

Ewing Christian College

(An Autonomous Constituent College of Allahabad University)

Centre for Computer Sciences

Syllabus – B.Sc. – Computer Application under Semester System Scheme

Semester – I		
Paper Code	Paper Title	Marks
CAB101/ 1COATH1	Introduction to Computing Systems	75
CAB102	Programming in 'C'	75
CAB103	Lab-1	50
	Total	200
Semester – II		
CAB201	Digital Logic and Computer Architecture	75
CAB202	Data Structures	75
CAB203	Lab-2	50
	Total	200
Semester – III		
CAB301	OOP with C++	75
CAB302	Numerical & Statistical Methods	75
CAB303	Lab-3	50
	Total	200
Semester – IV		
CAB401	Computer Communication & Networks	75
CAB402	Database Management Systems	75
CAB403	Lab.-4	50
	Total	200
Semester – V		
CAB501	System Analysis & Design	75
CAB502	Computer Graphics & CAD	75
CAB503	Java & Internet Programming	75
CAB504	Lab-5	75
	Total	300
Semester – VI		
CAB601	Web Technology	75
CAB602	.NET with C#	75
CAB603	Software Engineering	75
CAB605	Project	75
	Total	300
	Grand Total	1400

Semester – I / Paper-I

CAB101-Introduction to Computing Systems

- 1. An Introduction to Computers** – What is Computer, Computer System Characteristics and Capabilities-speed, accuracy, reliability, storage, versatility, **Types of Computers**:- Analog, Digital & Hybrid, General & Special Purpose Computers, Micro, Mini, Mainframe & Super Computers, Hand-held & Lap Top Computers. **Computer Application Areas**– Business & Industry, Health Care, Education, Science & Technology, Government, Entertainment, Census, Banking, Publication, Accounting etc. **Evolution of Computer** – ENIAC, UNIAC, First to Fifth Generation, **Overview of Computer System** – Block Diagram-CPU, Memory, Hardware, Software, Live-Ware, Firmware.
- 2. Components of a Computer - Central Processing Unit** – Control Unit, ALU, Registers, Bus, Microprocessor, Clock Speed. **Computer Memory** – RAM, ROM-PROM, EPROM, EEPROM, Cache Memory. **Storage Devices** – Magnetic Tape, Magnetic Disk, Hard Disk, Floppy Disk, CD-ROM. **Input / Output Devices** – Keyboard Devices-KeyBoard, Data Entry Terminals, Mouse, Light pen, Scanners – (OCR, BCR, OMR & MICR), Digitizer, Disks, Hardcopy Output- Printers- Impact and Non Impact categories, Plotters, COM Systems, Soft Copy Output –CRT, Voice Output.
- 3. Computer Software** – System Software, Operating Systems, Compilers, Application Softwares- Word Processing, Spreadsheets, Database Management, Graphics, **Computer Programming Languages** – Machine level, Assembly & High level Computer languages, Compiler/Assembler and Interpreter. **Number systems** – Binary, Decimal, Octal, Hexadecimal Systems, conversion from one number system to another, Binary arithmetic addition, and subtraction, ASCII, BCD and EBCDIC character set.
- 4. Introduction to Operating Systems**– Definition, Modules of OS – CPU Scheduler, Device manager, memory manager, User Manager, Batch systems, multi programmed batch systems, distributed systems, real time systems. Overview of MS-Windows, MS-DOS & Linux, Internal and External DOS Commands, Basic Linux Commands.

