

M.Sc. (IT)

Semester I

Subject Code	Name of Subject	Teaching			Total Credit
		L	T	P	
01MSI-101	Computer Organization	4	2	0	6
01MSI-102	Algorithmic & Application Programming	4	2	0	6
01MSI-103	Discrete Mathematical Structures	4	2	0	6
01MSI-104	Web Technology	4	2	0	6
Practical					
01MSI-201	'C' and Data Structure Lab	0	0	3	2
01MSI-202	Web Tech. Lab	0	0	3	2
01MSI-301	Discipline & Co-Curricular Activities	0	0	4	1
Total		16	8	10	29

Semester II

Subject Code	Name of Subject	Teaching			Total Credit
		L	T	P	
02MSI-101	Data Communications & Comp. Networks	4	2	0	6
02MSI-102	Data Warehousing and Mining	4	2	0	6
02MSI-103	Computer Oriented Numerical Methods	4	2	0	6
02MSI-104	Object Oriented Concepts & C++	4	2	0	6
Practical					
02MSI-201	Numerical Programming in 'C'	0	0	3	2
02MSI-202	Programming Lab in C++	0	0	3	2
02MSI-301	Discipline & Co-Curricular Activities	0	0	4	1
Total		16	8	10	29

Semester III

Subject Code	Name of Subject	Teaching			Total Credit
		L	T	P	
03MSI-101	Relational Database Management System	4	2	0	6
03MSI-102	Software Engineering	4	2	0	6
03MSI-103	Programming in Java	4	2	0	6
03MSI-104	Artificial Intelligence	4	2	0	6
Practical					
03MSI-201	RDBMS Lab	0	0	3	2
03MSI-202	Java Exploring Internet Lab	0	0	3	2
03MSI-301	Discipline And Co-Curricular Activities	0	0	4	1
Total		16	8	10	29

Semester IV

Subject Code	Name of Subject	Teaching			Total Credit
		L	T	P	
04MSI-101	Operating System	4	2	0	6
04MSI-102	Programming In Visual Basic	4	2	0	6
04MSI-103	Project	8	4	0	12
Practical					
04MSI-201	Unix, Shell Programming Lab	0	0	3	2
04MSI-202	Programming Lab using VB & .NET	0	0	3	2
04MSI-301	Discipline & Co-Curricular Activities	0	0	4	1
Total		16	8	10	29

Semester I

01MSI-101

COMPUTER ORGANIZATION

Course/Paper: 01MSI-101
MSISemester -I

Number system, Logic gates, Boolean algebra, K-Map, combinational circuit, flip-flop, sequential circuit, encoder, decoder, multi-plexer, shift register, fixed-point representation, floating-point representation.

Register transfer language, inter-register transfer, arithmetic micro operation, logic and shift micro operation, instruction codes, timing and control, input/output and interrupts.

Processor bus organization, arithmetic logic unit, stack organization, instruction format, addressing mode data transfer and manipulation, program control, control memory, addressing sequence, micro program sequencer, micro instruction formats.

Addition subtraction algorithm, multiplication algorithm, division algorithm, input-output interface, direct memory access. 8257 DMA controller, priority interrupts input-output processor, Programmable interface devices, parallel communication, 8255 programmable peripheral interface.

Block diagram of 8085 and pin configuration, 8086/8088 instruction set, data transfer instructions, arithmetic, logical, shift, rotate, flag, compare, jump instruction, subroutine, loop, addressing modes, memory hierarchy, associative memory, memory addressing, virtual memory, cache memory, cache coherence.

Suggested readings-

- 1). Digital Design M.MORRISMANO (Pearson Edition)
- 2). Computer Organization. Carl HAMCHER, 2 VONKE VRANESIC (International Edition)
- 3). Computer Organization Architecture. WILLIAM STALLINGS (Pearson Edition)

01MSI-102

ALGORITHMIC AND APPLICATION PROGRAMMING

Course/Paper: 01MSI-102
MSISemester -I

Basic concepts and notation of Algorithm, Understanding the Problem, Pseudo code and Flowchart, efficiency of algorithms, complexity measures, basic time analysis of an algorithm.

