

M.Sc (CA) (w.e.f June 2010-11)

I Year			Instructional System							Credits	Marks
Course Code	SLM Code	Name of Subject	PC P	A W	V G D	P D P	PE C	P P W	II I L		
M.Sc(CA)-1	C-101	Computer Fundamentals & Programming in C	√	√	√		√			4	100
M.Sc(CA)-2	C-104	Data Structure Through C	√	√	√		√			4	100
M.Sc(CA)-3	C-117	(A) Internet & E-commerce	√	√	√	√	√			8	100
	C-109	(B) DBMS									
M.Sc(CA)-4	C-110	Operating System with Unix & Shell programming	√	√	√		√			4	100
M.Sc(CA)-5	C-111	(A) System Analysis & design	√	√	√		√			8	100
	C-112	(B) Visual Basic									
M.Sc(CA)-6	C-113	Mathematics & Graph theory	√	√						6	100
M.Sc(CA)-7	-	Practical Covering M.Sc(CA) -1 to M.Sc(CA)-5					√			10	250
Total										44	850

II Year			Instructional System							Credits	Marks
Course code	SLM Code	Name of Subject	PC P	A W	V G D	PD P	PE C	P P W	I I L		
M.Sc(CA)-8	C-138	Computer Network	√	√	√					4	100
M.Sc(CA)-9	C-129	Design Analysis of Algorism	√	√	√					4	100
M.Sc(CA)-10	C-105	Object Oriented Programming & C ++	√	√	√		√			4	100
M.Sc(CA)-11	C-133	Computer Based Optimization Techniques	√	√	√					4	100
M.Sc(CA)-12	C-117	(A) Internet & E-Commerce	√	√	√					8	100
	C-118	(B) MIS									
M.Sc(CA)-13	C-137	Internet & Java Programming	√	√	√		√			4	100
M.Sc(CA)-14	C-136	Modeling & Simulation	√	√	√					4	100
M.Sc(CA)-15	-	Practical covering M.Sc(CA).-10 & 13	√	√			√			8	100
M.Sc(CA)-16	-	Project						√		4	150
Total										44	950

I YEAR

**COMPUTER FUNDAMENTAL AND PROGRAMMING IN C
C-101**

SECTION A

Number System: Decimal, Octal, Binary & Hexadecimal, Representation of Integer, fixed and floating points, character representation : ASCII, EBCDIC.

SECTION B

Functional Units of Computer : I/O devices, primary and secondary memories.

SECTION C

Programming Fundamental : Algorithm development, techniques of problem solving, flowcharting, stepwise refinement, algorithm for searching sorting exchange and insertion merging of order lists.

SECTION D

Representation of integers, character, reals, data types, constants and variables, arithmetic expression, assignment statement logical expression, sequencing, alteration and iteration, arrays, string processing, sub program, recursion, files and pointers testing and debugging of program.

DATA STRUCTURE THROUGH 'C'
C-104

SECTION A

1. Problem solving concepts, top down and bottom up design structured programming.
2. Concept of data type and data structure, differences between data type and data structures, view of data structures at logical level, implementation level and application level, built-in-data structures and user defined data structures.

SECTION B

3. Concepts of dynamic variables, difference between static and dynamic variables, concepts of pointer variables.
4. Study of the following user define data structures using static and variables.
 - Built-in data structures like arrays, records.
 - User defines data structures like stacks, queues, linked. User defines data structures like stacks, queues, linked lists, circular linked lists, doubly linked list.

SECTION C

5. Non-linear data structures: trees, terminology of trees, concepts and applications of binary trees, tree traversal techniques and algorithms.

SECTION D

6. Sorting and searching algorithms and their efficiency considerations.
7. Considerations for choice of proper data structure.

INTERNET AND E-COMMERCE
C-117

SECTION-A

Architectural framework of E-commerce

Web architecture, web browser, HTTP, TCP/IP, Webserver, HTML, Scripts standards:- EDIFACT, edi.