Suggested Readings:

1. Fundamental of Computers by Rajaraman
2. Computer Fundamentals by P K Sinha
3. Computer Fundamentals by B Ram
4. Learn DOS in a Day by Russell A. Stultz
5. UNIX Concepts & Applications by Sumitabaha Das

Semester – I / Paper-II
CAB102- Programming in 'C'

1. **Introductory Concepts of Programming** - Introduction, History, Program Development Stages – Analysis, Design, Coding, Testing, Debugging and Implementation, Design Tools – Algorithm, flowchart, Program Constructs – Sequence, Selection, Iteration, algorithms/ flowcharts for GCD, factorial, Fibonacci series, prime numbers generation and other simple problems, searching and sorting techniques

2. **'C' Fundamentals**- Introduction to 'C', History & Development, Character Set, Identifiers and keywords, Tokens, Data Types, constants, variables, operators, Separators, Declarations, expressions, statements, Symbolic constants, **Control Statements**- if, switch, break, continue, for, while, do while.

3. **Functions**: Definition, Declaring a function, making function call, passing arguments to a function, recursion, functions with default arguments, standard library functions - mathematical, string, **Arrays**: Declaration, Initialization, processing an array- traversal, searching, sorting, merging, insertion, deletion, passing arrays to functions, Multidimensional arrays, Arrays and strings, **Structures**: definition, declaring a structure, accessing structure elements, memory allocation, array of structures, nested structures.

4. **Pointers**- Pointer declarations, pointer arithmetic, Passing pointers to the functions, pointers and one dimensional array, Operations on pointers, arrays of pointers, dynamic memory allocation, related functions, **Preprocessor Declaratives**- file inclusion, macro definition, conditional, **Data Files**- Opening and closing a text/ data file, file access modes, creating and reading a data file, working with binary data files.

Suggested Readings:

1. Let Us 'C' by Yashwant Kanetkar
2. 'C' in Depth by Yashwant Kanetkar
3. Programming in ANSI C by Balagursamy
4. Programming in 'C' by Kanthane

CAB201- Digital logic and Computer Architecture

1. **Boolean algebra and Logic Gates:** Introduction to Boolean algebra, laws of Boolean algebra, logic gates, universal logic gates, POS and SOP notations, Canonical logic forms. Simplification of Boolean Functions: Laws of Boolean algebra and K-Maps, Tabulation Method.
2. **Combinational Circuits:** Half-Adder, Full-Adder, Subtractor, Code Converters, Magnitude Comparator, Encoder, Decoder, Multiplexer, De-multiplexer, Design of combinational circuits. **Sequential Circuits** – Latches & Flip-Flops, Analysis of clocked sequential circuits, Synchronous and Asynchronous sequential logic, counters, registers, shift registers,
3. **Basic Organization of CPU:** Components of a Processor – Essential and Non-essential, Basic Block Diagram, Instruction Cycle, Hardwired & micro programmed control unit, Addressing modes, Introduction to 8-BIT processor family – 8080, 8085, 6800, Z80, Difference between CISC and RISC Processors. **I/O Organization:** Peripheral devices, I/O interface- Serial (Synchronous & Asynchronous), and Parallel, Input/ Output Methods – Direct & Indirect Memory Access, Interrupts & its uses, Input-Output Processor & Co-processor.
4. **Memory Organization:** Organization of memory cell – Word Organization vs. Co-incidents Organization, Memory Hierarchy of a system - Main Memory, Auxiliary Memory, Cache Memory, Virtual memory, Interleaving, Memory Management Techniques – Reallocation, Swapping, Portioning, Paging, Segmentation.

Suggested Readings:

1. M. M. Mano, Computer System Architecture.
2. M. M. Mano, Digital Logic and Computer Design.
3. William Stallings, Computer Organization and Architecture: Designing For Performance.

Semester – II / Paper-II
CAB202- Data Structures

1. **Introduction:** Basic Terminology, Elementary Data Organization, Data Structure operations, Algorithm Complexity and Time-Space trade-off. **Stacks:** Array Representation and Implementation of stack, Operations on Stacks: Push & Pop, Array Representation of Stack, Linked Representation of Stack, Operations Associated with Stacks, Application of stack: Conversion of Infix to Prefix and Postfix Expressions, Evaluation of postfix expression using stack.

