Scheme of Examination
Master of Science (Computer Science) (Regular)
Two Year Program (Semester System)

With effect from : 2012-2013

First Semester

Paper No.	Nomenclature	Theory /External	Internal	Total Marks	Exam. Duration
M.Sc.-101	Fundamentals Of Computers & Ms-Office	80	20	100	3Hrs
M.Sc.-102	Computer Networking & Multimedia	80	20	100	3Hrs
M.Sc.-103	Programming in C and Data Structure	80	20	100	3Hrs
M.Sc.-104	Computer Organization And Architecture	80	20	100	3Hrs
M.Sc.-105	Practical-1 (Based on M.Sc.-101, M.Sc.-103)	80	20	100	4Hrs Each

Second Semester

Paper	Nomenclature	Theory /External	Internal	Total Marks	Exam. Duration
M.Sc.-201	Data Base Management Systems	80	20	100	3Hrs
M.Sc.-202	Visual Basic & Oracle	80	20	100	3Hrs
M.Sc.-203	System Analysis & Design	80	20	100	3Hrs
M.Sc.-204	Object Oriented Programming Using C++	80	20	100	3Hrs
M.Sc.-205	Practical-II (Based on M.Sc.-202, M.Sc.-204)	80	20	100	4Hrs Each

Third Semester With effect from : 2013-2014

Paper	Nomenclature	Theory /External	Internal	Total Marks	Exam. Duration
M.Sc.-301	Management Information System	80	20	100	3Hrs
M.Sc.-302	Software Engineering	80	20	100	3Hrs
M.Sc.-303	Operating System and Unix	80	20	100	3Hrs
M.Sc.-304	Internet, Web Programming & Java	80	20	100	3Hrs
M.Sc.-305	Practical-III (Based on M.Sc.-303, M.Sc.-304)	80	20	100	4Hrs Each

Fourth Semester

Paper	Nomenclature	Theory /External	Internal	Total Marks	Exam. Duration
M.Sc.-401	Artificial Intelligence	80	20	100	3Hrs
M.Sc.-402	Computer Graphics	80	20	100	3Hrs
M.Sc.-403	Windows Programming & Visual C++	80	20	100	3Hrs
M.Sc.-404	Practical-IV (Based on M.Sc.-402, M.Sc.-403)	80	20	100	4Hrs Each
M.Sc.-405	Project Report	80	20	100	

With effect from : 2012-2013

FUNDAMENTALS OF COMPUTERS & MS-OFFICE
PAPER CODE: M.Sc. -101

External: 80   **Time: 3Hrs**
Internal: 20

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

UNIT-I

Introduction: Historical evolution of computers, Classification of computers, Model of a digital computer, functioning of a digital computer, Why computers are useful? Human being vs computer, Computer as a tool, Applications of computers (desktop publishing, sports, design and manufacturing, research and design, military, robotics, planning & management, marketing, medicine & health care, arts, communications).

Number systems and Boolean Algebra: What is Number system, necessity of binary number system, binary, octal and hexadecimal number system, inter-conversion of numbers, binary arithmetic, character codes, concepts of Boolean Algebra and its requirement.

UNIT-II

Input/Output Devices : Punched cards, card-readers, key-punching machines, keyboards, mouse, joysticks, trackballs, digitizer, voice-recognition, optical-recognition, scanners, terminals, point-of-sale terminals, machine-vision systems. Hardcopy devices : Print quality, Impact printers - DMPs, Daisy-wheel printers, Line-printers, Drum printers, Chain printers; Non-impact printers - Inkjet, Laser, Thermal, LED; Plotters. Soft-copy devices : monitors, video-standards (VGA and SVGA).

Memory & Mass Storage Devices: Characteristics of memory systems, types of memory, RAM, ROM, magnetic disks - floppy disk, hard-disk; optical disks - CD, CD-I, CD-ROM; Magnetic tapes; Concepts of Virtual and Cache memory.

UNIT-III

Software Concepts : Introduction, types of software - System & Application software; Language translators - Compiler, Interpreter, Assembler; Operating system - Characteristics, bootstrapping, types of operating, operating system as a resource
manager; BIOS; System utilities - Editor, Loader, Linker, File Manager. Concept of GUI, GUI standards.

Social Concerns : Positive and Negative Impacts of Computer Technology, Viruses and their types, Computer Crimes. **Applications of Computers:** Scientific, Education, Medicines & Health, Research, Sports, etc.

UNIT-IV

MS-Office 2000
MS-Word : Introduction to MS-Word, Standard Toolbar, WordWrap, Text formatting, Formatting Paragraphs, Applying Effects to Text, Applying Animation to Text.

MS-Excel : Introduction to MS-Excel, Working with Toolbars, Formatting, Formulas, Data Management, Graphs & Chart, Macros, and other additional Functions.

