

M.Sc. Information Technology

SCHEME OF EXAMINATION

Course Title:	M.Sc. Information Technology
Abbreviation:	M.Sc.(IT)
Type of Course:	Two Year PG Degree Course
Pattern:	Yearly
Award of Degree:	Master of Information Technology M.Sc. (IT) Degree will be awarded for those who successfully complete all the components and declared pass in the programme after two years.

1. ELIGIBILITY FOR ADMISSION

Graduates possessing 50% marks in any faculty of any statutory university shall be eligible for admission to the M.Sc. Computer Science Course (Relaxation to SC/ST etc. as per Prevailing Rules)

2. PASS CRITERIA

For a pass in the examination, a candidate is required to obtain at least 25% in each paper (Theory, Practical and Project) and 36% marks of total aggregate marks of theory and practical.

3. CLASSIFICATION OF SUCCESSFUL CANDIDATE

Division	Total Marks
First Division	60% and above
Second Division	Above 48% and below 60%
Pass	Above 36% and below 48%
Fail	Below 36%

4. BACKLOG

50% Papers can be carried to the next year.

5. INSTRUCTIONS TO PAPER SETTER

6. The question paper contains 3 sections.

- **Section-A** consists of 10 questions (2 questions from each unit of syllabus).
- **Section-B** consists of 10 questions (2 questions from each unit of syllabus).
- **Section-C** consists of 5 questions (1 question from each unit syllabus).

The word limit of part A, B and C are 50, 200 and 500 respectively

7. WORKLOAD

At least 3 classes for theory class and 3 classes for practical lab should be assigned per week for each paper.

8. INSTRUCTIONS FOR STUDENTS

- Student has option to choose one paper from MIT 205(A), MIT 205(B), and MIT 205(C) in M.Sc. Information Technology final.
- The student has to complete two months career oriented summer training from any firm/organization. If the student does not get a chance to go for training, he/she can chose a research topic and can complete dissertation under the supervision of any of the faculty in his college.
- The student who has opted training, has to provide a signed certificate from the firm/ organization authority stating that the student has spent two months as a trainee in his organization/firm. The student who have opt dissertation, has to submit his/her dissertation report with a certificate from his supervisor.
- In both the cases student has to present his work in front of all the faculty members and fellow students at the starting of the session.

9. INSTRUCTIONS FOT PRACTICAL EXAMINATION

Each practical exam is to be conducted by two examiners one External and one Internal. External examiner should be senior lecturer from jurisdiction of other universities. Question paper of Practical Examination will be prepared by External examiner; Students have to perform exercise on computer.

Exercise must be written in answer books in proper documentation.

Marks distribution for Practical of 50 marks is as under:

- a) Three Exercises of 10 marks each Execution 03, Documentation 03) 30 Marks (Logic 04,
- b) Viva-Voce 10 Marks
- c) Laboratory Exercise File 10 Marks

Distribution for Project of 50 marks is as under:

- a) Research Project/ Case Study and Presentation 35 marks
- b) External Viva Voce 15 marks

The marks distribution for industrial training/dissertation is as under:

- a. Dissertation/ Training Report 30 marks
- b. Presentation 20 marks

**Teaching and Examination scheme for
M.Sc. (Previous) Information Technology**

Paper Name(Theory)		Exam Hours	Tut.	Lect. per week	Internal Marks	External Marks	Max. Marks	Min. Pass. Marks
Theory Papers								
MIT 101	Web Technology & Software Engineering	3	1	3	10	40	50	13 (25%)
MIT- 102	OOPs with C++	3	1	3	10	40	50	13 (25%)
MIT 103	Operating System	3	1	3	10	40	50	13 (25%)
MIT 104	Computer Organization and Architecture	3	1	3	10	40	50	13 (25%)
MIT 105	Data Communication and Networking	3	1	3	10	40	50	13 (25%)
MIT 106	Relational Database Management System	3	1	3	10	40	50	13 (25%)
Total of Theory Papers						300		108 (36%)
Practical Papers								
MIT 107	Internet and Web Lab	3		3	50			13 (25%)
MIT 108	C++ Lab	3		3	50			13 (25%)
MIT 109	RDBMS Lab	3		3	50			13 (25%)
Total of Practical Papers					150			54 (36%)
Grand Total					450			162 (36%)

