MCA SEMESTER – II					
Code	**Title**	**Marks of ESE**	**Marks of CIA**	**Credit**	**Total Marks**
CSC-5	Data Communication and Computer Network	70	30	4	100
CSC-6	Advance Java Programming	70	30	4	100
CSC-7	Database Management System	70	30	4	100
CSC-8	Design and Analysis of Algorithm	70	30	4	100
AEC-1	Ability Enhancement Courses	70	30	4	100
CSC-9	Practical based on CSC-6 & CSC-7	70	30	5	100
		Total		**25**	**600**

CSC-5	Data Communication and Computer Network	Credit:4

Unit-1. Introduction: Data Transmission concepts, transmission impairments, switching, modulation, multiplexing; Network Hardware-LAN, MAN, WAN, Wireless networks, Internet-works; Network Software- Layer, Protocols, interfaces and services; Reference Models-OSI, TCP/IP and their comparison.

Unit-2. Physical Layer: Transmission Media : Magnetic, twisted pair, coaxial cable, fiber optics, wireless transmission (radio, microwave, infrared), ATM, ISDN, Cellular radio and communication satellites.

Unit-3. Data Link Layer: Framing, Error control, Sliding window protocols (one bit, Go back n, selective repeat). Examples of DLL Protocols–HDLC, PPP. Medium Access Sub layer : Channel Allocation, MAC protocols – ALOHA, CSMA protocols, Collision free protocols, Limited Contention Protocols, Wireless LAN protocols, IEEE 802.3, 802.4, 802.5 standards and their comparison.

Unit-4. Network Layer: Design issues, Routing algorithms (shortest path, flooding, flow based, distance vector, hierarchical, broadcast, multicast, for mobile hosts), Congestion control algorithms (Leaky bucket, Token bucket, Choke Packet, Load shedding), Internetworking, IP Protocol, ARP, RARP.

Unit-5. Transport Layer: Addressing, establishing and releasing connection, flow control, buffering, Internet Transport Protocol (TCP and UDP).

Unit-6. Application Layer: Domain name system, E-mail, File transfer protocol, HTTP, HTTPS, World Wide Web.

Reference Books:

1. Trivedi, Computer Network, OUP.
2. Tanenbaum, Computer Networks, PHI.
3. Stallings, Data and Computer Communications, PHI.
4. Forouzan, Data Communications and Networks, TMH.

CSC-6	Advance Java Programming using J2EE	Credit: 4

Unit-1. Java Utilities: Collections – I/O streams – Networking – Event Handling.

Unit-2. AWT: Windows, Controls, Layout Managers and Menus – Swing. Multimedia: Images, Animation and Audio – JDBC.

Unit-3. Java Servlets: Design – Life Cycle – Constituents of javax.servlet package – cookies – session tracking – Java Server Pages: Overview – Implicit Objects – Scripting – Standard actions – Directives.

Unit-4. Remote Method Invocation: Remote Interface – The Naming Class – RMI Security Manager Class – RMI Exceptions – Creating RMI Client and Server classes – RMI – I IOP.

Unit-5. Java Beans: Events – Customization – Introspection – Persistence – EJB: Introduction – EJB Container – Classes – Interfaces – Deployment description – Session Bean – Entity Java Bean – Jar file.

Reference Books:

1. Roy, Advance Java Programming, OUP.
2. Deitel, Java- How to Program, PHI.
3. Seth &Juneja, Java, OUP.
4. H. Schildt, Java 2: The Complete Reference (5th ed.), TMH.

CSC-7	Database Management System	Credit: 4

Unit-1. Basic Concept: Database Systems, Characteristics, Data Models, Database Languages, DBMS Architecture, Database Users and Data Independence.

Unit-2. Database Design using ER Model:ER Modeling, relation types, role and Structural Constraints, Extended ER Modeling Features, Design of an ER Database Schema, Reduction of ER Schema to Tables.

Unit-3. Relational Model: Codd's rules, Relational Model Concepts, Relational Algebra, Relational Calculus.

Unit-4. Introduction to SQL: SQL data types and literals, Types of SQL commands, SQL operators, Tables, views and indexes, Queries and sub queries, Aggregate functions, Cursors in SQL.

Unit-5. Relational Database Design: Functional and multi-valued Dependencies, Desirable Properties of Decomposition, Normalization up to 5 NF.

Unit-6. Selected Database Issues: Security, Transaction Management, Basic Algorithms to Query Processing and Query Optimization, Concurrency Control, Recovery Techniques, Case Study: Oracle/MS-SQL.

Reference Books:

1. Silberschatz, Database System Concepts, TMH.
2. Raghu Ramakrishnan, Database Management Systems, TMH.
3. Elmsari and Navathe,Fundamentals of Database Systems, PE.