SECTION-B

Security Issue

Introduction to viruse , worms, bombs and protective measure and security issue, firewalls, and proxy application gateways, secure, electronic transaction, public and private key encryption, digital signature, and digital certificate.

SECTION-C

Electronic Payments Systems

Digital cash, electronic signature, debit cards at point of scale, smart cards, online credit cards based system, electronic fund EFT, payment gateways.

SECTION-D

Electronic Commerce Application

E-commerce banking, online shopping, business, models, and revenue models, online publishing, e- commerce in retail industry, CBS, digital copyrights, electronic data interchanges, electronic fund transfer, electronic display board, electronic catalogue.

DATA BASE MANAGEMENT SYSTEM
C-109

SECTION A

1. Introduction

Purpose of database, data models, instances & schemas, data independence, data definition language, data manipulation language, database manager, database administration.

SECTION B

2. Entity Relationship Model

Entity & Entity sets, relationship sets, mapping constraints, candidate & primary Key, entity relationship diagram, reducing E-R diagram to tables.

3. Relational Model

Concepts of relational model, integrity constraints, extension & intension, relational algebra, relational calculus, commercial query language, modifying the database, comments on relational model.

4. DBMS based on relational Model

Introduction, the mapping operation, data manipulation facility, data definition facility, data control facility.

SECTION C

5. Normalization

Introduction to functional dependence, normalization- 1NF,2NF,3NF,4NF,5NF.

SECTION D

6. Oracle Ingress or Sybase

Creation of tables, modification of tables, DDL command for RDBMS, SQL command for RDBMS, command language.

**OPERATING SYSTEMS WITH UNIX
AND SHELL PROGRAMMING
C-110**

SECTION A

Operating System Fundamentals

Introduction Concepts: Operating system function and characteristics, historical evolution of operating system, Real time systems, Distributed system, Methodologies for implementation of O/S service, system calls, system programs, Interrupt mechanisms.

SECTION B

I/O System, File Management and Process Scheduling

File system: Function of the system, File access and allocation methods, Directory structure, file protection mechanisms, implementation issue, hierarchy of file, disk scheduling policies.

Process Scheduling: Process, PCB, state transition, Level of Scheduling Comparative study of scheduling algorithms.

SECTION C

Feature of UNIX, directory structure of UNIX, File structure of UNIX, concept of inodes. Logging into Unix, format of UNIX components, basis operations on files, filters and pipelines mail and communication commands.

SECTION D

Shell Script

Types of shells, control structure for shells and I/O for shells. Use of Editors, VI, EX & Ed.

SYSTEM ANALYSIS AND DESIGN

C-111

SECTION (A)

1.Introduction

Concepts of a systems, examples of systems, types of systems – open and closed, static and dynamic with examples.

2.Overview of system analysis and Design

System development life cycle, brief introduction to analysis, implementation and testing and maintenance.

SECTION (B)

3.Preliminary Investigation

Project selection, scope definition and preliminary investigation.

4.Feasibility study

Technical and economic and operational feasibility, cost and benefit analysis.

SECTION C

5.Requirement Specification and analysis

Fact finding techniques, data flow diagrams, data dictionaries, decision trees and tables.

6.Detailed Design

Module Specification, file design, database design.

SECTION D

7.Testing and Quality Assurance

Maintenance, unit and integration testing techniques, design objectives, quality factors such as reliability correctness etc.

8.User Education and Training

Issues in user education and training, method of educating and training the user.

VISUAL BASIC C-112

SECTION-A

Visual basic environment and overview

Overview of main screen, menu bar, tool bar, tool box using menus, customizing a form, building user control, command buttons text boxes, labels images controls.

SECTION-B

Statements in visual basic, writing codes, dialog box, variable, type of variable string numbers,

SECTION-C

Writing procedures, VB programs structure, projects. Forms, modules, and frames, project with multiple forms displaying information on form, picture boxes, textboxes.