MS-PowerPoint : Introduction, PowerPoint Slide Creation, Slide-show, Adding Graphics, Formatting, Customizing and Printing.

MS-Access : Introduction, Understanding Databases, Creating a Database and Tables Automatically, Creating and Customizing a Form, Adding, Editing, Sorting and Searching of Records, Creating and Printing Reports, Queries, Creating a Database and Application, Linking, Importing and Exporting Data, Form, Creating Reports, Creating Charts and Pivot Tables.

Suggested Readings

1.   Gill, Nasib Singh : Essentials of Computer and Network Technology, Khanna Books Publishing Co., New Delhi.
2.   Sanders, D.: Computers Today, Tata McGraw-Hill.
3.   Gill Nasib Singh: Computing Fundamentals and Programming in C, Khanna Books Publishing Co., New Delhi.
4.   Rajender Singh Chhillar : Application of IT to Business, Ramesh Publishers, Jaipur.
5.   Microsoft Office – Complete Reference – BPB Publication
6.   Learn Microsoft Office – Russell A. Stultz – BPB Publication

Note : Latest and additional good books may be suggested and added from time to time.

COMPUTER NETWORKING & MULTIMEDIA
PAPER CODE: M.Sc.-102

External: 80   **Time: 3Hrs**
Internal: 20
Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to

compulsory question, student will have to attempt four more questions selecting one question from each Unit.

UNIT-I

Data communications concepts: Digital and analog , parallel and serial, synchronous and asynchronous, simplex, half duplex, duplex, multiplexing, Transmission media: Wired (physical): Twisted pair, Coaxial cable, Optical Fiber, Wireless: Terrestrial, Microwave, Satellite microwaves: Broadcast radio, infrared, blue tooth

Communication switching techniques: Circuit switching, message switching, packet switching.

Introduction to Computer Network : Network Topologies, Types of Network, OSI and TCP/IP Models: Layers and their functions, comparison of models.

UNIT-II

Data Link Layer Fundamentals: Framing, Basics of Error Detection, Forward Error Correction, Cyclic Redundancy Check codes for Error Detection , Flow Control .

Media Access Protocols : The advantages of Multiple-Access Sharing of Channel Resource , ALOHA, Carrier Sense Multiple Access (CSMA) , CSMA with Collision Detection (CSMA/CD), Token Ring, Token Bus, Asynchronous Transfer Mode (ATM).

UNIT-III

Network Layer: IP Addressing and Routing, Gateway, N/W Layer Protocols: ARP, IPV4, ICMP, IPV6.

Transport Layer: Process-to-Process Delivery: UDP, TCP Congestion Control. **Application Layer:** Domain Name System (DNS), E-mail (SMTP), File Transfer (FTP) HTTP, WWW.

Network Security: Security requirements and attacks, Cryptography: Symmetric key and public key encryption, Digital signature.

UNIT-IV

Multimedia : Introduction to Multimedia : Classification of Multimedia, Multimedia Software, Components of Multimedia – Audio : Analog to Digital conversion, sound card fundamentals, Text : Hyper text, Hyper media and Hyper Graphics.
Graphics and Animation : Classification of Animation, Authoring Process and Tools.

Suggested Readings :

1. A.S. Tanebaum : Computer Networks (4th ed.), Prentice-Hall of India.
2. W. Tomasi : Introduction to Data Communications and Networking, Pearson, Education.
3. P.C. Gupta : Data Communications and Computer Networks, Prentice-Hall of India.
4. Behrouz Forouzan and S.C., Fegan : Data Communications and Networking, McGraw Hill.
5. William Stalilngs : Data and Computer Communications, Pearson Education.
6. S. Gokul : Multimedia Magic, BPB Publication.

7. Bufford : Multimedia Systems, Addison Wesley.
8. Jeffcoate : Multimedia in Practice, Prectice-Hall.
9. Any other book(s) covering the contents of the paper in more depth.

Note : Latest and additional good books may be suggested and added from time to time.

PROGRAMMING IN C AND DATA STRUCTURE
PAPER CODE: M.Sc. -103

External: 80   **Time: 3Hrs**
Internal: 20

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

UNIT-I

Programming fundamentals: Algorithm development, techniques of problem solving, flow-chart, decision table, structured programming concepts; top-down design, development of efficient program; program correctness; debugging and testing of programs, algorithm for searching, sorting (exchange and insertion), merging of ordered lists.

UNIT-II

Programming in C: Introduction to C, Data type, constants and variable; structure of a C program, operators and expressions, control statements: sequencing, alteration and iteration; functions, recursion, array, string and pointers, file handling.

UNIT-III

Arrays: Representation of single and multidimensional arrays; sparse arrays - lower and upper triangular matrices and Tri-diagonal matrices.

