

UTTARAKHAND TECHNICAL UNIVERSITY

SYLLABUS FOR MSc(IT)

FIRST SEMESTER (Theory Papers)		
Subject Code	Subject Name	Max. Marks
MS 101	Computer Fundamentals & Programming in 'C'	70
MS 102	Mathematical Foundation of Computers Science	70
MS 103	Digital Electronics & Computer System Architecture	70
MS 104	Structured System Analysis and Design	70
MS 105	Accounting and Financial Management	70
FIRST SEMESTER (Practical Papers)		
MSP11	Practical on Computer Programming & Problem Solving in 'C'	100
MSP12	PC Packages(Introduction to DOS & MS-office)	100
	Internal Assessment	150 (30 X 5 = 150)
	Total marks of First Semester	600
SECOND SEMESTER (Theory Papers)		
Subject Code	Subject Name	Max. Marks
MS 201	Data Structure	70
MS 202	Computer Organization	70
MS 203	Operating System	70
MS 204	Software Engineering	70
MS 205	Object Oriented Programming using JAVA	70
SECOND SEMESTER (Practical Papers)		
MSP21	Practical on Data Structures	100
MSP22	Practical on JAVA Programming	100
	Internal Assessment	150 (30 X 5 = 150)
	Total marks of Second Semester	600
THIRD SEMESTER (Theory Papers)		
Subject Code	Subject Name	Max. Marks
MS 301	Computer Algorithms	70
MS 302	Computer Network	70
MS 303	Relational Database Management System	70
MS 304	Computer Graphics & Animation	70
MS 305	Elective	70
THIRD SEMESTER (Practical Papers)		
MSP31	Practical on RDBMS with Oracle	100
MSP32	Practical on Computer Graphics & Animation	100
	Internal Assessment	150 (30 X 5 = 150)
	Total marks of Third Semester	600
FOURTH SEMESTER (Theory Papers)		
Subject Code	Subject Name	Max. Marks
MS 401	Colloquium	100
MS402	Project Work	400
FOURTH SEMESTER (Practical Papers)		
	Internal Assessment	100
	Total marks of Fourth Semester	600

List of Elective Subjects

S.No.	Name of Subject
1	Distributed Databases
2	Data Compression
3	Data Mining & Data Warehousing
4	Parallel Algorithms
5	Linux & Web Server Administration

MS101: Computer Fundamental & Programming in 'C'

UNIT-1

Introduction to Computers: Computer Hardware Components, Disk Storage, memory, keyboard, mouse, printer, monitor, CD etc and their function, comparison based analysis of various hardware components. Basic operating system concepts: MS DOS, WINDOWS, functional knowledge of these operating system. Introduction to Basic commands of DOS, Managing file and directories in various operating system, Introduction to internet, Basic terms related with Internet, TCP/IP.

UNIT-2

Programming in C :History, Introduction to C Programming Languages, structure of C programs, compilation and execution C program, debugging techniques, data types and Sizes, declaration of variables, Modifiers, identifiers and keywords, Symbolic constants, storage classes (automatic, external, register and statics) Enumerations, command line parameters, Macros, The C preprocessor

UNIT-3

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.

UNIT-4

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

Arrays : Linear arrays, multi dimensional arrays, Passing arrays to functions, Arrays and strings.

UNIT-5

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.

MS102: Mathematical Foundation of Computer Science

UNIT-1

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

UNIT-2

Function: Types Composition of function, Recursively defined function.

UNIT-3

Mathematical Induction: Piano's Axioms, Mathematical Induction, Discrete Numeric Functions and Generating functions, simple Recurrence relation with constant coefficients, linear recurrence relation with constant coefficients, Asymtotic Behavior of functions.

UNIT-4

Algebraic Structure: Properties , semi group, monoid, group, ablian group, properties of group, Subgroup, Cyclic group, cosets, permutation groups, Homorphism, Isomorphsim and Automorphism of groups.

UNIT-5

Propositional Logic: Preposition ,first order logic, basic logical operation, tautologies, contradiction, algebra of proposition, logical implication logical equivalence, normal forms, interface 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, Bound lattices ,Distributive lattices and complemented lattices.

MS103: Digital Electronic & computer system architecture

UNIT-1

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,

UNIT-2

Half adder, full adder, subtractor, decoder, encoders, multiplexer, demultiplexer, carry look ahead adder, combinational logic design, flip-flops, registers, counters (synchronous & asynchronous), ALU, micro-operation, ALU-chip, faster algorithm and implementation (multiplication & division).

UNIT-3

Basic organization: operational flow chart (fetch, execute, instruction cycle), organization of central Processing units, hardware & micro programmed control unit, single origination, general Registers organization, Stack Organization, addressing mode, Instruction formats, data transfer & Manipulation I/O Organization, Bus architecture, Programming Registers.

UNIT-4

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.....

