MAHARSHI DAYANAND SARASWATI UNIVERSITY, AJMER

पाठ्यक्रम

SYLLABUS

SCHEME OF EXAMINATION AND COURSES OF STUDY

FACULTY OF SCIENCE

M.Sc. Information Technology

Annual Scheme (For Affiliated Colleges)

M.Sc. IT (Prev) & (Final)

2012–13 से प्रभावी(w.e.f.)

सत्र 2013–14

महर्षि दयानन्द सरस्वती विश्वविद्यालय, अजमेर

NOTICE

1. Change in Statutes/Ordinances/Rules/Regulations/ Syllabus and Books may, from time to time, be made by amendment or remaking, and a candidate shall, except in so far as the University determines otherwise comply with any change that applies to years he has not completed at the time of change.**The decision taken by the Academic Council shall be final.**

सूचना

1. समय-समय पर संशोधन या पुन: निर्माण कर परिनियमों /अध्यादेशों / नियमों / विनियमों / पाठ्यक्रमों व पुस्तकों में परिवर्तन किया जा सकता है, तथा किसी भी परिवर्तन को छात्र को मानना होगा बशर्ते कि विश्वविद्यालय ने अन्यथा प्रकार से उनको छूट न दी हो और छात्र ने उस परिवर्तन के पूर्व वर्ष पाठ्यक्रम को पूरा न किया हो। **विद्या परिषद द्वारा लिये गये निर्णय अन्तिम होंगे।**

TEACHING AND EXAMINATION SCHEME FOR M. SC. INFORMATION TECHNOLOGY –PREVIOUS

Paper Name (Theory)		Lec	Tut	Exam Hours	Max Marks	
					Internal	Main
MIT – 101	Computer Organization	3	1	3	20	80
MIT – 102	Data Structures and Algorithm	3	1	3	20	80
MIT – 103	Relational Database Management Systems	3	1	3	20	80
MIT – 104	Discrete Mathematical Structures	3	1	3	20	80
MIT – 105	Programming in Visual Basic	3	1	3	20	80
MIT – 106	Web Technology	3	1	3	20	80
MIT – 107	Data Communication & Networks	3	1	3	20	80
MIT – 108	Data Ware-housing & Data Mining	3	1	3	20	80
	Total of Theory					**800**

Paper Name (Practical)		Pract Hours	Pract Exam	Min Mark	Max Marks
MIT – 109	Programming Lab – 1 ('C' and Data Structures)	3	3	20	50
MIT – 110	Programming Lab – 2 (SQL Programming)	3	3	20	50
MIT – 111	Programming Lab – 3 (Visual Basic & .NET)	3	3	20	50
MIT – 112	Programming Lab – 4 (HTML, FrontPage, JavaScript)	3	3	20	50
	Total of Practical				200
	Grand Total (Theory + Practical)				**1000**

M. SC. INFORMATION TECHNOLOGY – FINAL

Paper Name (Theory)		Lec	Tut	Exam Hours	Max Marks	
					Internal	Main
MIT – 201	Operating Systems	3	1	3	20	80
MIT – 202	Object Oriented Concept & C++	3	1	3	20	80
MIT – 203	Computer Oriented Numerical Methods	3	1	3	20	80
MIT – 204	Software Engineering	3	1	3	20	80
MIT – 205	Programming in Java	3	1	3	20	80
MIT – 206	Artificial Intelligence	3	1	3	20	80
MIT – 207	Cyber Law & Internet Security	3	1	3	20	80
MIT – 208	Software Testing & Quality Assurance	3	1	3	20	80
	Total of Theory					**800**

Paper Name (Practical)		Pract Hours	Pract Exam	Min Mark	Max Marks
MIT – 209	Programming Lab – 5 (C++ & Software Engg)	3	3	20	50
MIT – 210	Programming Lab – 6 (Unix, Shell Prog and Numerical Programming in C)	3	3	20	50
MIT – 211	Programming Lab – 7 (Prolog Programming)	3	3	20	50
MIT – 212	Programming Lab – 8 (Java, Exploring Internet)	3	3	20	50
MIT – 213	Project	6	3	40	100
	Total of Practical				300
	Grand Total (Theory + Practical)				**1100**