2. **Queues:** Array and linked representation and implementation of queues, Operations on Queue: Create, Add, Delete, Full and Empty. Circular queue, Deque, and Priority Queue. **Linked list:** Representation and Implementation of Singly Linked Lists, Two-way Header List, Traversing and Searching of Linked List, Overflow and Underflow, Insertion and deletion to/from Linked Lists, Insertion and deletion Algorithms, Doubly linked list, Linked List in Array, Polynomial representation and addition, Generalized linked list, Garbage Collection and Compaction.

3. **Trees:** Basic terminology, Binary Trees, Binary tree representation, algebraic Expressions, Complete Binary Tree. Extended Binary Trees, Array and Linked Representation of Binary trees, Traversing Binary trees, Threaded Binary trees. Traversing Threaded Binary trees, Huffman algorithm. **Binary Search Trees:** Binary Search Tree (BST), Insertion and Deletion in BST, Complexity of Search Algorithm, Path Length, AVL Trees, B-trees. Hashing Comparisons.

4. **Searching and Hashing:** Sequential search, binary search, comparison and analysis, Hash Table, Hash Functions, Collision Resolution Strategies, Hash Table Implementation. **Sorting:** Insertion Sort, Bubble Sorting, Quick Sort, Two Way Merge Sort, Heap Sort.

References

1. Y. Langsam, M. Augenstein and A. Tannenbaum, **Data Structures using C and C++**, Pearson Education Asia, 2nd Edition, 2002.
2. Ellis Horowitz, S. Sahni, D. Mehta **Fundamentals of Data Structures in C++**, Galgotia Book Source, New Delhi.
3. S. Lipschutz, **Data Structures** Mc-Graw Hill International Editions, 1986.
4. Jean-Paul Tremblay, Paul. G. Soresan, **An introduction to data structures with Applications**, Tata Mc-Graw Hill International Editions, 2nd edition 1984.

- 1. Introduction:** Introduction to Programming Techniques – POP, OOP, OOP Concept, characteristics, Applications, Introduction to OOP languages, Introduction to C++, Features, Bridging C & C++ (Overview of C Concepts), C++ Data Types, Tokens, Keywords, Operators, **Decision Making & Branching:** If Statement, If-Else statement, Nesting of If-Else, Switch statement, **Looping:** While Statement, Do Statement, For Statement, Overview of functions & structures in C.
- 2. Class & Objects:** Declaring Data Members, Member Functions, Types of class Members, Array within a class. **Class Function Definition:** Member Function definition inside the class and outside the class, Friend Function, Inline Function, Static Members & Functions, Scope Resolution Operator, Private and Public Member Functions, Nesting of Member Functions. Creating Objects, Accessing class data members, Accessing member functions, Arrays of Objects, Objects as function arguments: Pass by value, Pass by reference, Pointers to Objects.
- 3. Constructors and Destructors:** Declaration and Definition, Default Constructors, Parameterized Constructors, Constructor Overloading, Copy Constructors. Destructors: Definition and use. **Inheritance** - Extending Classes Concept of inheritance, Base class, Derived class, Defining derived classes, Visibility modes: Private, public, protected; Types of Inheritance- Single, Multiple, Multilevel, Hybrid, Hierarchical, Nesting of classes.
- 4. Function Overloading & Operator Overloading:** Binary & Unary Operators. **Polymorphism:** Definition, early Binding, Polymorphism with pointers, Virtual Functions, late binding, pure virtual functions. **Input/output files:** Streams, buffers & iostreams, header files, redirection, file input and output.

