

Data Structure and Algorithms

S.E. Sem. III [INFT]

EVALUATION SYSTEM

	Time	Marks
Theory Exam	3 Hrs.	100
Practical Exam	3 Hrs.	50
Oral Exam	–	–
Term Work	–	25

SYLLABUS

1. Revisiting Java Programming Construct

Classes types and objects, Methods, Expressions, Control flow, Arrays, input and output, Packages, Utilities in the java. lang package

2. Object Oriented Design & Analysis of Algorithms

Inheritance and polymorphism, Exceptions, Interfaces, Abstract Classes, and Casting, Recursion and Other Design patterns, Pseudo – Code, Simple justification Techniques.

Measures algorithmic complexity, Space complexity, Time complexity, Some mathematics needed in measuring complexity, The big O-notation used in measuring complexity.

3. Stacks, Queues and Recursion

Recursion, Stacks, Queues, Linked Lists, Double – ended Queues.

4. Vectors, Lists and Sequences

Vectors and Array Lists, Lists, Sequences, Favourite lists and the move – to Front Heuristic.

5. Trees

The tree Abstract Data Type, basic Algorithms on Tree, binary Tree, data Structures for representing Tree.

6. Priority queues

The priority queues Abstract data Type, Implementing a Priority queues with a List Heaps, Adaptable priority queues.

7. Maps and dictionaries

The Map Abstract data Type, Hash Tables, The dictionary data Type, Skip Lists, Extensions and Applications for dictionaries.

8. Search Trees

Binary Search Trees, AVL Tree, Splay Trees, (2, 4) Trees, Red – Black Trees, External searching in B – Trees.

9. Sorting Sets, and Selection

Merge Sort, Heap Sort, Quick Sort, and A Lower Bound on comparison Based Sorting.

BUCKET Sort and radix Sort, the complexity of some sorting algorithms, comparison of Sorting Algorithms, The Set ADT and union / file Structures.

10. Text Processing

String operations, Pattern Matching Algorithms, Tries, Text compression, Text similarity Testing.

11. Graphs

The graph Abstract Data Type, Data Structures for Graphs, Graph Traversals Directed Graphs, Weighted Graphs, Shortest Paths, Minimum spanning Trees.

Reference:

1. Data Structure and Algorithm in JAVA, 3rd Edition (2007) – (*Micheal T. Goodrich, Roberto Tamassia*), Wiley India.
2. Data Structure using JAVA – (*Langsam*), Pearson Education.
3. Hubbard Schaum's outline of data structures with JAVA – (*Jhon R., H. Schaum*), McGraw Hill.
4. Data Structure with JAVA – (*Hubbard*), Pearson Education.
5. Data Structures and Algorithms in JAVA, 1st Edition (2001), Singapore – (*Adam Drozdek*), Thomson Asia Pte Ltd. (IBSN 0534–37668–1)
6. Object Oriented Data Structures Using JAVA, 1st Edition (2004), New Delhi – (*Nell Data, Daniel T. Joyce, Chip Weems*), Narosa Publishing House.
7. The Art of Computer Programming , Volume 1/Fundamental Algorithms, 3rd Edition (1973) – (*Knuth, Donald E.*), Addison – Wesley.

