M.Sc.(FirstSemester)

M.Sc.–101Computer Organization & Assembly Language

Max. Marks-40 **Pass. Marks:16**

Unit-I

Basic Building Blocks of Computers:Concepts of Boolean Algebra, Logic Gates, Logic Diagrams of Boolean Expressions, Minimization Techniques, SOP (Sum of Products) and POS (Products of Sum) forms, Combinational Circuits, Adders, Subtractors, Multiplexers, Decoders etc., Sequential Circuits, Flip-Flops (SR, D, JK, T), Registers (Shift Register), Counters (Binary, up, down, Ripple).

Unit-II

Basic Computer Organization:-Block Diagram, Evolution of Computer Systems, Classification of Computers, Data Representation in ComputersBinary, Octal & Hexadecimal Numbering systems and their inter-conversion, Fixed Point and Floating representation of numbers, Complements, Alphanumeric Representation, Binary codes-BCD, EBCDIC, Gray, Parity, Error detection and correction codes.

Unit-III:

Memory Organization:-Types and Organizations, Memory Hierarchy, Semiconductor Main Memory RAM, ROM, Memory Connection to CPU, Auxiliary Memory (Magnetic disks, Magnetic Tapes, RAID etc.), Associative Memory (Hardware Organization, Match Logic, Read/write Operation), Cache Memory(Associative, Direct, Set-Associative Mapping), Virtual Memory (Address Space and Memory Space) Optical Memories (CD-ROM, WROM, DVD-ROM etc.).

Unit-IV:

I/O Organization & Overview of 8086 CPU:-Commonly used Peripheral Devices, Input-Output Interface, Input-Output Techniques (Programmed Input/output, Interrupt driven Input/output, Direct Memory Access), Input-Output Processor(IOP).Introduction to Microprocessor, Architecture of 8086/8088 Microprocessor, Software model of 8086/8088 Microprocessor, CPU Registers, Addressing Modes & Instruction Formats of 8086/8088.

Unit-V:

Introduction to 8086/8088 Programming:-Program Structure of 8086/8088 Assembly Language Program, Format of Assembler Instruction, The Instruction set of 8086/8088, Data Transfer, Arithmetic, Logic, Shift and Rotate Instructions. Flag Control Instructions, Compare Instructions, Jump Instructions, Subroutines and Subroutine-Handling Instructions, The Loop and Loop-Handling Instructions, String and String-Handling Instructions. Use of Assembly language, Instructions for specific programs for typical problems like table Search, subroutines, Symbolic and Numeric Manipulations and I/O.

M.Sc. –102 Programming and Problem Solving through C

Max. Marks 40 **Pass. Marks 16**

UNIT-I:-Techniques of Problem solving, Top-down, Bottom up approaches for problem solving. Divide and conquer principle, Algorithm Development, representation of algorithm, stepwise refinement, Algorithm for sorting and searching and Merging lists.

UNIT-II:-Introduction to C language, variable and arithmetic expressions, symbolic constants Declaration, Arithmetic operators, Relational and logical operators, type conversion, Increment and decrement operators, Bitwise operators, Assignment operators and expressions conditional expressions, precedence and order of evaluation on, C control statement, Simple exercises.

UNIT-III:-C functions, Basics of function and functions returning Non integers, external variables, scope Rules, Header files Static variables. Register variable,Block structure initialization, Recursion, Pointers and addresses arithmetic, multidimensional arrays, initialization of pointer arrays command line arguments, pointers to functions.

UNIT-IV :-Basics of structures, structure and functions, Arrays of structure, pointers to structure self-referential structure, Table look-up Typed if, unions Bitfields, input and output, formatted output, print I/O formatted, input scanf file access error Handling stderr and exit, line input and output.

UNIT-V:-working with files: Introduction classes for file stream operations , opening and closing files detecting end of file, file pointers and manipulators sequential input and output operations, updating and handling during file operations

Text Books:

1. How to solve it by Computer by R.G. Dromey (P.H.II),1994
2. C Programming Language Dennis Ritchie IInded. (P.H.I),1994

M.Sc.103: SOFTWARE ENGINEERING

MAX.MARKS: 40 **PASS MARKS: 16**

UNIT-I:-

Software Processes: Processes projects and products, Component software processes, characteristics of a software process, software Development Process, project management process, software configuration management process.

Software requirement Analysis and Specification: Software requirement, need for SRS, requirement process, problem analysis, analysis issues, requirement specification, characteristics of an SRS, component of an SRS, structure of requirement document validation requirement reviews, size measures, quality metrics.

