How to solve it by Computer

4.PGDCA 114 COMPUTER ORGANIZATION

Overview of electronics: Stored program concept and Von Neumann architecture. Electronic components-Resistor, capacitor and Inductors, Semiconductor devices -Diodes, transistors (BJT and FET). Integrated circuits, Popular IC packages, Analog VS digital electronics, Transistor as a switch.

Boolean algebra and logic gates: Representation of values and complements. AND, OR, NOT operators, DeMorgan's theorem-simplifying expressions simple problems. Logic gates - Truth tables of AND, OR, NOT, XOR, XNOR, NAND, NOR gates, Combining logic circuits for expressions using NAND and NOR gates, Logic circuit families.

Combination and sequential Circuits : (Simple block diagrams, truth tables and IC

packages only required) RS, JK, D and T flip flops, Master slave flip flops, counters- ripple and decade, Registers, latches and Tristate buffers.

Building blocks of a computer system: Basic building blocks I/O, Memory, ALU, Control and their interconnections, control unit and its functions- instruction set, Instruction and execution cycle, organizational sequence of operation of control registers: controlling of arithmetic operations; branch, skip, jump and shift instructions, ALU its components.

Addressing techniques and registers: Addressing techniques-Direct immediate addressing; Paging, relative, indirect and indexed addressing, Memory buffer register; accumulators: Registers-Indexed, General purpose, Special purpose; overflow, carry, shift, scratch registers; stack pointers; floating point; status information and buffer registers.

Input-Output Organization: I/O devices (Video terminals and Printers). Programmed and Interrupt control mechanism, I/O controllers, Computer Buses, Interfacing buses, bus format & bandwidths.

Memory: Main, RAM, static and Dynamic, ROM, EPROM, EEPROM, Cache and Virtual memory, Auxiliary storage devices; hard disk, floppy disk, magnetic tape, cassette, cartridges and compact disks.

Microprocessors : Functional elements, introduction to 4 bit 8 bit, 16 bit, 32 bit microprocessors (Intel and Motorola), Architecture of 8086 microprocessor; Interactions of 8086, Memory interfacing, Interrupts and Interrupts controller, Timer and PIA for interfacing.

Books:

1. Mano Morris M : Computer System Architecture, PHI, 1993
2. Hayes IP : Computer Architecture and Organisation, McGraw-Hill, International Edition, 1988.
3. Tannenbaum A.S. : Structured Computer Organisation
4. Bartee T.c. : Digital Computer Fundamentals
5. Malvino & Leech: Computer Architecture

5. PGDCA 115 ACCOUNTING AND FINANCIAL MANAGEMENT

Accounting : Principles, concepts and conventions, double entry system of accounting, introduction of basic books of accounts of sole proprietary concern, closing of books of accounts and preparation of trial balance.

Final Accounts: Trading profit and loss accounts and balance sheet of sole proprietary

concer, with normal closing entries. Introduction to manufacturing account, finally accounts.

Financial Management: Meaning and role.

Ratio Analysis: Meaning, advantages, limitations, types of ratios and their usefulness.

Fund Flow Statement: Meaning of the terms-fund, flow and fund, working capital cycle, preparation and interpretation of the fund flow statement.

Costing : Nature, importance and basic principles.

Budget and Budgetary Control: Nature and scope, importance methods of finalisation of master budget and functional budgets Marginal Costing , Nature, scope and importance, Break even analysis, it's use and limitations, construction of break even chart, practical applications of marginal costing.

Standard Costing : Nature, scope computation and analysis of variances with reference to material cost, Labor cost and overhead cost, interpretation of the variances.

Introduction to computerized accounting System Coding logic and codes required, master files transaction files, Introduction to documents used for data collection, processing of different files and outputs obtained.

Books:

1. Kellock J : Elements of Accountlnu. Heinemann. 1970.
2. Levy and Sarnat . Principles of Financial Management, Prentice Hall International.
3. Pandey J.M : Financial Management, Vikas Publications. 1979.
4. Horngren and Sundem. IntroduCiionto Financial Accounting Prentice Hall International.
5. Shukla & Aganval Advanced Accounting

PGDCA-11

1. PGDCA 121 DBMS

Need, purpose and goal of DBMS, three schema architecture, ER Diagram, data models- Relational Network, Hierarchical and Object Oriented.

Data Base Design: Conceptual data base design, Theory of Normalization Primitive and Composite data types, concept of physical and logical databases, data abstraction and data independence, data aggregation, Relational Calculus.

SQL: DDL and DML, Relational Algebra.

Application Development using SQL: embedded SQL, Stored procedures and triggers and views, Constraints assertions.

Internal of RDBMS: Physical data organization in sequential, indexed random and hashed files.

Reference Books:

1. H.f. Korth and Silberschatz: *Database Systems Concepts*, McGraw Hill
2. Almasri and S.B. Navathe: *Fundamentals of Database Systems*,
3. C.J. Date: *Data Base Design*, Addison Wesley
4. Hansen and Hansen : *DBM and Design*, PHI

PGDCA122. OPERATING SYSTEM

Prerequisite: Computer Organization and Assembly Language Programming, System Software and C-Programming.

Introduction: Evolution of Operating systems, Types of Operating systems, Different views of the OS, Design and implementation of operating system.

Memory Management: Address protection, Single process monitor, and Partitioned memory allocation static, partitioned memory allocation dynamic, segmentation. Virtual memory, paging. page replacement algorithms and cache memory.

Support for Concurrent Process: Mutual exclusion, Semaphores, queuing implementation of semaphores, Classical problems in concurrent programming, Critical regions.

