

SRIDEV SUMAN UTTARAKHAND UNIVERSITY

M. Sc. (Information Technology)

PROGRAMME

SEMESTER - I

MS101 : Computer Fundamentals & Programming in 'C' —

MS102 : Mathematical Foundation of Computers Science —

MS103 : Digital Electronics & Computer System Architecture

MS104 : Structured System Analysis and Design —

MS105 : Accounting and Financial Management

MSP11 : Computer Programming & Problem Solving in 'C'

MSP12 : PC Packages(Introduction to DOS & MS-office)

SEMESTER - II

MS201 : Data Structures Using 'C'

MS202 : Relational Database Management Systems

MS203 : Operating System

MS204 : Software Engineering and Project Management —

MS205 : Object Oriented Analysis and Designing —

MSP21 : Data Structures Using 'C'

MSP22 : Relational Database Management Systems

SEMESTER - III

MS301 : Introduction to Web Technology

MS302 : Data communication and Networks

MS303 : Analysis & Design of Algorithm

MS304 : Visual Basic With .NET Technology

MS305 : Elective

- i) Advance RDBMS
- ii) E-Governance —
- iii) Fuzzy Logic & Neural Network
- iv) Artificial Intelligence
- v) Distributed and Parallel Computing

MSP31 : Introduction to Web Technology

MSP32 : Visual Basic With .NET Technology

SEMESTER - IV

MSPR 401 : Project work 6 months duration (In an organization)

MSSM 402 : Seminar

FIRST SEMESTER:

S.No	Course No.	Subject	Evaluation - Scheme							
			Period			Sessional		Examination		
			L	T	P	TA	CT	TOT	ESE	Sub. Total
Theory										
1.	MS101	Computer Fundamental & Programming in 'C'	3	1	-	10	20	30	70	100
2.	MS102	Mathematical Foundation of Computer Science	3	1	-	10	20	30	70	100
3.	MS103	Digital Electronics & Computer System Architecture	3	1	-	10	20	30	70	100
4.	MS104	Structured System Analysis and Design	3	1	-	10	20	30	70	100
5.	MS105	Accounting and Financial Management	3	1	-	10	20	30	70	100
Practical										
1.	MSP11	Computer Programming & Problem Solving in 'C'	-	-	4	50	-	50	50	100
2.	MSP12	PC Packages (Introduction to DOS & MS office)	-	-	4	50	-	50	50	100
Total			15	5	8	-	-	250	450	700

Total Period = 28

Total Marks = 700

SECOND SEMESTER:

S.No	Course No.	Subject	Evaluation - Scheme							
			Period			Sessional		Examination		
			L	T	P	TA	CT	TOT	ESE	Sub. Total
Theory										
1.	MS201	Data Structures Using 'C'	3	1	-	10	20	30	70	100
2.	MS202	Relational Database Management System	3	1	-	10	20	30	70	100
3.	MS203	Operating System	3	1	-	10	20	30	70	100
4.	MS204	Software Engineering and Project Management	3	1	-	10	20	30	70	100
5.	MS205	Object Oriented Analysis and Design	3	1	-	10	20	30	70	100
Practical										
1.	MSP21	Data Structures Using 'C'	-	-	4	50	-	50	50	100
2.	MSP22	Relational Database Management Systems	-	-	4	50	-	50	50	100
Total			15	5	8	-	-	250	450	700

TA : Teacher Assessment
 CT : Class Test
 FSE : End Semester Examination
 SUB TOT. : Subject Total
 TOT. : Total

Total Period = 28
 Total Marks = 700

THIRD SEMESTER:

S.No Course No. Subject

Evaluation - Scheme
 Period Sessional Examination
 L T P TA CT TOT ESE Sub. Total

Theory

1.	MS301	Introduction to Web Technology	3	1	-	10	20	30	70	100
2.	MS302	Data Communication and Networks	3	1	-	10	20	30	70	100
3.	MS303	Analysis & Design of Algorithm	3	1	-	10	20	30	70	100
4.	MS304	Visual Basic With .NET Technology	3	1	-	10	20	30	70	100
5.	MS305	Elective i) Advance RDBMS ii) E-Governance iii) Fuzzy Logic & Neural Network iv) Artificial Intelligence v) Distributed and Parallel Computing	3	1	-	10	20	30	70	100

Practical

1.	MSP31	Introduction to Web Technology	-	-	4	50	-	50	50	100
2.	MSP32	Visual Basic With .NET Technology	-	-	4	50	-	50	50	100
Total			15	5	8	-	-	250	450	700

Total Period = 28
 Total Marks = 700

FOURTH SEMESTER:

S.No Course No. Subject

Evaluation - Scheme
 Period Sessional Examination
 L T P TA CT TOT ESE Sub. Total

Theory

1.	MSPR	Thesis/Project Work	-	-	20	100	-	-	200	300
2.	MSSM	Seminar	-	-	8	-	-	-	100	100
Total			-	-	-	-	-	-	300	400

TA : Teacher Assessment
 CT : Class Test
 ESE : End Semester Examination
 SUB TOT. : Subject Total
 TOT. : Total

Total Period = 28
 Total Marks = 400

Note: The students with the help of the Institution may do summer training of 6-8 weeks duration, after II Semester in an organization (academic or industrial) which will be submitted in the organization.