UNIT-II-

Planning Software Project:- Cost estimation, uncertainties in cost estimation, building cost estimation models, on size estimation, COCOMO model, project scheduling, average duration estimation, project scheduling and milestones, staffing and personnel planning, personnel plan, team structure, software configuration management plans, quality assurance plans, verification and validation, project monitoring plans, risk management.

UNIT-III

Function Oriented Design:- Design principles, coupling, cohesion, verification, network metrics, stability metrics, information flow metrics.

UNIT-IV

Testing Methods : . A Strategic Approach to software testing, strategic issues, unit testing, validation testing, system testing .Software testing fundamentals, test case design, white box testing, Control structure testing, black-box testing.

UNIT-V

Re-Engineering : a software reengineering process model, reverse engineering, restructuring, code restructuring, data restructuring.

Computer-Aided software Engineering: What is case, building blocks for case.

M.Sc. - 104 Numerical and Statistical Analysis

Max. Marks:- 40 **Pass. Marks :-16**

Unit-I: Probability Distributions and Statistical Inference.

Discrete Probability distribution, Binomial & Poisson distributions. Continuous probability distributions: Exponential and normal distributions (for all prob. Distributions simple properties & applications). Testing of hypothesis, point and interval estimates. Testing of single and two mean z and T- tests for variables. Chi-square for independence of two attributes (mXn) table & goodness of fit. F test for homogeneity of two variances.

Unit-II: Correlation and Regression Analysis.

Objectives, Correlation & regression coefficients & lines, Reliability of estimates and predictions. Partial correlation coefficients and partial regression coefficients. Multiple correlation coefficients. Polynomial curve fitting, Fitting of a regression plane.

Unit-III:

Floating point arithmetic, errors, Solution of algebraic and transcendental equations, Newton Raphson and Muller method for real and complex roots, Bairstrow method, rate of Convergence, Eigen values and Eigen vectors ; Jacobi and House hold method.

Unit-IV:

Langrange and Newton Interpolation, Hermite Interpolation, Spline Interpolation, Bivariate Interpolation, Least square Approximation, Numerical integration, Simpson rule, Method based on undetermined coefficients, Gauses Legendre method, Gauses chebyshew method, Gauses Laguerre method.

Unit-V:

Numerical Solution of the differential equations, Euler method, Taylor series method, Picard method, Runge Kutta method, Predicter Corrector method, Cubic Spline method, Finite difference analogues of partial differential equation in Laplace form, Solution by five point formula, ADI, method.

M.Sc. – 105 Communication Skill &Job oriented Training Program

Max. Marks 40 **Pass. Marks:- 16**

Unit-I: Fundaments of Communication (OHP & PPP):

Definitions, importance, forms of communication, process of communication, channels, barriers and strategies to overcome barriers of communication.

Listening (PPP): Def, Importance, Benefits, barriers, approaches, be a better listener, exercises and cases.

Unit-II: Advance Communication (PPP and Exercises on handouts)

Why communication ? Art of communication, V3 communication, Key elements of IP communication, Quizzes, exercises and cases/incidents for practice.

Unit- III : Group Discussions : (PPP)

Definitions, importance, process, points to be borne in mind while participating, Dos and Don'ts.

Practice – if time permits or to be covered in PDP.

Interview (PPP)

Types of, Points to be borne in mind as an interviewer or an Interviewee, commonly asked questions, Dos and Don'ts.

Practice-if time permits or to be covered in PDP.

Unit-IV: Transactional Analysis: (PPP)

Transactional analysis, Johari Window, FIRO-B (PPP).

Unit-V: Written Communication:

Report writing, documentation, business correspondence, preparation of manuals and project reports

M.Sc. – 201 Data and File Structure using C++

Max. Marks:- 40 **Pass. Marks:- 16**

Unit-I

Information and its storage representation, nature of information, transmission of information, storage of information, primitive data structure, operations on data structure, integer, real numbers, character information, logical and pointer information, representation and manipulation, storage representation of string manipulation application, text handing analysis.

Unit-II

Linear Data structure and their sequential representation, Non- primitive data structures, storage structure for arrays, stacks, definition and operations on stacks, application of stack, recursion, polish expressions and their manipulation, Queues, operations on queues, simulation, priority queues, linked storage representation, pointers and linked allocation, linked linear lists, operations on linked lists, circular linked list, doubly links list, application of linked lists, polynomial manipulation, linked dictionary, multiple precision arithmetic.