The question paper will be divided into 3 parts:

Part A:

1. 10 Question of 1 mark each
2. Answer should not exceed more than 20 words
3. All questions are compulsory

Part B:

1. 5 Questions of 2 marks each
2. Answer should not exceed more than 50 words
3. All questions are compulsory

Part C:

1. 3 Questions of 20 marks each. There will be an internal choice in each question.
2. Answer should not exceed 400 words
3. All questions are compulsory.

Note:

1. **Lec:** Lectures **Tut:** Tutorials per week per hour
2. There will be sessional (internal assessment) of 20 marks conducted by the college
3. Two Practical exams shall be conducted by one internal and one external examiner of a batch of 20 students in day.
4. **Project Work:** 6 hours per student
   The Project Report work shall be assessed by one internal and one external examiner only of a batch of 20 students in a day. The project work should not be done in a group. Each student shall be allotted one project and one copy should be submitted to the University.
5. Duration of Practical exam is 3 hours.
6. A Laboratory Exercise File should be prepared by each student for each practical paper and should be submitted during practical examinations.
7. Practical of 50 marks distribution is as under:
   a. 30 marks for practical examination exercise for 3 questions
   b. 10 marks for Viva-voce
   c. 10 marks for Laboratory Exercise File
8. Eligibility: Graduate from any discipline with 50% marks in aggregate. As regards admission on reserved category seats government rules will be applicable

Scheme of Examination
(For M. Sc. Computer Science/Information Technology)

Reg. 17 (a)

The examination for the M. Sc. Computer Science/Information Technology will consist of (a) Theory papers (b) Laboratory / Practical work and project work. Candidates will be required to pursue a regular, full time course of study at the University department and the affiliated colleges for a period of two academic years in order to be eligible for appearing in the examination..

1. Eligibility for M. Sc. Computer Science/Information Technology: 50% marks in any graduation scheme.
2. Examination:
   i. There shall be 25 papers (16 theory, 8 practical in each year and 1 project as practical in the final year) of 2100 marks (previous and final year). Theory paper shall be of 3 hours duration having 100 marks. Out of 100 marks 20 marks shall be considered as internal assessment based on internal test and seminars and 80 marks will be of examination determined by the University. The practical shall be of 50 marks assessed by external examiner and

the project work shall be of 100 marks based on project presentation and viva-voce, assessed by external examiner..

ii. For passing a candidate shall have to secure at least 40% marks in each course (theory paper, sessional and practical work separately) and 50% marks in the aggregate in all the courses.

iii. Due paper(s) will be applicable if a candidate obtains 50% marks in aggregate and fails in not more than three (3) papers (theory). Due paper(s) will be held along with the examination of the next year. The chance of due paper(s) will be given only 2 times.

iv. Wherever a candidate appears at for a due paper examination he/she will do so according to the syllabus in force.

v. A candidate not appearing at any examination/absent in any paper of term end examination shall be deemed as fail.

3. A candidate for a pass in the examination shall be required to obtain:

i. At least 50% marks in the aggregate of all the papers prescribed for the examination and

ii. At least 50% marks in the practical(s) wherever prescribed at the examination, provided that if a candidate fails to secure at least 40% marks in each individual paper at the examination notwithstanding his having obtained the minimum percentage of marks required in the aggregate for that examination.

No Division will be awarded in the Previous Year examinations. Division shall be awarded at the end of the Final Year Examination on the combined marks obtained at the previous and final examinations taken together as noted below:

Passed with First Division	60% of the aggregate marks taken together of previous and final examinations
Passed with second division	48%

Provided that if a candidate clears any paper after a continuous period of two years since he/she was admitted to the M. Sc. Computer Science/Information Technology then for the passing marks, i.e. 40% marks, shall be taken into account in the case of such course(s).