Each theory paper will of 100 marks comprising of 70 marks for University examination and 30 Marks for sessional. Each practical will be of 100 marks (50 marks of University examination and 50 Marks for sessional) The following in the distribution for marks (Semester wise):

	Theory	Practicals	Total
1. Semester I	5x100	2x100	700
2. Semester II	5x100	2x100	700
3. Semester III	5x100	2x100	700
4. Semester IV			
(a) Project			300
(b) Seminar			100
TOTAL			2500

MS101 : Computer Fundamentals & Programming in 'C'

Introduction to Computers: Computer hardware Components, Disk Storage, memory, keyboard, mouse, printers, monitors, CD etc., and their functions. Comparison Based analysis of various hardware components.

Basic Operating System Concepts: MS-DOS, WINDOWS. Functional knowledge of these operating systems. Introduction to Basic Commands of DOS, Managing File and Directories in various operating Systems. Introduction to Internet, Basic terms related with Internet, TCP/IP.

Programming in C: History, Introduction to C Programming Languages. Structure of C programs, compilation and execution of C programmes. Debugging Techniques, Data Types and Sizes, Declaration of variables, Modifiers, Identifiers and keywords, Symbolic constants, Storage classes (automatic, external, register and static), Enumerations, command line parameters, Macros, The C Preprocessor.

Operators: Unary operators. Arithmetic & logical operators, Bit wise operators, Assignment operators and expressions, Conditional expressions, precedence and order of evaluation, Control Statements: if-else, switch, break, continue, the comma operator, go to statement.

Loops: for, while, do-while.

Functions, built-in and user-defined, function declaration, definition and function call, parameter passing, call by value, call by reference, recursive functions, multifile programs.

Arrays: Linear arrays, multidimensional arrays, Passing arrays to functions, Arrays and strings.

Structure and Union: Definition and differences, self-referential structure, And address of (&) operator, pointer to pointer, Dynamic Memory Allocation, calloc and malloc functions, array of pointers, function of pointers, structures and pointers.

References:

1. V. Rajaraman, "Fundamentals of Computers", PHI
2. Peter Norton's "Introduction to Computer", TMH
3. Hahn, "The Internet complete reference", TMH
4. Peter Norton's, "DOS Guide", Prentice Hall of India
5. Gottfried, "Programming in C, Schaum's Series Tata McGraw Hill

MS102 : Mathematical Foundation of Computers Science

Relation: Type and compositions of relations. Pictorial representation of relations. Equivalence relations. Partial ordering relation.

Function: Types. Composition of function. Recursively defined function.

Mathematical Induction: Pano's axioms. Mathematical Induction. Discrete Numeric Functions and Generating functions. Simple Recurrence relation with constant coefficients, Linear recurrence relation without constant coefficients. Asymptotic Behaviour of functions

Algebraic Structures: Properties, Semi group, monoid, Group, Abelian group, properties of group, Subgroup, Cyclic group, Cosets, Permutation groups, Homomorphism, Isomorphism and Automorphism of groups.

Propositional Logic: Preposition, First order logic, Basic logical operations, Tautologies, Contradictions, Algebra of Proposition, Logical implication, Logical equivalence, Normal forms, Inference Theory, Predicates and quantifiers, Posets, Hasse Diagram.

Lattices: Introduction, Ordered set, Hasse diagram of partially ordered set, Consistent enumeration, Isomorphic ordered set, Well ordered set, Lattices, Properties of lattices, Bounded lattices, Distributive lattices, and Complemented lattices.

References:

1. Lipschutz, Seymour, "Discrete Mathematics", TMH.
2. Trembley, J.P. & R. Manohar, "Discrete mathematical Structure with Application to Computer Science", TMH.
3. Kenneth H. Rosen, "Discrete Mathematics and its applications", TMH
4. Doerr Alan and Levasseur Kenneth, "Applied Discrete Structure for Computer Science, Galgotia Pub. Pvt. Ltd.
5. Gersting "Mathematical Structure for Computer Science", WH freeman and Macmillan
6. Kumar Rajendra, "Theory of Automata: Languages and Computation", PPM
7. Hopcroft J.E. Ullman J.D., "Introduction to Automata Theory, Language and Computation" Narosa Pub House, New Delhi.
8. C.L.Liu "Elements of Discrete Mathematics", McGraw Hill.
9. Peter Grossman, "Discrete Mathematics for Computer", Palgrave Macmillan.