C Language: Types, Operators and Expressions, variable names, data types and sizes constants, declarations, operator, expressions and type conversions.

Control flow: Statements and blocks, selection and loops structures, break, continue, branching and labels.

Functions and program structure: Basics, functions and their arguments, external variables and static variables, scope rules, register variables, block structures, initialization, recursion.

Pointers and Arrays: Pointers and addresses, pointers and function arguments, pointers and arrays, address arithmetic, character pointers and functions, multi-dimensional arrays, pointers arrays, pointer to functions, 2D string and string functions.

Structures: Basics, structures and functions, arrays of structures, pointers to structures, typedef, Single linked list, double linked list, circular list, sparse table, stack, queue, list, prefix, postfix, infix, sorting, insertion, selection, bubble, quick, merge, radix. Searching, binary, linear

Tree, Binary Tree, tree traversal, in-order, pre-order, post-order graph, BFS, DFS, algorithm of Kruskal, prism.

Suggested readings-

- 1). Fundamentals of Algorithmics. Gills Brassard, Paul Brotley (Prentice Hall India)
- 2). Introduction of Algorithmics. Corman. (Hitesh Jaipur)
- 3). Fundamentals of Algorithmics. Brassard & Bentley. (Pearson publication)

01MSI-103

DISCRETE MATHEMATICAL STRUCTURES

Course/Paper: 01MSI-103 MSI Semester -I

Law of formal logic, connectivity, propositions, conditional statements, WFF tautology, contradiction, logical equivalence, law of logic, duality, logical implications, normal forms, sets, sub-sets, finite and infinite sets, universal, power disjoint sets, property of sets, union, intersection sets, distributive, complement and property of complement, Venn diagram, difference, Cartesian product set. Relation property. Irreflexive, asymmetric, compatible universal complementary relation, equivalence class, coordinate diagram, transitivity extension, closure, matrix representation and digraph, functions, mapping, composition of function, associative mapping, inverse mapping, characteristic functions, recursions, linear recursion relation, non homogeneous relations.

Partial ordering, total order set, dual order, Hasse Diagram, Lexicographic ordering, least and greatest element, minimal and maximal element, upper and lower bound, Well ordering theorem, Lattices, property bound lattices, direct product, Boolean algebra, homomorphism, minimization function, gates, Boolean algebra and applications.

Basic of counting, permutation combination, circular permutation, power set, basic identities, partition and cross partition, pigeonhole principle, Pascal triangle,

Graph, definition, incidence and degree, order of graph, adjacency matrix, linked representation, circuit path, sub-graph, removal and addition of vertex and edge, operation of graph, complement and connect of graph, cycle, path, wheel, bipartite graph, isomorphism, forest and operation, tree, spanning tree, rooted tree, binary tree, height balance binary tree, planar graph, Eulers graph and Hamiltonian graph, digraph

Suggested readings-

- 1). Discrete Mathematical Structure. Dr V.B.L Chaurasis (Genius Pub)
- 2). Discrete Mathematical Structure. Kolman, Busby (PHI Publication)
- 3). Discrete Mathematical Structure. Dr.K.C.Jain (CBC)
- 4). Discrete Mathematics. Olympia Nicodemi (CBS)

01MSI-104

WEB TECHNOLOGY

Course/Paper: 01MSI-104
MSISemester -I

The internet: history of the World Wide Web, hardware and software trend, object technology – java script object, scripting for the web-browser portability.

Introduction of HTML: introduction, markup language, editing HTML: common tags, headers, text styles, linking, images, formatting text, horizontal rules and more line breaks, unordered lists, nested and ordered lists, basic HTML tables : intermediate HTML tables and formatting : basic HTML forms, more complex HTML forms, internal linking, creating and using image maps.

Java script – introduction to scripting: introduction- memory concepts- arithmetic- decision making. Java script control structures, Java script functions: introduction – program modules in java script - function definitions, duration of identifiers, scope rules, recursion, java script global functions.