UNIT-5

I/O Organization : peripheral device, 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,

MS104: Structured System Analysis and Design

UNIT-1

System Concept and Information System Environment: The System Concept, Definition, Characterizes of System ,Element of a system ,Open and closed system ,Formal and informal system Computer based information system , 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 and maintenance.

The Role of the system Analyst: Historical Perspective, Academic& Personal qualification, the multifaceted role of the analyst, The analyst/user interface, Behavioral issues.

UNIT-2

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

UNIT-3

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.

UNIT-4

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.

UNIT-5

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

MS105: Accounting and Financial Management

UNIT-1

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.

UNIT-2

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 application of compounding and present value techniques. Long-term source of finance: Introduction to shares, debenture, preference shares.

UNIT-3

Capital Budgeting: Meaning Importance, Difficulties, Introduction to Evolution techniques:- Traditional techniques (ARR Payback method) . Discounting cash flow techniques (Present value, NPV, IRR) Ratio analysis: Meaning, Advantages, and Limitations of ratio analysis, Types of ratios and their usefulness.

UNIT-4

Costing : Nature ,importance and types of cost Marginal costing :Nature ,scope and importance of marginal costing ,Break – even analysis , its uses and limitations ,constructions of break –even charts, Practical applications of marginal costing .Inventory control system :The need cost of inventory, method of inventory costing.

UNIT-5

Introduction to computerized Accounting System: Coding logic and codes required, master files, transactions files , introduction to documents used for data collection .Processing of different files and outputs obtained

MS201: Data Structures

UNIT-1

Introduction to Data Structure : Concept of data structure , abstract data structure, time & space analysis of algorithms. Memory representation of Array Stacks and Queues : Introduction to stack & operation on stack, Multiple Stack, Stacks application: Infix, postfix, Prefix and Recursion, Introduction to queues & Operations on the Queues, , Circular queue, Dequeue, Priority queue.

UNIT-2

Linked list : Introduction to the Linked List as Stacks & Queues, Header nodes, Doubly Linked List, Circular Linked List, Operation on Linked list like Insertion, Deletion, Traversing, Merging, Copying, Comparing, Reversing, Inverting, Concatenating, etc., Application of Linked List.

UNIT-3

Trees : Basic Terminology of trees, Binary Trees, Tree Representations as Array & Linked List, Binary tree representation, Traversal of binary trees: In order, Preorder & postorder, Application of Binary trees, Threaded binary tree, B-tree & Height balanced tree, representation of B+ & B* trees, Conversion of General Tree to Binary tree, Counting binary trees, 2-3 Trees.

UNIT-4

Searching & Sorting : Sequential searching, Binary search, Sorting : External & Internal, Insertion sort, Selection sort, Quick sort, Bubble sort, Heap sort, Merge Sort, Radix sort, Comparison of sorting methods, Algorithms of sorting and searching in Linked List and Arrays.

UNIT-5

Tables & Graphs : Hash table, Collision resolution Techniques, Introduction to graphs: Terminology, Directed, Undirected & Weighted graph, Representation of graphs, Graph Traversals – Depth first & Breadth first search, Spanning Trees, Minimum Spanning Trees, The basic Greedy Strategy for computing Algorithm of Kruskal 20025 and Prim, Application of Graphs: Shortest path and Longest Path Problems, Topological sorting of nodes of an acyclic graph.

TEXTS & REFERENCE BOOKS:

- □ **FUNDAMENTALS OF DATA STRUCTURE** : BY S. SAWHNEY & E. HOROWITCH
- □ **DATA STRUCTURE** : BY TREMBLAY & SORRENSON
- □ **DATA STRUCTURE USING PASCAL**: BY TANNENBAUM & AUGENSTEIN
- □ **DATA STRUCTURE** : BY LIPSCHUISTS (SCHAUM'S OUTLINE SERIES, MCGRAW HILL PUBLICATION)

MS202: Computer Organization

UNIT-1

Introduction to Organization and Architecture: System Buses: Computer Components, Computer Function, Interconnection Structures, Bus Interconnection, PCI, Input/Output : External Devices, I/O Modules, Programmed I/O, Interrupt-Driven I/O, Direct Memory Access, I/O Channels and Processors, The External Interface

UNIT-2

Internal Memory: Computer Memory System Overview, Semiconductor Main Memory, Cache Memory, Advanced DRAM Organization, External Memory - Magnetic Disk, RAID, Optical Memory, Magnetic Tape Computer Arithmetic - The Arithmetic and Logic Unit (ALU), Integer Representation, Integer Arithmetic, Floating – Point Representation, Floating-Point Arithmetic.