MS103 : Digital Electronics & Computer System Architecture

Representation of information & Basic Building Blocks: Introduction to Computer, Computer hardware generation, Number System: Binary, Octal, Hexadecimal, Character Codes (BCD), ASCII, EBCDIC and their conversion. Logic gates, Boolean Algebra, K-map simplification, Half Adder, Full Adder, Subtractor, Decoder, Encoders, Multiplexer, Demultiplexer, Carry look ahead adder, Combinational logic Design, Flip-Flops, Registers, Counters (Synchronous and asynchronous), ALU, Micro-operation, ALU-chip, Faster Algorithm and Implementation (multiplication & Division).

Basic Organization: Operational flow chart (Fetch, Execute Instruction Cycle), Organization of Central Processing Unit, Hardwired & micro programmed control unit, Single Organization, General Register Organization, Stack Organization, Addressing modes, Instruction formats, data transfer & Manipulation, I/O Organization, Bus Architecture, Programming Registers.

Memory Organization: Memory hierarchy, Main memory (RAM/ROM) chips), Auxiliary memory, Associative memory, Cache memory, Virtual memory, Memory Management Hardware, hit/miss ratio, magnetic disk and its performance, magnetic Tape etc.

I/O Organization: Peripheral devices, I/O interface, Modes of Transfer, Priority Interrupt, Direct Memory Access Input-Output Processor, and Serial Communication, I/O Controllers, Asynchronous data transfer, Strobe Control, Handshaking.

References:

1. William Stallings, "Computer Organization & Architecture" Pearson Education Asia
2. Mano Morris, "Computer System Architecture" PHI
3. Zaky & Hamacher, "Computer Organization: McGraw Hill
4. B. Ram, "Computer Fundamental Architecture & Organization" New Age
5. Tannenbaum, "Structured Computer Organization" PHI.

MS104 : Structured System Analysis and Design

System Concepts and Information System Environment, The System Concept Definition, Characteristics of Systems, Elements of a System, Open and Closed and closed system, Formal & Informal Information Systems, Computer based Information Systems, Management Information System, Decision Support System, General Business Knowledge, and Interpersonal Communicational System.

The System Development Life Cycle: Recognition of needs, Impetus for System Change, Feasibility Study, Analysis, Design, Implementation, Post implementation & Maintenance.

The Role of the Systems Analyst: Historical Perspective, Academic & Personal Qualifications, the multifaceted role of the Analyst, The Analyst/User Interface, Behavioral issues.

Systems Planning & Initial Investigation: Strategies for Determining Information Requirement, Problem Definition & Project initiation, Background Analysis, Fact Analysis, Review of Written Documents, Onsite Observations, Interviews & Questionnaires, Fact Analysis, Performance Analysis, Efficiency Analysis, Service Analysis.

Information Gathering: Kind of Information needed, Information about the firms, Information gathering tools, the art of Interviewing, Arranging the Interview, Guides to Successful Interview, Types of Interviews and Questionnaires, The Structured and Unstructured Alternatives.

The Tools of Structured Analysis: The Dataflow Diagram (DFD), Data Dictionary, Decision Trees and Structured English.

Feasibility Study: System performance, Economic Feasibility, Technical Feasibility, Behavioral Feasibility, Steps in Feasibility Analysis.

Input/Output and Forms Design: Input Design, CRT Screen Design, Output Design, Requirements form Design.

References:

1. Elias M. Awad, "Systems Analysis & Design" Galgotia Publication
2. Hoffer, "Modern Systems Analysis & Design" Addison Wesley.
3. Kendall, "Introduction to System Analysis & Design", McGraw Hill

MS105 : Accounting and Financial Management

Accounting: Principles, Concepts and conventions, double entry system of accounting, Ledger posting and Trial balance, Final Accounts: Trading, profit and loss accounts and balance sheet of sole proprietary concern with normal closing entries, Introduction to manufacturing account of partnership firms, limited company.

Financial Management: Meaning, role and scope of financial Management. Basic Financial Concepts: Time value of Money, present value, future value of a series of cash flows, annuity, Practical applications of compounding and present value techniques. Long-term source of finance: Introduction to shares, debenture, preference shares.

Capital Budgeting: Meaning, importance, difficulties, Introduction to evaluation techniques - Traditional techniques (ARR Payback method). Discounting cash flow techniques (Present value, NPV, IRR) Ratio Analysis: Meaning, advantages, limitations of ratio analysis, Types of ratios and their usefulness.

Costing: Nature, importance and Types of cost Marginal costing: Nature, scope and importance of marginal costing. Break-even analysis, its uses and limitations, construction of break-even charts. Practical applications of marginal costing. Inventory Control System: The need cost of inventory, methods of inventory costing

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.