Provided further that in case where a candidate requires more than 40% marks in order to reach the requisite minimum aggregate as many marks, out of those actually secured by him/her will be taken into account as would enable him/her to make up the deficiency in the requisite minimum aggregate marks.

4. Candidates reappearing at an examination in a subsequent year shall be examined in accordance with the scheme and syllabi in force and shall be entitled to the award of the degree of year in which they clear the last failing/unclear paper.

Duration 3 hours *Max marks 80*

MIT – 101 COMPUTER ORGANIZATION

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.

Reference Books:

1. Computer Architecture and Organization, Hayes, Tata McGraw Hill
2. Computer Architecture and Logic Design, Thomas C, Tata McGraw Hill
3. Computer System Architecture, M. Morris Mano, PHI
4. Digital computer, M. Morris Mano, PHI
5. Computer Architecture, William Sterling

Duration 3 hours *Max marks 80*

MIT – 102 DATA STRUCTURES AND ALGORITHM

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, table look up fields, typedef, file

Single linked lists, double linked list, circular list, sparse table, stack, queue, list, prefix, postfix, infix, sorting, insertion, selection, bubble, algorithm of

quick, merge, radix,.

Searching, binary, linear, tree, Binary Tree, tree traversal, breadth – first, depth – first; , in-order, pre-order, post-order graph, BFS, DFS, algorithm of Kruskal, prim.

Reference Books

1. A. V. Aho, J. E. Hoperoft, and J. D. Ullman, Data Structures and Algorithms, Pearson Education Asia.
2. R. Johnsonbaugh, Discrete Mathematics, Pearson Education Asia
3. Sara Baase & Allen Van Gelder – Computer Algorithms, Pearson Education Asia.
4. Jean- Paul Tremblay and Paul G. Sorenson, An Introduction to Data Structures with Applications, TMH Publishing Co. Ltd.
5. Programming in C, Gottfried, Tata McGraw
6. Programming in C, E. Balagurusamy, PHI.
7. C Programming R.B. Patil, Khanna Publication

Duration 3 hours *Max marks 80*

MIT – 103 RELATIONAL DATABASE MANAGEMENT SYSTEMS

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, generalization, 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, multi-media 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 verses 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

Reference Books:

1. Database Management System, Korth, Tata McGraw Hill.
2. Data Base System Concept, C. J. Date
3. Data Base Management System , Navathe, Pearson Education Asia
4. SQL Complete Reference, Leon and Leon, Tata McGraw Hill

5. Oracle Developers Guide, Muller, Tata McGraw Hill
6. SQL, PL/SQL Programming Language, Ivan Bayross, BPB Publications

Duration 3 hours *Max marks 80*

MIT – 104 DISCRETE MATHEMATICAL STRUCTURES

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, compliment and property of compliment, Venn diagram, difference, cartisan product set.

Relation property, irreflexive, asymmetric, compatible universal complimentary relation, equivalence class, coordinate diagram, transitivity extension, closure, matrix representation and digraph, functions, mapping, composition of functions, 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-Order set, operations, Well-ordering theorem, Lattices, property, bounded 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, binomial theorem, n-Ary operation, semi group, homomorphism and isomorphism of semi groups, monoid, Addition, multiplication Modulo m & p, property and postulates of group, cosets.

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.

Reference Books:

1. Discrete Mathematical structures, Kolman, Busby & Ross, PHI
2. Discrete Mathematics for Computer Scientists and Mathematicians, Baker, PHI
3. Discrete Mathematics with Graph Theory, Goodaire & Paramenter, PHI
4. Discrete Mathematics, Lieu and Lieu.