SECTION-D

Printer objects controlling program flow. Built in function user defined function and procedures. Arrays, grids & records. Object oriented programming, creating object, building classes.

MATHEMATICS AND GRAPH THEORY
C-113

SECTION – A

Sets and elements, universal set and empty set, subsets, Venn diagrams, set operations, Algebra of sets, Cartesian product, Relations, mappings, Countable and uncountable sets, Domain and range, propositional logic, FOPL ,Logical equivalences, quantifiers.

SECTION-B

Partially ordered sets, External elements of partial ordered sets, Least upper bound and greatest lower bound, Finite Boolean algebra, Lattices, Bounded lattices, Distributive lattices.

SECTION-C

Matrices, matrix addition and scalar multiplication, Transpose, Inverse, Determinants, Eigen values and Eigen vectors.
Permutations, Combinations, Pigeon hole principle, Elements of Probability, Conditional Probability, Baye's Theorem.

SECTION-D

Tree, Binary tree, Traversals, Huffman's algorithm, Minimum spanning trees, Euler graph , Hamiltonian cycle, Cutsets, Matching, Coloring.

II YEAR

COMPUTER NETWORKS (C-138)

Unit 1:

Introduction : Overview of computer network, seven-layer architecture, TCP/IP suite of protocol, etc. Mac protocols for high-speed LANs, Mans & WIRELESS LANs. (For example, FDDI, DQDB, HIPPI, Gigabit Ethernet, Wireless Ethernet etc.)
Fast access technologies. (For example, ADSL, Cable Modem, etc.)

Unit 2:

IPv6 : why IPv6, basic protocol, extension & option, support for QoS, Security, etc, neighbor discovery, auto configuration, routing. Change to other protocols. Application programming interface for Ipv6. 6bone.

Unit 3:

Mobility in network. Mobile. Security related issues. IP Multicasting. Multicasting routing protocols, address assignments, session discovery, etc.

Unit 4:

TCP extensions for high-speed networks, transaction-oriented application, other new option in TCP.

Unit 5:

Network security at various layers. Secure-HTTP, SSL, ESP, Authentication header, Key distribution protocols. Digital signatures, digital certificates.

DESIGN & ANALYSIS OF ALGORITHM (C-129)

UNIT I

Introduction : Algorithms, Analysis of Algorithms, Design of Algorithms, and Complexity of Algorithms, Asymptotic Notations, Growth of function, Recurrences
Sorting in polynomial Time: Insertion sort, Merge sort, Heap sort, and Quick sort sorting
in Linear Time: Counting sort, Radix Sort, Bucket Sort medians and order statistics.

UNIT II

Elementary Data Structure : Stacks, Queues, Linked list, Binary Search Tree, Hash Table.

Advanced Data Structure : Red Black Trees, Splay Tress, Augmenting Data Structure Binomial Heap, BTree, Fibonacci Heap, and Data Structure for Disjoint Sets Union-find Algorithm, Dictionaries and priority Queues, mergeable heaps, concatenable queues.

UNIT III

Advanced Design and Analysis Techniques : Dynamic programming, Greedy Algorithm, Backtracking, Branch-and-Bound, Amortized Analysis.

UNIT IV

Graph Algorithms : Elementary Graph Algorithms, Breadth First Search, Depth First Search, Minimum Spanning Tree, Kruskal's Algorithms, Prim's Algorithms, Single Source Shortest Path, All pair Shortest Path, Maximum flow and Travelling Salesman Problem.

UNIT V

Randomized Algorithms, String Matching, NP-Hard and NP-Completeness
Approximation Algorithms, Sorting Network, Matrix Operations, Polynomials and the FFT, Number Theoretic Algorithms, Computational GeometrOR.