Java script arrays: introduction, array-declaring and allocating arrays, references and reference parameters – passing arrays to functions, multiple subscripted arrays. Java script objects: introduction, math, string, data, boolean and number objects.

Dynamic HTML CSS : introduction – inline styles, creating style sheets with the style element, conflicting styles, linking external style sheets, positioning elements, backgrounds, element dimensions, text flow and the box model, user style sheets.

Dynamic HTML: object model and collections: introduction, object referencing, collections all and children, dynamic style, dynamic positioning, using the frames collection, navigator object. Dynamic HTML: event model : introduction, event ON CLICK, event ON LOAD – error handling with ON ERROR, tracking the mouse with event, more DHTML events.

Filters and Transitions: Dynamical HTML: Client side scripting with VB script: Introduction - operators- data types and control structures – VB script functions – arrays –string manipulation classes and objects.

• Suggested readings-

- 1).H.T.M.L,D.H.T.M.L,C.G.I .Ievan Bayross (BPB)
- 2).Web Technology. Pankaj Sharma (S.K.Kataris & Sons)
- 3).Internet How to Program. Deitel (Person)

01MSI-201

'C' AND DATA STRUCTURE LAB

Course/Paper: 01MSI-201
MSISemester -I

01MSI-202

WEB TECH. LAB

Course/Paper: 01MSI-202
MSISemester -I

Semester II

02 MSI-101

DATA COMMUNICATIONS AND NETWORKS

Course/Paper: 02 MSI-101
MSI Semester -II

Introduction to Data communications and networking, protocols, standards and architecture, topology, transmission mode, OSI model, analog and digital signals, periodic and aperiodic signals, time and frequency domain, Fourier analysis concept.

Encoding digital to digital conversion, analog to digital conversion, digital to analog conversion, analog to analog conversion, transmission of digital data, DTE-DCE interface, EIA-232, EIA-449, X.21, modem, cable modem, guided and unguided, transmission media.

Multiplexing, TDM, FDM, WDM, DSL, HDLC, error classification, types of errors, error detection, error correction, virtual redundancy check, longitudinal redundancy check, cyclic redundancy check.

Asynchronous transfer mode, protocol architecture, ATM cells, ATM layers, switches, circuit switching network and concepts, routing, packet switching, X.25, virtual circuit approach, point-to-point layers, link control protocol, network control protocol.

Introduction to ISDN, subscriber access to ISDN, ISDN layer, broadband ISDN, frame relay, frame relay operations and layers, repeaters, bridges, gateway, routers, client-server mode, boot-strap protocol, Telnet, FTP, hypertext protocol.

• Suggested readings-

- 1). Computer Networks. Andrew's Tanenbaum (Pearson Publication)
- 2). Computer Networking. James.F.Kurose, Keithw.Ross (Pearson Publication)
- 3). Networking and System. D.Roy Choudhary (New AGE International)
- 4). A.T.M Networks. Rainer Handel, Manfred (Pearson Publications)

02 MSI-102

DATA WAREHOUSING AND MINING

Course/Paper: 02 MSI-102
MSI Semester -II

Data Warehousing: 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. Database Schema Star flake schema, Identifying facts and dimensions,

Designing fact *tables* and dimension *tables*, Designing Star flake schema Multidimension Schemas. Horizontal and Vertical partitioning, Hardware partitioning.

Aggregation and aggregation summary *tables*. Data Marts, Designing data Marts. Metadata Data transformation and load, Data management, Query generation,

Metadata and tools. Data Warehouse Process and Load Managers. Hardware architecture Process, Server, Network and Client hardware, Physical database 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.

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 environmental, testing database, testing of the application, Data warehouse futures. Data Mining: Data Mining 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 Modes. Case

Studies of data mining mode for an online bank. Wireless communication corporation.