Suggested Readings / Books:

- 1. Object Oriented Programming with C++**, E. Balagurusami, Fourth Edition, Tata McGraw Hill
- 2. Object Oriented Programming in Turbo C++**, Robert Lafore, Fourth Edition Galgotia Publications.
- 3. The C++ Programming Language**, Bjarna Stroustrup, Third Edition, Addison-Wesley Publishing Company.
- 4. Object Oriented Programming Using C++**, Salaria, R. S, Fourth Edition, Khanna Book Publishing

CAB302- Numerical & Statistical Methods

1. **Floating Point Arithmetic:** Absolute, Relative and Percentage Error. **Iterative Methods:** Bisection Method, False-Position (Regula-Falsi) Method, Newton-Raphson Method, Secant Method, Rate of Convergence of Iterative Method. **Simultaneous Linear Equation:** Solution of Linear Equation, Gauss Elimination direct Method and Pivoting, Gauss Sedial Iterative method, Rate of Convergence.
2. **Interpolation and Approximation:** Newton's forward and backward formula, Central Difference Formula, Gauss Forward and Backward Formula. **Interpolation with unequal intervals:** Langrange's Interpolation, Newton Divided difference formula. **Numerical Differentiation and Integration:** Trapezoidal Rule, Simpson's Rule, Solution of Differential equations: Taylor's method, Euler's Method, Runge-Kutta method, Predictor-corrector methods.
3. **Curve Fitting:** Method of Least Squares, Fitting of Straight Lines, poliyomial, exponential curve. **Frequency Chart:** Different Frequency chart like Histogram, frequency curve, Pi-Chart. **Regression Analysis:** Linear and Non Linear regression, Multiple regression.
4. **Time Series and Forecasting:** Moving averages, smoothening of curves, forecasting models and methods, Statical quality control methods. **Testing of Hypothesis:** Chi-Square Test, T-Test, and F-Test.

Books for Study and Reference:

1. Snedecor G.W. and Cochran W.G. (1989): Statistical methods, 8 ed., Affiliated East West.
2. Trivedi K.S. (1994): Probability and Statistics with Reliability, Queueing and computer Science applications, Prentice Hall of India.
3. Balaguruswamy E. (1988): Computer oriented Statistical and Numerical methods, Macmillan India Ltd.
4. S. C. Chopra and R. P.Canale - Numerical Methods for Engineers - Third Edition - McGraw Hill International Edition - 1998.
5. S. S. Sastri, Introductory Methods of Numerical Analysis, Prentice Hall

CAB401- COMPUTER COMMUNICATION & NETWORKS

1. **Introduction:** History & development of computer network, network topologies, **Transmission media-** UTP, STP, Coaxial Cable, Optical Fiber, analog & digital transmission, multiplexing, FDM, TDM, Classification of Network in various ways.
2. **Data Transmission Basics:** Synchronous/Asynchronous, Error detection and correction methods, Data Compression, Protocol basic, circuit, message, packet and cell switching, connection oriented and connectionless network, ISO-OSI model, TCP/IP model, Ethernet, CSMA/CD, CSMA/CA, Token passing ring, FDDI.
3. **Networking Devices:** Hubs, Repeaters, Internetworking: Routers, Bridges, Switches, Gateways, Routing Basics, Routing algorithms, Implementation of wired and wireless networks, IP addressing, Sub netting, CIDR, Designing a campus-wide network.
4. **Internet:** Connecting to Internet: Telephone, Cable, Satellite connection, Choosing an ISP, network applications: Client Server Concepts.

Suggested Readings:

1. A. S. Tennanbaum, –Computer Network,| 2nd Edition, PHI
2. Data Communication and Computer Networking – Behrouz A. Forouzan.
3. Data and Computer communication- W. Stalling.
4. A top-down approach to computer Networking – Kurose, Ross.

CAB402- DATABASE MANAGEMENT SYSTEMS

1. Database Systems, View of Data Models, Database Languages, DBMS Architecture, Database Users and Data Independence. ER Modeling, relation types, role and Structural Constraints, Extended ER Modeling Features, Design of an ER Database Schema, Reduction of ER Schema to Tables. Relational Model: Relational Model Concepts, Relational Algebra.
2. **Introduction to SQL & PL/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. PL/SQL: PL/SQL data types, character set, variables, literals, constants, commit, rollback, locking, exceptions, triggers.
3. **Relational Database Design:** Functional and multi-valued Dependencies, Desirable Properties of Decomposition, Normalization up to BCNF. Concept and Design of Object Oriented Database. **Selected Database Issues:** Security, Transaction Management, Basic Algorithms to Query Processing and Query Optimization, Concurrency Control, Recovery Techniques, locking.
4. **Case Study:** Oracle/ MS-SQL/ PL/SQL/ VISUAL BASIC FORMS.