References:

1. S.N. Maheswari & S.K. Maheshwari, "Introduction of Financial Accountancy" Vikas Publication.
2. S.N. Maheshwari & S.K. Maheshwari, "Advanced Accountancy" Vikas Pub.
3. S.N. Maheshwari & S.K. Maheshwari "Financial Management, Vikas Pub.
4. Jawahar Lal "Financial Accounting" Wheeler publishing
5. Khan & Jain "Management Accounting" Tata McGraw Hill publication
6. K.S. Sastry & Nand Dhamesa, "The practices of Mgmt. Accounting, Wheeler Publications.
7. I.M. Pandey "Financial Management" Vikas Publication.
8. J.Khan & Jain "Financial management" Tata McGraw Hill Publication
9. Geoffrey Knott "Financial Management" Palgrave Macmillan. //

MS201 : Data Structures Using 'C'

Introduction: Basic Terminology, Elementary Data Organization, Data Structure operations, Algorithm Complexity and Time-Space trade-off. Arrays: Array Definition, Representation and Analysis, Single and Multidimensional Arrays, address calculation, application of arrays, Character String in C, Character string operation, Array as Parameters, Ordered list, Sparse Matrices, and Vector. Stacks: Array Representation and Implementation of stack, Operations and Stacks: Push and POP, Array Representation of Stack, Linked Representation of stack, Operations

Associated with Stacks, Application of stack, Conversion of Infix to Prefix and Postfix Expressions, Evaluation of postfix expression using stack, Recursion: Recursive definition and processes, recursion in C, example of recursion, Tower of Hanoi Problem, simulating recursion Backtracking, recursive algorithms, principles of recursion, tail recursion, removal of recursion.

Queues: Array and linked representation and implementation of queues, Operations on Queue: Create, Add, Delete, Full and Empty, Circular queue, Dequeue, and Priority Queue Link List: Representation and implementation of Singly linked lists, Two-way Header List, Traversing and Searching of Linked List, Overflow and Underflow, Insertion and deletion to from Linked Lists, Insertion and deletion Algorithms, Doubly linked list, Linked List of Array, Polynomial representation and addition, Generalized linked list, Garbage Collection and Compaction.

Trees: Basic terminology, Binary Tree, Binary tree representation algebraic Expressions, Complete Binary Tree, Extended Binary Tree, Array and Linked Representation of Binary trees, Traversing Binary trees, Threaded Binary trees, Traversing Threaded Binary tree, Huffman algorithm, Searching and Hashing: Sequential search, comparison and analysis, Hash Table, Hash Function, Collection Resolution Strategies, Hash Table Implementation.

Sorting: Insertion Sort, Bubble sorting, Quick Sort, Two way Merge Sort, Heap Sort, Binary Search Trees: Binary Search (BST), Insertion and Deletion in BST, Complexity of search Algorithm, Path Length, AVL Tree, B-trees.

File Structures: Physical Storage Media File Organization, Organization of records into Blocks, Sequential Files, Indexing and Hashing, Primary indices, Secondary indices, B+ Tree index Files B Tree index Files, Indexing and Hashing Comparisons.

References:

1. Horowitz and Sahani, "Fundamentals of data Structures" Galgotia
2. R. Kruse et al, "Data Structures and Program Design in C" Person Education
3. A.M. Tenenbaum et al, "Data Structures and Program Design in C" Person Education
4. Lipschutz, "Data Structure", TMH
5. K Loudon, "Mastering Algorithms With C", Shroff Publishers and Distributors
6. Bruno R Preiss, "Data Structure and Algorithms with Object Oriented

Design Pattern in C++, John Wiley & Sons, Inc.

7. Adam Frozdek, "Data Structures and Algorithms in C++" Thomson Asia
8. Pal G. Sorenson, "An Introduction to Data Structures with Application", TMH

MS202 : Relational Database Management Systems

Introduction: An overview of database management system, Database System Vs File System, Database system concepts and architecture, data models schema and instances, data independence and data base language and interfaces, Data definitions language, DDL, Overall Database structure, Data modeling using the Entity Relationship Model: ER model concepts, notation for ER diagram, mapping constraints, keys, Concepts of Super Key, candidate key, primary key, Generalization, aggregation, reduction of an ER diagrams to tables, extended ER model, relationships of higher degree.

Relational Data Model and Language: Relational data model concepts, integrity constraints: entity integrity, referential integrity, Keys constraints, Domain constraints, relational algebra, relational calculus, tuple and domain calculus.

Introduction to SQL: Characteristics of SQL, Advantages of SQL, SQL data types and literals, Types of SQL commands, SQL operators and their procedure, Tables, views and indexes Queries and sub queries, Aggregate functions, Insert, update and delete operations, Joins, Unions, Intersection, Minus, Cursors in SQL, PL/SQL, Triggers and clusters.

Database Design & Normalization: Functional dependencies, normal forms, first, second third normal forms, BCNF, inclusion dependencies, loss less join decompositions, normalization using FD, MVD, and JDs, alternative approaches to database design

Transaction Processing Concepts: Transaction system, Testing of serializability, Serializability of schedules, conflict and view serializable schedule, recoverability, Recovery from transaction failures, deadlock handling.

Concurrency Control Techniques: Concurrency control, locking Techniques for concurrency control.

References:

1. Date C.J. "An Introduction to Database System". Addison Wesley
2. Korth, Silbertz, Sudarshan, "Database Concepts" McGraw Hill
3. Elmasri, Navathe, "Fundamentals of Database Systems" Addison Wesley

4. Paul Beynon Davis, "Database Systems" Palgrave Macmillan
5. Bipin C. Desai, "An Introduction to Database Systems", Galgotia Pub.