Stacks and Queues: Introduction and primitive operations on stack; Stack application: Infix, postfix, prefix expressions; Evaluation of postfix expression; Conversion from infix to Postfix. Introduction and primitive operation on queues, D-queues and priority queues.

Lists: Introduction to linked lists; Sequential and linked lists, operations such as traversal, insertion, deletion, searching, Two way lists.

UNIT-IV

Trees: Introduction and terminology; Traversal of binary trees; Recursive algorithms for tree operations such as traversal, insertion, deletion; threaded trees, binary search trees.

File structure: physical storage devices and their characteristics, constituents of a file viz. fields, records, fixed and variable length records, primary and secondary keys; file operations, basic file system operations, file organizations: serial sequential, index sequential, direct , inverted, multilist, hashing function and collision handling methods.

Sorting Techniques: Insertion sort, selection sort, merge sort.

Searching Techniques: linear search, binary search .

Suggested Reading:

1. Kenneth, A. : C problem solving and programming, Prentice Hall.
2. Gill Nasib Singh: Computing Fundamentals and Programming in C, Khanna Books Publishing Co., New Delhi.
3. Gottfried, B. : Theory and problems of Programming in C, Schaum Series.
4. Kerninghan & Ritchie : The Programming Language, PHI.
5. E. Horowitz and S. Sahani, "Fundamentals of Data Structures", Galgotia Booksource Pvt. Ltd, 2003
6. R. S. Salaria, "Data Structure & Algorithms", Khanna Book Publishing Co. (P) Ltd., 2002.
7. P. S. Deshpande and O.G. Kakde, "C & Data Structure", Wiley Dreamtech, 1st Edition, 2003.
8. Schaum's outline series, "Data Structure", TMH, 2002

Note : Latest and additional good books may be suggested and added from time to time.

COMPUTER ORGANISATION AND ARCHITECTURE
PAPER CODE: M.Sc.-104

External: 80   **Time: 3Hrs**
Internal: 20
Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

UNIT-I

Representation of Information: Number Systems, Integer and Floating-point representation, Character codes: ASCII and EBCDIC.

Basic Building Blocks and Circuit Design: OR, AND, NOT, XOR Gates; De Morgan's theorem, Universal building blocks, laws and theorems of boolean algebra, Simplifying logic circuits – sum of

product and product of sum form, algebraic simplification, Karnaugh simplification; arithmetic circuits; flip-flops, counters; shift registers; encoder, decoder, multiplexor, de multiplexor circuits.

UNIT-II

Register transfer and Micro-operations: Register Transfer Language, Bus and memory Transfers. Micro operations: Arithmetic, Logic & Shift Micro operations.

Basic Computer Organization and Design: Computer Instruction and instructions Codes, Timing and Control, Instruction Cycle. Register reference, Memory Reference & Input-Output instructions. Interrupts; Design of Control unit.

UNIT-III

Central Processing Unit: General Register Organization, Stack Organization, Instruction Formats, Addressing Modes, Data and Transfer Manipulation, Program Control, Reduced Instruction Set Computer, Pipeline and Vector Processing: Parallel processing, Pipelining, Arithmetic Pipeline, Instruction pipeline and Arrays Processors.

UNIT-IV

Computer Arithmetic: Addition and Subtraction, Multiplication Algorithms, Division algorithm, Floating-Point Arithmetic Operations
Input-Output Organization: Peripheral Devices, Input-Output interface, Asynchronous Data Transfer, Modes of transfer, Priority interrupt, Direct Memory Access (DMA), input-output processors (IOP), Serial communication. Multi-processors, characteristics of multi-processors, Inter-connection structures, Inter-processor Arbitration, Inter-processor Communication and Synchronization, Cache Coherence.

Suggested Readings
1. Mano, M.M. : Digital Logic and Computer Design, Prentice- Hall of India.
2. Gill, Nasib Singh and Dixit J.B.: Digital Design and Computer Organisation, University Science Press (Laxmi Publications), New Delhi.
3. Stallings, William : Computer Organisation & Architecture.
4. Mano, M.M. : Digital Design, Prentice-Hall of India.
5. Anand Kumar : Fundamentals of Digital Circuits, PHI.
6. Tokheim : Digital Electronics, TMH.
7. S. Rangnekar; Digital Electronics, ISTE/ EXCE.L
8. Any other book(s) covering the contents of the paper in more depth.

Note : Latest and additional good books may be suggested and added from time to time.

PRACTICAL- I
PAPER CODE: M.Sc. -105

External: 80
Internal: 20

Based on paper MSc-101 and MSc-103

SECOND SEMESTER

DATA BASE MANAGEMENT SYSTEMS
PAPER CODE: M.Sc.-201

External: 80   **Times: 3Hrs**
Internal: 20

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

UNIT-I

Introduction: Characteristics of database approach, data models, DBMS architecture and data independence.
E-R Modeling: Entity types, entity set, attribute and key, relationships, relation types, roles and structural constraints, weak entities, enhanced E-R .
Database Languages - DDL, DML, Database Access for applications Programs, database Users and Administrator, Transaction Management, Database system Structure, Storage Manager, Query Processor.