Suggested Readings:

1. C.J.Date, An Introduction to Database Systems, Vol I & II, Addison Wesley.
2. Korth Silberschatz, Data Base System Concepts, 4th ed., McGraw Hill.
3. J.D.Ullman, Principles of Database Systems, Golgotha, New Delhi.
4. Wiederhold, Database Design, McGraw Hill.
5. R. Elmasri, and S.B. Navathe, Fundamentals of Database Systems, Pearson Education Asia.
6. Raghu Ramakrishnan, Database Management Systems, McGraw-Hill Education.

CAB501- SYSTEM ANALYSIS AND DESIGN

1. **Concept of System and Information System:** Definition, Fundamental Design Activities- Verification and Validation, **Types of Information System:** TPS, MIS, DSS, Interpersonal Communication System. **System Development Life Cycle:** Recognition of needs for System Change, Feasibility Study, Analysis, Design, Implementation & maintenance. **The Role of System Analyst:** Academic & Personal Qualifications, the Multifaceted Role of Analyst, the Analyst/User Interface.
2. **System Planning and Initial Investigation:** Strategies for Determining Information Requirement, Problem Definition & Project Initiation, Back Ground Analysis, Fact Analysis, Review of written Documents, On-site Observations, Interviews & Questionnaires, Fact Analysis, Performance Analysis, Efficiency Analysis, Service Analysis. **Information Gathering:** Information about the firms, Tools – Interview, Questionnaires.
3. **The Tools of Structured Analysis:** The Dataflow Diagram (DFD), Data Dictionary, Decision Tree and Structured English. **Feasibility Study:** System Performance, Types of Feasibility, Steps. Input/output & Form Design: Input / CRT/ design, output design, Requirements, **System Testing:** Types of Testing, Preparing a Test Plan
4. **Quality Assurance:** Implementation of Quality assurance, Inspection, walks through, follow up, documentation and report writing. **Project Management:** Measuring the process, planning, estimating, identifying and evaluating risk, organizing resources, defining a project schedule, monitoring, review.

Suggested Readings:

1. Elias M. Awad, "System Analysis & Design", Galgotia Publication.
2. Hoffer, "Modern System Analysis & Design", Addison Wesley.
3. Kendall, "Introduction to System Analysis & Design", McGraw Hill.

CAB502- Computer Graphics & CAD

- 1. Basic Concepts:** Origin of Computer Graphics, new display devices, how the interactive graphics display works, general purpose graphics S/W, user interface. **Graphical Input Devices & Input Techniques:** Pointing and positioning devices, mouse, tablets, light-pen, 3 dimensional input devices, comparators, positioning techniques, pointing & selection, inking and painting.
- 2. Point Plotting Techniques:** Coordinate System, Incremental Method, Line Drawing Algorithms, Circle Generators, Line Drawing Displays – Display Devices & Controllers, The CRT, Inherent Memory Devices, The Storage Tube Display, The Refresh Line Drawing Display.
- 3. Two Dimensional Transformations:** Transformation Principles, Concatenation, Matrix Representation. **Clipping & Windowing:** Line Clipping Algo, Midpoint Subdivision, Polygon Clipping, Viewing Transformations, Windowing Transformations, segments, functions for segmenting, posting and unposting a segment, free storage allocation, display file.
- 4. Geometric Models:** Geometric Modeling, symbols and instances, boxing, advantages and limitations of display procedures. **Event Handling & Input Functions:** Polling, Interrupts, Event Queue, Event Handling Function, Dragging & Fixing, Hit Detection, Basic & Raster Graphics. **Transformations & Shading Models:** 3D Transformations, parallel and perspective projections, simple shading models, Introduction to Corel Draw, Harvard graphics, Photoshop, Pagemaker, Paintshop.