UNIT-3

Instruction Sets: Characteristics and Functions, Machine Instruction Characteristics, Types of Operands, Types of Operations, Assembly Language, Instruction Sets : Addressing Modes and Formats, Addressing, Instruction Formats

UNIT-4

CPU Structure and function: Processor Organization, Register Organization, The Instruction Cycle, Instruction Pipelining, The Pentium Processor, The PowerPC Processor

UNIT-5

Reduced Instruction set Computers (RISCs) :Instruction Execution Characteristics, Reduced Instruction Set Architecture, Control Unit Operation - Micro - operations, Control of the CPU, Hardwired Implementation

TEXTS & REFERENCE BOOKS :

□ □ **COMPUTER ORGANIZATION AND ARCHITECTURE BY WILLIAM STALLINGS, TMH PUBLICATION**

□ □ **COMPUTER SYSTEM ARCHITECTURE: BY M. MORRIS MANO,**

□ □ **DIGITAL LOGIC AND COMPUTER DESIGN: BY M. MORRIS MANO**

MS203 Operating System

UNIT-1

Definitions, Components and types of Operating system, Operating System Services, System Calls, System Programs, System Structure, System Design and Implementation, System Generations.

UNIT-2

Process Concepts, Process State & Process Control Block, Process Scheduling, Scheduling, Criteria, Scheduling Algorithms, Multiple- Processor Scheduling Real-Time Scheduling. The Critical Sections Problem

UNIT-3

Semaphores, Classical Problem of Synchronization, Monitors, Atomic Transactions, System Model, Deadlock Characterizations, Method for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock, Combined Approach to Deadlock.

UNIT-4

Storage management Logical Versus Physical Address Space, Swapping, Contiguous Allocating, Paging, Segmentation, Segmentation With Paging, Virtual Memory, Demand Paging, Performance of Demand Paging, Page Replacement, Page Replacement Algorithms, Allocation of Frames

UNIT-5

Thrashing, Demand Segmentation I/o system Overview, I/O Hardware, Application I/O Interface, Kernel I/O Subsystem, Performance, Disk Structure, Disk Scheduling, Disk Management, Swap Space Management, Disk Reliability, Stable Storage Implementation.

TEXT & REFERENCE BOOKS :

□ □ **OPERATING SYSTEM CONCEPTS** BY SILBERSCHATZ & GALVIN,
ADDISON WESLEY PUBLICATION

□ □ **OPERATING SYSTEM CONCEPTS & DESIGN** BY *MILAN MILEN KOVIC*,
TMH PUBLICATION

MS204 Software Engineering

UNIT-1

SOFTWARE : Software Characteristics, Components & Applications, Software Engineering - A Layered Technology, Software Process Models - Linear Sequential Model, Prototype & Rad Model., Evolutionary Software Process Model – Incremental Model and Spiral Model.
SOFTWARE PROJECT MANAGEMENT : Project Management Concepts – People Problem and Process

S/W PROCESS AND PROJECT METRICS : Metrics in The Process and Project Domains. Software Measurement –Size Oriented, Function Oriented Metrics, Extended Function

UNIT - 2

SOFTWARE PROJECT PLANNING: Objectives, Scope, Project Estimation, Decomposition Techniques, Empirical Estimation Models.

ANALYSIS CONCEPT AND PRINCIPLES : Requirement Analysis, Communication Techniques, Analysis Principles, Software Prototyping, Specifications.

ANALYSIS MODELING: Elements of The Analysis Modeling, Data Modeling . Functional Modeling and Information Flow, Behavioral Modeling, Data Dictionary.

UNIT – 3

DESIGN CONCEPTS AND PRINCIPLES: Design Process, Design Concepts, Design Principles, Effective Modular Design .

DESIGN METHODS : Architectural Design Process, Transform Mapping and Transaction Mapping, Interface Design, - Internal and External Design, Human computer Interface Design, Interface Design Guidelines, Procedural Design,

UNIT - 4

S/W Quality Assurance : Quality Concepts, Matrix for Software Quality, Quality Movement, S/W Q A, S/W Review, Formal Technical Reviews, Formal Approaches to Sqa, S/W Reliability, ISO 9000 quality Standards

S/W TESTING MODELS : S/W Testing Fundamentals, Test Case Design, White and Black Box Testing, Basic Path Testing, Control Structure

S/W TESTING STRATEGIES : Strategic Approach To S/W Testing, Unit Testing, Integration Testing, Validation Testing, System Testing, Debugging

UNIT - 5

S/W REUSE : Reuse Process, Building Reuse Components, Classified And Retrieving Components, Economics Of S/W Reuse **COMPUTER AIDED S/W ENGINEERING**: Introducing of Case, Building Block For Case, Taxonomy Of Case Tools, Integrating Case Environment, Integrating Architecture, Case Repository

TEXTS & REFERENCE BOOKS :