MS203 : Operating System

Introduction: Definition and Types of operating systems, Batch Systems, multi programming, time-sharing parallel, distributed and real-time systems, Operating system structure, Operating system components and services, System calls, system programs, Virtual machines.

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

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

Storage Management: Memory Management-Logical and Physical Address Space Swapping, Contiguous Allocation, Paging Segmentation with paging in MULTICS and Intel 386, Virtual Memory, Demand paging and its performance, Page replacement algorithms, Allocation of frames, Thrashing, Page size and other considerations, Demand segmentation, File systems, secondary storage structure, File concept, access methods, directory implementation, Efficiency and performance, recovery, Disk structure, Disk scheduling methods, Disk management, Recovery, Disk structure, disk scheduling methods, Disk management, Swap-Space management, Disk reliability.

Security & Case Study: Protection and Security-Goals of protection, Domain of protection, Access matrix, Implementation of access Matrix, Revocation of Access Rights, Language based protection, The security problem, Authentication, One time passwords, Program threats, System threats, Threat Monitoring, Encryption.

References:

1. Abraham Silberschatz & Peter Baer Galving "Operating System Concepts"
2. Milan Milankovic, "Operating Systems, Concept & Design" McGraw Hill
3. Harvey M Deitel "Operating System" Addison Wesley
4. R. C. Joshi "Operating System"

MS204 : Software Engineering and Project Management

Introduction: Introduction to software engineering, Importance of software, evolving role of software, Software Characteristics, Software Components, Software Applications, Software Crisis, Software engineering problems, Software Development Life Cycle, Software Process.

Software Requirement Specification: Analysis, Principles, Water Fall Model, The Incremental Model, Prototyping, Spiral Model, Role of management in software development, Role of matrices and Measurement, Problem Analysis, Requirement specification, Monitoring and Control.

Software Design: Design principles, problem partitioning, abstraction, top down and bottom up-design, Structured approach functional versus object oriented approach, design specifications and verification, Monitoring and control, Cohesiveness, coupling, Forth generation techniques, Functional Independence, Software Architecture, Transaction and Transaction and Transform Mapping, Component level Design, Forth Generation Techniques.

Coding: Top-Down and Bottom-Up programming, structured programming, information hiding, programming style and internal documentation.

Testing principles, Levels of testing, functional testing, structural testing, test plane, test case specification, reliability assessment, software testing strategies, Verification and validation, Unit testing, Integration Testing, Alpha & Beta testing, system testing and debugging.

Software Project Management: The Management spectrum (The people, the product, the process, the project) Cost estimation, project scheduling, staffing, software configuration management, Structured Vs. Unstructured maintenance, quality assurance, project monitoring, risk management.

Software Reliability & Quality Assurance Reliability issues, Reliability metrics, Reliability growth modeling, Software quality, ISO 9000 Certification for software industry, SEI capability maturity model, comparison between ISO & SEI CMM. CASE (Computer Aided Software Engineering): CASE and its scope, CASE support in software life cycle, documentation, project management, internal interface, Reverse Software Engineering, Architecture of CASE environment.

References:

1. Pressman, Roger S., "Software Engineering: A Practitioner's Approach Ed. Boston: McGraw Hill, 2001
2. Jalote, Pankaj, "Software Engineering Ed.2" New Delhi: Narosa 2002
3. Schaum's Series, "Software Engineering" TMH

4. Ghezzi Carlo and Others "Fundamentals of Software Engineering" PHI
5. Alexis Leon and Mathews Leon, "Fundamental of Software Engg."
6. Sommerville Ian, "Software Engineering" AWL
7. Fagan, "Software Engineering" New Delhi" TMH
8. Pfeifferger, S. "Software Engineering" Macmillan. 1987

MS205: Object Oriented Analysis and Designing

Object modeling: Objects and classes. Links and associations. Generalization and inheritance. Grouping constructs. Aggregation. Generalization as extension and restriction. Multiple inheritance. Meta data, candidate keys. **Dynamic modeling:** Events and states Nesting. Concurrency. **Functional modeling:** Data flow diagrams. Specifying operations.

Analysis: Object modeling, Dynamic modeling, functional modeling. Adding operations. Iteration.

System design: Subsystems. Concurrency. Allocation to processors and tasks. Management of data stores. Control implementation. Boundary condition. Architectural frameworks. **Object design:** Optimization, implementation to control. Adjustment of inheritance. Design of associations. Documentation. Comparison of methodologies.

Implementation: Using a programming language, a database system. Programming styles. Reusability, extensibility, robustness, programming-in-large, case study.

References:

1. Booch, G. : Object Oriented Analysis and Design. 2nd Edition.
2. Rebecca Wirfs-Brock, et. al : "Designing Object Oriented Software", PHI.
3. Rumbaugh, J. Object Oriented Modeling and Design , Prentice Hall of India.
4. P.M. Chilean: Programming in C++ Merril Pub. 1990.
5. E.R. Tello : Object Oriented Programming of A.I. Addison Wesley Pub. Co.