Suggested Readings:

1. Graphics Under C by Yashwant Kanetakar
2. Computer Graphics by Baker and Hearn
3. Computer Graphics : Schaum Series

CAB503- Java & Internet Programming

- 1. Introduction:** About OOP's, Similarities and differences with C++, **Evolution:** Java History, Portable, Platform Independence, Distributed Multithreaded and interactive differences between Java & C, Java & C++, Java & Internet, Web Browsers (hot java, Netscape Navigator, Internet explorer), h/w & s/w requirements.
- 2. Overview:** Class Declaration, Opening Base, Main Line, Output Line, Use of Math Function, Import statement, Interface Statement, Class Definitions, Java Character Set, Keyboard Identifier, literals, operators, separator, Java Statement, Creating, Compiling & Running a program, command line argument. **Constants, Variables & Data types:** (Integer, Real) constant, (Single, String, Backslash character) constants, variables (integer, floating, character, Boolean) data types, declaring and assigning values to variables, scope to variables, typecasting.
- 3. Operator & Expression:** (Arithmetic, relation, logical, assignment, conditional, bit wise, special) operators, arithmetic expressions, evaluation of expression, operator precedence. **Decision Making & Branching:** If Statement, If-Else statement, Nesting of If-Else, Switch statement, **Looping:** While Statement, Do Statement, For Statement. **Classes, Objects & Method:** Defining a Class, Creating Object, Accessing Class Member, Constructor, Overloading, Static members, Nesting of Methods, (public, friend, protected and private) classes. **Arrays:** Single Dimensional & double dimensional Arrays, Creating & Initialization of Arrays, String Handling. **Packages:** Java API Package, Using Package System, Creating, Using and Accessing a Package.
- 4. Multithreaded Programming:** Creating Threads, extending the thread class, blocking and stopping a thread, **Applet programming:** Local & remote applet, difference between applet and application, writing a applet, designing web pages, applet tag, adding applet to html file. **Exception & Error Handling:** Types of Errors, exceptions, exception for debugging, I/O Management – Concepts of Streams, Stream Classes, Character Stream Classes, Using Streams, Using the File Class, Creation of Files, Reading / Writing- character and bytes.

Suggested Readings:

1. Complete Reference Java 2 by Herbert Schildt
2. Programming with Java by Balagurusamy
3. Java How to program by Dietel & Dietel

CAB601- WEB TECHNOLOGY

1. History of Web, Growth Of the Web, Protocols governing the web, Introduction To Cyber Laws in India, Introduction to International Cyber Laws, Web Browser, Web Server, Web Development Tools (Dream weaver).
2. **HTML:** Introduction, Formatting Tags, Links, List, Tables, Frames, Forms, Comments in HTML, Style Sheets
3. **JAVA SCRIPT:** Introduction, Documents, Forms, Statements, functions, objects, Events and Event Handling, Arrays, Forms, Buttons, Checkboxes, Text fields and Text areas, Working with browser objects, Creating browser-specific scripts & Cross-browser scripts, Introduction to PHP.
4. **ASP:** Introduction, Objects, Methods, and Establishing Database Connections, **Web Publishing:** Setting/ Hosting Website

Suggested Readings:

1. HTML 4.0 – E Stephen Mack & Janan Platt
2. The ABCs of JavaScript – Lee Purcell, Mary Jane Mava
3. Active Server Pages 2.0 – Stephen Walther
4. Active Server Pages 3 – A Russel Jones
5. Commercial Web Development Using HTML, DHTML, Java Script, CGI, Perl- Ivan Bayross.