UNIT-II

Relational Model : Introduction to the Relational Model, Integrity Constraint Over relations, Enforcing Integrity constraints, Querying relational data, Logical data base Design, Introduction to views, Destroying/altering Tables and Views.

Relational Algebra and Calculus : Relational Algebra, Selection and projection set operations, renaming, Joins, Division, Examples of Algebra overviews, Relational calculus- Tuple relational Calculus, Domain relational calculus, Expressive Power of Algebra and Calculus.

UNIT-III

Schema refinement, Functional dependencies: Problems Caused by redundancy, Decompositions, Problem related to decomposition, Normalization : FIRST, SECOND, THIRD Normal forms, BCNF, Lossless join Decomposition, Dependency preserving Decomposition, Schema refinement in Data base Design, Multi valued Dependencies, forth Normal Form.

UNIT-IV

Transaction Management : ACID Properties, Transactions and Schedules, Concurrent Execution of transaction, Serializability and recoverability.

Concurrency Control : Introduction to Lock Management, Lock Conversions, Dealing with Dead Locks, Concurrency without Locking.
Recovery Techniques, Database Security

Suggested Readings :
1. Raghurama Krishnan : Data base Management Systems, Johannes Gehrke, Tata McGraw Hill Latest Edition.
2. Siberschatz, Korth : Data base System Concepts, McGraw Hill, latest edition.
3. P. Radha Krishna : Database Management Systems, HI-TECH Publications.
4. C.J. Date : Introduction to Database Systems, Pearson, Education.
5. Rob & Coronel : Data base Systems design, Implementation, and Management, latest Edition, Thomson.
6. Elmasri Navrate : Data base Management System, Pearson Education.
7. Mathew Leon : Data base Management System, Leon Vikas.
8. Connoley : Data base Systems, Pearson Education.
9. Any other book(s) covering the contents of the paper in more depth.

Note : Latest and additional good books may be suggested and added from time to time.

VISUAL BASIC & ORACLE
PAPER CODE: M.Sc.-202

External: 80   **Time: 3Hrs**
Internal: 20
Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

UNIT-I
Basics of Visual Basic: Variable Names, Data Types, Assignment, If-then, If-then-else, if then-elseifelse, expression, print statement, arrays, variable declaration, built-in & User defined types, Subroutine and functions, Boolean Operators, Arithmetic Operator, For- .next, do loop, while-wend, procedure/Public, Private and Static & Dim Statement.

Structure of VB program: Forms & built in controls, Properties and events, Code Module, Scale Modes, Printer Object (Printing text, setting Fonts, graphics), Common dialog Boxes, picture controls, image-controls, send keys, MS-Common Controls, Error Handling, Classes, Control Arrays, MDI, SDI.

UNIT-II

Database Interface: Review of ANSI SQL, ODBC, Pass through ODBC, DAO, MS-Jet Engine, DB-Engine, Workspaces, Databases, recordsets, Data bound controls, ActiveX controls, ADO, Active X Data controls, RDO.

Data view Window: Data Environment Designer, Crystal Report and Data Report Utility Using Visual Basic (VB) for Transaction Management, Concurrency Control, Interfacing with RDBMS, Backend Stored procedure Usage.

UNIT-III

Introduction to Oracle : Overview of RDBMS, Getting started, Modules of Oracle, Invoking SQLPLUS, Data types, Data Constraints, Operators, Data manipulation - Create, Modify, Insert, Delete and Update; Searching, Matching and Oracle Functions.
SQL*Forms : Basic concepts, Form Construction, Creating default form, user-defined form, multiple-record form, Master-detail form.

PL/SQL Blocks in SQL*Forms : PL/SQL syntax, Data types, PL/SQL functions, Error handling in PL/SQL, package functions, package procedures, Oracle transactions.

UNIT-IV

SQL*ReportWriter : Selective dump report, Master-detail Report, Control-break Report, Test report.

QL*Menu : Various menu styles, using pull-down & bar-menu, Authorisation of SQL*Menu, Creating Oracle Menu, Granting Role Access, Generating & Executing Applications.

Stored Procedures/Functions : Stored procedures, How to create & execute procedures ?, Where to store procedures? Stored functions, How to create & execute functions ?, Where to store functions ? Where do procedures & functions reside ?

Database Triggers : Introduction, Use & type of database Triggers, Database Triggers vs SQL*Forms, Database Triggers Vs. Declarative Integrity Constraints, How to apply Triggers ?, BEFORE vs. AFTER Trigger Combinations, Creating a Trigger, Dropping a Trigger.

