

U.G. 2nd Semester

Paper: CST201C (Core) Data Structures

Credits: 5 = 3+1+1 (48 Lectures)

UNIT I: Introduction [4 lectures]

Definition of data structure, classification of data structure: primitive and non-primitive, linear and non-linear, ADT, data structure operations. Algorithms : definition, different approaches of designing an algorithm, Complexity, Time Space tradeoff, Asymptotic Notations for Complexity of Algorithms.

UNIT II: Arrays [8 lectures]

Introduction, Representation and Analysis, Single and Multidimensional Arrays, address Calculation of single and two dimensional arrays, operations of one dimensional array, passing arrays to functions, Pointers and arrays, array of pointers, array of structures, Two dimensional array, operations of two dimensional array

UNIT III: Stacks and Queues [12 lectures]

Introduction, Operations on Stack: Push & Pop, Array and 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.

Queue-Operations on Queue: insertion & deletion, Array and linked representation of queue, Circular queues: definition, operation and implementation, Concept of D-queues and Priority Queues.

UNIT IV: Linked List [6 lectures]

Introduction, Operations on linked list, Representation and Implementation of Singly Linked Lists, Overflow and Underflow

Doubly Linked List: definition, operations and implementation, Circular Link List: definition, operations and implementation

UNIT V: Trees [10 lectures]

Introduction, Basic terminology, Binary Trees, Binary tree representation, Strictly Binary Tree, Complete Binary Tree, Extended Binary Trees, Array and Linked Representation of Binary trees, Traversing Binary trees. Binary Search Tree (BST): Introduction, Insertion and Deletion in BST

UNIT VI: Searching and Sorting [8 lectures]

Sequential search, binary search, Insertion Sort, Bubble Sorting, Selection Sorting, Quick Sort, Merge Sort, Heap Sort, Radix Sort. Hashing, Hash Functions, Collision Resolution Strategies

Textbooks:

1. Seymour Lipschutz, "Data Structures", Tata McGraw Hill

Recommended Books:

1. Horowitz and Sahani, "Fundamentals of data Structures", Galgotia Publication Pvt. Ltd., New Delhi.
2. R. Kruse et al, "Data Structures and Program Design in C", Pearson Education Asia, Delhi-2002
3. A. M. Tenenbaum, "Data Structures using C & C++", Prentice-Hall of India Pvt. Ltd., New Delhi.
4. K Loudon, "Mastering Algorithms with C", Shroff Publisher & Distributors Pvt. Ltd.
5. Bruno R Preiss, "Data Structures and Algorithms with Object Oriented Design Pattern in C++", Jhon Wiley & Sons, Inc.
6. Adam Drozdek, "Data Structures and Algorithms in C++", Thomson Asia Pvt

Paper: CST202C (Core)

Digital Logic

Credits: 5 = 4+1+0 (64 Lectures)

UNIT I: Data Representation [8 Lectures]

Information Representation: Number Systems, Number base conversion, Binary Arithmetic, Fixed-point and Floating-point representation of numbers, BCD Codes, Error detecting and correcting codes, Character Representation – ASCII, EBCDIC, Gray code, Unicode.

UNIT II: Boolean Algebra and Logic Gates [10 Lectures]

Basic Definitions of Boolean Algebra, Basic Theorems and Properties of Boolean Algebra - Boolean Functions - Canonical and Standard Forms - Other Logic Operations - Digital Logic Gates.

UNIT III: Boolean Functions [10 Lectures]

Simplification of Boolean Functions: The Map Method - Two and Three Variable Maps - Four Variable Map - Five and Six Variable Maps - Product of Sums Simplifications - NAND and NOR Implementation - Other Two Level Implementations - Don't Care Conditions.

UNIT IV: Combinational Logic [12 Lectures]

Introduction - Adders - Subtractor - Code Conversion - Binary Adder – Encoder - Decoders – multiplexer and Demultiplexer.

UNIT V: Sequential Logic [12 Lectures]

RS, JK, D, and T Flip-Flops - Edge-Triggered - Master-Slave Flip- Flops. Registers: Shift Registers -Types of Shift Registers.

UNIT VI: Counters [12 Lectures]

Asynchronous Counters Ripple, Mod, Up-Down Counters- Decoding Gates - Synchronous Counters - Ring, Decade, Presetable, Shift Counters. Memory: Basic Terms & Ideas - Magnetic Memories - Memory Addressing - Types of ROMs - Types of RAMs.

Textbooks:

1. M.Moris Mano, Digital Logic and Computer Design, PHI, 2001.

Recommended Books:

1. D.P.Leach & A.P.Malvino, Digital Principles and Applications -TMH - Fifth Edition - 2002.
2. Computer Organization and Architecture; William Stallings, Pearson.
3. T. C.Bartee, Digital Computer Fundamentals, 6th Edition, Tata McGraw Hill, 1991.
4. R.J.Tocci, Digital System Principles and Applications, 8th Edition.

Paper: CST203G (General Elective)

Basic Web Technology

Credits: 4 = 3+0+1 (64 Lectures)

UNIT I: Introduction [5 Lectures]

Definition: Network, Internet, Intranet, History of the Internet and World Wide Web, Services of Internet, Search Engines, E-mail and its Protocols(SMTP, POP3, IMAP), Browsers: definition, types, functions. URL, web sites, web page, home page, Domain names, web Portals.

UNIT II: HTML [9 Lectures]

Static Web Development: Introduction to HTML, HTML Document structure, HTML comments, Text formatting, inserting special characters, anchor tag, marquee tag, adding images and Sound, Types of lists, tables, frames, floating frames, Developing Forms, Image maps.

UNIT III: Cascading Style Sheet [5 Lectures]

Definition, Advantages, Style rule, different types of selectors, different ways to associate CSS with HTML document, CSS properties, creating styles, link tag.

UNIT IV: BOOTSTRAP [7 Lectures]

Introduction, Typography, tables, images, Jumbotron, Wells, Alerts, Buttons, Badges, List groups, Navbar, Themes, Grid System.

UNIT V: Introduction to Java Script [14 Lectures]

Data Types, Control Statements, operators, Built in and User Defined Functions, Objects in Java Script, Handling Events.

UNIT VI: XML [8 Lectures]

Introduction to XML, Well-formed XML document, Components of XML document, XML Style sheets, XSL, XML Schemas.

Textbooks:

1. The complete reference HTML, by Thomas A powell, TMH publication.

Recommended Books:

1. Mastering HTML 4.0 by Deborah S. Ray and Erich J. Ray. BPB Publication.
2. Internet and World Wide Web Deitel HM, Deitel ,Goldberg , Third Edition
3. HTML Black Book , Stephen Holzner, Wiley Dreamtech.
4. Rajkamal, "Web Technology", Tata McGraw-Hill, 2001.
5. Jeffrey C. Jackson, "Web Technologies : A Computer Science Perspective", Pearson.
6. Mastering JavaScript and Jscript by J.Jaworski ;BPB Publication