□ □ **Software Engineering** By R.S.Pressman

□ □ **An Integrated Approach To Software Engineering** By Pankaj Jalote

MS205 Object Oriented Programming using JAVA

UNIT-1

Importance and features of JAVA, Keywords, Constants, Variables, and Data Types. Operators and Expressions, Decision making, branching and looping: If Else, Switch? Operators, While, Do. While, For Statement, Labeled Loops Statement, Jump statements: Break, Continue, and Return, Arrays and Strings, Creating and Arrays, one and two Dimension Arrays, Strings Arrays, Methods, String and String Buffer Classes, Wrapper Classes

UNIT-2

Classes, Objects and Methods, Defining a class, adding variables and Methods, creating objects constructors, class inheritance, Inheritance, Basics types, using super, multi level hierarchy, abstract and final classes, object class, packages and interfaces, Access protection, Extending interfaces, packages. Exception Handling, Fundamentals exception types, uncaught exceptions, throws, throw, try -catch, final, built in exceptions, creating your own exceptions, Multithreading, Fundamentals, Java Thread model: priorities, synchronization, messaging, thread class, Run able interface, Inter thread communication, suspending, resuming and stopping threads.

UNIT-3

Input/Output, Basics, Streams, Byte and Character stream, predefined streams, reading and writing from console and files. Using standard Java Packages (Lang, util, io), Networking, Basics, networking classes and interfaces, using java.net package, doing TCP/IP and Datagram programming. Applet Programming, Creating and executing Java applets, inserting applets in a web page, Java security.

UNIT-4

AWT Classes, Event Handling and Swing classes, AWT Programming, Working with windows, Graphics and Text, using AWT controls, Layout managers and menus, Handling image, animation, sound and video, Event Handling, Different mechanism, the Delegation Event Model, Event Classes. Event Listener interfaces, Adapter and Inner Classes, Java Swing, Applet, Icons and Labels, Text fields, Buttons, Combo Boxes, Tabbed and Scroll Panes, Trees, Tables.

UNIT-5

JDBC, Setting the JDBC connectivity with a backend database, RMI, Two tier and Multi tier Architecture, Object serialization, RMI Fundamentals, Programming using Java RMI Classes and interfaces, Servlets, Background, Life Cycle, Java Servlet Development kit, Servlet API, Handling HTTP Requests and responding, Using Cookies, Session Tracking and security issues.

TEXTS & REFERENCE BOOKS:

- JAVA THE COMPLETE REFERENCE BY PATRICK NAUGHTON AND HERBERT SCHIEDT.**
- PROGRAMMING WITH JAVA BY E. BALAGURUSWAMY.**
- USING JAVA 1.2 BY JOSEPH WEBER.**

MS301 Computer Algorithms

UNIT-1

BASIC CONCEPTS OF ALGORITHMS

Introduction – Notion of Algorithm – Fundamentals of Algorithmic Solving – Important Problem types – Fundamentals of the Analysis Framework – Asymptotic Notations and Basic Efficiency Classes.

UNIT-2

MATHEMATICAL ASPECTS AND ANALYSIS OF ALGORITHMS

Mathematical Analysis of Non-recursive Algorithm – Mathematical Analysis of Recursive Algorithm – Example: Fibonacci Numbers – Empirical Analysis of Algorithms – Algorithm Visualization.

UNIT-3

ANALYSIS OF SORTING AND SEARCHING ALGORITHMS

Brute Force – Selection Sort and Bubble Sort – Sequential Search and Brute-force string matching – Divide and conquer – Merge sort – Quick Sort – Binary Search – Binary tree-Traversal and Related Properties – Decrease and Conquer – Insertion Sort – Depth first Search and Breadth First Search.

UNIT-4

ALGORITHMIC TECHNIQUES

Transform and conquer – Presorting – Balanced Search trees – AVL Trees – Heaps and Heap sort – Dynamic Programming – Warshall's and Floyd's Algorithm – Optimal Binary Search trees – Greedy Techniques – Prim's Algorithm – Kruskal's Algorithm – Dijkstra's Algorithm – Huffman trees.

UNIT-5

ALGORITHM DESIGN METHODS

Backtracking – n-Queen's Problem – Hamiltonian Circuit problem – Subset-Sum problem – Branch and bound – Assignment problem – Knapsack problem – Traveling salesman problem.

TEXT BOOKS

1. Anany Levitin, "Introduction to the Design and Analysis of Algorithm", Pearson Education Asia, 2003.

REFERENCES

1. T.H. Cormen, C.E. Leiserson, R.L. Rivest and C. Stein, "Introduction to Algorithms", PHI Pvt. Ltd., 2001
2. Sara Baase and Allen Van Gelder, "Computer Algorithms - Introduction to Design and Analysis", Pearson Education Asia, 2003.
3. A.V.Aho, J.E. Hopcroft and J.D.Ullman, "The Design and Analysis Of Computer Algorithms", Pearson Education Asia, 2003.