Utilities : Export/Import, SQL*Loader.

Suggested Readings :
1. McBride, P.K. : Programming in Visual Basic, BPB Publ.
2. Holzner Steven : Visual Basic Programming, IDG Books India Ltd.
3. Artiken : Visual Basic for Programming Explorer, Comdex.
5. Using Visual Basic 6.
6. Any other book(s) covering the content of the paper in more depth.

Note : Latest and additional good books may be suggested and added from time to time.

SYSTEM ANALYSIS & DESIGN
PAPER CODE: MSc-203

External: 80   **Time: 3Hrs**
Internal: 20

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

UNIT-I

Overview of system analysis and design. Business systems concepts, system development life cycle, project selection, feasibility, analysis, design, implementation, testing and evaluation.

Project Selection : Source of Project requests, managing project review and selection, preliminary investigation.

UNIT-II

Feasibility Study : Technical and economical feasibility, cost and benefit analysis.

System requirement specification and Analysis : Fact finding techniques, Data flow diagrams, data dictionaries, process organisation and interactions, Decision analysis, decision trees and tables.

UNIT-III

Detailed design, modularization, module specification, file design, system development involving data bases.
System Control and Quality : Assurance 4-Design objectives reliability and maintenance, software design and documentation tools top down , bottom up and variants, Units and integration testing, testing practices and plans. System Controls, Audit trails.

UNIT-IV

System Administration and Training : conversion, and operation plans.
Hardware and Software Selection : Hardware acquisition, memory process, peripherals, bench marking, vendor selection, software selection-operating system languages, language process, performance and acceptance criteria.

Suggested Reading:

1. Award Elias M. – Systems Analysis & Design.
2. Sen James A. – Analysis & Design of Information Systems
3. Lee-Introductory Systems Analysis and Design
4. Wetherbe James C. Systems Analysis & Design
5. Any other book(s) covering the content of the paper in more depth.

Note : Latest and additional good books may be suggested and added from time to time.

OBJECT ORIENTED PROGRAMMING USING C++
PAPER CODE: M.Sc. -204

External: 80   **Time: 3Hrs**
Internal: 20

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

UNIT-I

Object Oriented Programming Concepts : Procedural Language and Object Oriented approach, Characteristics of OOP, user defined types, polymorphism and encapsulation.

Getting started with C++: syntax, data types, variables, string, function, namespace and exception, operators, flow control, recursion, array and pointer, structure.

UNIT-II

Abstracting Mechanisms : Classes, private, public, constructors, destructors, member functions, static members, references etc. Class hierarchy derived classes.

Memory management : new, delete, object copying, copy constructors, assignment operator, this input/output.

UNIT-III

Inheritance and Polymorphism: Derived Class and Base Class, Different types of Inheritance, Overriding member function, Abstract Class, Public and Private Inheritance, Ambiguity in Multiple inheritance , operator overloading, operator function, I/O
Operators, Virtual function, Friend function, Static function.

UNIT-IV

Exception handling : Exceptions and derived classes, function exception declarations, Unexpected exceptions, Exceptions when handling exceptions, resource capture and release etc.

Templates and Standard Template library : Template classes, declaration, template functions, namespaces, string, iterators, hashes, iostreams and other type.

Suggested Books :

1. Herbert Schildts : C++ - The Complete Reference, Tata McGraw Hill Publications.
2. Balaguru Swamy : C++, Tata McGraw Hill Publications.

3. Balaguruswamy : Object Oriented Programming and C++, TMH.
4. Shah & Thakker : Programming in C++, ISTE/EXCEL.
5. Johnston : C++ Programming Today, PHI.
6. Olshevsky : Revolutionary Guide to Object Oriented Programming Using C++, SPD/WROX.
7. Object Oriented Programming and C++, Rajaram, New Age International.
8. Samanta : Object Oriented Programming with C++ & JAVA, PHI.
9. Subburaj : Object-Oriented Programming with C++, VIKAS.
10. Any other book(s) covering the constents of the paper in more depth.

Note : Latest and additional good books may be suggested and added from time to time.

PRACTICAL II
PAPER CODE: M.Sc.-205

External: 80
Internal: 20

Based on paper MSc-202 and MSc-204

With effect from : 2013-2014

MANAGEMENT INFORMATION SYSTEM
PAPER CODE- M.Sc.-301

External: 80   **Time: 3Hrs**
Internal: 20
Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

UNIT-I

Evolution of MIS: Concepts, framework for understanding and designing MIS in an Organization.
Organization and Information Systems: The Organization: Structure, Managers and activities , Data, information and its attributes , The level of people and their information needs , Types of Decisions and information , Information System, categorization of information on the basis of nature and characteristics.

UNIT-II

Kinds Of Information Systems

Transaction Processing System (TPS), Office Automation System (OAS), Management Information System (MIS), Decision Support System (DSS) and Group Decision Support System (GDSS), Expert System (ES), Executive Support System (EIS or ESS).