Unit-III

Nonlinear Data structures: Trees, definitions and concepts of general trees and binary trees, representation of binary trees, binary tree representation of general tree, binary tree traversal, Threaded binary trees, operation on binary trees, application of trees, binary search trees, evaluation of binary search trees, AVL trees, B.B. trees, M. Way search trees and B-trees and B-trees, B* trees, graphs and their representation, matrix representation, list structure, Breadth first search, depth first search, application of graphs, Spanning Tree.

Unit-IV

Sorting and Searching : Notation and concepts, selection sort, bubble sort, merge sort, tree sorts, partition exchange sort, radix sort, address calculation method, Summary of Sorting methods, Searching Haah-table method, Hashing functions, Collision resolution techniques, external sorting, run list sorting, polyphase sorting, oscillating sorting, sorting on disks.

. **Unit-V**

File Structure : Magnetic tapes, drums, disks, Mass storage devices and their characteristics, record organization, sequential file structure and processing of fixed sequential files (ISAM, direct files, structure and processing, external searching, multilist organization, inverted list organization, controlled list Length, cellular partitioned structures, inverted list.

M.Sc. - 202 System Programming using Linux

Max. Marks 40 **Pass. Marks 16**

Unit-I

What is system software, Components of s/w, evolution of s/w, Translators and Loaders, Assemblers, Assembly process, Design of two pass assemblers, Macros and Macro processor.

Unit-II

Loading, Linking and Relocation, linking and loading Schemes, program relocatability, overview of Linkage editing schemes, A linkage editor for IBM PC, object Module format, Design of linkage editor, linking for program overlays.

Unit-III

The Arrival of Linux, the Spirit of Linux the strengths of linux, linux and Unix history, linux distribution, System specific information, linux Command information, Installing linux, Running a Linux System, Networking overview, Linux Networking.

Unit-IV

Using graphical Systems with Linux. The shell and text files, the Shell prompt, functions of shell, different type of shells, Entering command, The shell start-up process, Customizing shell,Loops, Using Text Editors text processing, Simple shell script programs.

Unit-V

The Role of the System Administrator. Principles of maintaining linux system, Using Basic Administrator Tools, Basic Administration Tasks, Hardware Redundancy and Fault Tolerance.

M.Sc. – 203 Computer System Architecture and Parallel Processing

Max. Marks 40 **Pass. Marks 16**

Unit-I

Central Processing Unit : General Register organization, Stack Organization, Register stack, Memory stack, Reverse Polish Notation Evaluation of Arithmetic Expressions, Instruction Formats, Addressing Modes, Data Transfer and Manipulation, Program Control, Subroutine Call and Return, Program Interrupt, Types of Interrupts Reduced Instruction Set Computer (RISC), Characteristics of RISC/CISC.

Unit-II

Computer Arithmetic: Arithmetic algorithms – Addition and Subtraction (with Signed-Magnitude Data, Hardware Implementation, Hardware Algorithm, with 2's Complement Data) Multiplication Algorithms – (Hardware Implementation for Signed-Magnitude data, Hardware Algorithm, Booth's Algorithm, Array Multiplier) Division Algorithm (Hardware Implementation for Signed-Magnitude data, Divide Overflow, Hardware Algorithm), Floating Point Arithmetic Operations- (Register Configuration, Addition and Subtraction, Multiplication, Division).

Unit-III

Introduction to parallel processing: Parallel Processing Mechanisms, Parallelism in Uni-processor System. Parallel Computer Structures: Pipeline Computers, Array Computers, Multiprocessor System, Performance of Parallel Computers, Dataflow and New Concepts, Architectural Classification Schemes. Applications of Parallel Processing.

Unit-IV

Pipeline and vector processing : Principles of linear pipelining, General Consideration in pipelining, Arithmetic Pipeline, Instruction Pipeline & RISC Pipeline with examples, Vector Processing, Matrix Multiplication, Memory Interleaving, Supercomputers, Attached Array processor and SIMD Array processor.

Unit-V

Multiprocessors: Characteristic of Multiprocessors, Multiprocessor Architecture and Programming Functional Structure, Interconnection Networks (Time shared or Common bus, Crossbar Switch, Multiport memory, Multistage Switching Network, Hypercube Interconnection), Interprocessor Arbitration, Interprocessor Communication and Synchronization, Mutual Exclusion with a Semaphore, Cache Coherence.

