3. Charles H. Roth, Jr. and Larry L. Kinney, Fundamentals of Logic Design, CL Engineering, Seventh Edition, 2013.

Reference books

1. W. H. Gothmann, Digital Electronics -An Introduction to Theory and Practice, Prentice Hall of India, 2000
2. Donald D. Givone, Digital Principles and Design, Tata McGraw –Hill, Thirteenth Impression, 2003.

BCS-12 PRINCIPLES OF DATA STRUCTURES THROUGH C/C++

Course Category	:	Department Core (DC)
Pre-requisite Subject	:	NIL
Contact Hours/Week	:	Lecture : 3, Tutorial : 1 , Practical: 2
Number of Credits	:	5
Course Assessment Methods	:	Continuous assessment through tutorials, attendance, home assignments, quizzes, practical work, record, viva voce and Three Minor tests and One Major Theory & Practical Examination
Course Outcomes	:	The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course

1. Describe how arrays, records, linked lists, stacks, queues, trees, and graphs are represented in memory, used by the algorithms and their common applications.

2. Write programs that use arrays, records, linked structures, stacks, queues, trees, and graphs.

3. Compare and contrast the benefits of dynamic and static data structures implementations.

4. Identity the alternative implementations of data structures with respect to its performance to solve a real world problem.

5. Demonstrate organization of information using Trees and Graphs and also to perform different operations on these data structures.

6. Design and implement an appropriate organization of data on primary and secondary memories for efficient its efficient retrieval. .

7. Discuss the computational efficiency of the principal algorithms for sorting, searching and hashing.

8. Describe the concept of recursion, its application, its implementation and removal of recursion.

Topics Covered

UNIT-I

Introduction: Basic Terminology, Elementary Data Organization, Structure Operations, Complexity   9
and Time-Space Tradeoff

Arrays: Definition, Representation and Analysis, Single and Multi Dimension Array, Address
Calculation, Application of Arrays, Character, String in C, Character String Operation, Arrays
Parameters, Ordered List, Sparse Matrices and Vectors

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 Expressions using Stack, Application of Recursion in Problem like Tower of Hanoi

UNIT-II

Queues: Array and Linked Representation and Implementation of Queues, Operations on Queue: 9
Create, Add, Delete, Full and Empty, Circular Queues, D-Queues and Priority Queues.

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.

UNIT-III

Trees: Basic Terminology, Binary Trees, Binary Tree Representation, Algebraic Expressions,   9
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.

UNIT-IV

Searching and Hashing: Sequential Search, Binary Search, Comparison and Analysis, Hash   9
Table, Hash Functions, Collision Resolution Strategies, Hash Table Implementation.

Sorting: Insertion Sort, Bubble Sorting, Quick Sort, Two Way Merge Sort, Heap Sort, Sorting
on Different Keys, Practical Consideration for Internal Sorting.

Graphs: Terminology &Representations, Graphs &Multi-Graphs, Directed Graphs, Sequential
Representations of Graphs, Adjacency Matrices, Traversal, Connected Component and Spanning
Trees, Minimum Cost Spanning Trees.

EXPERIMENTS

Write C/C++ Programs to illustrate the concept of the following:
1. Sorting Algorithms-Non-Recursive
2. Sorting Algorithms-Recursive
3. Searching Algorithm
4. Stack
5. Queue
6. Linked List
7. Graph

Textbooks

1. Horowitz and Sahani, Fundamentals of Data Structures, Galgotia Publication, New Delhi.
2. R. Kruseetal, Data Structure and Pragram Design in C, Pearson Education Asia Delhi
3. A. M.Tenenbaum, Data Structures using C & C++, PHI, India
4. K Loudon, Mastering Algorithms with C, Shroff Publication and Distributor Pvt. Ltd.
5. Bruno R Preiss, Data Structure and Algorithms with Object Oriented Design Pattern in C++, John Wiley & Sons
6. Adam Drozdek, "Data Structures and Algorithms in C++", Thomson Asia Pvt. Ltd. Singapore

Reference books
1. Lewis, H.R., Denenberg, L., Data Structures and their Algorithms. Published by Addison-Wesley, UK, 1991
2. Oluwadare, S.A., Agbonifo, O.C., Fundamentals of Data structures and Algorithms. Lecture Notes, 2013

BCS-13   INTERNET & JAVA PROGRAMMING

Course Category	:	Department Core (DC)
Pre-requisite Subject	:	NIL
Contact Hours/Week	:	Lecture : 3, Tutorial : 1 , Practical: 2
Number of Credits	:	5
Course Assessment Methods	:	Continuous assessment through tutorials, attendance, home assignments, quizzes, practical work, record, viva voce and Three Minor tests and One Major Theory & Practical Examination
Course Outcomes	:	The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course

1.   To identify different components of client server architecture on Internet computing.

2.   Knowledge of how to develop and deploy applications and applets in JAVA.

3.   Knowledge of how to develop and deploy GUI using JAVA Swing and AWT.

4.   Design, develop and implement interactive web applications.

5.   Be able to implement, compile, test and run JAVA programs comprising more than one class and to address a particular software problem.

6.   To understand the basic concepts of Internet services and related technologies.

7.   Develop programs using the JAVA Collection API as well as the JAVA standard class library.

Topics Covered
UNIT-I