Scheme of Examination (MCA)

Paper Code	Nomenclature	Max. Marks	Pass Marks
First Year			
CS-DE-11	Computer Fundamentals and Programming in C	100	40
CS-DE-12	Software Engineering	100	40
CS-DE-13	Computer Organization	100	40
CS-DE-14	Data Structures	100	40
CS-DE-15	PC-Software	100	40
CS-DE-16	Computer Networks	100	40
CS-DE-17	Software Lab – I Programming using C	100	40
CS-DE-18	Software Lab – II PC-Software	100	40
	Total	**800**	
Second Year			
CS-DE-21	Computer Graphics	100	40
CS-DE-22	Object Oriented Methodologies & C++	100	40
CS-DE-23	System Simulation	100	40
CS-DE-24	Operating System	100	40
CS-DE-25	Database Systems	100	40
CS-DE-26	Elective – I	100	40
CS-DE-27	Software Lab – I Programming using C++	100	40
CS-DE-28	Software Lab – II Oracle	100	40
	Total Marks	**800**	
Elective Papers			
CS-DE-26(i)	Computer Oriented Optimization Techniques		
CS-DE-26(ii)	Analysis and Design of Algorithm		
CS-DE-26(iii)	Compiler Construction		
CS-DE-26(iv)	Artificial Intelligence		
Third Year			
CS-DE-31	Computer Architecture & Parallel Processing	100	40
CS-DE-32	Web Engineering	100	40
CS-DE-33	Visual Programming	100	40
CS-DE-34	Elective – I	100	40
CS-DE-35	Elective-II	100	40
CS-DE-36	Project Report	100	40
CS-DE-37	Software Lab – I HTML/XML/Java/Java Script/JSP	100	40
CS-DE-38	Software Lab – II Visual Programming	100	40
	Total Marks	**800**	
Elective Papers			
CS-DE-34(i)	Microprocessor		
CS-DE-34(ii)	Data Mining and Warehousing		
CS-DE-34(iii)	Software Project Management		
CS-DE-34(iv)	Java Programming		
CS-DE-35(i)	Principles of Programming Languages		
CS-DE-35(ii)	Theory of Computation		
CS-DE-35(iii)	Internet Computing		
CS-DE-35(iv)	Linux and Shall Programming		

Note: (1)   (a) Scheme & Syllabi of PGDCA, M.Sc. (Computer Science) 1st year and MCA 1st year are same.

(b) Scheme & Syllabi of M.Sc. (Computer Science) 2nd year and MCA 2nd year is same.

(2)   A candidate seeking admission to Master of Computer Applications (MCA) 1st year should have passed three years Bachelor Degree (or Equivalent thereto) in any discipline from this university or any examination recognized by this university equivalent thereto.

However, a candidate who has passed 1-year Diploma courses in Computer Science/Computer Applications/IT from this University or any recognized University after three years Bachelor degree (or equivalent) is eligible to get admission directly to MCA 2nd year under lateral entry scheme.

A student who has passed M.Sc.(Computer Science) of this University or recognized as equivalent by this university will get admission in MCA 3rd year directly under lateral entry scheme.

A student who has appeared in PGDCA examination from this university may be admitted provisionally in MCA 2nd year (Lateral Entry Scheme). However, for promotion to MCA 3rd year such a candidate should have passed all papers of 1st year Examination. Similarly a student who has passed M.Sc. (Computer Science) 1st year through distance education mode of this University and has appeared in 2nd year may be admitted provisionally in MCA 3rd year (lateral entry scheme) through Distance Education Mode.

CS-DE-11 Computer Fundamentals and Programming in C

Maximum Marks: 100　　　　**Minimum Pass Marks: 40**　　　　**Time: 3 hours**

Note: Examiner will be required to set TEN questions in all selecting FIVE questions from each unit. Students will be required to attempt FIVE questions in all selecting at least two questions from each unit. All questions will carry equal marks.

UNIT-I

Computer Fundamentals: Definition, Block Diagram along with Computer components, characteristics & classification of computers, hardware & software, types of software, Introduction to Compiler, Assembler, and Interpreter.

Operating System: Definition, functions, different types – single user, multi user, time sharing, multiprogramming, batch processing, real time etc.

Planning the Computer Program: Concept of problem solving, Problem definition, Program design, Debugging, Types of errors in programming, Documentation.

Techniques of Problem Solving: Flowcharting, decision table, algorithms, Structured programming concepts, Programming methodologies viz. top-down and bottom-up programming.

Overview of C: History of C, Importance of C, Structure of a C Program.

Elements of C: C character set, identifiers and keywords, Data types, Constants and Variables.

Operators: Arithmetic, relational, logical, bitwise, unary, assignment and conditional operators and their hierarchy & associativity.