MS301 : Introduction to Web Technology

Introduction: History of web, growth of web, the past decade, protocols governing the web, web applications, development of the web in India, creating web sites for individuals and corporate world, Introduction to cyber law of India, international cyber laws.

Web development Strategies: Web projects, writing web project, identification of objects, target users, web team, assessment of web team, team dynamics, planning and process development, early planning, contents, technical and production planning, communication issues.

Communication with clients, communication breakdowns, development of multi-department & large scale sites, quality assurance & testing, study of technological advances and impact of web teams.

Design strategies for E-commerce site development: Basic foundation in e-commerce system, creating forms, managing database through web.

Java Programming: Introduction, Operator, Data types, Variables, Methods and Classes, Multi threaded programming, I/O Java applet.

Java Library: String handling, I/O exploring JAVA, Networking, Applet Classes, Event Handling, Introduction to AWT, Working with windows, Graphics, AWT Controls, Layout manager and menu, Images, Additional Packages.

Software Development Using Java: Java Bean, Java Swing, Java Servlets, Migrating from C++ to Java, Application of JAVA, Dynamic Billboard Applet.

Image Menu: An image based menu, Lavatron Applets, Scrabblets JDBC, Brief functioning of Upper Layer E-mail and their applications.

References:

1. Sharma & Sharma, "Developing E-commerce sites", Addison Wesley
2. Burdman, "Collaborative Web Development" Addison Wesley
3. Margarel Leving Young, "The complete Reference Internet" TMH
4. Naughton, Schidt, "The Complete Reference JAVA2", TMH
5. Balagurusamy E, "Programming in JAVA, TMH
6. Dustin R. Calway, "Inside Serviets" Addison Wesley
7. Mark Wutica, "Java Enterprise Edition" QUE
8. Steven Hoizner, "Java2 Black book" Dreamtech

MS302 : Data communication and Networks

Introduction to Computer Networking: Use, advantage, structure of the communications network topologies the telephone network, analog to digital communication.

Communication Between Analog Computers & Terminals Layered Protocols, Network & The OSI Models, Traffic control and accountability wide area

and local area networks, connection oriented and connectionless networks, classification of communication protocols polling/selection systems, non-priority system, priority system, rotation for layered protocols foals of layered protocols, network design problems, communication between layers. A parameter illustration, introduction to standards organizations and the ISO standards.

Polling Selection Satellite and Local area Networks: Binary synchronous control system, BSC system, conversion using satellite communication SPUS, and the Tele port primary attribute of a LAN, IEEE LAN standards, LAN topology and protocols.

Switching and routing in Network: Telephone switching system, message switching, packet switching, packet switching support to circuit switching networks.

The X.25 & Digital Networks: Layers of x.25, features of x.25 flow control principles, other packet type, x.25 logical channel states time out and time limits, packet formats, flow control and windows x.25 facilities, other standards layer the pad, communication networks communication between layers, advantage of digital networks, Digital's switching, voice transmission by packet.

Personal Computer Network: Personal computer communications, characteristics, using the personal computers as server linking the personal computer to mainframe computers, semaphores of vendor offerings, File transfer on personal computers, personal computer and local area networks, Personal computer networks and the OSI models.

TCP/IP: TCP/IP and Internetworking, example of TCP/IP operations, related protocols ports and sockets. The IP address structure, major features of IP, IP datagram, Major IP services, IP source routing, value of the transport layer, TCP, Major features of TCP, passive and active operation, the transmission control block (TCB), route discovery protocols, examples of route discovery protocols, application layer protocols.

References:

1. Tanenbaum, A.S. : Computer Network, PHI - 1995.
2. Mattern J.: Computer Network and Distributed processing, 1985.
3. Black : Computer Network; Protocols, Standards and Interface PHI - 1995.
4. Black : Data Network; Concepts, Theory and Practices, PHI
5. Starlings, William : Local Networks; and Introduction Mack Publishing Co.

6. Comer: Internetworking : Principles, Protocols Architecture, PHI with TCP/IP
7. Crichlow : Introduction to Distributed and Parallel Comp.
8. Ahuja : Design and Analysis of Computer Communication Network, McGraw Hill Co.
9. Chorafas: Designing and Implementing Networks, McGraw Hill Co.

MS303 : Analysis & Design of Algorithm

Introduction: Algorithms, Analysis of Algorithms, Design of Algorithms, and Complexity of Algorithms, Asymptotic Notations, Growth of function, Recurrences. Sorting in polynomial Time: Insertion sort, Merge sort, Heap sort, and Quick sort. Sorting in Linear Time: Counting sort, Radix Sort, Bucket Sort Medians and order statistics.

Elementary Data Structure: Stacks, Queues, Linked list, Binary Search Tree, Hash Table.

Advanced Data Structure: Red Black Trees, Splay Trees, Augmenting Data Structure Binomial Heap, B-Tree, Fibonacci Heap, and Data structure for Disjoint Sets, Union-find Algorithm, Dictionaries and priority Queues, mergeable heaps, concatenable queues.