Duration 3 hours *Max marks 80*

MIT – 105 PROGRAMMING IN VISUAL BASIC

Introduction: Need of Visual languages, Integrated Development Environment (IDE), Advantage of Visual BASIC, Characteristics and features of Visual BASIC, Characteristics and features of Visual BASIC- IDE, Projects, User Interface, Objects 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, Inputs/Outputs, Comments, Editor, Subroutines, Control Flow Statements, Objects, and variants.

Designing User Interface- Elements of User Interface, Under-Standing Forms, Menus and Toolbars, Designing Menus and Tool-bars, 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, constant, arrays, control statements, loops, advance features of VB.net, collection, interface, events, delegates, overloading, attributes, database connectivity with VB.Net using ADO.Net

Reference Books:

1. Programming with Visual Basic 6.0, Mohammed Azam, Vikas Publications
2. Visual Basic Programming, Dietel & Dietel, Pearson Education

Duration 3 hours *Max marks 80*

MIT – 106 WEB TECHNOLOGY

Internet – current state, hardware and software requirement, ISP, an internet account, web home page, URL, browser, security on web, searching tools, search engines, FTP, Gopher, Telnet, emails. Electronic Commerce Framework, Electronic and Media Convergence, Traditional vs. Electronic Business Applications, Overview of Mobile Computing Technology, Mobile Data Internet and Mobile Computing Applications

Networks-Security and Firewalls - Client Server Network Security Threads, Firewalls and Network Security, Data Message Security, Encrypted Documents and Electronic mail.

JavaScript, comment types, JavaScript reserved words, identifiers, events, primitive data types, escape sequences, data type conversion functions and methods, operators, control structures and statements objects, applet fundamentals, applet life cycle, local and remote applet applications, tags, creating and passing parameters to applets, exception handling.

Build HTML documents from scratch. View HTML document using a variety of Web Browsers Organize information using Lists Use HTML frames and tables for page layout.

Connect to a variety of resources by using hypertext links Create style sheets to format the look and feel of the pages. Understand key image theory concepts. Create new images from scans or from scratch Optimize image sizes.

Create animated gifs and transparent images be able to create graphical elements for use on web pages: buttons banners navigation bars, background tiles. Embed images and other multimedia. Post information to HITTP server. Evaluate a document design for effectiveness, usability and efficiency.

Using DHTML create functionalities like animation, stages-based presentations, splash pages, pull-down menus, drop down means, drag drop techniques. Integrating JavaScript with HTML and DHTML

References Books:

1. Elizabeth Castro, HTML 4, Pearson Education Asia.
2. D.S. Rayand E.J. Ray., Mastering HTML 4, Sybex Computer Books Inc.
3. Jeff Rule, DHTML, Tata Mc Graw Hill
4. Joseph Schmuller, Dynamic HTML, Sybex Computer Books Inc.
5. Jason J Manger, JavaScript essentials, Osborne Mc Graw Hill.
6. Joel Sarkar, Principal of Web Design, Thomson Learning
7. R.Kalakola and A.B. Whiston : Frintiers of Electronic Commerce; Addison Wisley, 1996.
8. Soka:From EDI to E-Commerce; McGraw Hill, 1995.

Duration 3 hours *Max marks 80*

MIT – 107 DATA COMMUNICATIONS AND NETWORKS

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.

Reference:

1. Data and Computer communications, William Stallings, PHI
2. Data communication and networking, Behoruz A. Forouzan
3. Data communication and networking, A S Godbole, Tata McGrawhill
4. Network concepts and Architecture, Hancock, BPB Publications
5. Data Communication and Networking, Tannenbaum, PHI

Duration 3 hours *Max marks 80*

MIT – 108 DATA WAREHOUSING AND MINING

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 Multi-

dimension schemas Horizontal and vertical partitioning, Hardware partitioning.

Aggregations 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

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 models, Case studies of data mining mode for an online bank Wireless communication corporation

References Books:

1. Sam Anahory, Dennis Murray, "Data Warehousing", Pearson Education Pub.
2. Michael A. Berry,Gordon S.Linoff,"Mastering Data Mining",Wiley Publishing.
3. Mallach G.Fredn E,"Decision Support System and Data Warehouse Systems", TMH.
4. John Poole, Dan Chang, Douglas Talbert, "Common Warehouse Metadata Developer's Guide", Wiley Pub.