M.Sc. (Final) Information Technology

Paper Name(Theory)		Lectures per week	Tut	Exam Hours	Internal Marks	Ext. Marks	Max. Marks	Min. Passing Marks
Theory Papers								
MIT 201	Data and File Structure using C/C++	3	1	3	10	40	50	13 (25%)
MIT 202	JAVA	3	1	3	10	40	50	13 (25%)
MIT 203	Web Application development using ASP.net	3	1	3	10	40	50	13 (25%)
MIT 204	Computer Graphics	3	1	3	10	40	50	13 (25%)
MIT 205	Discrete Mathematics and Iterative Methods	3	1	3	10	40	50	13 (25%)
MIT 206(A)	Artificial Intelligence	3	1	3	10	40	50	13 (25%)
MIT 206(B)	Data Warehousing & Data Mining	3	1	3	10	40	50	13 (25%)
MIT 206(C)	Communication Theory	3	1	3	10	40	50	13 (25%)
Total of Theory Papers						300		108 (36% aggregate)
Practical Papers								
MIT 207	Data and File Structure using C/C++ Lab	3		3			50	13 (25%)
MIT 208	JAVA and ASP.net Lab	3		3			50	13 (25%)
MIT 209	Project/ Dissertation/Training	3		3			50	13 (25%)
Total of Practical Papers							150	54 (36% aggregate)
Grand Total							450	162 (36% aggregate)

Paper Code: MIT 101

Paper Name : Web Technology and Software Engineering

UNIT-I

The internet: history of the World Wide Web, hardware and software trend, TCP/IP protocol, Email, browsers, HTTP, FTP, URL, DNS. Introduction of HTML: introduction, markup language, editing, HTML: common tags, headers, text styles, linking, images, formatting text, horizontal rules and line breaks, unordered lists, nested and ordered lists, HTML tables: intermediate HTML tables and formatting: basic HTML forms, more complex HTML forms, internal linking and using image maps.

UNIT-II

Style Sheet: Introduction , Elements Of Style Sheets, Embedded Style Sheet And Linked Style Sheets, Style Sheet Precedence, Div And Span, CSS: Introduction, Inline Style Sheet , Conflicting Styles, Linking External Style Sheet, Positioning Elements, Backgrounds Element, Dimensions, Text Flow And The Box Model, User Style Sheets.

UNIT-III

E-commerce: Definition internet and E-Business, Advantages, application, E-commerce Framework, E-commerce Models, Brokerage Model, aggregator Model and Value Chain Model, Consumer oriented E-Commerce. Electronic Data Interchange: EDI application in business, EDI Security and privacy issue. Electronic payment System: smart card credit card, online banking, mobile banking, Electronic payment Risk and security issue, Designing EPS.

UNIT-IV

Software Engineering paradigms: software characteristics, myths, s/w applications, Software engineering Definitions, various s/w process models, computer aided Software engineering project management, management activities, project planning and scheduling and Risk management, Software metrics and Measures: Process Metrics, Project Metrics, COCOMO Model, RMMM, User interface Design: design Issue, interface design process, user analysis, user interface prototyping.

UNIT- V

Verification and validation: planning verification and validation, S/W inspection, Automated static analysis, verification and formal methods. Software Testing: System testing, component testing, Test Case design, Test Automation. Quality Management: Process and Product quality, Quality assurance and standards, Quality planning. Quality control, Process and product improvement, process classification, process analysis and modeling, process change, the CMMI process Improving Framework.

Suggested Readings

1. Internet and Web Page Designing By V.K. Jain(BPB)
2. Frontiers of Electronic Commerce By R. Kalakola and A.B. Whiston (Wisley)
3. Software Engineering- A Practitioner's Approach By Pressman Roger(Tata McGraw Hill)
4. Software Engineering By Sommerville(Pearson Education Ltd.)
5. An Integrated Approach to Software Engineering By Pankaj Jalote (NAROSA).

Paper Code: MIT 102

Paper Name : OOPs with C++

UNIT I

Object Oriented System: Difference Between Procedural and Object Oriented Languages, Object Oriented Paradigm, Inheritance, Polymorphism, Abstraction, Encapsulation, Benefits and Application of Oops. Introduction to C++, Character Set, Constants, Variables and Data Types, Enumeration Types, Operators, Arithmetic Expressions, Operator Precedence and Associativity, Integer Overflow and Underflow, Input, Output, Conditional Statements, Conditional Operator, Scope of Variables, Type Conversion.

UNIT II

Iteration: While, Do While, For. Break, Continue, Goto Functions - Standard and User-Defined Function, Recursive Function, Passing By Value And Reference, Pointers and Functions, Reference and Functions.