Advanced Design and Analysis Techniques: Dynamic Programming, Greedy Algorithm, Backtracking, Branch-and-Bound, Amortized Analysis.

Graph Algorithms: Elementary Graph Algorithms, Breadth First search, Depth First search, Minimum Spanning Tree, Kruskal's Algorithms, Prim's Algorithms, Single Source Shortest Path, All pair Shortest Path, Maximum flow and Traveling Salesman Problem.

Randomized Algorithms, String Matching, NP-Hard and NP-Completeness Approximation Algorithms, Sorting Network, Matrix Operations, Polynomials & the FFT, Number Theoretic Algorithms.

References:

1. Horowitz Sahani, "Fundamentals of Computer Algorithms." Galgotia
2. Cormen Leiserson et al, "Introduction to Algorithms", PHI
3. Brassard Bratley, "Fundamental of Algorithms" PHI
4. M.T. Goodrich et al, "Algorithms Design" John Wiley
5. A.V. Aho et al, "The Design and analysis of Algorithms" Person Education
6. Algorithms & Data Structure: Baldwin Scragg, Wiley dreamtech

MS304 : Visual Basic With .NET Technology

Introduction to Visual Basic .NET: Writing Window Applications with Visual Basic, Windows Graphical User Interface, Programming Languages - Procedural, Event Driven, and Object Oriented, The Object Model, Microsoft's Visual Studio .NET, Writing Visual Basic Projects, Three-Step Process, Visual Basic Application Files.

Visual Studio Environment: IDE Start Page, New Project Dialog, IDE Main Window, Toolbars, Document Window, Form Designer, Solution Explorer Window, Properties Window, Toolbox, Design Time, Run Time, and Break Time.

Writing Visual Basic Project: Workspace Setup, Plan the Project, Define the User Interface, Set Properties, Coding, Testing, Maintenance, Printing.

Finding and Fixing Errors: Syntax Errors, Run-Time Errors, Logic Errors, Project Debugging, Naming Rules and Conventions for Objects.

VARIABLES, CONSTANTS AND CALCULATIONS: Data: Variables and Constants, Formatting Data, Handling Exceptions, Displaying Messages in Message Boxes, Counting and Accumulating Sums, Decisions and Conditions, Menus, Sub Procedures, and functions, Lists, Loops, and Printing, Graphics, Animation, and additional topics in Visual Basic.

MS305 (i) : Advance RDBMS

Data Processing Systems, Transaction Processing and Concepts: Transaction system, Testing of serializability, Serializability of schedules, conflict and view serializable schedule, recoverability, Recovery from transaction failures, deadlock handling.

File processing system, File Management system, Components of RDBMS, Database Architecture.

Object Oriented Databases, Distributed Databases, Client/server database, Data Dictionary, Database models, Normalization, The Database Administration, Database Manager responsibilities.

Monitoring Database performance, Database Machine overview.

Designing RDBMS for organization, Object modeling, Perspectives of Data Modelling.

Evolving the logical model, Transformation from Logical to Physical model.

Concurrency Control Techniques: Concurrency control, locking Techniques for concurrency control, CODD's 12 rules for a fully relational DBMS

Data Integrity, Redundancy, Primary and Foreign keys.

Object database management, Database design and choosing the database server.

SQL and MySQL, Database access and ODBC.

Middleware: Kinds of middleware, Sockets-talking to database, virtual database engine defined, web based middleware, Microsoft JET engine.

Database security and Recovery, Data Mining and Warehouse.

References:

1. Adv. DBMS by V.K. Jain, Cyber Tech Publication, 5A/13 Ansari Road Daryaganj, N. Delhi - 110002
2. Date C.J. "An Introduction to Database System". Addison Wesley
3. Korth, Silbertz, Sudarshan, "Database Concepts" McGraw Hill
4. Elmasri, Navathe, "Fundamentals of Database Systems" Addison Wesley
5. Paul Beynon Davis, "Database Systems" Palgrave Macmillan
6. Biplin C. Desai, "An introduction to Database Systems", Galgotia Pub.

MS305 (ii) : E-Governance

Introduction: E-Governance - Technology and Prospects, Definition of E-Governance, Economic potential of E-Governance, Incentives for engaging in E-Governance, forces behind E-Governance, Advantages and Disadvantages, Architectural framework, Impact of E-Governance.

Network Infrastructure of E-Governance: Internet based E-Governance Issues, problems and prospects, Network Infrastructure, Network Access Equipments, Broadband telecommunication (ATM, ISDN, FRAME RELAY).

Mobile Commerce: Introduction, Wireless Application Protocol, WAP Technology, Mobile Information device, Mobile Computing Applications.

Web Security: Security Issues on web, Importance of Firewall, components of Firewall, Transaction security, Emerging client server, Security Threats, Network Security, Factors to consider in Firewall design, Limitation of Firewalls.