M.Sc. - 204 Design and Analysis of Algorithms

Max. Marks 40 **Pass. Marks 16**

Unit-I

Elementary Algorithms-examples, problems and instances, characteristics, Problem: Available Tools & Algorithms, Building Blocks of Algorithms, Outline of Algorithms. Some useful Mathematical Functions & Notation, Mathematical Expectation, Principal of Mathematical Induction, Concept of Efficiency of an Algorithm, Well knew Asymptotic Function & Notation.

Unit-II

Analysis of Algorithm-simple example, well known Sorting Algorithms Best-Case and Worst –Case Analysis, Analysis of Non-Recursive Control structure, Recursive Constructs, Solving Recurrences, Average Case & Amoritzed Analysis. Resursive algorithms(Tower of Honoi, Permutations).

Unit-III

Design Techniques: Divide and Conquer- Control abstraction binary search, merge sort, Quick sort, Strassen's matrix multiplication, Exponentiation.

Dynamic Programming: The problem of Making Change, The principle of optimality, Chained Matrix Multiplication Matrix multiplication using Dynamic Programming. Greedy methods (Formulization of Greedy Technique, Minimum Spanning Trees, Kruskal's Algorithm).

Unit-IV

Graph algorithms: Examples, Traversing Trees, DFS, BFS & Minimax principle, Topological sort, strongly connected component, minimal spanning tree, Kruskal and prims algorithm, Dijkstra's Algorithm, all paths shortest paths, Floyd-Marshall algorithm, Flow networks.

Unit-V

Models for executing algorithms: Regular Expressions, Regular language, Finite Automata. Formal Language & Grammer, CFG, PDA. Turning machine Formal definition and example, Instantaneous Description and Transition Diagram.

M.Sc. - 205 Java Programming

Max. Marks 40 **Pass. Marks 16**

Unit-I

Understanding the Internet, What in the Internet, How TCP/IP makes the Internet work, who runs the Internet, Overview of the Internet, Services like E-mail, WWW, FTP, Telnet etc. Domain Name System (DNS), Simple Network Management, Protocols (SNMP), Internet security, Cryptography, Public-key algorithms, Authentication Protocols, Digital Signature, Multimedia, Audio, Video, Data Compression.

Unit-II

Java History, Java features, How Java differs from C and C++ , Java and Internet, Java and WWW, Hardware and Software requirements, Java environments, Simple Java Program, Java Program Structure, Java Tokens, Java statements, Implementations a Java Program, Java virtual machine, Constants, variables and data types.

Unit-III

Operations and expressions, Arithmetic, Relational, Logical, Bit-Wise operators, operator precedence and Associability various control flow statement like if…..else, switch while, do, for etc. classes object and methods, Inheritance extending a Class, Visibility control, Arrays strings and vectors.

Unit-IV

Interfaces, Multiple inheritance defining Interface, extending Interfaces, Implementing Interfaces, Accessing Interface variables, Java API Packages, Naming Conventions, Creating packages, Accessing a package, Adding a class to a package, Hiding classes. Multi threaded programming, Creating threads, extending thread class, life cycle of a Thread, Thread exception, Thread priority.

Unit-V

Exceptions, execution Handling in Java, Applet programming, Applet life Cycle, creating executable Applet, Applet Tag, Running an applet, passing parameters to applet, Graphics programming, GUI Concepts in Java, managing Input/Output files in Java.

M.Sc.301: Cloud Computing

Max. Marks 40 **Pass. Marks 16**

Unit-I

Introduction: Historical development ,Vision of Cloud Computing, Characteristics of cloud computing as per NIST , Cloud computing reference model ,Cloud computing environments, Cloud services requirements, Cloud and dynamic infrastructure, Cloud Adoption and rudiments. Overview of cloud applications: ECG Analysis in the cloud, Protein structure prediction, Gene Expression Data Analysis ,Satellite Image Processing ,CRM and ERP ,Social networking .

Unit-II

Cloud Computing Architecture: Cloud Reference Model, Types of Clouds, Cloud Interoperability & Standards, Scalability and Fault Tolerance,
Cloud Solutions: Cloud Ecosystem, Cloud Business Process Management, Cloud Service Management. Cloud Offerings: Cloud Analytics, Testing Under Control, Virtual Desktop Infrastructure.

Unit –III

Cloud Management & Virtualization Technology: Resiliency, Provisioning, Asset management, Conceps of Map reduce , Cloud Governance, High Availability and Disaster Recovery. Virtualization: Fundamental concepts of compute ,storage, networking, desktop and application virtualization .Virtualization benefits, server virtualization, Block and file level storage virtualization Hypervisor management software, Infrastructure Requirements , Virtual LAN(VLAN) and Virtual SAN(VSAN) and their benefits .