UNIT III

Array: One, Two and Multidimensional, Passing Array to a Function, Pointers and References. Array and Pointers - Dynamic Arrays, String Processing, Pointer to One and Two Dimensional Arrays, Array of Pointer. Pointer and Function, Function Returning Pointer, Structures and Pointers, Dynamic Structures.

UNIT IV

Class: Definitions, Declaring Members and Methods in Functions, Functions Returning Objects, Static Data Members and Methods, Inline Function, Offline(Outline) Function, Virtual Function, Abstract Class, Friend Function, Function Overloading and Overriding. Constructors- Needs and Its Usage, Types of Constructors, Destructor, Pointer to Objects, Pointers to Members, Dynamic Class Objects, Friend Functions and Its Usage, Inheritance - Needs of Inheritance, Usage, Types of Inheritance.

UNIT V

Operator Overloading: Needs and Rules of Operator Overloading, Overloading Through Member Function and Friend Function. Type Conversion- Basic to Class, Class to Basic, One Class to Another Class. Compile Time and Run Time Polymorphism. String Class, Stream Classes In C++, Manipulators, Templates, File Handling.

Suggested Readings

1. Object Oriented Programming With C++ By E. Balagurusamy (Tata McGraw Hill)
2. C++ The Complete Reference By Herbert Schildt (Tata Mcgraw Hill)
3. Object Oriented Programming With C++ By Schaum Series (Tata McGraw Hill)

Paper Code: MIT 103 **Paper Name : Operating System**

UNIT I

Introduction to Operating System: Operating System structure: CPU management, File management, memory management, I/O management, types of Operating Systems: Simple batch operating system, multiprogramming batch mode operating system, time-sharing system, parallel system, distributed system, real time system. Process concept, Process control block (PCB), process states and relationship, process switch, threads.

UNIT II

CPU scheduling: FCFS, SJF, SRTM, Time sharing, MLQ, MLQ with feedback Scheduling criteria: CPU utilization, Throughput, Turnaround time, waiting time, response time, Memory management: Static, dynamic, paging, demand paging, virtual memory, segmentation, replacement policies and algorithms. FIFO, LRU, Optimal. File Concept: Access methods, and directory structure: Single Level and two levels tree structure, protection.

UNIT III

Process synchronization: Critical section, semaphores, mutual exclusion, Classical problems of synchronization: Bounded buffer problem, Readers and Writers problem, Dead locks, Dead locks characterization, prevention, avoidance, detection, recovery, Banker's Algorithm.

UNIT IV

Unix: features of Unix, Types of shell, Unix file system, inode and block storage of file, file and directory structure and permission. File related commands. Process: killing, changing priority, scheduling, communication in Unix, Unix tools.

UNIT V

Shell script, Shell variables, system variables, positional parameter, arithmetic in shell script, decision making, looping control structure, and programming.

Suggested Readings

1. Operating Systems Concepts and Design, Milan Milenkovic, TMH

2. Operating System Concepts, Abraham Silberschatz, Peter Baer Galvin Addison-Wesley.
3. Operating Systems Concepts, by Silberschatz, Galvin and Gagne.
4. P.K. Sinha, Distributed Operating Systems, PHI, 1998, R2.

Paper Code: MIT 104

Paper Name : Computer Organization & Architecture

UNIT I

Digital Computer, Data Type, Number System, Complements, Fixed-Point Representation, Floating Point Representation, Gray Code, BCD code, ASSCII Codes, Unicode, Error Detection Codes, Logic Gate, Boolean Algebra, Map Simplification, Combinational Circuits, Flip Flops, Sequential Circuits, Decoders, Multiplexers, Registers, Counters

UNIT II

Memory Organization: Memory Hierarchy, Main Memory, Auxiliary Memory, Associative Memory, Cache Memory, Virtual Memory, Memory Management Hardware.

UNIT III

Input – Output Organization: Input – Output Interface, Asynchronous DATA Transfer, Mode of Transfer, Priority Interrupt, Direct Memory Access (DMA), Input – Output Processor (IOP), Serial Communication.

UNIT IV

Central Processing UNIT : Stack Organization, Instruction Formats, Addressing Modes, Data Transfer and Manipulation, Program Control, Reduced Instruction Set Computer (RISC), CISC Characteristics, RISC Characteristics, Control Design – Hardwired Control, Micro – Programmed.

UNIT V

Microprocessor Architecture: Introduction, Intel 8085- ALU, Timing and Control UNIT, Register, Data and Address Bus, Pin Configuration, Intel 8085 Instruction, Opode and Operand Instruction word Size, Instruction Cycle, Instruction set of Intel 8085: Introduction, Instruction and Data Formats, Addressing Modes, Status Flags, Symbols and Abbreviations, Intel Instruction.