CAB602- .NET WITH C#

- 1. Introduction to .NET:** Definition, Features of .NET, CLR, CTS, CLS, MSIL, Managed Code and Managed data, Assembly, Namespace, Introduction to C#, Features of C#, **Types and Variables:** value type, reference type, Boxing and Un Boxing, Instance variable, array elements, Parameters(value/ reference/ output), local variables.
- 2. Control Statements:** if, switch, while, do, for, for-each, break, continue, goto, return statements. **Exception Handling:** Exception, causes of exception, checked and un checked statements, compiler setting and overflow checking, try/catch, try/finally, try/catch/finally, throwing exceptions. **Namespace:** Definition, Namespace declaration, using directives, alias.
- 3. Classes:** Definition and declaration, class modifiers, Abstract class, sealed class, Constructors and Destructors, Methods, Methods Parameters (value/ reference/ output), parameter array, static and instance method, virtual method, override method, method overloading, method hiding, sealed method, Abstract method, **Properties, Array Indexes:** Definition, Accessors, Read-only and write-only properties, Definition and declaration of arrays, single dimension/ multi dimension array, rank of an array, jagged array, Indexes.
- 4. Structure, Enums, Delegates and Events:** Definition of struct, difference between class and struct, Enums, Enum members, Definition of delegates, single cast and multi cast delegates, Events. **Inheritance and Interface:** Definition of Inheritance and Interface, working with interface, inheritance of interfaces, Interface implementation, multiple implementations. **ADO.NET:** Introduction, Difference between ADO and ADO.NET, primary objects of ADO.NET, Reading/ Writing/ Updating/ displaying data in a data grid.

Suggested Readings:

1. Programming in C# by E Balagurusamy
2. C#: Nuts & Bolts by Sonal Mukhi
3. C#: A Complete Reference by Herbert Schildt

CAB603- Software Engineering

1. Introduction

Introduction to Software Engineering, Software Components, Software Characteristics, Software Crisis, Software Engineering Processes, Similarity and Differences from Conventional Engineering Processes, Software Quality Attributes. Software Development Life Cycle (SDLC) Models: Water Fall Model, Prototype Model, Spiral Model, Evolutionary Development Models, Iterative Enhancement Models.

2. Software Requirement Specifications (SRS)

Requirement Engineering Process: Elicitation, Analysis, Documentation, Review and Management of User Needs, Feasibility Study, Information Modeling, Data Flow Diagrams, Entity Relationship Diagrams, Decision Tables, SRS Document, IEEE Standards for SRS.

3. Software Design & Testing

Basic Concept of Software Design, Architectural Design, Low Level Design: Modularization, Design Structure Charts, Pseudo Codes, Flow Charts, Coupling and Cohesion Measures, Design Strategies: Function Oriented Design, Object Oriented Design, Top-Down and Bottom-Up Design. **Software Testing:** Testing Objectives, Unit Testing, Integration Testing, Acceptance Testing, Regression Testing, Testing for Functionality and Testing for Performance, Top-Down and Bottom-Up Testing Strategies: Test Drivers and Test Stubs, Structural Testing (White Box Testing), Functional Testing (Black Box Testing).

4. Software Maintenance and Software Project Management

Software as an Evolutionary Entity, Need for Maintenance, Categories of Maintenance: Preventive, Corrective and Perfective Maintenance, Cost of Maintenance, Software Re-Engineering, Reverse Engineering. Software Configuration Management Activities, Change Control Process, Software Version Control, An Overview of CASE Tools. Estimation of Various Parameters such as Cost, Efforts, Schedule/Duration, Constructive Cost Models (COCOMO), Resource Allocation Models, Software Risk Analysis and Management.

References:

1. R. S. Pressman, Software Engineering: A Practitioners Approach, McGraw Hill.
2. Rajib Mall, Fundamentals of Software Engineering, PHI Publication.
3. K. K. Aggarwal and Yogesh Singh, Software Engineering, New Age International Publishers.
4. Pankaj Jalote, Software Engineering, Wiley
5. Carlo Ghezzi, M. Jarayeri, D. Manodrioli, Fundamentals of Software Engineering, PHI Publication.
6. Ian Sommerville, Software Engineering, Addison Wesley.