Unit-IV

Cloud Security: Cloud Information security fundamentals, Cloud security services, Design principles, Policy Implementation, Cloud Computing Security Challenges, Virtualization security Management, Cloud Computing Security Architecture .

Unit-V

Market Based Management of Clouds , Federated Clouds/Inter Cloud: Characterization & Definition , Third Party Cloud Services .Case study : Google App Engine, Microsoft Azure , Hadoop , Amazon , Aneka.

M.Sc.-302 : RELATIONAL DATA BASE MANAGEMENTSYSTEM (SQLPROGRAMMINGUSING ORACLE)

MAX.MARKS: 40 **PASS MARKS: 16**

UNIT-I

INTRODUCTION: -Advantages of DBMS approach, various views of data, data independence, Schema & sub-schema, Primary concepts of data models, Database languages, Transaction management, Database administrator & uses, data dictionary, Overall systemarchitecture.ER MODEL: - Basic concept, Design issues, Mapping constraints, Keys, ER diagram, weak & strong entity sets, specialization & generalization, aggregation, inheritance, design of ER schema, Reduction of ER schema to tables.

UNIT –II

DOMAIN RELATIONS & KEYS :- Domains, Relations, Kinds of relation, relational databases, various types of keys, candidate, primary, alternate & foreign Keys. RELATION ALGEBRA & SQL :- The structure, relation algebra with extended operations, Modification of database, idea of relational calculus, Basic structure of SQL, set operation, Aggregate function, Null values, Nested subqueries, Derived relations, views modification of database, Join relations, DDL & SQL .

UNIT– III

FUNCTIONAL DEPENDENCIES & NORMALIZATION: Base definitions, Trivial & non-Trivial dependencies, Closure set of dependencies & of attributes, Irreducible set of dependencies, introduction to normalization, Non- loss decomposition, FD diagram of I, II & III NF, Dependencies prevention, BCNF, Multi-valued dependencies prevention's, BCNF, Multi-valued dependencies & ANF, Join dependencies & 4 NF.

DATABASE INTEGRITY :-General idea, Integrity rules, Domain rules, Attribute rules, Relation rules, Database rule, assertions, triggers, Integrity & SQL.

UNIT –IV

DISTRIBUTED DATABASES :- Basic idea, distributed data storage, Data replication, Data Fragmentation, horizontal, vertical & mixed fragmentation. EMERGING TRENDS IN DBMS :- Object – Oriented database- Basic idea & the model Object structures Object, Class, inheritance, multiple object identity, Data warehousing terminology, definitions, characteristics, Data mining & its overview, Database on www, multimedia database difference with conventional DBMS, issues, similarity based retrieval continuous media data, multimedia data formats, video servers.

UNIT- V

NETWORK & HIERARCHICAL MODEL: Basic idea , Data structure diagram,DBTG model, implementation, Tree structure diagram, Implementation techniques, comparison of three models.

TRANSACTION CONCURRENCY & RECOVERY:- Basic concept, ACID properties, Transaction state, Implementation of atomicity & durability concurrent

executions, Basic idea of serializability, Basic idea of concurrency control, Basic idea of deadlock, Failure classification, storage structure - types, stable storage implementation, data access, Recovery & Atomicity – Log based recovery, deferred database modifications, immediate database modifications, checkpoints.

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M.Sc.-303 : Advance Java Programming

MAX.MARKS: 40 **PASS MARKS: 16**

Unit-I

Introduction to Applet and Swing – Creating Applet in Java, Identifying various stages of an Applet life Cycle, various Graphic method in java, the AWT control components, the Swing component class Hierarchy, using top level swing containers , using intermediate level swing containers, using the atomic component, using the Layout Manager, Flow Layout Manager, Border Layout Manager and Grid Layout Manager.

Unit-II

Introduction to Event Handling – Identifying the source of Event, Event Listeners and Event Handlers, the Delegation Event Model, Event classes, Event Listener Interface, Action Listener interface, Mouse Listener Interface Adapter classes- the Mouse Adapter class, the Mouse Motion Listener Interface.

Unit-III

Introduction

to JDBC – What is JDBC. Database connectivity , JDBC Architecture, JDBC drivers, Using JDBC API – Loading a Driver, connecting and executing JDBC statement, Handling SQL Exceptions. Accessing Result Sets, method of Result Set interface, Methods of Prepared Statement interface , retrieving row, inserting row, Managing Database Transactions, creating and calling stored procedures in JDBC, using Metadata in JDBC.