Suggested Readings

1. M. Morris Mano, Computer System Architecture, (Pearson, Prentice Hall)
2. JP Hayes, Computer architecture and Organization, Tata McGraw Hill
3. Tennenbaum, Computer Organization, PHI
4. V Carl Hamacher & Zeky : Computer Organization McGraw Hill
5. William Stalling : Computer Organization and Architecture, Prentice Hall of India
6. Digital Computer Organization By Prof. B.K. Biswas, IITKGP

Paper Code: MIT 105

Paper Name : Data Communication & Networking

The word limit

UNIT I

Introduction to data communication and networking: types of networks: LAN, MAN, WAN, data communication model, protocol and architecture: OSI reference model, TCP/IP model, topology, analog and digital transmission. Transmission impairment: Attenuation, delay distortion noise, Nyquist and Shannon theorem for channel capacity.

UNIT II

Transmission media: Twisted pair, coaxial cable, optical fiber, terrestrial microwave, satellite microwaves, radio waves, infrared. Digital Signal: NRZ-L, NRZ-I, Manchester, differential Manchester, Pulse code modulation, differential pulse code modulation, delta modulation. Asynchronous and synchronous transmission, Switching: Circuit switching, cross bar switching space division switch, time

division switch.

UNIT III

Data link layer: services, framing, flow control protocol: stop and wait protocol, sliding window protocol go back N and selective repeat, error correction and error detection, cyclic redundancy code. Medium Access sub layer: IEEE 802.3, 802.4 and 802.5 and FDDE standard and packet format, wireless LANs, bridges: transparent bridge, spanning tree bridge, source routing bridge.

UNIT IV

Comparison of packet switching, circuit switching, routing, shortest path (Dijkstra) routing, Hooding, Bellmanford routing, congestion control, effect of congestion, leaky bucket algorithm, token bucket algorithm, firewall, principle of internet working, IP protocol header, IP Header, IP address, Subnet, Subnet mask, IPV6 header.

UNIT V

Connection- oriented transport, protocol mechanism (TCP), address, upward and downward multiplexing, flow control, connection establishment and termination, UDP, security requirement and attack, conventional encryption, DES, public key encryption, RSA.

Suggested Readings

1. WL Scheweber Data Communications TMH, 1999.
2. Behrouz, Forouzan, Data Communication and Networking TMH, 1999
3. Andrew S Tennanbaum , Computer Networks, Prentice Hall of India,
4. Principles of Communication systems: IT(T) 403
5. W. Stalling, Data and Computer Communications. , Prentice Hall of India,

Paper Code: MIT 106

Paper Name : Relation Data Base Management System

UNIT I

Introduction to DBMS: Components, Structure, Different Views of Data, Advantages, Data Models: Hierarchical, Network, Relational, Object relational models, Codd's Rules. E-R Model: Entities, Attributes, Associations, Relationship, Keys. Normalization: 1NF, 2NF, 3NF, 4NF, BCNF, E-R Diagram. set theoretical operations: Selection, Projection, Join Division, Cartesian Product, Referential Integrity.

UNIT II

Relational Calculus: Structure of Relational database, Relational algebra, Modification of a database, Deletion, Insertion, updation, Selection, View, Tuple Relational Calculus, Domain Relational Calculus, File Organization: Heap, serial, Sequential, index sequential, hash-Indexing, B-Tree file organization.

UNIT III

Introduction to SQL: DDL, DML, DCL, Data Types, Table: Constraint, Domain, Entity, Referential integrity, Create, After, Drop Table, Commands: Insert, Update, Delete with Where, Queries and SQL Functions, Sequence, View, Index, Locks, Granting privilege, Report writing.

UNIT IV

Introduction to PL/SQL: Advantages, Character Set, Data types, Attribute, Control Structure, concept of Exception, User defined exceptions, Cursors, Composite data types, Tables vs Array. Database Triggers, Operators, Query and Sub-queries.

UNIT V

Recovery, Reliability, Types of Failures, audit trails, transaction, Failure anticipation and recovery in centralized DBMS, Buffer management Serializability, concurrency control, Locking scheme, deadlock detection, recovery, avoidance, Database Security.

Suggested Readings

1. Database management system : Korth, Tata McGraw Hill Publishing
2. Relational database management system : Bipin Desai, Galgotia Publications

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Paper Code: MIT 201

Paper Name : Data & File Structure Using C/C++

UNIT I

Need of programming languages, Defining problems Flowcharts and algorithm development. Data types, constants, variables, operators and expressions. Input and output statements, Conditional and control statements, Arrays 1-D and 2-D array.

