Organized by

Department of Computer Science and Engineering, MNIT Jaipur

5 day's Skill Development Workshop on "Data Structure Fundamentals"

10-12,17,18 August, 2019

Sponsored By

TEQIP – III

Technical Education Quality Improvement Programme

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Objective

- To enrich the knowledge and skill in Data Structure.
- To enable the participants to solve various engineering solution of the problem by applying Data Structure.
- To expertise participants via emphasizing hands on practices, focused to complex Problem solving skill.
- To steer coding skill after having a good knowledge of Data Structure.
- To provide an opportunity to excel the understanding of efficient data structures for advantageous placement hiring opportunities.

Registration:

For MNIT Students (UG/PG/PhD): **NIL (Free)**
For Outside participants: Rs. 2000/-

Registration Deadline:
On or before 09 August, 2019

To register fill the Google form:

https://forms.gle/2or24zWszecXbJwg6

Resource Experts

Distinguished faculties from MNIT/NIT'S

Purpose of Workshop:

Data structure is used as a mechanism for managing large amounts of complex data efficiently. For example, large volume of databases and indexing services of internet. In the software design, data structures play the key role. The purpose of this short term course workshop is to make the concepts of data structure of the participants fundamentally strong. It also emphasizes on the extensive ***hands on programming practices*** of the data structures. Further the major goal is to offer all the essential basic and advanced knowledge of data structures so that participants can solve problems/questions related to it in academic/interviews/placements/competitive carrier development ahead for employability. Thus, focus is to strengthen data structure fundamentals and provide a disciplined deep understanding of this course.

Workshop Course Modules (25 Hr. Lecture, 15 Hr. Hands on Lab)

- Introduction to Data Structures and Algorithms:
  - Types of data structures, Time and Space analysis & asymptotic concepts
- Creation and Manipulation of linear data structures:
  - Stack, Queue, Linked List (Singly, Doubly, Circular), its applications
- Sorting and Searching:
  - Selection, Insertion, Bubble, Merge, Quick, Heap, Radix, Bucket sorting, Linear & Binary Search
- Non-Linear Data Structures:
  - Trees (Binary Tree, Binary Search Tree, Tree traversals),
  - Graphs (Representations, Operations, Traversals), Spanning Trees, MSTs, Applications, Shortest Paths
- Advanced Data Structures & Algorithmic Concepts:
  - Hashing, AVL Trees, B+ Trees & Applications
  - Concepts of algorithm designs

Workshop Outcomes

- Data structure is a subject of primary importance in software design; hence, after completion of the course, participants will be able to solve DSA related problems.
- Participants will be able to do efficient programming since organizing or efficiently structuring data is important for designing and implementation of efficient algorithms. After completion, participants can comfortably implement data structures in a language of choice and solves various problems.
- Provide strong enriched introduction to data structure fundamentals useful to excel in placements/interviews/academics.
- Up-skilled coding will also come handy in answering programming questions during placement interviews.

* Completion certificates will be provided to all the participants.

Workshop Contents: (All modules are covered with hands on coding practices)

Schedule	Expert Lectures 9:00AM – 1:00PM	Programming Lab Sessions 2:00PM – 6:00 PM
Day 1 **Module 1** 10 Aug 19	**Introduction to Data Structures & Algorithms :** Time and space analysis of algorithms (Average, best, worst case analysis), Types of Data Structures: Linear & Non Linear Data Structures.	**Practice Session:** Module 1
Day 2 **Module 2** 11 Aug 19	**Linear Data Structures:** Creation and Manipulation of linear data structures: Arrays, Stacks, Queues, Linked List (Singly, Doubly Circular)	**Practice Session:** Module 2
Day 3 **Module 3** 12 Aug 19	**Sorting Algorithms:** Insertion Sort, Selection Sort, Bubble Sort, Merge Sort, Quick Sort, Heap Sort, Counting Sort, Radix sort, Bucket Sort, **Searching Algorithms:** Linear and Binary Search	**Practice Session:** Module 3
Day 4 **Module 4** 17 Aug 19	**Non-Linear Data Structures:** **Trees:** Binary Trees, Binary Search Trees, Binary tree traversal (In-order, Post-order, Pre-order) **Graphs:** Representation of Graphs, Elementary Graph operations, Graph Searching (Breadth First Search, Depth First), Spanning Trees, Minimal spanning tree, Shortest path	**Practice Session:** Module 4
Day 5 **Module 5** 18 Aug 19	**Advance Data Structure & Algorithm Concepts:** Hashing, AVL trees, B+ tree, Introduction of basics of Algorithm Design and Analysis	**Practice Session:** **Mock-MCQ-Interview Practices** Module 5