Unit-IV

Introduction to JavaBean – java bean concept, software components and javabeans ,elements of javabeans, javabean component specification, services of javabean components, types of javabean. Beans development kit, user defined javabeans, creating javabean Applet using BDK, types of javabean properties creating custom Events, Event class, Event Listener, Event Handler.

Unit-V

RMI – Overview of distributed Application , Remote Method Invocation, components of RMI application , RMI architecture, RMI Packages, Distributed Garbage collection, creating Distributed application using RMI, creating remote interface, implementing remote interface, creating RMI server, creating RMI client, Running the RMI application, Transmitting files using RMI , client side cabecks.

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M.Sc.-304 PRINCIPLES OF COMPILER DESIGN

MAX.MARKS: 40 **PASS MARKS: 16**

Unit-I

Introduction to Automata Theory : Mathematical Preliminaries: sets and relations ,Graphs language, alphabets, strings, recursive definitions, regular expressions, Finite automaton (FA), Deterministic FA(DFA), Non Deterministic FA(NDFA), Turing machine, FA with null strings, Transition graphs, FA with outputs Conversations of FA and regular expressions, Regular languages and their closure properties pumping lemma for regular languages, Non regular languages.

Unit-II

Push down Automata Theory : Context free grammars, context free languages ICFL) , Deviation trees, Chomsky normal form ambiguity in CFG, Pushdown Automata (PDA), PDA and CFL equivalence, pumping lemma for CFL, non CFL, closure properties of CFL.

Unit-III

Compiler and Translators, why do we need translators, the structure of Compiler, Lexical Analysis, Syntax analysis, Intermediate code generation, Book keeping, error handling. Finite Automata and Lexical analysis, The role of the lexical analyzer, regular expressions, finite automata, from regular expression to finite automata, minimizing the number of states of a DFA, A Language for specifying
lexical analyzer, implementation of lexical analyzer using lex.

Unit-IV

Context - free grammars, derivation of parse trees, capabilities of CFGs, Parsers, shift-reduce parsing, operators precedence parsing, top -down parsing, Predictive parsing, LR parsers, The canonical collection of LR (0) items, constructing SLR parsing tables, constructing canonical LR parsing tables, constructing LALR parsing tables, Simple parsing exercises using yacc.

Unit-V

Syntax-directed translations schemes, implementation of syntax directed translators, intermediate code, postfix notation, parse trees and syntax trees, three-address code, quadruples, and triples, translations of assignment statements, Boolean expressions, statements that alter the flow of control, cost fix translations, translation with the top- down parser. Symbol tables, the contents of symbol tables, data structures for symbol tables, representing scope information, run time storage administration, implementation of a simple stack allocation schemes, implementation of block-structured languages, storage for block - structured languages.

M.Sc.-305 : COMPUTER GRAPHICS (WITH MULTIMEDIA)

Max. Marks: 40 **Pass. Marks: 16**

Unit-I

A Brief background about applications of Computer Graphics, Overview of Graphics Systems, Video display devices, Refresh cathode ray tubes, Raser and random scan displays, colour CRT monitors, Flat panel displays, LCDs. Design and architecture of raster scan and random scan display systems. A brief introduction to input devices and hardput devices. Output primitives, DDA and Bresenham's 2D line drawing algorithms, Parallel line algorithms.

Unit-II

Midpoint circle generating algorithm, Ellipse generating algorithm, Other curves, Filled area primitives, Scan line polygon fill algorithm, Inside outside test, Boundary fill algorithm, Flood fill algorithm, Character generation, Attributes of output primitive, line and curve attributes, Character attributes.

Unit-III

Anti-aliasing, Two dimensional geometric transformations, Composite transformations, General Composite Transformations and Computational Efficiency, Other transformations, Affine transformation, Two dimensional viewing, Window to view port coordinate transformation.

Unit-IV

Clipping operations, Cohen Sutherland line clipping, Liang Barsky line cliping, Nicholl-Lee-Nicholl line clipping, polygon clipping, Sutherland Hodgeman and Weiler Atherton Polygon clipping, Text and curve clipping. Three dimensional concepts, Display methods, polygon surfaces, quadric surfaces and
superquadrics.

Unit-V

Three dimensional Geometric and Modeling Transformations, General three dimensional rotation, Three dimensional viewing pipeline, Projections, Parallel and perspective projection, View volume and general Projective transformation. Visible Surface Detection Methods, Back Face detection, Depth Buffer Method, A buffer method, Depth sorting method.