Scheduling: Process concepts, systems programmer's view of processes, OS view: of processes, OS services for process management, virtual processors, interrupt System mechanism, scheduling algorithms, implementation of concurrency primitive.

System deadlock: Prevention, detection and avoidance.

Multiprogramming system: Queue Management, I/O supervisors, memory management. File system, disk scheduling. Security mechanism, authentication, protection, access control and cryptography.

Multi Processor System: Multiprocessor interconnections, multi processor types, functions. disk scheduling. Security mechanism , authentication, protection, access control and cryptography.

Multi Processor System: Multiprocessor interconnections, Multiprocessor types, functions.

Introduction to parallel computing, multiprocessor synchronization. Distributed operating systems - computer networks algorithms for distributed processing.

Books:

1. Peterson, James. L. and Silberschatz A. : Operating System, Addison-Wesley Publ. Comp., 1989.
2. Tanenbaum A. S. : Modern Operating System, PHI Publ., 1995.
3. Bach, M.: Design of the UNIX operating System.
4. Melenkovic, Milan: Operating system -concept and Design, McGraw-Hill International Editions, 1992.
5. Deitel Harvey M.: An introduction to operating systems, Addison-Wesley Pub. Company, 1989.
6. Hansen Per Brinesh : Operating System Principles, PHI, 97178.
7. Madnick and Donovan: Operating System, McGraw-Hill Book co.

2.PGDCA 122 OOPS With C++

1. Concept of OOP and POP.

2. Introduction of C++.

3. Elements of C++

- a. Character Set
- b. Key Words
- c. Data Types
- d. Constants and Variables
- e. Operators unary, binary, ternary
- f. Operator precedence

4. Control Flow:

- a Statements and blocks
- b. If
- c. Switch
- d. Loops: For, While, Do-While

5. Arrays:

- a. Basic Concepts
- b. Memory Representation
- c. One Dimensional Array
- d. Two Dimensional Array
- e. Three Dimensional Array

6. Functions:

- a. Basic concept
- b. Declaration and prototype
- c. Calling
- d. Arguments

7. Pointers:

- a. Basic Concepts
- b. &, * Operator

8. Structure, Union and Enumerated Data Types

Basic Concepts, reference operator, structure with array

9. File Handling:

- a. Types of Files
- b. File Organization
- c. Opening, Reading, Writing, Closing
- d. Text and binary file

10. Class: Declaration, Definition, use of scope resolution operator

PGDCA 123 Internet – Technology

Introduction:

1. Concept of Internetworking
2. Elements of internetworking
3. Elements of multimedia supported network
4. Architecture of intranet
5. Resource requirement for intranet
6. Essential components of intranet

Active server pages (ASP)

1. Introduction

2. How active server page work
3. Client side scripting versus server side scripting
4. A simple ASP example
5. Server side active x components
6. Session tracking and cookies
7. Accessing a database from an active server page

Web servers (PWS/IIS/A pache):

1. Introduction
2. Microsoft personal web server overview
3. Publishing, preparing applications on PWS
4. Microsoft internet servers
5. Apache web server

Multimedia Networking

1. Standard capability
2. Voice over net
3. Video over net
4. Multimedia supported LAN and WAN
5. Multimedia supported OS

Internetworking support in various OS

6. Security issues15

Reference Books:

1. Internet and worldwide web H.M. Deitel
2. An Internet application HALL
3. Internet security Farmer and venema

2. MCA 212 OOPS With C++

1. Concept of OOP and POP.

2. Introduction of C++.

3. Elements of C++

- a. Character Set
- b. Key Words
- c. Data Types
- d. Constants and Variables
- e. Operators unary, binary, ternary
- f. Operator precedence

4. Control Flow:

- a Statements and blocks
- b. If
- c. Switch
- d. Loops: For, While, Do-While

5. Arrays:

- a. Basic Concepts
- b. Memory Representation
- c. One Dimensional Array
- d. Two Dimensional Array
- e. Three Dimensional Array

6. Functions:

- a. Basic concept
- b. Declaration and prototype
- c. Calling
- d. Arguments

7. Pointers:

- a. Basic Concepts
- b. &, * Operator

8. Structure, Union and Enumerated Data Types

Basic Concepts, reference operator, structure with array

9. File Handling:

- a. Types of Files
- b. File Organization
- c. Opening, Reading, Writing, Closing
- d. Text and binary file

10. Class: Declaration, Definition, use of scope resolution operator

5. PGDCA125 SYSTEM ANALYSIS AND DESIGN

Introduction: system Definition and concepts, characteristics and types of System, Real-life Business Subsystems, Systems Models, System Boundaries; Real-time and Distributed Systems, Basic principles of successful System.

Overview of system analysis and design, feasibility analysis, design, implementation, testing and evaluation- Introduction to Systems Development Life Cycle and its phases.

Project Selection : Sources of projects requests, managing project; review and selection, preliminary investigation.

Feasibility Study - Technical and economical feasibility, cost and benefit analysis.

System requirement specification and analysis: Fact finding techniques, data flow diagrams, data dictionaries, process organisation and interactions, Decision trees and tables.

Books:

1. James, A. S. : Analysis of Design of Information Systems, McGraw-Hill, 1986.
2. Awad Elias M. : System Analysis and design,
3. J. Ludeberg, M. Glkuhi G. & Hilsson, A. : Information System Development. A Systematic Approach, Prentice Hall International, 1981.
4. Lee, B.S. : Introducing System Analysis and Design Vol 1 & 2, Manchester United Kingdom, National Computer Centre, 1978.
5. Davis W. S : System Analysis and design, Addison - Wesley, 1983.
6. Daniel: Practical System Design, Galgotia Pub!. Pvt. Ltd.