OBJECT ORIENTED PROGRAMMING AND C++

C-105

SECTION A

OOP paradigm, Advantages of OOP, Comparison between functional programming and OOP approach, characteristics of object oriented Language objects, class, Inheritance, Polymorphism, and abstraction, encapsulation, Dynamic Binding, Message passing. Introduction to C++, Identifier and Keywords, constants, C++ Operators, Type conversion, Variable declaration, Statement, expression, User defined data types, conditional expression (For, While, Do-While, Do-While) loop statement, breaking control statements (Break, continue).

SECTION B

Defining a function, types of functions, Inline functions, Call by value and Call by reference, Preprocessor, Header files and standard functions, Structures, Pointers and structures, Unions, Enumeration.

SECTION C

Classes, Member function, Objects, Array of objects, Nested classes, Constructors, Copy constructors, Destructors, Inline member functions, static class member, friend functions, Dynamic memory allocation.

Inheritance: Single inheritance, Multi – level inheritance, Hierarchical, Virtual base class, Abstract classes, Constructors in Derived classes, Nesting of classes.

SECTION D

Function overloading, Operator overloading, Polymorphism, Early binding, Polymorphism with pointers, Virtual functions, Late binding, Pure virtual functions, Opening and closing of files, Stream member functions, Binary file operations, classes and file operations, Random access file processing.

COMPUTER BASED OPTIMIZATION TECHNIQUES (C-133)

UNIT-I

Preliminaries : Inventory Models and Replacement Problems : Inventory models-various costs deterministic inventory models, Single period inventory model with shortest cost, Stochastic models, Application of inventory models, Economic lot sizes-price breaks, Replacement problems-capital equipment-discounting costs-replacement in anticipation of failure-group replacement-stochastic nature underlying the failure phenomenon.

UNIT-II

Linear Programming Problems (LPP) : Definition of LPP, Graphical Solutions of Linear Programming Problems, Simplex method, and Artificial Variable Method, Two Phase Method, Charnes' Big-M Method, Sensitivity Analysis, Revised Simplex Method, Duality, Dual simplex method.

UNIT-III

Integer Linear Programming Problems : Integer Linear Programming Problems, Mixed Integer Linear Programming Problems, Cutting Plane Method, Branch and Bound Method, 0-1 Integer Linear Programming Problem.

Transportation Problems : Introduction to Transportation Model, Matrix from TP, Applications of TP Models, Basic Feasible Solution of a TP, Degeneracy in TP, Formulation of Loops in TP, Solution Techniques of TP, Different Methods of Obtaining Initial Basic Feasible Solutions viz. Matrix Minima Method, Row Minima Method, Column Minima Methods, Vogel's Approximation Method, Techniques for Obtaining Optimal Basic Feasible Solution.

Assignment Problems : Definition, Hungarian Method for AP.

UNIT-IV

Introduction to NLP : Definition of NLP, Convex Programming Problems, Quadratic Programming Problems, Wolfe's Method for Quadratic Programming, Kuhn-Tucker Conditions, Geometrical Interpretation of KT-Conditions, KT-Points etc.

Dynamic Programming : Bellman's Principle of optimality of Dynamic Programming Multistage decision problem and its solution by Dynamic Programming with finite number of stages, Solution of linear programming problems as a dynamic Programming problem.

UNIT-V

Queuing Theory : Introduction to Queues, Basic Elements of Queuing Models, Queue Disciplines, Memory less Distribution, Role of Exponential and Poisson Distributions, Markovian Process, Erlang distribution, Symbols and Notations, Distribution of Arrivals, Distribution of Service Times, Definition of Steady and Transient State, Poisson Queues.

INTERNET AND E-COMMERCE
C-117

SECTION-A

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SECTION-B

Security Issue

Introduction to viruse , worms, bombs and protective measure and security issue, firewalls, and proxy application gateways, secure, electronic transaction, public and private key encryption, digital signature, and digital certificate.

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MANAGEMENT INFORMATION SYSTEM (C-118)

Unit 1:

Foundation of Information systems: Introduction to information system in business, fundamentals of information systems, Solving business problems with information systems, Type of information system, effectiveness and efficiency criteria in information system.