UNIT-III

Manufacturing and Service Systems

Information systems for Accounting, Finance, Production and Manufacturing, Marketing and HRM functions - IS in hospital, hotel, bank.

Enterprise System

Enterprise Resources Planning (ERP): Features, selection criteria, merits, issues and challenges in Implementation - Supply Chain Management (SCM): Features, Modules in SCM - Customer Relationship Management (CRM): Phases.

UNIT-IV

Choice of IT: Nature of IT decision - Strategic decision - Configuration design and evaluation Information technology implementation plan.

Security and Ethical Challenges

Ethical responsibilities of Business Professionals – Business, technology. Computer crime – Hacking, cyber theft, unauthorized use at work. Piracy – software and intellectual property. Privacy – Issues and the Internet Privacy. Challenges – working condition, individuals. Health and Social Issues, Ergonomics and cyber terrorism.

Suggested Books :

1. "Management Information Systems", Kenneth J Laudon, Jane P. Laudon,   Pearson/PHI,10/e, 2007
2. "Management Information Systems", W. S. Jawadekar, Tata McGraw Hill Edition, 3/e, 2004
3. "Introduction to Information System", James A. O' Brien, Tata McGraw Hill, 12th Edtion.
4. "Management Information Systems", S.Sadagopan, PHI, 1/e, 2005
5. "Management Information Systems", Effy Oz, Thomson Course Technology, 3/e, 2003
6. Corporate Information Strategy and Management", Lynda M AppleGate, Robert D Austin et al, Tata McGraw Hill, 7th Edition.

Note : Latest and additional good books may be suggested and added from time to time.

SOFTWARE ENGINEERING
PAPER CODE- M.Sc.-302

External: 80   **Time: 3Hrs**
Internal: 20

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

UNIT-I

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.

UNIT-II

Software Development: Phases, Process Models, Role of Management, Role of Metrics and Measurement, Software Quality factors.
Software Project Estimation Models- Empirical, Putnam, COCOMO models.

UNIT-III

System Design : Design Objectives, Design Principles, Effective Modular Design (Financial independence, Coupling Cohesion), Design Tools and Techniques, Prototyping Structured Programming.

UNIT-IV

Coding : Programming Principles, Verification, Monitoring and Control.
Testing : Testing Fundamentals, Test case design, Functional Testing, Structural Testing, Test Plan activities during testing, Unit System, Integration Testing.
Reliability : Concept of Software Reliability, Software Repair and Availability, Software Errors and Faults Reliability Models (JM, GO, MUSA Markov) Limitations of Reliability Models.

Suggested Readings:

1. Gill Nasib Singh. : Software Engineering, Khanna Books Publishing Co.(P) Ltd, N. Delhi
2. Jalote, Pankaj : An Integrated Approach to Software Engineering, Narosa Publ.
3. Pressman : Software Engineering, TMH.
4. Ghezzi, Carlo : Fundaments of Software Engineering, PHI.
5. Fairley, R.E. : Software Engineering Concepts,McGraw-Hill.
6. Lewis, T.G. : Software Engineering,McGraw-Hill..
7. Shere : Software Engineering & Management, Prentice Hall.
8. Deutsch, Willis : Software Quality Engineering : A Total Technical and Management Approach, Prentice Hall

Note : Latest and additional good books may be suggested and added from time to time.

OPERATING SYSTEM AND UNIX
PAPER CODE- M.Sc.-303

External: 80   **Time: 3Hrs**
Internal: 20
Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

UNIT-I

Operating systems overview: Operating systems as an extended machine & resource manager, Operating systems classification; Operating systems and system calls; Operating systems architecture.
Process Management functions: Process model, hierarchies, and implementation; process states and transitions; multi-programming, multi-tasking, multi-threading; level of schedulers and scheduling algorithms.

UNIT-II

Memory Management and Virtual Memory : Logical versus Physical Address Space, Swapping, Contiguous Allocation, Paging, Segmentation, Segmentation with Paging, Demand Paging,

Performance of Demanding Paging, Page Replacement, Page Replacement Algorithm, Allocation of Frames, Thrashing.

UNIT-III

Device Management function: I/O devices and controllers, interrupt handlers, device independent I/O software, user-space I/O software; disk scheduling; clock hardware software; terminal input/output software.
File management functions: file naming, structure, types, access mechanisms, attributes and operations; directory structures and directory operations; file space allocations; file sharing, file locking; symbolic links; file protection and security: distributed file systems.

UNIT-IV

Concurrent programming: sequential and concurrent process; precedence graph, Bernsterins condition; time dependency and critical code section, mutual exclusion problem; classical process co-ordination problems; deadlock handling, inter-process communication.
Unix Operating System : Overview of UNIX OS in general and implementation of all above functions in Unix Operating System.