MS302 Computer Networks

UNIT-1

Analog & Digital signal. Electromagnetic spectrum, Asynchronous & Synchronous Transmission. Ideal channel, Band rate, Base band broad band channel, Multiplexer FDM, TDM, STDM, Carrier, Modulation, AM, FM, PCM, PwM, SWM, Encoding, Schemes, The needs and importance of networking, type of network, server based, peer based, hybrid, layered Architecture, LAN Topology. Network adopted card, logical topology. Modem

UNIT-2

Switching technique, message switching, circuit switching, packet switching, virtual circuit, transmission media, OSI reference model, IEEE standards, 802.3, 802.4, 802.5 ALOHA, SLOTTED ALOHA, CSMA, CSMA/CD Birmap CCITTX.25, CCITT x.11 Token ring, Token bus.

UNIT-3

Fast Ethernet, FDDI Token ring, Wireless LAN, ATM Network, Principles of Internetworking Internetworking devices, Bridge, Routers Gateways, repeater, routing algorithms, distance vector routing, shortest path routing, Broadcast routing, Multicast routing, ICP/IP Prococol, IPV6 addressing, congestion control, Traffic Shapping.

UNIT-4

TELNET, FTP, SMTP, MINE, SNMP, UDP, URL (Uniform Resource Locater) THTTP Source routing Bridge, Transport Bridge, ISDN Channel, ISDN services, base band ISDN, broadband ISDN.

UNIT-5

Different switches, PBX network, network securing application of cryptography to security, Data Encryption Transposition cipher, substitution cipher, PSA Algorithms, EDI layout Architecture, Function of Network operating system. Client OS, Server OS, idea about PSNT.

TEXT & REFERENCE BOOKS:

- COMPUTER NETWORKING** BY *ANDREWS TANANBAUM*
- UNDERSTANDING DATA COMMUNICATION OF NETWORKING** BY *WILLIAM A SHAY*
- COMMUNICATION AND NETWORK** BY *LEWIS MACHENZIE*
- DATA COMMUNICATION** BY *PRAKASH C GPTA*
- DATA AND COMPUTER COMMUNICATION:** BY WILLIAM STALLINGS

MS303 Relational Database Management System

UNIT-1

INTRODUCTION TO DATABASE SYSTEMS : Operational Data, File management Vs Data management, Characteristics of database approach, An Architecture for a Database System, Advantages and Disadvantages of DBMS, Data associations - Entities, Attributes and Associations, Relationship among Entities, Representation of Associations and Relationship, Data Model classification, Entity Relationship model.

RELATIONAL DATA STRUCTURE : A review of set theory, Relations, Domains and Attributes, Tuples, keys, Extensions and Intensions, Relational Algebra and Operations, Retrieval Operations

UNIT-2

RELATIONAL DATABASE DESIGN : Universal Relation, Anomalies in a Database, Normalization Theory, Functional Dependencies. Closure of a set of F.D Covers, Non redundant and minimum cover, Canonical cover, First, Second and Third Normal Forms, Relations with more than one candidate key, Good and bad decompositions, Boyce Codd Normal form, Multivalued dependencies and Fourth Normal Form, Join dependencies and Fifth Normal Form.

UNIT-3

QUERY PROCESSING: Query processing stages, Query interpretation, Equivalence of Expression, Query Execution statistics. Query Execution plan, Query Estimation, Query Evaluation, **THE DISTRIBUTED DATABASES** : Distributed Database concepts, Architecture of Distributed Databases, The design of Distributed Databases, Distributed Query processing, Recovery in Distributed systems, Commit protocols for Distributed Databases, Multi database System

UNIT-4

DDL & DML : Data Definition Language (DDL) - Creating, Altering & Dropping tables, Integrity Constant, Data Manipulation Language (DML) - Select Insert, Update, Delete Commands, Transaction Control using SQL - Commit, Rollback, Save point command, Data Controlling using SQL - Grant, Revoke, Set Role, SQL functions,

UNIT-5

PL/SQL : Introduction to PL/SQL Execution environment, Oracle transaction, Cursor, Parameterized, Implementation of concurrency control in oracle using locks, Stored procedure, Function, Package, Overloading procedure and function, Database triggers.

TEXTS AND REFERENCE BOOKS:

□□ **AN INTRODUCTION TO DATABASE SYSTEM (3RD ED.)** : BY C. J. DATE

□□ **DATABASE SYSTEM CONCEPTS** : BY HENRY F. KORTH

□□ **DATABASE MANAGEMENT SYSTEMS** BY LEON & LEON, VIKAS PUBLICATIONS.