CSC-8	Design and Analysis of Algorithm	Credit: 4

Unit-1. Introduction, Growth Functions and Recurrences: Role of Algorithms in Computing, Analyzing and designing of algorithms, Mathematical Foundations, Methods of ProofInduction, Contradiction, Growth Functions-Different Asymptotic Notations, Worst, Average and Best case Analysis, Recurrences- Substitution, Recursion Tree and Master Methods.

Unit-2.Brute Force and Divide and Conquer Methods: Brute Force, Exhaustive Search-Travelling Salesman Problem, Knapsack Problem and Assignment problem. Divide and conquer method– Merge sort, Quick sort, Binary search, Strassen's Matrix Multiplication.

Unit-3.Dynamic Programming, Greedy Techniques and Randomized algorithms: Elements of Dynamic Programming, Assembly Line Scheduling, Matrix Chain Multiplication, Elements of Greedy Algorithms, Prim's algorithm- Kruskal's Algorithm- Dijkstra's Algorithm-Huffman Trees. Randomized Algorithms

Unit-4. Complexity Theory and Approximation algorithms: Introduction, P, NP, NP-Hard, NPComplete and Associated Problems, Approximation Algorithm- Vertex Cover and Travelling Salesman-Problem.

Reference Books:

1. Sridhar, Design and Analysis of Algorithms, OUP.
2. Aho, The Design and Analysis of Computer Algorithms, Addison-Wesley.
3. Paneerselvam, Design and Analysis of Algorithm, PHI.
4. Dave, Design and Analysis of Algorithm, PE.
5. Goodman, Introduction to the Design and Analysis of Algorithms, TMH.

AEC-1	Ability Enhancement Courses	Credit: 4

Computer and IT Skills

Unit-1. Basics of Computer: Basic Applications of Computer; Components of Computer System, Central Processing Unit (CPU), VDU, Keyboard and Mouse, Other input/output Devices, Computer Memory, Concepts of Hardware and Software; Concept of Computing, Data and Information; Applications of IECT; Connecting keyboard, mouse, monitor and printer to CPU and checking power supply.

Unit-2. Operating Computer using GUI Based Operating System: Operating System; Basics of Popular Operating Systems; The User Interface, Using Mouse; Using right Button of the Mouse and Moving Icons on the screen, Use of Common Icons, Status Bar, Using Menu and Menu-selection, Running an Application, Viewing of File, Folders and Directories, Creating and Renaming of files and folders, Opening and closing of different Windows; Using help; Creating Short cuts, Basics of O.S Setup; Common utilities.

Unit-3. Understanding Word Processing: Word Processing Basics; Opening and Closing of documents; Text creation and Manipulation; Formatting of text; Table handling; Spell check, language setting and thesaurus; Printing of word document.

Unit-4. Using Spread Sheet: Basics of Spreadsheet: Manipulation of cells; Formulas and Functions; Editing of Spread Sheet, printing of Spread Sheet.

Unit-5. Introduction to Internet, WWW and Web Browsers: Basic of Computer networks; LAN, WAN; Concept of Internet; Applications of Internet; connecting to internet; What is ISP; Knowing the Internet; Basics of internet connectivity related troubleshooting, World Wide Web; Web Browsing softwares, Search Engines; Understanding URL; Domain name; IP Address; Using e-governance website.

Reference Books:

1. ReemaThareja, Information Technology and its Applications in Business, OUP.
2. V. Rajaraman, Introduction to Information Technology, PHI.
3. Leon & M. Leon, Fundamental of IT, Vikas Publication.

Web Designing

Unit 1: Internet Concept:Fundamental of Web,History of Web, Web development overview, Domain Name System (DNS), DHCP,and SMTP and other servers,Internet service provider (ISP), Concept of IP Address, Internet Protocol, TCP/IP Architecture and protocol (IP),Web Browser and Web Server.

Unit-2.HTML: HTML Tag, Rules of HTML, Text Formatting & Style, List, Adding Graphics to Html Document, Tables and Layout, Linking Documents, Frame, Forms, Project in HTML.

Unit-3.CSS: Style sheet, types of style sheets- Inline, External, Embedded CSS; text formatting properties, CSS Border, margin properties, Positioning, color properties, Use of classes in CSS.

Unit-4. Scripting Language: Java Script, Advantage of Java Script, JS object model and hierarchy, Handling event, Operators and syntax of JS, Function, Client side JS Vs Server side JS,JS security.

Unit-5. XML: Introduction to XML, XML in Action, Commercial Benefits of XML, Gaining Competitive advantage with XML, Programming in XML, XML Schema, XSLT, DOM structure model, XML quires and transformation.

Reference Books:

1. Roy, Web Technologies, OUP.
2. Sabesta, Programming the World Wide Web, PE.
3. Godbole&Kahate, Web Technologies, TMH.

CSC-9	Practical based on CSC-6	Credit: 5

1. Implementation of Multi-threading and Exception handling concepts
2. Implementation of I/O Streams
3. Programs in AWT, Swing and Event handling
4. Network Programming
5. Programs using JDBC.
6. Implementing Servlets / JSP
7. RMI Programming