. Suggested readings-

- 1). Data Warehouse OLAP and Data Mining. S.Nagabhushana.(AGE International Publications)
- 2). Data Mining, Data Warehouse & OLAP. Gajendra Sharma.(S.K Kataria & Sons)
- 3). Data Warehouse, Data Mining & OLAP. Alex Berson, Stephen j. Smith.(S.K Kataria & Sons)

02MSI-103

COMPUTER ORIENTED NUMERICAL METHODS

Course/Paper: 02MSI-103
MSI Semester -II

Bisection method, method of successive approximation, method of false position. Newton's iteration method, geometrical interpretation, convergence of Newton, Newton Raphson method, Horner's method Gauss Elimination, Jordan method, inverse of matrix using Gauss Elimination method, Iterative methods, Jacobi method of iteration. Gauss Seidel Iteration method Finite differences, forward, backward, central differences, difference of polynomial, fractional polynomial, reciprocal factorial Gregory Newton Forward and Backward interpolation Formula. Gauss Forward and Backward interpolation Formula. Derivatives using Newton's Forward. Backward difference formula, trapezoidal rules, Simpson's 1/3, 3/8 rules. Weddle's rule.

. Suggested readings-

- 1) Computer Oriented Numerical Methods V.Rajaraman (PHI)
- 2) Introduction to Numerical Analysis S.S. Sastri (PHI)

3).Numerical Method. Er Ginish Nayyar.(S.K Kataia & Sons)

4).Advanced Engineering Mathematics.Prof RohitMukherjee,Drvivek.(Genius Publications)

02MSI-104

OBJECT ORIENTED CONCEPTS AND C++

Course/Paper: 02MSI-104
MSISemester –II

Data types, operator, input-output, control statements, loops, arrays, strings and string functions, functions, structure and union. Introduction to OOPS, object oriented analysis and design, class, declaring object, member function, data hiding, parameter passing, friend function and class, empty static, overloading, constructor, type of constructor, destructor, recursive constructor, calling constructor and destructor, overloading unary operator, binary operator with friend function, rule of overloading.

Inheritance, derive and base class, overriding, base and derive constructor, type of inheritance, virtual base class, abstract class, qualifier class and inheritance, pointer, pointer to class, pointer to object, pointer to derived class and base class, pointer to member, pointer to array, accessing private member and direct access to private member, new delete operator, dynamic memory

Binding in C++, virtual function, rule for virtual function, pointer to derive class object, pure virtual function, constructor and virtual functions, polymorphism, file, file operator and commands, use in C++, templates..

• Suggested readings-

- 1).Let us c++. Yashwant kanetker. (B.P.B)
- 2).Object Oriented Programing With C++. Vikas Thada (CBC)
- 3) Object Oriented Programing With C++. Ebalagurusamy.(Tata Mcgraw Hill).

02MSI-201

NUMERICAL PROGRAMMING IN ‘C’

Course/Paper: 02MSI-201
MSISemester -II

02MSI-202

PROGRAMMING LAB IN ‘C++’

Course/Paper: 02MSI-202
MSISemester -II

Semester III

03MSI-101

RELATIONAL DATABASE MANAGEMENT SYSTEMS

Course/Paper: 03MSI-101
MSI Semester –III

Object of database systems, data abstraction, data definition language, data manipulation language, database administrator database model, database system architecture. Entity relationship model, entities and entity sets their relationship, mapping constraints, generalizations, aggregation, use of ER model for the design of databases, sequential, random, index sequential file organization, relational algebra, normalization up to DKNF. Object oriented modeling, class, different types of attributes, generalization, inheritance, aggregation, encapsulation, distributed database design, architecture of distributed processing system, data communication concept, data placement, placement of DDBMS, and other components, concurrency control techniques, recovery, transaction management, need of recovery, recovery techniques, serializability, two-phase locking.

Query optimization and processing, algorithm for external sorting, select and join, object and set operations, heuristics in query optimization, temporal database concept, multimedia database, data-mining, association rule, classification, application, data warehousing, need, architecture, characteristics, data layer, XML, tree data model, document, DTD schema query, database, data-warehousing versus view. Security and integrity of databases, security specifications in SQL, access control, flow control, encryption of public key infrastructure, cryptography and types. SQL*PLUS Data types, Constraints, Operators, DDL, DML, PL/SQL syntax, Data types, PL/SQL functions, Error handling in PL/SQL, package functions, package procedures, Oracle transactions. Stored procedures & functions, creation and execution of procedures, triggers.