Encryption: Encryption techniques, Symmetric Encryption-Keys and data encryption standard, Triple encryption, Asymmetric encryption-Secret key encryption, public and private pair key encryption, Digital Signature, Virtual Private Network.

Electronic Payments: Overview, The SET protocol, payment Gateway, certificate, digital Tokens, Smart card, credit card, magnetic strip card, E-

Checks, Credit/Debit card based EPS, online Banking, EDI Application in business, E-Commerce Law, Forms of Agreement, Govt. policies and Agenda.

References:

1. Ravt Kalakota, Andrew Winston, "Frontiers of Electronic Commerce" Addison Wesley.
2. Bajaj and Nag, "E-Commerce the cutting edge of Business", TMH.
3. P. Lashin, John Vacca, "Electronic Commerce" Firewall Media, N. Delhi.
4. E Business & Commerce: Brahm Cazner, Wiley dreamtech.

MS305 (iii): Fuzzy Logic & Neural Network

Statistical concepts and Reasoning theories. Probability and Bayes' Theorem. Certainty factors and Rule-Based systems. Bayesian networks.

Working of Human Mind. Discourse and Pragmatic processing. Semantic Nets and Frames. Fundamentals of Neural networks and Building techniques. Discovery and Analogy. Neural net learning and Genetic learning. Formal learning theory.

A.I. techniques, pattern recognition, Level of, speech recognition representation in A.I. properties of internal representation. Introduction to Predicate Calculus: Predicates and Arguments, connectives, Simplifications of strategies, extracting answers from Resolution Refutation. Control strategies.

Dempster-Shafer Theory. Parallelism in Reasoning system. Distributed reasoning systems. Default reasoning, default logic. Logics for non monotonic reasoning. Symbolic techniques for representing and using uncertain knowledge. Definition, Concept, and framework of Fuzzy Logic. Fundamental changes to the idea about Set membership and corresponding changes to the definition of Logic Operations. Defining fuzzy sets, used in representing a list of Propositions.

Commonsense ontologies. Memory organization. Case based reasoning. Perception. Robot Architectures. Graphical representation of networks. Matching. Forward and backward production system. Using deduction systems to generate Robot Plans. Heuristic graph search process.

Real Life Applications of Fuzzy Logic and Neural Networks.

References:

1. Principles of Artificial Intelligence. By Nils J. Nilsson, Narosa Publishing House, N. Delhi.

2. Artificial Intelligence Elaine Rich, Tata MC Graw, N.Delhi.
3. 3.Principal of Artificial Intelligence, Nelson Springer-Verlag.
4. P. Hajek, Metamathematics of Fuzzy Logic, Kluwer Academic Publishers.
5. Harris, J., An Introduction to Fuzzy Logic Applications, Kluwer Academic Publishers, Dordrecht, 2000, ISBN 0-7923-6325-6
6. Investment in Mutual Funds using Fuzzy Logic By Kurt E. Peray, Foreword by Chemical Publishing Co., Inc., New York.

MS305 (iv) : Artificial Intelligence

Introduction: Definition and meaning of artificial intelligence, A.I. techniques, pattern recognition, Level of, speech recognition representation in A.I. properties of internal representation.

Production System: Different types of tracing, strategies, graph search strategies, Heuristic graph, search procedure, AND/OR graph, relationship between decompositional and compatible systems, searching Gate Tree, min-max search game playing, actual game playing.

Introduction to Predicate Calculus: Predicates and Arguments, connectives, Simplifications of strategies, extracting answers from Resolution Refutation, Control strategies.

Rule Based Deduction Systems: Forward and backward deduction system, resolving with AND/OR graph, computation, deduction and program synthesis, central knowledge for rules based deduct systems.

Managing Plans of Action: Plan interpreter, planning decisions, execution monitoring and re-planning domain of application robot motion planning and game playing.

Structural Object Representation: Semantic networks semantic market matching deductive operations on structured objects.

Architectural for A.I. Systems: Knowledge, acquisitions representation IMAGES PROCESSING, Natural language processing.

References:

1. Introduction to artificial Intelligence Eugene Charnik Drew MC mott
2. Artificial Intelligence Elaine Rice
3. Principal of Artificial Intelligence, Nelson, Springer-Verlag.
4. Artificial Intelligence Application Programming: Tim Jones, Wiley dreamtech

MS305 (v): Distributed and Parallel Computing

Parallel and high-performance computers. Models and parallel computers. Basic communication operations. Performance and scalability. MPT and open MP programming.

Distributed processing potential. Forms of Distributed processing strategies. Hexagon Distributed computing, client server model.

References:

1. Kumar, Grama, Gupta and Karypis : Introduction to Parallel Computing, Benjamin Benjamin Cummings Publishing Co.
2. Tanenbaum, A.S. : Computer Networks, prentice-Hall.
3. Martin, J : Design and Strategy for Distributed Data Processing, Prentice Hall.
4. Martin, J. : Computer Networks and Distributed Processing, Prentice-Hall.
5. Stallings, William : Local Networks: An Introduction Macmillan publishing Co.