M.Sc- 401 COMPUTER ORIENTED OPTIMIZATION TECHNIQUES

MAX.MARKS: 40 **PASS MARKS: 16**

UNIT-I

Linear Programming-Mathematical formulation of Problems, graphical solution, simplex method, two phase method, Big M Method, concept of duality, dual simplex method, Degeneracy and its resolution, sensitivity analysis.

UNIT-II

Assignment problems- Mathematical formulation, Hungarian method for solution, unbalanced assignment problems, infeasible assignment, Crew based problems, Transportation problems-Vogel's approximation method, optimal solution by stepping stonemethod and modified distribution method, degeneracy in transportation problems, transhipment problems.

UNIT-III

Game theory, two person zero sum game, minimax (maximin) criterian, solution of games with saddle point and without saddle point, equivalence of the rectangular game and linear programming and solution by simplex method, concept of dominance, graphical method for 2 x n and m x 2 games, algebraic method for a general game, iterative method, Sequencing problems of n jobs through 2 machines, 3 machines, and n jobs through machines.

UNIT-IV

Replacement problems- replacement of items that deteriorate, with time, money value and present wortk factor, Replacement policy when money value changes, replacement of items that are failed completely, group replacement of items, integer programming, Nonlinear programming problem, Kuhn Tueker conditions, graphical solution, quadratic programming, solution by Wolfe's method.

UNIT-V

Dynamic Programming minimum path problems, problems on single additive constraint additive separable return, single multiplicative constraint additive separable return, single additive constraint multiplicative separable return, serial multistage model, Development of CPM/PERT techniques, construction of network diagram, determination of critical path, probability of completing the project by scheduled date.

Text Boks:

1. Gillett Billy E. Introduction to Operations Research : A Computer oriented algorithmic approach, Tata Mc-Graw Hill Publishing Company Ltd., New Delhi.
2. A Ckoff, R.L. and Sasieni, M.W. Fundamentals of Operations Research, Wiley, 1968.
3. Hadley G. Linear Programming, Oxford and IBH Publishing Co. Ltd. Ltd., New-Delhi.
4. Operations Research : S.D. Sharma,

M.Sc.-402 ARTIFICIAL INTELLIGENCE

MAX.MARKS: 40 **PASS MARKS: 16**

UNIT-I

What is Artificial Intelligence, what is an AI technique, criteria for success, Problems, problem spaces and search, Production system, Problem characteristics, Hill-climbing, Best-First search, AO algorithm, constraint satisfaction.

UNIT-II

Natural language Processing, Introduction, overview of linguistics, Grammars and language, Basic Parsing techniques, Semantic analysis and representation, structure, Natural Language generation, Natural Language systems .

UNIT-III

Knowledge Representation Issues, Approaches to knowledge Representation, Representing simple facts in logic, computable functions and predicates, Procedural vs declarative knowledge, forward vs Backward Reasoning matching, control knowledge.

UNIT-IV

Expert systems, Rule-Based system architecture Non-production system Architecture, dealing with uncertainty, knowledge acquisition and validation, knowledge system Building tools.

UNIT-V

Pattern Recognition, Recognition and classification process, learning classification Patterns, Recognizing and understanding speech.

Text Books :

1. Artificial Intelligence Elaine Rich and Kevin Knight Tata Mc-Graw Hill Edition.
2. Introduction to Artificial Intelligence and expert system. Dan. W. Patterson
Prentice–Hall of India.

Reference Books:

1. Principles of Artificial Intelligence by Nils J. Nilson (Narosa Publication).

M.Sc.-403 : Data Warehousing and Data Mining

MAX.MARKS: 40 **PASS MARKS: 16**

UNIT-I

Motivation, importance, Data type for Data Mining :relation Databases, Data Warehouses, Transactional databases, advanced database system and its applications, Data mining Functionalities: Concept/Class description, Association , Analysis classification & Prediction, Cluster Analysis, Outlier Analysis, Evolution Analysis, Classification of Data Mining Systems, Major Issues in Data Mining.

UNIT –II

Data Warehouse and OLAP Technology for Data Mining: Differences between Operational Database Systems and Data Warehouses, a multidimensional Data Model, Data Warehouse Architecture, Data Warehouse Architecture, Data Warehouse Implementation, Data Cube Technology.