Duration 3 hours *Max marks 80*

MIT – 201 OPERATING SYSTEMS

Introduction to Operating Systems, goals of OS, operation of OS, resource allocater and related functions, classes of OS, batch processing, multi-processing, time sharing, distributed, real time systems, system calls, system programs, structure of OS, layer design of DOS, Unix,

Process concept, interacting process, threads, 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, 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.

History of Linux, Linux architecture, Linux File System, file naming, types of files, directory command, file command, vi editor, locating files in Linux, filter, pipe, shell variables, local and global variables, command substitution, if, while, for, shift, tar, basic networking commands in Linux.

Reference:

1. Operating System Linux, NIIT PHI
2. Operating System Concepts, Galvin, Addison Wesley
3. Operating Systems, Ritchie, BPB Publications.

Duration 3 hours *Max marks 80*

MIT – 202 OBJECT ORIENTED CONCEPTS AND C++

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.

Single linked lists, double linked list, circular list, sparse table, stack, queue, d-queue list, priority queue, graph, prefix, postfix, infix, sorting, insertion, selection, bubble, algorithm of quick, merge, radix, heap.

Searching, binary, linear, tree, Binary Tree, Binary search tree, tree traversal, breadth – first, depth – first, AVL tree, B-tree, in-order, pre-order, post-order graph, BFS, DFS, shortest path, algorithm of Kruskal, prim.

Reference Books:

1. Object Oriented Programming with C++, E. Balagurusamy, Tata McGraw Hill.
2. Data Structures and algorithms in C++, Adam Drozdex, Vikas Publications
3. Understanding Programming an introduction using C++, Scott R Canon, Vikas Publications.
4. OOPS with C++, N P Bhave,
5. OOPS with ANSI C++, A N Kamthane,

Duration 3 hours *Max marks 80*

MIT – 203 COMPUTER ORIENTED NUMERICAL METHODS

Characteristics of Numerical Computation, Approximation, Significant Digit, Errors, Introduction to Matrix, Types of Matrix, Square, Row, Column, Diagonal, Unit, Null, Upper Triangular, Lower Triangular, Symmetric, Skew Symmetric, operation of matrix, trace, transpose, addition, subtraction, multiplication, determinant, inverse, Introduction to Linear Equations,

Bisection method, method of successive approximation, method of false position, Newton's iteration method, Newton Raphson method, Horner's method

Gauss Jordan method, Gauss Elimination method, Iterative methods, Jacobi method of iteration, Gauss Seidel Iteration method

Finite differences, forward, backward, central differences, other difference operations and its relations, difference of polynomial, fractional polynomial, reciprocal factorial

Gregory Newton Forward and Backward interpolation Formula, Gauss Forward and backward difference interpolation formula, interpolation with unequal intervals,

Euler methods, modified Euler Method, Runge Kutta 2nd and 4th order method, trapezoidal rules, Simpson's 1/3, 3/8 rules, Weddle's rule.

Reference:

1. Numerical Methods, Dr. V. N. Vedamurthy & Iyengar Vikas Publication
2. Computer Oriented Numerical Methods, V.Rajaraman
3. Computer Oriented Numerical Methods, Iyengar & Iyengar

Duration 3 hours *Max marks 80*

MIT – 204 SOFTWARE ENGINEERING

Concepts of Software Engineering, Software Characteristics, components applications, software Metrics and Models; Process and Product Metrics, Size metric, Complexity metric, McCabe's Cyclometic 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 & 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, MUSA Markov) Limitations of Reliability Models

Reference:

1. Software Engineering Fundamentals, Ali Behforooz, Oxford Univ Press.
2. Software Engineering, Pressman, R. S. Pressman & Associates.
3. Software Engineering, Sommerville, Addison Wesley

Duration 3 hours *Max marks 80*

MIT – 205 PROGRAMMING IN JAVA

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 multilevel 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.