UNIT-II

Input/output: Unformatted & formatted I/O function in C.

Control statements: Sequencing, Selection: if and switch statement; alternation, Repetition: for, while, and do-while loop; break, continue, goto.

Functions: Definition, prototype, passing parameters, recursion.

Storage classes in C: auto, extern, register and static storage class, their scope, storage, & lifetime.

Arrays: Definition, types, initialization, processing an array, passing arrays to functions, Strings.

Pointers: Declaration, operations on pointers, pointers and arrays, dynamic memory allocation, pointers and functions, pointers and strings.

Structure & Union: Definition, processing, Structure and pointers, passing structures to functions.

Data files: Opening and closing a file, I/O operations on files, Error handling during I/O operation, Random access to files.

Text Books:
1. Sinha, P.K. & Sinha, Priti, "Computer Fundamentals", BPB
2. Dromey, R.G., "How to Solve it By Computer", PHI
3. Gottfried, Byron S., "Programming with C", Tata McGraw Hill
4. Balagurusamy, E., "Programming in ANSI C", McGraw-Hill

Reference Books:
1. Jeri R. Hanly & Elliot P. Koffman, "Problem Solving and Program Design in C", Addison Wesley.
2. Yashwant Kanetker, "Let us C", BPB
3. Norton, Peter, "Introduction to Computers", McGraw-Hill
4. Leon, Alexis & Leon, Mathews, "Introduction to Computers", Leon Tech World
5. Rajaraman, V., "Fundamentals of Computers", PHI
6. Rajaraman, V., "Computer Programming in C", PHI

CS-DE-12 SOFTWARE ENGINEERING

Maximum Marks: 100   **Minimum Pass Marks: 40**   **Time: 3 hours**

Note: Examiner will be required to set TEN questions in all selecting FIVE questions from each unit. Student will be required to attempt FIVE questions in all selecting at least two questions from each unit. All questions will carry equal marks.

Unit-I

Introduction: Software Crisis-problem and causes, Software Processes, Software life cycle models: Waterfall, Prototype, Evolutionary and Spiral models, Overview of Quality Standards like ISO 9001, SEI-CMM, CMMI, PCMM, Six Sigma.

Software Metrics: Size Metrics like LOC, Token Count, Function Count, Design Metrics, Data Structure Metrics, Information Flow Metrics, cyclomatic complexity, Halstead Complexity measures.

Software Project Planning: Cost estimation, static, Single and multivariate models, COCOMO model, Putnam Resource Allocation Model, Risk management, project scheduling, personnel planning, team structure, Software configuration management, quality assurance, project monitoring.

Software Requirement Analysis and Specifications: Structured Analysis, Data Flow Diagrams, Data Dictionaries, Entity-Relationship diagrams, Software Requirement and Specifications, Behavioral and non-behavioral requirements.

Unit-II

Software Design: Design fundamentals, problem partitioning and abstraction, design methodology, Cohesion & Coupling, Classification of Cohesiveness & Coupling, Function Oriented Design, and User Interface Design.

Coding: Programming style, structured programming.

Software reliability: metric and specification, Musa and JM reliability model, fault avoidance and tolerance, exception handling, defensive programming.

Software Testing: Testing fundamentals, Functional testing: Boundary Value Analysis, Equivalence class testing, Decision table testing, Cause effect graphing, Structural testing: Control flow based and data flow based testing, loop testing, mutation testing, load, stress and performance testing, software testing strategies: unit testing, integration testing, Validation testing, System testing, Alpha and Beta testing, debugging.

Static Testing Strategies: Formal Technical Reviews (Peer Reviews), Walk Through, Code Inspection, Compliance with Design and Coding Standards.

Software Maintenance: Management of Maintenance, Maintenance Process, maintenance characteristics, maintainability, maintenance tasks, and maintenance side effects, Reverse Engineering, Software Re-engineering, Configuration Management, Documentation.

Text Books:
1. Pressman R. S., "Software Engineering – A Practitioner's Approach", Tata McGraw Hill.
2. Jalote P., "An Integrated approach to Software Engineering", Narosa.

Reference Books:
1. Sommerville, "Software Engineering", Addison Wesley.
2. Fairley R., "Software Engineering Concepts", Tata McGraw Hill.
3. James Peter, W Pedrycz, "Software Engineering", John Wiley & Sons.

CS-DE-13 COMPUTER ORGANIZATION

Maximum Marks: 100   **Minimum Pass Marks: 40**   **Time: 3 hours**

Note: Examiner will be required to set TEN questions in all selecting FIVE questions from each unit. Student will be required to attempt FIVE questions in all selecting at least two questions from each unit. All questions will carry equal marks.