UNIT II

Function: Types of functions, function prototype, passing parameters, recursion. Pointers: uses of pointers, pointer arithmetic, pointers and array, pointers and functions, pointer to pointer. Structures and Union. File handling : Opening, closing, creating, processing and unformatted data files, Introduction to Dynamic Memory Allocation,

UNIT III

Data Structure: Definition, Implementation, Analysis of algorithm, Complexity Measures and Notations. Arrays: Representation of arrays (multidimensional), Address calculation using column and row major ordering. Linked Lists: Implementation, Doubly linked list, Circular linked list.

UNIT IV

Stacks: Definition, Implementation, Application (Tower of Hanoi, Function Call and return, Parentheses Matching, Back-tracking, Expression Evaluation) Queues : Definition, deque, enqueue, priority queue, Implementation, Application

UNIT V

Tree: Definition of elements, Binary trees: Types (Full, Complete, Almost complete), Binary Search Tree, Traversal (Pre, In, Post & Level order), AVL Tree, B Tree. Graphs: Elementary definition, Representation (Adjacency Matrix, Adjacency Lists) Traversal (BFS, DFS Application: Spanning Tree (Prim and Kruskal Algorithm), Dijkstra's algorithm and shortest path algorithms. Sorting : Bubble, Selection, Insertion, Quick, Heap, Merge Searching : Simple String Searching, Binary Search

Suggested Readings

1. Let Us C: Yashwant Kanetkar, BPB Publication
2. Programming in ANSI C: Ebalagurusamy, Tata McGraw hill.
3. Data structure using C, Rajani Jindal, Umesh Publications.
4. Data structure and algorithms in C++, Adam Drozex, Vikas Publications.
5. Expert Data Structures with C, R.B. Patel, Khanna Book Publishing Co (P) Ltd. Delhi.

Paper Code: MIT 202 Paper Name : JAVA

UNIT I

Introduction to java, history, characteristics, Object oriented Programming, data types, variables. Arrays, control statements: Selection, interaction, jump statements, operators. Introduction to classes, class fundamentals, constructor, methods, stack class, inheritance creating multilevel hierarchy, method overriding.

UNIT II

Inheritance of procedures and Data, packages and interface, exception handling, multithreaded programming thread priorities, synchronization, messaging, creating and controlling of threads. String handling and various string functions. Java utilities like java.Lang, java.util and their uses, java.io, basics of networking using Java.

UNIT III

Java applets and their use – Event Handling – AWT and working with Windows – Event Handling – Event Handling Mechanisms, Delegation Event Model, Event Class, Event Listener Interfaces, Adapter Classes, Inner Class. AWT and working with windows – AWT Classes, Window fundamentals, frame

windows, frame window in An Applet, Working with Graphics, color, fonts and text.

UNIT IV

Swings, Java beans, beans architecture, JDBC class methods, JDBC Components, driver, connectivity to database, processing result and interfaces. Creating and executing SQL statements, Resultset and Resultset MetaData Object.

UNIT V

Servlet fundamentals – architecture, life cycle of a Servlet, initialization, Servlet and HTML, retrieving data in Servlet, servicing the GET and POST requests, Servlet sessions – session tracking, cookies. JDBC and Inter Servlet communications. JSP fundamentals – architecture, implicit objects, standard actions, JSP errors.

Suggested Readings

1. The Complete reference Java 2 By Patrick Naughton, Herbert Schildt (Tata McGraw Hill)
2. The Java Handbook, Patrik Naughton, Tata McGraw Hill
3. Introduction to Java Programming, E. Balaguruswamy, PHI.
4. Programming Java, Decker & Hirshfield, Vikas Publication.

Paper Code: MIT 203

Paper Name : Web Application Development using ASP.Net

UNIT I

Introduction to Web Application Development: Life Cycle of Web Application. Introduction to .NET Framework, Features of .Net, .Net Versions, Microsoft Intermediate Language – Meta Data, .Net types and .Net name spaces, Common Language Runtime, Common Type System, Common Language Specification, .Net Applications using command line compiler and visual studio .Net IDE.

UNIT II

Basics of ASP.NET: Introducing ASP .NET, Creating ASP .NET applications, Web forms, Web controls, working with events, Rich web controls, Custom web controls, Validation controls, Debugging ASP .NET pages. Advanced ASP .NET: ASP .NET configuration, Business objects, State Management: Query String, Session, Cache, Cookies.