□□ **AN INTRODUCTION TO DATABASE SYSTEM** BY BIPIN C. DESAI

□□ **THE ORACLE COOK BOOK** BY LIEBSCHUTYZ, BPB PUBLICATIONS

□□ **ORACLE A BEGINNERS GUIDE** BY MICHAEL ABBEY & MICHAEL J. COREY, TMH PUBLICATIONS

□□ **ORACLE & CLIENT SERVER** BY BOBROSKI

□□ **SQL PL/SQL THE PROGRAMMING LANGUAGE OF ORACLE** BY IVAN BAYROSS

MS304 Computer Graphics and Animation

UNIT – 1

Introduction and Line Generation: Types of computer graphics, Graphic Displays- Random scan displays, Raster scan displays, Frame buffer and video controller, Points and lines, Line drawing algorithms, Circle generating algorithms, Mid point circle generating algorithm, and parallel version of these algorithms.

UNIT – 2

Transformations: Basic transformation, Matrix representations and homogenous coordinates, Composite transformations, Reflections and shearing. **Windowing and Clipping:** Viewing pipeline, Viewing transformations, 2-D Clipping algorithms- Line clipping algorithms such as Cohen Sutherland line clipping algorithm, Liang Barsky algorithm, Line clipping against non rectangular clip windows; Polygon clipping – Sutherland Hodgeman polygon clipping, Weiler and Atherton polygon clipping, Curve clipping, Text clipping.

UNIT – 3

Three Dimensional: 3-D geometric primitives, 3-D Object representation, 3-D Transformation, 3-D viewing, projections, 3-D Clipping.

UNIT – 4

Curves and Surfaces: Quadric surfaces, Spheres, Ellipsoid, Blobby objects, Introductory concepts of Spline, Bspline and Bezier curves and surfaces. **Hidden Lines and Surfaces:** Back Face Detection algorithm, Depth buffer method, A- buffer method, Scan line method, basic illumination models – Ambient light, Diffuse reflection, Specular reflection and Phong model, Combined approach, Warn model, Intensity Attenuation, Color consideration, Transparency and Shadows.

UNIT – 5

Computer Animations : Conventional and computer assisted animation, design of animation sequences, interpolation, simple animation effects, animation languages (Key Frame System, Parameterized systems), motion specifications, methods of controlling animation.

References:

1. Donald Hearn and M Pauline Baker, “Computer Graphics C Version”, Pearson Education
2. Amrendra N Sinha and Arun D Udai,” Computer Graphics”, TMH
3. Donald Hearn and M Pauline Baker, “ Computer Graphics with OpenGL”, Pearson education
4. Steven Harrington, “Computer Graphics: A Programming Approach”, PHI or TMH
5. James D Foley, A V Dam, S K Feiner and John f Hughes, “Computer Graphics Principles and Practice” Second Edition in C.

MS305-A Distributed Database System

UNIT 1

Introduction: Distributed Data processing, Distributed database system (DDBMSS), Promises of DDBMSSs, Complicating factors and Problem areas in DDBMSSs, Overview Of Relational DBMS Relational Database concepts, Normalization, Integrity rules, Relational Data Languages, Relational DBMS

UNIT 2

Distributed DBMS Architecture: DBMS Standardization, Architectural models for Distributed DBMS, Distributed DBMS Architecture Distributed Database Design: Alternative design Strategies, Distribution design issues, Fragmentation, Allocation. Semantic Data Control: View Management, Data security, Semantic Integrity Control

UNIT 3

Overview Of Query Processing: Query processing problem, Objectives of Query Processing, Complexity of Relational Algebra operations, characterization of Query processors, Layers of Query Processing Introduction To Transaction Management: Definition of Transaction, Properties of transaction, types of transaction

UNIT 4

Distributed Concurrency Control: Serializability theory, Taxonomy of concurrency control mechanisms, locking bases concurrency control algorithms. Parallel Database Systems: Database servers, Parallel architecture, Parallel DBMS techniques, Parallel execution problems, Parallel execution for hierarchical architecture.

UNIT 5

Distributed Object Database Management systems: Fundamental Object concepts and Object models, Object distribution design. Architectural issues, Object management, Distributed object storage, Object query processing. Transaction management. Database Interoperability: Database Integration, Query processing,

Textbooks:

1. Principles of Distributed Database Systems, Second Edition, M.Tamer Ozsü Patrick Valduriez

Reference books:

1.Distributed Databases principles and systems, StefanoCeri,Giuseppe Pelagatti,TatamcGrawHill

MS305-B DATA COMPRESSION

UNIT - 1: Introduction

Compression Techniques: Loss less compression, Lossy Compression, Measures of performance, Modeling and coding, Mathematical Preliminaries for Lossless compression: A brief introduction to information theory, Models: Physical models, Probability models, Markov models, composite source model, Coding: uniquely decodable codes, Prefix codes.

UNIT – 2: Huffman coding

The Huffman coding algorithm: Minimum variance Huffman codes, Adaptive Huffman coding: Update procedure, Encoding procedure, Decoding procedure. Golomb codes, Rice codes, Tunstall codes, Applications of Huffman coding: Loss less image compression, Text compression, Audio Compression.