UNIT-I
Information Representation: Number systems, BCD codes, Character codes – ASCII, EBCDIC, Unicode, Error Detecting and Correcting codes, Fixed-point and Floating-point representation of numbers. Binary arithmetic, Booths multiplication.
Binary Logic: Boolean algebra, Boolean functions, truth tables, canonical   and standard forms, simplification of Boolean functions, Digital logic gates.
Combinational Logic: Design procedure, Adders, Subtractors, Code Conversion, Analysis procedure, Multilevel NAND & NOR Circuits, XOR & XNOR functions Encoders, Decoders, Multiplexers, Demultiplexers and Comparators, Binary Parallel Adder, BCD Adder

UNIT-II
Sequential Logic: Flip-flops, Shift registers and Counters.
Memory System: Memory parameters, Semiconductor RAMs, ROMs, Magnetic and Optical storage devices, Flash memory.
CPU Organization: Processor organization, Machine instructions, instruction cycles, instruction formats and addressing modes, microprogramming concepts, and micro program sequencer.
I/O Organization: I/O interface, Interrupt structure, transfer of information between CPU/memory and I/O devices, and IOPs.

Text Books:
1. Mano, M. Morris, "Digital Logic and Computer Design", Prentice Hall of India Pvt. Ltd.
2. Rajaraman, V., Radhakrishanan,T., "An Introduction To Digital Computer Design", Prentice Hall of India Pvt. Ltd.

Reference Books:
1. Hayes, J.P., "Computer Architecture and Organization", McGraw Hill
2. Tanebaum A.S., "Structured Computer Organization", Prentice Hall of India Pvt. Ltd.
3. Stallings W., "Computer Organization and Architecture", Prentice Hall of India Pvt. Ltd.

CS-DE-14 DATA STRUCTURES

Maximum Marks: 100   **Minimum Pass Marks: 40**   **Time: 3 hours**

Note: Examiner will be required to set TEN questions in all selecting FIVE questions from each unit. Student will be required to attempt FIVE questions in all selecting at least two questions from each unit. All questions will carry equal marks.

UNIT –I

Introduction to Data Structures: Primitive and Composite, Arrays, Matrices, Sparse Matrices, Linear Search, Binary Search, Insertion Sort, Selection Sort, Bubble Sort, String, Representation and Manipulation, Complexity of Algorithms, Records and Pointers.

Linked Lists: Searching, Insertion, Deletion, Sorted Linked List, Circular List, Header List, Two – Way List; Stacks, Queues , Recursion, Quick Sort, Linked and Array representation of Stacks, Queues, and Dequeues, Polish Notation, Priority Queues,

UNIT –II

Trees: Binary Trees, Threaded Binary Trees, Balanced Tree, Different tree traversal algorithms, Binary Search Tree, Huffman Tree, Heap Sort, AVL Search Trees, B Trees, m-way Search Trees.

Representation of Graphs and Applications: Adjacency Matrix, Path Matrix, Warshall's Algorithm, Linked Representation of a Graph, Traversing a Graph;

Sorting and Searching: Radix Sort, Merge Sort, Hashing.

Text Books:
1. Seymour Lipschutz, "Data Structures", Tata Mcgrraw- Hill Publishing Company Limited,   Schaum's Outlines, New Delhi.
2. Yedidyan Langsam, Moshe J. Augenstein, and Aaron M. Tenenbaum, "Data Structures Using C", Prentice- Hall of India Pvt. Ltd., New Delhi.

Reference Books:
1. Trembley, J.P. And Sorenson P.G., "An Introduction to Data Structures With Applications", McGraw-Hill International Student Edition, New York.
2. Mark Allen Weiss, "Data Structures and Algorithm Analysis in C", Addison- Wesley, (An Imprint of Pearson Education), Mexico City. Prentice- Hall of India Pvt. Ltd., New Delhi.

CS-DE-15 PC-SOFTWARE

Maximum Marks: 100 **Minimum Pass Marks: 40** **Time: 3 hours**

Note: Examiner will be required to set TEN questions in all selecting FIVE questions from each unit. Student will be required to attempt FIVE questions in all selecting at least two questions from each unit. All questions will carry equal marks.

UNIT – I

MS Windows: Features of Windows; Various versions of Windows & its use; My Computer & Recycle bin; Desktop, Icons and Windows Explorer; Dialog Boxes & Toolbars; Working with Files & Folders; simple operations like copy, delete, moving of files and folders from one drive to another, Accessories and Windows Settings using Control Panel.