Reference books:-

1. Y. Daniel Liang, Introduction to Java Programming, PHI.
2. Patrick Naughton, Java Complete Reference, Tata McGraw Hill.
3. The Java Handbook, Patrick Naughton, Tata McGraw Hill.
4. Introduction to Java Programming, E Balaguruswamy, PHI.
5. Programming Java, Decker & Hirshfield, Vikas Publications

Duration 3 hours *Max marks 80*

MIT – 206 ARTIFICIAL INTELLIGENCE

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, basic list 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, non-deductive 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.

Reference Books:

1. Artificial Intelligence and Expert System, D. W. Patterson, PHI
2. Artificial Intelligence, Ritchie

Duration 3 hours *Max marks 80*

MIT – 207 CYBER LAW & INTERNET SECURITY

Introduction: Issues in Network Security, Network Security Services, basic Concepts of Encryption and Decryption, Substitution Ciphers, Transposition Ciphers. Electronic Mail Security, IP Security, WEB Security, Intruders, Viruses and Worms, Firewalls.

Cyber Laws: Cyber laws for Cyberspace- Legal Identity and Private International Laws in Cyberspace. E-Commerce, E-Commerce, Issues of Privacy

The World of Electronic Contracts - E-Agreements and the Web Surfing, Terms of Service Contracts, Terms of Service Agreement for Web Site Owners, Tips to Frame a Private Policy for and E-commerce Site

Cyber Pirates - Copyright, Digital Content right. Steps to protect the Contents on WWW, Software Patents, Domain Name System and Trademarks Crimes-Cyber Crimes and Future Imperfect, Strategy to Combat Cyber Crimes,

Cryptography: Basic Terms and Concepts, Brief History of Cryptography and Cryptanalysis. Uses and misuses. Basic Number Theory - Divisibility, Primarily, Bases, Congruence's, Modular Arithmetic, GCD's, Euclidian algorithm, Fermat and Euler Theorems, Finding large primes, Pohlig-Hellman, RSA.

Reference Books:

1. William Stallings, "Cryptography and Network Security : Principles and Practice", Pearson Education, 2000.
2. Kernal Texpalan, "Communication network Management:, PHI, 1992.
3. D.E. Corner, "Computer Networks and Internet", 2nd Edition, Addison Wesley Publication. 2000.

Duration 3 hours *Max marks 100*

MIT – 208 SOFTWARE TESTING & QUALITY ASSURANCE

Need for Testing—Psychology of testing—Testing economics—white box testing , Black box testing, Grey box Testing—Retesting regression Testing—Verification and Validation Testing Strategies—Levels of Testing—Unit, Integration ,System Testing, Acceptance Testing

Test case Design—Statement Coverage—Branch Coverage—Condition Coverage—Decision / Condition Coverage—Multiple Condition Coverage—Data Flow Coverage—Mutation Testing

Test Case Designs. Boundary Value analysis—Equivalence Partitioning—Cause Effect Graphing, Error Guessing, Logic Based Testing.

Special Topics: Syntax testing—Finite State Testing Logic Based Testing Domain Testing

Test Planning—Test Plan Documentation—Test Estimation—Test Schedule —Test monitoring and Control—standards for Testing.

Introduction of Object Oriented Testing—Automated Tools for Testing—Tool Selection and Implementation—Test case generators—GUI Testing—Testing Web enabled Application.

Reference books:

1. Glenford J.Myers," The Art of Software Testing" John Wesley & Sons 1979.
2. Boris Beizer, "Software Testing Technologies" 1st edition Dreamtech 2000.
3. Roger S.Pressman," Software Engineering" 5th edition, Mc Graw Hill
4. William E.Lewis," Software Testing and continuous quality improvement "Auerbach

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