UNIT III

ASP .NET security: Authentication and authorization, Deployment projects. Basics of ADO .NET, ADO vs. ADO.NET, ADO.NET Namespaces, ADO .NET Providers – OLEDB & SQL, Connected and Disconnected Mode, Dataset, Data Adapter, Command Object's Method, Programming with ADO.NET

UNIT IV

Web Services: Introduction to Web Services, Web services Infrastructure, Building a web service, Deploying and publishing web services, finding web services, Consuming web services.

UNIT V

Cyber Security: definition, cybercrime and information security, classification of cybercrime, cybercriminals, phishing, password cracking, keyloggers steganography, DoS and DoS attacks, SQL Injection, Cyber Law, The Indian IT Act, Digital Signatures and IT Act, Cyber security and organizational implications, Cyber crisis management.

Suggested Readings

1. Asp.net with C# by Chirs Hart, John Kauffman, Chris UllmanWorx Publication
2. ASP.NET 2.0 Black Book By Rudraksh Batra, Charul Shukla (Dream Tech Press)
3. ASP. NET Bible By Mridula Parihar and et al. (Hungry Minds, New York)
4. Cyber Security by Nina Godbole & sunit Belapure

Paper Code: MIT 204
Paper Name : Computer Graphics

UNIT I

Interactive graphics, Passive graphics, advantage of interactive graphics, classification of application, hardware and software requirement of computer graphics, Input and Output Devices of Computer Graphics, Scanners, Touch Panels, Data Gloves, Joystick, Monitors:-CRT and flat Panels etc. Working Characteristics of CRT, Raster Scan Display, Random Scan Display, Frame Buffer and Other Flat Panel Displays.

UNIT II

Scan Conversion, Point, Line, Circle, Ellipse, Representation of Various Line Drawing Algorithm, Circle Drawing Algorithm, Ellipses and Polygon Drawing Algorithm, Implementation of graphics Algorithm using C and visual basic programming, filling of polygons and various filling algorithms (flood fill and boundary fill algorithms).

UNIT III

2D Transformation, Translation, Rotation, Scaling, Homogenous Coordinates and Matrix Representation of 2D Transformation, Composite Transformation (co-ordinate axis based, pivot point based transformations), Windows to view port transformations, Clipping, need of clippings, Types of clipping, Method of Line Clipping, Polygon Clipping, interior and Exterior Clipping.

UNIT IV

3D Graphics, Matrix Representation of 3D transformations, Translation, Rotation, Scaling, Composite Transformation, Projection, Curves: Bezier curves and surfaces, B-Spline Curve and surfaces, Geometric and parametric continuity.

UNIT V

Solid Modelling, Representation of object vertices, edges and surfaces, Priority algorithm, Boolean set operations for solid modelling, Primitive instances, boundary representation, Graphics Standards: GKS, PHIGS and requirements of Graphics software Standards, GUI and concepts of graphics in windows environments, various tools of graphics in GUI concept

Suggested Readings

1. Computer Graphics By Hearn and Baker (Prentice Hall India)
2. Introduction to Computer Graphics By Krihnamurthy N (Tata McGraw Hill)

Paper Code: MIT 205
Paper Name : Discrete Mathematics and Iterative Methods

Unit I

Set Theory: Sets and Elements, Universal Set, Empty Sets and Sub Set, Venn Diagrams, Set Operation, Algebra of Sets and Duality, Finite and Infinite Sets and Counting Principle, Classes of Sets, Power Sets, Partition, Mathematical Induction, Multi Sets, Logic and Propositional Calculus- Propositions and Compound Propositions, Basic logic operation, Truth Tables, Tautologies and Contradictions, Logical Equivalence, Algebra of Propositions, Logical Implication, Normal Forms.

Unit II

Relations: Product Set, Relation, Pictorial Representation of Relations, Matrix Representations, Type of Relations. Closure Properties, Equivalence Relations, Functions and Algorithm- Function, Mapping, Recursively Defined Function, Cardinality, Algorithm and Functions, Complexity of Algorithms.

Unit III

Order Sets: Properties, Hasse Diagram, Consistent Enumeration, Supremum and Infimum, Isomorphic Order Sets, Well Order Sets. Boolean Algebra- Basic Definition, Duality, Basic Theorems, Sum of Products Form, Logic Gates and Circuits, Karnaugh Map.

Counting: Basic Counting Principle, Factorial Notations, Binomial Coefficients Pascals's Triangle,

Binomial Theorem, Permutations, Combinations, Pigeonhole Principle, Ordered and Unordered Partitions.