UNIT-III

Data Preprocessing: Data Cleaning, Data Integration and Transformation, Data Reduction, Discretization and Concept Hierarchy Generation. Data Mining Primitives. Languages, and System Architectures, Concept Description: Characterization and Comparison, Analytical Characterization

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UNIT-IV

Mining Association Rules in Large Databases: Association Rule Mining: Market Basket Analysis, Basic Concepts, Mining Single-Dimensional Boolean Association Rules from Transactional Databases: the Apriori algorithm, Generating Association rules from Frequent items, Improving the efficiency of Apriory, Mining Multilevel Association Rules, Multidimensional Association Rules, Constraint-Based Association Mining.

UNIT-V

Classification & Prediction and Cluster Analysis: Issues regarding ,classification & prediction, Different Classification Methods, Prediction, Cluster Analysis, Major Clustering Methods, Applications & Trends in Data Mining: Data Mining Applications, currently available tools.

Text Books

1. J., Han and M. Kamber, -Data Mining: Concept and Techniques", Morgan Kaufmann Pub.
2. Berson -Dataware housing, Data Mining& DLAP, @004, TMH.
3. W.H. Inmon - Building the Datawarehouse, 3ed, Wiley India.
4. Anahory, "Data Warehousing in Real World", PearSon Education.
5. Adriaans, "Data Mining", Pearson Education.
6. S.K. Pujari, -Data Mining Techniques", University Press, Hyderabad.

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M.Sc. –404 COMPUTER NETWORKS

MAX.MARKS: 40 **PASS MARKS: 16**

UNIT-I

Users of Computer Network, Network Hardware, Network software, Protocol Hierarchies, Design issue for the layers, Interfaces and services, connection oriented and connection-less services, service primitives, the relationship of services, to protocols, Reference Models, comparison of OSI and TCP/IP Reference models, Data communication services, SMDS, X.25, Frame Relay, Broadband ISDN, ATM and comparison of services.

UNIT-II

Physical layer, Theoretical Basis for data communication, Bandwidth-limited signals. Maximum Data Rate of a Channel, Transmission media, Magnetic media, Wireless, Transmission, The telephone systems, Narrowband and Broadband ISDN and ATM, communication satellites.

UNIT-III

Data Link layer, Design issues, Services provided to the Network layer, error detection and correction, elementary data link protocols, sliding window protocols, Protocol specification and verification, Case studies, HDLC and the Data link layer in the Internet.

UNIT-IV

Network layer design issues, routing algorithms, the optimality principle, shortest path routing, Flooding, Flow-based Routing, Distance-vector and link-state routing broadcast and Multicast Routing, Congestion control algorithms, general principles of congestion control, Traffic shaping, choke packets, load shedding, jitter control.

UNIT-V

The transport layer, The transport service, Quality at service, Transport service Primitives, Addressing establishing a connection, Releasing a connection, Flow-Control and Buffering, Multiplexing, crash Recovery, The Internet Transport protocols, TCP service model, TCP protocol, TCP segment header, TCP connection management, TCP transmission policy, TCP congestion control, TCP timer management UDP.

M.Sc.-405 OBJECT ORIENTED MODELLING & DESIGN USING UML

MAX.MARKS: 40 **PASS MARKS: 16**

UNIT-I

The object Model, the evolution of object model, elements of object model, applying the object model, Classes and Objects, Relationships among objects, the nature of a class, relationship among classes, the interplay of classes and objects, on building quality classes and objects .

UNIT-II

Advanced object Modeling, Aggregation, Abstract Classes, Generalization as extension and Restriction, Multiple inheritance, Metadata, Candidate Keys, Constraints. Dynamic Modeling – events and states, operations nested state diagrams, Concurrency, Functional Modeling, Data Flow Diagrams, specifying operations, Constraints, Relation of Functional to object and Dynamic Models.

UNIT-III

Design Methodology, OMT as a software engineering methodology, Analysis, overview of analysis, Problem statement, overview of system Design, Breaking a system into subsystems, identifying Concurrency, Allocating subsystems to processes and tasks, Management of data stores, Handling global resources, choosing software control implementation, Handling Boundary condition, setting trade off priorities, Common architectural frameworks.

UNIT-IV

Object Design, overview of object Design, Combining the three models, Design algorithms, Design optimization, implementation of Control adjustment of inheritance, Design of Association, object representation, Physical packaging.

UNIT-V

Implementation, from Design to implementation object-oriented style, Reusability, extensibility, Robustness, Object Oriented languages, Translating a Design into an implementation.

Text Books:

1. Object Oriented Modeling and Design by James Rumbaugh et. el. Edition P.H.I, 1991.
2. Object Oriented Analysis and Design with application. By Grady Booch (IInd ed.)'Addition Wesely (2000).