MS Word: Features & applications. Menus & Commands; Toolbars & Buttons; Shortcut Menus, Wizards & Templates; Different Page Views and layouts; Applying various Text Enhancements; Working with – Styles, Text Attributes; Paragraph and Page Formatting; Text Editing using various features; Creation & Working with Tables; Adding References and Graphics; Mail Merge, Envelops & Mailing Labels. Importing and exporting to and from various formats. Spell check, thesaurus.

MS PowerPoint: Applications, Working with MS PowerPoint; Creating a New Presentation; Using Wizards; Slides & its different views; Inserting, Deleting and Copying of Slides; Working with Notes, Handouts, Columns & Lists; Adding Graphics, Sounds and Movies to a Slide; Working with PowerPoint Objects; Designing & Presentation of a Slide Show;

UNIT – II

MS Excel: Applications, concepts of Workbook & Worksheets; Using Wizards; Various Data Types; Using different features with Data, Cell and Texts; Inserting, Removing & Resizing of Columns & Rows; Working with Data & Ranges; Different Views of Worksheets; Column Freezing, Labels, Hiding, Splitting etc.; Use of Formulas, Calculations & Functions; Cell Formatting including Borders & Shading; Working with Different Chart Types.

Database system: Components, three schema architecture of database, advantages and disadvantages of database systems, Relational Data model, Entity Relationship Model as a tool of conceptual design, ER diagram.

MS Access: Parts of an Access Window, Tool Bars and Their Icons, Creating a New Database, Creating a Database through Table Wizard, Creating a New Table, Relationships, Creating Table through Design View, Relationship, Query, Forms, Reports, Import/export tables etc.

Text Books:
1. Taxali, R. K., "PC Software for Windows made simple", Tata McGraw Hill.
2. Blackburn, Andrew, "MS Windows XP Home Edition Complete", Laxmi Publications.

Reference Books:
1. Windows XP Complete Reference. BPB Publications
2. MS Office XP complete BPB publication
3. MS Windows XP Home edition complete, BPB Publications

CS-DE-16 COMPUTER NETWORKS

Maximum Marks: 100 **Minimum Pass Marks: 40** **Time: 3 hours**

Note: Examiner will be required to set TEN questions in all selecting FIVE questions from each unit. Students will be required to attempt FIVE questions in all selecting at least two questions from each unit. All questions will carry equal marks.

UNIT – I

Introduction to Computer Networks and its uses; Types of Computer Networks: Classification by area, Classification by topology, Switched networks; Public and Private Networks;

Introduction to network design issues: addressing, routing, reliability, security, flow control, error control, media access control; Networking models: decentralized, centralized, distributed, client/server, peer-to-peer, web-based, emerging file sharing model;

Data transmission modes; Analog and Digital communication; Capacity of a channel: bit rate, bandwidth, baud; Switching; Multiplexing;

Network architecture: protocols, services and OSI reference model;

Transmission media: Copper media, Fiber-Optic media, Wireless communication, Satellite communication; Introduction to Wireless networks and wireless technologies;

Network hardware components: connectors, transceivers & media converters, repeaters, network interface cards and PC cards, bridges, switches, routers, gateways;

Introduction to LAN technologies: Ethernet, switched Ethernet, VLAN, fast Ethernet, gigabit Ethernet, token ring, FDDI, Wireless LANs; Bluetooth;

UNIT – II

Introduction to the Internet; Internet history; Internet and Intranet; Internet Services; TCP/IP model and its protocols (TCP, UDP, IP); IP addresses(IPv4); Next generation Internet Protocol (IPv6); IP address resolution- DNS;

Internet Technology and Protocols: E-mail ; Working with E-Mail: Opening of E-Mail account; E-Mail organization; Parts of E-Mail text; Working with messages – send, read, reply, delete, forward, attachments, signature, address book etc.; E-Mail Protocols - SMTP, MIME, POP;

File transfer and FTP; Remote login using TELNET; World Wide Web and HTTP; Web Browsers; Internet Search Engines; Uniform Resource Locator(URL); Web Servers; Popular Web Browsers and Search Engines; Working of Internet Explorer; Saving, Downloading, and Printing documents from the Web;

Internet Connection: Dialup; Leased line; Analog and Cable Modems; DSL service; Home Networking concepts; Internet Service Provider;

Internet Security issues: Threats and Attacks; Security measures; Firewalls; Encryption; Authentication; Virtual Private Networks;

Text Books:
1. Michael A. Gallo, William M. Hancock, "Computer Communications and Networking Technologies", CENGAGE Learning.

Reference Books:
1. Andrew S. Tanenbaum, "Computer Networks", Pearson.
2. P.K. Sinha, "Foundations of Computing", BPB.
3. James F. Kurose, Keith W. Ross, "Computer Networking", Pearson.
4. Behrouz A Forouzan, "Data Communications and Networking", McGraw Hill.