Unit IV

Graph: Directed and Undirected graph, multigraph, Sub Graph , Isomorphic & Homomorphic Graph Hamilton Graphs, Complete, Regular and Bipartite Graphs, Tree Graphs. Basic Definitions, Sequential Representation of Directed Graph, Digraph and Relations, Adjacency Matrix, Warshall's Algorithm. Linked Representation of Directed Graph, Depth First Search(DFS) and Breath First Search(BFS), Binary Tree , Rooted Tree , Spanning Tree , Kruskal's and Prims Algorithms.

Unit V

Iterative methods: Newton-Raphson method. Solutions of linear system by Gaussian, Gauss- Jordan, Jacobi and Gauss-Seidel methods. Inverse of a matrix by Gauss-Jordan method, Eigenvalue of a matrix by Power methods. Interpolation: Newton's divided difference formula. Newton's forward and backward difference formulae, Cubic Spline Interpolation. Numerical Differentiation and Integration: Numerical differentiation with interpolating polynomials, Numerical integration by Trapezoidal and Simpson's 1/3rd rule. Double integrals using Trapezoidal and Simpson's rules. Runge-Kutta method of order four for first and second order differential equations.

Suggested Readings

1. Discrete Mathematics By Vinay Kumar (BPB)
2. Discrete Mathematical Structure By Dr. K.C.Jain, Dr. M.L. Rawat(College Book Centre)
3. Balagurusamy, E., "Numerical methods", Tata McGraw-Hill, New Delhi, 2002.

MIT 206(A): Artificial intelligence & Expert Systems

Unit I

Overview of Artificial intelligence: Defining the problem as a state and space search, Production system, Control Strategies, Knowledge Representation: Using Predicate Logic, computable Function and Predicates, Resolution.

Unit II

Knowledge : Procedure V/S Declarative Knowledge, Matching, Control Knowledge, Probability and Byes Theorem, Certainty factors, and Rule based System, Frames, Frames, Scripts, and Semantic Nets.

Unit III

Search and control strategies : Preliminary concept, Uniform and Blind search, breadth first search, depth first Search, A, A*, AO*, Performance Comparison of various search technique.

Unit IV

Introduction to PROLOG programming : Syntax for Predicate calculus programming. Abstract Data Types (ADT) in PROLOG. Mete-predicates, Types and Unification, Meta Interpreters, Semantic Nets and Frames in PROLOG.

Unit V

Expert System : Introduction, Features Applications Expert System Shells, Rule Based System Architecture, Non-Production System Architecture, Frame Architecture, Decision Tree Architecture, Black Board System Architecture, Knowledge System Building Tools.

Suggested Readings

1. Artificial Intelligence By Rich And Knight (Tata McGraw Hill)
2. Introduction to Artificial Intelligence and Expert Systems By Patterson (Prentice-Hall India)

Paper Code: MIT 206(B)

Paper Name : Data Warehousing and Data Mining

UNIT I

Introduction to Data Warehouse, Data warehouse uses, Data Warehouse Planning stages and Designing

approaches. Delivery Process-Data Warehouse Delivery Methods. System Processes; data in Flow Process, Extract and load process, Clean and transform Process, Backup and Archive process and Query Management Process. Process Architecture - Load manager, Warehouse manager, Query manager.

UNIT II

Database Schema-Star flake schema, Identifying facts and dimensions, Designing fact tables and dimension tables, Design Star flake schema, Multi-dimension schemas. Horizontal and vertical partitioning, Hardware partitioning. Aggregations and aggregation summary table Data Marts, Designing Data Marts. Metadata-Data transformation and load Managers.

UNIT III

Hardware architecture-Process, Server, Network and Client hardware. Physical Layout-Parallel technology Disk technology, Contents of data warehouse database, Database structures and layout and file systems. Security- Security requirements, impact of security on design and performance, Backup strategies and disaster recovery. Service agreement and operations of Warehouse.

UNIT IV

Capacity Planning (Process Estimate load), Tuning the data warehouse (Aggregate performance, data load and queries). Testing data warehouse-Develop test plan Testing backup recovery, Testing operational environment, testing database, testing of the application. Data warehouse futures.

UNIT V

Data Meaning concepts, Business Technical and Social context for Data mining. Data Mining approaches, Data mining methodologies. Data mining techniques (Automatic cluster detection, Decision tree), Building good effective models, Working with model set, multiple models. Case studies of data mining mode for an online bank, Wireless communication corporation.