UNIT-3: Arithmetic Coding

Coding a sequence, Generating a binary code, Comparison of Binary and Huffman coding, Applications: Bi-level image compression-The JBIG standard, JBIG2, Image compression. Dictionary Techniques: Introduction, Static Dictionary: Diagram Coding, Adaptive Dictionary. The LZ77 Approach, The LZ78 Approach, Applications: File Compression-UNIX compress, Image Compression: The Graphics Interchange Format (GIF), Compression over Modems: V.42 bits, Predictive Coding: Prediction with Partial match (ppm): The basic algorithm, The ESCAPE SYMBOL, length of context, The Exclusion Principle, The Burrows-Wheeler Transform: Move-to-front coding, CALIC, JPEG-LS, Multi-resolution Approaches, Facsimile Encoding, Dynamic Markov Compression.

UNIT – 4: Mathematical Preliminaries for Lossy Coding

Distortion criteria, Models, Scalar Quantization: The Quantization problem, Uniform Quantizer, Adaptive Quantization, Non uniform Quantization.

UNIT-5: Vector Quantization

Advantages of Vector Quantization over Scalar Quantization, The Linde-Buzo-Gray Algorithm, Tree structured Vector Quantizers. Structured Vector Quantizers.

Books:

1. Khalid Sayood, Introduction to Data Compression, Morgan Kaufmann Publishers

MS305-C Data Mining and Data Warehousing

UNIT – 1

Data Warehousing Concept and Definition Operational Data, Common Characteristics of Data Warehouse, Knowledge Discovery and Decision Making, Knowledge Discovery and Data Mining, Application of Data Warehouse .

UNIT – 2

Find User Data Access Tools – Data Warehouse Query Tools, Data Modeling Strategy - Star Schema, Multi Fact Table Star Schema, Star With The Original Entry Relationship Model, Dimensional Model, OLAP, Relational OLAP, Multidimensional Database, The Data Cube Presentation of Fact Tables

UNIT – 3

Data Warehouse, Architecture and Optimization – 3 Tier Architecture, Oracle Warehouse, Components of An Oracle Data Warehouse, Classical Data Warehouse, Advantages of Using An Oracle Server, Transportaion of Data Into The Data Warehouse, Data Created in The Data Warehouse, Presentation of Data To End Users, Object Oriented System Architecture Definitions, Object Modeling Techniques,

UNIT – 4

Oracle Feature Suitable for Data Warehousing, Application Planning The Infrastructure – Oracle Server Configuration, Infrastructure Suitable for The Data Warehouse Using Oracle of A Guidelines, Data Warehouse Capacity Planning .

UNIT – 5

Implementing of The Application Design, Necessity of data Warehouse Metadata, Performance optimization, Data administration techniques.

TEXTS & REFERENCE BOOKS :

□ **DATA WAREHOUSING WITH ORACLE** BY SIMA YAZDANI – SHIRLEY S. WONG

MS305-D Parallel Algorithms

UNIT-1 Introduction:

The need for parallel computers, Models of computation, Analyzing parallel algorithms, Expressing parallel algorithms,

UNIT-2

The Computational Power of The PRAM model: Comparison between RAM and PRAM models, Graph coloring on PRAM, Parallel computation, thesis, NC and P-complete classes.

UNIT-3

Selection: Sequential algorithms, Desirable properties for parallel algorithms, An EREW algorithm for parallel selection

Merging: A network for merging, Merging on the CREW model, Merging on the EREW model, A better algorithm for the EREW model

UNIT-4

Parallel Algorithms for Neural Networks

Sorting: A network for sorting, Sorting on a linear array, Sorting on the CRCW model, Sorting on the CREW model, Sorting on the EREW model

Searching: Searching a sorted sequence (EREW, CREW, CRCW), Searching a random sequence (EREW, CREW, CRCW, Tree, Mesh)

UNIT-5

Fourier Transforms: DFT and convolution theorem, Algorithms for FFT, Inverse DFT, Computing the DFT in parallel

Decision and Optimization

References:

- R. Greenlaw, H.J. Hoover, W.L. Ruzzo, *Limits to Parallel Computation: P-Completeness Theory*, Oxford University Press, New York, 1995.
- V. Kumar, A. Grama, A. Gupta, G. Karypis, *Introduction to Parallel Computing*, The Benjamin/Cummings Publishing Company, Redwood City, California, 1994.
- T. Cormen, C. Leiserson, R. Rivest, *Introduction to Algorithms*, The MIT Press, Cambridge, 1992.
- S. G. Akl, *The Design and Analysis of Parallel Algorithms*, Prentice Hall, 1989.
- M. J. Quinn, *Parallel Computing*, McGraw Hill, 1994.
- T. Leighton, *Introduction to Parallel Algorithms and Architectures: Arrays, Trees, Hypercubes*, Morgan Kaufmann Publishers, San Mateo, California, 1992.
- D.P. Bovet, P. Crescenzi, *Introduction to The Theory of Complexity*, Prentice Hall, N.Y., 1994.
- Al Geist, et al., *PVM: Parallel Virtual Machine - a User's Guide and Tutorial for Networked Parallel Computing*, The MIT Press, Cambridge, 1994.
- B. Wilkinson, M. Allen. *Parallel Programming – Techniques and Applications Using Networked Workstations and Parallel Computers*, Prentice Hall, 1999.
- S. G. Akl, *Parallel Computation – Models and Methods*, Prentice Hall, 1997.
- P. S. Pacheco, *Parallel Programming with MPI*, Morgan Kaufman, San Francisco, 1997.