. Suggested readings-

- 1). Database Management System. pooja jain.
- 2). Database Management System. Kourth. (Tata Mcgrow Hill)
- 3). Database Management System. Raghu Ramakrishnan. (Tata Mcgrow Hill)

03MSI-102

SOFTWARE ENGINEERING

Course/Paper: 03MSI-102
MSI Semester –III

Concepts of Software Engineering, Software Characteristics, components applications, software metrics and Models; Process and Product Metrics, Size Metric, Complexity metric, McCabe's Cyclometric Complexity, Halsted Theory, Function Point Analysis.

System Development Life Cycle (SDLC) Steps, Water fall model, Prototypes, Spiral model. Planning and Software Project: Cost Estimation. Project Scheduling, Quality Assurance Plans, project Monitoring Plans.

Software Development & Software Design: System design, detailed design, function oriented design, object oriented design, user interface design. Design level metrics: phases, Process models, Role of Management, Role of Metrics and Measurement, Software Quality factors.

Coding and Testing: Programming Practices, verification, Monitoring and Control, Testing level Metrics Software quality and reliability Clean room approach, software reengineering.

Testing and Reliability : Testing Fundamentals, Test case design, Functional Testing, Structural Testing, Test Plan activities during testing. Unit System. Integration Testing. Concept of Software Reliability, Software Repair and Availability, Software Errors and Faults Reliability Models (JM, GO, MUSAMarkov) Limitations of Reliability Models.

. Suggested readings-

- 1).Software Engineering. Rogers Pressman (Tata Mcgrow Hill)
- 2).Advanced Software Engineering. Shalni Puri. (Genius)
- 3).Softwre Engineering.Hadson.

03MSI-103

PROGRAMMING IN JAVA

**Course/Paper: 03MSI-103
MSI Semester –III**

Introduction to Java, history, characteristics, Object oriented programming, data types, variables, arrays, difference between Java and C++. Control statements: selection, iteration, jump statements, operators Introduction to classes, class fundamentals, constructor, methods, stack class, inheritance, creating multi-level hierarchy, method over riding Packages and interfaces, exception handling, multi-threaded programming, I/O applets.

Java Library, string handling, string comparison, string buffer, utility classes, vector stack dictionary, applet class, introduction to AWT, working with frame windows.

Java beans, beans architecture, AWT components, advantage of Java beans, beans serialization, JDBC, class and methods, API components, JDBC components, driver, connectivity to database, processing result and interfaces, RMI, comparison of distributed and non distributed Java programs, interfaces, RMI architecture layer, ODBC, CORBA, CORBA services and products, CGI, structure of CGI.

. Suggested readings-

- 1).Programing With Java. E-Balagurusamy.()
- 2).java2.Hebert Schildt.(Tata Mcgrow Hill)
- 3).Complef Refrence of java.Schildt.(Tata Mcgrow Hill)
- 4).J2EE Black Book.Kogent.Dreatesh

03MSI-104

ARTIFICIAL INTELLIGENCE

**Course/Paper: 03MSI-104
MSI Semester –III**

Definition of AI, Application of AI, knowledge-based system, representation of knowledge, organization, manipulation and acquisition of knowledge.

Introduction of prolog, variable, object, domain, clauses, recursion, basiclist manipulation function, predicates, input, output, local variable, iteration, recursion, arrays, database in prolog, rule order, goal order, cut, trial, prolog, query

Syntax, semantics of propositional logic, syntax and semantics of FOPL, conversion to clausal form, inference rule, resolution principles, nondeductive inference methods, representation using rules, truth maintenance system, predicate completion and circumscription, modal and temporal logics, fuzzy logic.

Bayesian probabilistic inference, possible word representations, Dempster-Shafer Theory, Ad-Hoc methods, Heuristic reasoning methods, associative networks, frame networks, search problems, uniformed or blind search, searching And-Or graph Matching techniques, measures for matching, matching like patterns, partial matching, Fuzzy matching algorithms, indexing and retrieval techniques, integrating knowledge and memory.Expert system, rule based

system architecture, non-productive system architecture dealing with uncertainty, knowledge acquisition and validation, knowledge system building tool.