Suggested Readings

1.Tenenbaum : Modern Operating Systems, Prentice-Hall.
2. Godbole : Operating System, Tata McGraw-Hill.
3. Peterson, James L: Operating System Concepts, Addison Wesley Publ. & Silberschatz Comp.
4. Deitel, H.M. : An Introduction to Operating System, Addison Wesley Publ. Comp.
5. Brain Kernighen & Rob Pike: The UNIX Programming Environment, Prentice Hall.
6. Maurice Bach :Design of the UNIX Operating System, Prentice Hall.
7. Stephen Prato :Advanced UNIX-Programmer's guide, BPB.
8. Sumitabha Das : UNIX Concepts and Applications – Featuring SCO UNIX and LINUX, 2nd Ed., TMH.

Note : Latest and additional good books may be suggested and added from time to time.

INTERNET, WEB PROGRAMMING & JAVA
PAPER CODE- M.Sc.-304

External: 80   **Time: 3Hrs**
Internal: 20
Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

UNIT-I

Internet Beginning and Current State, Hardware and Software requirement, ISP and Internet accounts, Web-Home page, URI, Browser, Security on Web, Plug-ins and helpers, Searching tools and Search engine FTP, Gopher, Telnet and e-mail.

UNIT-II
Web Authoring using HTML
Creating a Web page, Methods of Linking, Publishing, HTML, Text formatting and alignment, Font Control, Arranging text in lists, Images on a Web page, Backgrounds and Color Control, Interactive Layout with Frames JavaScript.

UNIT-III
Programming through JAVA
Java History, Java features, Java and Internet, Java and World Wide Web, Hardware and software requirements, Java environment, Java Program Structure, Java Tokens, Java Virtual Machine, Constants, Variables and Data Types, Operators and Expressions, Decision Making and Branching, Decision Making and looping Classes and Methods, Interfaces, Packages, Managing Errors and Exceptions.

UNIT-IV
Programming Applet
Local and remote Applets and Applications, Applet life cycle, creating and Executable. Applet, Passing Parameters to Applet.**JavaBeans, JDBC, CORBA, RMI.**
Overview of CGI Programming.

Suggested Readings

1. Patrick Naughton & : Java 2.0 : The Complete Reference, TMH.
Herbert Schildt.
2. Holzner Steven : Java 2, Swing, Servlets, JDBC & Java Beans
Programming (Black Book), IDG Books India (P) Ltd.
3. Hatman & Eden : ASP with VBScript, SQL and HTML Programming

Reference, IDG Books India(P), Ltd.
4. Jackson, J. : Java by Example, Sunsoft Press.
5. Wiber, J. : Using Java 2 Platform, PHI.
6. Harold, E. : Java Secrets, Comdex.
7. Zolli, A. : Mastering Java, BPB.
8. TiHel, E. :Discover Java, Comdex.
Note : Latest and additional good books may be suggested and added from time to time.

PRACTICAL- III
PAPER CODE- M.Sc.-305

External: 80
Internal: 20

Based on M.Sc.-303, M.Sc.-304

FOURTH SEMESTER

ARTIFICIAL INTELLIGENCE
PAPER CODE- M.Sc.-401

External: 80   **Time: 3Hrs**
Internal: 20

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

UNIT-I

Problem solving
State space search: Production systems, Search space control, Depth first search, unknown search, Hill climbing best first search, branch and bound. Best First Search, Problem Reduction, Constraints, Satisfaction, Means End Analysis.

UNIT-II

Knowledge Representation
Predicale logic : Skolemzing queries, Unification, Modus pones, Resolution, dependency directed back tracking.
Rule Based Systems: Forward reasoning Conflict resolution, Backward reasoning. Use of non back track.

UNIT-III

Perception: Sensing, Speech recognition, Vision, Action, Neural networks : Introduction, Comparison of artificial neural networks with biological neural networks, Learning in neural networks, Perceptions, Back propagation networks, application of neural networks.

Fuzzy logic : Definition, Difference between Boolean and Fuzzy logic, fuzzy subset, fuzzy membership function, fuzzy expert system, Inference process for fuzzy expert system, fuzzy controller

UNIT-IV

Expert system development life cycle: Problem selection, Prototype construction, Formalization, Implementation, Evaluation, Knowledge acquisition: Knowledge engineer, Cognitive behavior, Acquisition techniques.

Knowledge representation: Level of representation, Knowledge representation schemes, Formal logic, Inference Engine, Semantic net, Frame, Scripts.