MS305-E LINUX AND WEB SERVER ADMINISTRATION

UNIT – 1

Linux introduction and file system - Basic Features, Advantages, Installing requirement, Basic Architecture of Unix/Linux system, Kernel, Shell. Linux File system-Boot block, super block, Inode table, data blocks, How Linux access files, storage files, Linux standard directories, Commands for files and directories cd, ls, cp, md, rm, mkdir, rmdir, more, less, creating and viewing files, using cat, file comparisons, View files, disk related commands, checking disk free spaces. Partitioning the Hard drive for Linux, Installing the Linux system, System startup and shut-down.

UNIT-2

Essential linux commands Understanding shells, Processes in linux process fundamentals, connecting processes with pipes, Redirecting input output, manual help, Background processing, managing multiple processes, changing process priority, scheduling of processes at command, batch commands, kill, ps, who, sleep, Printing commands, grape, fgrep, find, sort, Cal, banner, touch, file, file related commands-ws, sat, cut, grep, dd, etc. Mathematical commands- bc, expr, factor, units. vi, joe, vim editor

UNIT-3

Shell programming Basic of shell programming, Various types of shell, shell programming in bash, conditional and looping statements, case statements, parameter passing and arguments, Shell variables, shell keywords, Creating Shell programs for automate system tasks and report printing, use of grep in shell, awk programming.

UNIT-4

System administration Common administrative tasks, identifying administrative files – configuratinn and log files, Role of system administrator, Managing user accounts-adding & deleting users, changing permissions and ownerships, Creating and managing groups, modifying group attributes, Temporary disable user's accounts, creating and mounting file system, checking and monitoring system performance file security & Permissions, becoming super user using su. Getting system information - host name, disk partitions & sizes, users, kernel. Backup and restore files, linuxconf. utility in GUI, reconfiguration hardware with kudzu Configure desktop-X configurator, understanding XF86config file, starting & using X desktop. KDE & Gnome graphical interfaces, changing X settings.

UNIT-5

Basic networking administration Setting up a LAN using Linux, choosing peer to peer vs client/server model, setting up an Ethernet Lan, configuring host computers, checking Ethernet connecting, connecting to internet, administration in a networked environment, common networking administrative tasks, the network file system, configuring Ethernet, initializing Ethernet Interface, ifconfig, netstat and netconfig commands a TCP/IP networks, DNS services, routing using Linux, SLIP & PPP services, UUCP. Installation & Administration of mail server, ftp server and Apache web server.

TEXTS & REFERENCES BOOKS :

- **USING LINUX** BY JACK TACKETT, DAVID GUNTER, PHI, EEE EDITION
- **RED HAT LINUX7.X BIBLE** –CRISTOPHER NEGUS, IDG BOOKS INDIA LTD.
- **LINUX INSTALLTION AND ADMINISTRATION**, NICHOLAS WELLS, COURSE TECHNOLOGY (VIKAS PUBLISHING, NEW DELHI).
- **UNIX SHELL PROGRAMMING** – YASHWANT KANETKAR, BPB PUBLICATIONS,
- **LINUX NETWORKING AND SECURITY** – WELLS, COURSE TECHNOLOGY (VIKAS PUBLISHING, NEW DELHI).

MS401 COLLOQUIUM

The aim of the subject is to develop ability of a student to carry out literature survey & independent study of advanced subject/topic/matters in the field of Computer Science and Information technology.

At the beginning of semester a list of colloquium topic should be displayed on the notice board by the department and/or on the institution web site. Every Student must select a topic of his choice. The student is required to conduct rigorous study/survey on the subject under the supervision of the faculty member of the department, prepare a report and present this in presence of all the students of his class at the end of semester. The comments & criticism of the topic/subject will be discussed for the benefit of all the students. The evaluation will be carried out by the department based on the presentation.

MS402 PROJECT WORK

Every student is required to carry out project work under the supervision of a faculty member of the department. However, a student may also opt to pursue his project work in a reputed industry/institution with the consent of Department/Institute. In such cases, the department must look into the suitability of the projects and assign one internal guide/supervisor. The internal supervisor shall monitor progress of the student continuously. A candidate is required to present the progress of the project work (at least twice) during the semester at an appropriate time decided by the Department . There will a final presentation of the project work at the end of the semester.