. Suggested readings-

- 1).Artificial Intelligence.Rich,Knight.(Tata Mcgrow Hill)
- 2).Artificial Intelligence. Russel Noring.(Pearson)

03MSI-201

RDBMS LAB

Course/Paper: 03MSI-201
MSISemester -III

03MSI-202

JAVA EXPLORING INTERNET LAB

Course/Paper: 03MSI-202
MSISemester -III

Semester IV

04MSI-101

OPERATING SYSTEMS

Course/Paper: 04MSI-101
MSISemester –IV

Introduction to Operating Systems, goals of OS, operation of OS, resource allocator and related functions, classes of OS, batch processing, multi- processing, timesharing, distributed, real time systems, system calls, system programs, structure of OS, layer design of DOS, Unix, virtual machine OS, kernel based OS, micro-kernel based OS, architecture of Window 2000

Process concept, interacting process, threads, process in Unix, process and thread in Windows 2000, process scheduling, fundamental of scheduling, scheduling criteria, long medium short term scheduling, scheduling algorithms upto multi-processor scheduling, algorithm evaluation, structure of concurrent systems, critical section critical region, inter-process communication, monitor and semaphores, implementation and uses

Logical versus physical address, swapping, contiguous allocation, segmentation, paging, segmentation with paging, kernel memory allocation, page replacement algorithm, virtual memory, virtual memory with paging, demand paging, dead lock, characterization, methods for handling dead locks, prevention, avoidance, thrashing, allocation of frame, virtual memory using segmentation, Windows 2000.

Unix: History, programmer interface, file manipulation, process control, kernel, signals file system, block and inodes, stream editor, character transliteration, VI editor. Shell script, variables, file name expansion, shell commands, looping and making decisions.

. Suggested readings-

- 1). Operating System.Galvyn.
- 2). Operating System.D.M.Dhamdhare.
- 3). Operating System concept.Manish K .Sah(Ashirwad)
- 4).Modern Operating System.Tanenbaum.

04MSI-102

PROGRAMMING IN VISUAL BASIC

Course/Paper: 04MSI-102
MSI Semester -IV

Introduction : Need of Visual languages, Integrated Development Environment (IDE), Advantage of Visual BASIC, Characteristics and features of Visual BASIC IDE, Projects, User Interface, Object oriented, Visual Development and Event Driven Programming, Forms/Graphic Controls, Data Processing, sharing with Windows and Internet applications

Visual Basic Programming and Tools: An Introduction of Visual BASIC Programming, simple program construction, Statements, Input/Outputs, Comments, Editor, Subroutines, Control Flow Statements, Objects, and variants. Designing User Interface Elements of User Interface, Understanding Forms, Menus and Toolbars,

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

Controls Textbox, Combo Box, Scrollbar and slider Controls Operations, Generating Timed events, drawing with Visual Basic using Graphics, controls, Coordinate systems and Graphic methods. Manipulating Colors and Pixels with Visual Basic, Database programming with Visual Basic Data access methods. Creating, reading and writing text files. Data Controls, creating queries.

Structure of VB.Net, data type, operator, constants, arrays, control statements, loops, advance features of VB.Net, collection, interface, events, delegates, overloading, attributes, database connectivity with VB.Net using ADO.Net

. Suggested readings-

- 1).black book.Steven Holzner.(Dreamtech Publications)
- 2).Visual Basic.Gurmeet Singh.(Laxmi Publications)
- 3).Mastering in Visual Basic.Erangles.(B.P.B)

04MSI-102

PROJECT

Course/Paper: 04MSI-102
MSI Semester -IV

04MSI-201

Unix Shell Programming Lab

Course/Paper: 04MSI-201
MSI Semester -IV

04MSI-202

PROGRAMMING LAB USING VB & .NET

Course/Paper: 04MSI-202
MSI Semester -IV