Suggested Readings :

1. Rich Elaine and : Artificial Intelligence, 2nd edition, Tata McGraw Hill .
   Knight Kevin
2. Tani Moto : Introduction to AI using LISP.
3. Patterson : Artificial Intelligence and Expert Systems.
4. Winston, P.H. and: LISP B.K.P.
5. Sangal Rajeev : LISP Programming, Tata McGraw Hill.
6. Balagurusamy : Artificial Intelligence & Technology.
7. Mishkoff, Henry C: Understanding Artificial Intelligence, BPB Publ.
8. Bharti & Chaitenya: Natural Language Processing, PHI

Note : Latest and additional good books may be suggested and added from time to time.

COMPUTER GRAPHICS
PAPER CODE- M.Sc.-402

External: 80   **Time: 3Hrs**
Internal: 20

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

UNIT-I

Overview of Computer Graphics : Interactive graphics, passive graphics, Advantages of Interactive Graphics Display Devices: Refresh CRT, Random-Scan and Raster Scan Monitor, Colour CRT Monitors DVST Plasma, Panel Displays, LED and LCD monitors, Hard copy devices.

UNIT-II

Scan conversion: Scan converting a point, line, circle and ellipse.
2-D graphics transformations (Rotations, Scaling, Translations, Reflecting Shearing), Composite 2D graphics transformations, 2-D viewing and clipping , Windowing concepts, clipping algorithms (Line, Area and Text-Sutherland-Cohen, Mid-point subdivision), Window to view port transformation Primitive and attributes, Exterior and Interior clipping.

UNIT-III

Interactive Graphics: Concept of Positioning and Pointing, Interactive Graphic Devices (Key Boards, Touch Panels, Light Pens, Graphic tablets, Joysticks, Mouse, Voice Systems), Interactive

Graphical Techniques. Basic Positioning Methods, Constraints, Gride, Gravity field, Rubber Bond Methods, Sketching, Dragging, Inking and Painting.

Computer Graphic Software : Introduction, GKS (Primitive, attributes and Viewport, Display subroutines), PHIGS/PHIGS+.

UNIT-IV

3-D Graphics: 3D Graphics transformations (Rotation, Rotation about an arbitary line Scaling, Translation), Parallel and Perspective Projections, Concepts of Hidden Line, Hidden Line and Surface elimination methods(Z-Buffer, Scanline, Painter's Subdivision). **3-D viewing and clipping 3-D Object Representation:** Wireframe model, Bezier Curves and Surfaces.

Suggested Readings

1. Hearn, D.,Baker, : Computer Graphics, Prentice Hall.
2. Plastock : Theory & Problem of Computer Graphics, Schaum Series.
3. Foley & Van Dam: Fundamentals of Interactive Computer Graphics, Addison-Wesley.
4. Newman : Principles of Interactive Computer Graphics, McGraw Hill, 1980.

Note : Latest and additional good books may be suggested and added from time to time.

WINDOWS PROGRAMING & VISUAL C++
PAPER CODE- M.Sc.-403

External: 80   **Time: 3Hrs**
Internal: 20

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 8 parts (short-answer type questions) covering the entire syllabus and will carry 16 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 16 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

UNIT-I

Introduction to Windows Program: Message processing in Windows Programming, Message boxes, Menu and Accelerators. Dialog Box. Creating Icons, Cursor and Bitmaps, Introduction to Child Window Controls. Check boxes, Static control, Radio Buttons, Scroll bars.

UNIT-II

Advance Window Controls : Toolbars up down controls, Spin control, Progress bar, Tree view, Tab controls, Text and Font, Working with Graphics, Consoles, Multitasking Process and Threads. Clipboard Drag and Drops, Advance features of Windows Programming GDI Metafiles, Sound API, DLL.

UNIT-III

Visual C++ Basic: Introduction, Building a Basic Application, SDI and MDI, View Document Architecture Using Microsoft Foundation Class (MFC) Library, Visual C++ Resources: Application Wizard, Accelerators and Menus, Toolbars.

UNIT-IV

Visual C++ And Database Management: MFC programming without View Document Architecture,. Data Access Objects (DAO) versus Open Database Connectivity (ODBC), Database Building Overview, Building a Database Application using ODBC, Building a Database Application Using.

Suggested Readings:
1. Charles Petzold: Windows Programming, Microsoft Press.
2. Herbett Schildts: Windows Programming, TMH.
3. Murray: VC++, TMH.
4. Steve Holzner: Introduction to VC++.
5. Any other book(s) covering the contents of the paper in more depth.

Note : Latest and additional good books may be suggested and added from time to time.

PRACTICAL IV
Paper No- M.Sc.-404

External: 80
Internal: 20

Based on M.Sc.-402, M.Sc.-403

PROJECT REPORT
Paper No- M.Sc.-405

External: 80
Internal: 20

1. Each student should carry out Project using the software development tools /languages/ technologies that they have learnt and/or have studied during the concerned semester.
2. It should be done by the student in an organization/college under the supervision of the staff(s) assigned by Head of the Department/Director/Principal.