Unit 2:

An overview of Management Information Systems : Definition of a management information system, MIS versus Data processing, MIS & Decision Support Systems, MIS & Information Resources Management, End user computing, Concept of an MIS, Structure of Management information system.

Unit 3:

Concepts of planning & control: Concept of organization planning, the planning process, Computational support for planning, Characteristics of control process, the nature of control in an organization.

Unit 4:

Business applications of information technology : Internet & electronic commerce, internet, extranet & Enterprise Solutions, Information System for Business Operations, Information System for managerial Decision support, Information System for Strategic Advantage.

Unit 5:

Managing Information Technology: Enterprise & Global Management, Security & Ethical challenges, Planning & Implementing changes.

Advanced Concepts in Information Systems : Enterprise Resource Planning Supply Chain Management, Customer Relationship Management, and Procurement Management.

INTERNET & JAVA PROGRAMMING (C– 137)

Unit- I

Internet : Internet, Connecting to Internet: Telephone, Cable, Satellite connection, Choosing and ISP, Introduction to Internet services, E-Mail concepts, Sending and Receiving secure E-Mail, Voice and Video Conferencing.

Unit- II

Core Java : Introduction, Operator, Data type, Variable, Arrays, Control Statements, Methods & Classes, Inheritance, Package and Interface, Exception Handling, Multithread programming, I/O, Java Applet, String handling, Networking, Event handling, Introduction to AWT, AWT controls, Layout managers, Menus, Images, Graphics.

Unit- III

Java Swing : Creating a Swing Applet and Application, Programming using Panes, Pluggable Look and feel, Labels, Text fields, Buttons, Toggle buttons, Checkboxes, Radio Buttons, View ports, Scroll Panes, Scroll Bars, Lists, Combo box, Progress, Menu and Toolbars, layered Panes, Tabbed, Tabbed Panes, Split Panes, Layouts, Window, Dialog Boxes, Inner frame.

JDBC : The connectivity Model, JDBC/ODBC Bridge, java.sql package, connectivity to remote database, navigating through multiple rows retrieved from a database.

Unit- IV

Java Beans : Application Builder tools, the bean developer kit(BDK), JAR files, Introduction, Developing a simple bean, using Bound properties, The Java Beans API, Session Beans, Entity Beans, Introduction to Enterprise Java beans (EJB).

Unit- V

Java Servlets : Servlet basics, Servlet API basic, Life cycle of a Servlet, Running Servlet, Debugging servlets, Thread-safe Servlets, HTTP Redirects, Cookies, Introduction to Java Server Pages (JSP).

MODELING & SIMULATION (C-136)

Unit-I

System definition and components, stochastic activities, continuous and discrete Systems, System modeling, types of models, static and dynamic physical models, statics and dynamic mathematical models, Full corporate model, types of system study.

Unit-II

System simulation, Why to simulate and when to simulate, Basic nature of simulation, technique of simulation, comparison of simulation and analytical methods, types of system simulation, real time simulation, hybrid simulation, simulation of pure-pursuit problem single-server queuing system and an inventory problem, Monte Carlo simulation, Distributed Lag models, Cobweb model.

Unit-III

Simulation of continuous systems, analog vs. digital simulation, of water reservoir system, simulation of a servo system, simulation of an autopilot, Discrete system Simulation, Fixed time-step vs. event-to-event model, generation of random numbers, Test for randomness, Generalization of non-uniformly distributed random numbers, Monte-Carlo computation vs. stochastic simulation.

Unit-IV

System dynamics, exponential growth models, exponential decay models, modified exponential growth models, logistic curves, generalization of growth models, System dynamics diagrams, Feedback in Socio-Economic systems, world model.

Unit-V

Simulation of PERT networks, Critical path computation, uncertainties in Activity duration, Resource allocation and consideration. Simulation software, Simulation languages, continuous and discrete simulation languages, Expression based languages, object-oriented simulation, general-purpose vs. application-oriented simulation packages, CSMP-III, MODSIM-III.