Suggested Readings

1. Sam Anahory, Dennis Murray, "Data Warehousing", Pearson Education pub.
2. Michel A. Berry, Gordon S. Linoff, "Mastering Data Mining", Wiley Publishing.
3. Mallach G, Fredn E, "Decision Support System and Data Warehouse Systems", TMH

Paper Code: MIT 206(C)

Paper Name : Communication Theory

UNIT I

Introduction to Communications System, Analog communication, digital communication, transmission media, Advantages & Disadvantages of Analog & digital communication, Modulation, Need for Modulation, modulation techniques, Introduction to wireless transmission, spread spectrum, signal propagation, multiplexing, signals, antennas

UNIT II

Amplitude Modulation, Methods of generation & demodulation of AM-DSB, AM-DSB/SC and AM-SSB signals. Modulation & detector circuits for AM systems. AM transmitters & receivers.

UNIT III

Phase & freq. modulation & their relationship, Spectrum & band width of a sinusoidally modulated FM signal, Narrow band & wide band FM. Generation & demodulation of FM signals. FM transmitters & receivers. Comparison of AM, FM & PM.

UNIT IV

Access control - specialized MAC - SDMA - FDMA - TDMA - aloha - CSMA – collision avoidance - polling - CDMA - comparison of S/T/F/CDMA satellite systems- broadcast systems, digital audio broadcasting, digital video broadcasting, WDM Optical networks Bluetooth, IEEE 802.16.

UNIT V

Mobile network layer, mobile IP, packet delivery registration, tunneling and encapsulation, Adhoc networks, routing, algorithms, metrics, mobile transport layer - TCP, indirect TCP, snooping TCP, mobile TCP, retransmission, recovery, support for mobility, file systems, WWW, WAP, architecture, datagram protocol.

Suggested Readings:

1. Wireless Communication & Networking: William Stalling, PHI.
2. Communication Theory: Sanjay Sharma, S.K. Kataria & Sons
3. Wireless Communication: R P Yadav

Paper Code: MIT 209 Paper Name : Project**Scheme of Examination**

Maximum Marks: 50

Duration: 3 Hours

Minimum Passing Marks: 13

Marks distribution for Project of 50 marks is as under

- | | | |
|----|-----------------------------------------------|----------|
| a) | Research Project/ Case Study and Presentation | 35 marks |
| b) | External Viva Voce | 15 marks |

Practical Training and Project Work:

1. Project Work may be done individually or in groups in case of bigger projects. However if project is done in group each student must be given a responsibility for a distinct module and care should be taken to monitor the individual student.
2. Project Work can be carried out in the college or outside with prior permission of college.
3. The Student must submit a synopsis of the project report to the college for approval. The Project Guide can accept the project or suggest modification for resubmission. Only on acceptance of draft project report the student should make the final copies.

Submission Copy:

The Student should submit spiral bound copy of the project report.

Format of the Project:(a) **Paper:** The Report shall be typed on White Paper of A4 size.(b) **Final Submission:**The

(c) Report to be submitted must be original.

(d) **Typing:****Font:-** Times New Roman **Heading:-** 16 pt., **Bold Subheading:-** 14 pt, **Bold Content:-** 12 pt.**Line Spacing:-** 1.5 line. **Typing Side :-**One Side **Font Color:-** Black.(e) **Margins:**The typing must be done in the following margin:**Left :** 0.75”**Right:** 0.75”**Top:** 1”**Bottom:** 1”**Left Gutter:** 0.5”(f) **Binding:**

The report shall be Spiral Bound.

(g) **Title Cover:**

The Title cover should contain the following details:

Top: Project Title in block capitals of 16pt.**Centre:** Name of project developer’s and Guide name.**Bottom:** Name of the university, Year of submission all in block capitals of 14pt letters on separate lines with proper spacing and centering.(h) **Blank sheets:**

At the beginning and end of the report, two white blank papers should be provided, one for the Purpose of Binding and other to be left blank.

(i) **Content:**

I). Acknowledgement

- II).** Institute/College/Organization certificate where the project is being developed.
- III).** Table of contents
- IV).** A brief overview of project
- V).** Profiles of problem assigned
- VI).** Study of Existing System
- VII).** System Requirement
- VIII).** Project plan
 - Team Structure
 - Development Schedule
 - Programming language and Development Tools
- IX).** Requirement Specification
- X).** Design
 - Detailed DFD's and Structure Diagram
 - Data structure, Database and File Specification
- XI).** Project Legacy
 - Current Status of project
 - Remaining Areas of concern
 - Technical and Managerial Lessons Learnt
 - Future Recommendations
- XII).** Nomenclature and Abbreviations.
- XIII).** Bibliography
- XIV).** Source Code.
