



DATA STRUCTURE AND ALGORITHMS USING JAVA

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PRE-REQUISITES : This course requires that the students are familiar with programming language such as C/C++/Java, data structures and algorithms.

INTENDED AUDIENCE : The undergraduate students from the engineering disciplines, namely CSE, IT, EE, ECE, etc. might be interested for this course.

INDUSTRIES APPLICABLE TO : All IT companies.

COURSE OUTLINE :

With the growth of Information and Communication Technology, there is a need to develop large and complex software. For developing large software, software developers should have enough proficiency of data structures and algorithms. Further, those software should be platform independent, Internet enabled, easy to modify, secure, and robust. To meet this requirement object-oriented paradigm has been developed and based on this paradigm the Java programming language emerges as the best programming environment. Now, Java programming language is being used for mobile programming, Internet programming, and many other applications compatible to distributed systems. This course aims to cover the essential topics of data structures and algorithms and how the same can be implemented using Java programming language. The participants of the proposed course will be able to improve their skills, to cope with the current demand of IT industries and solve many problems in their own filed of studies.

ABOUT INSTRUCTOR :

Prof. Debasis Samanta holds a Ph.D. in Computer Science and Engineering from Indian Institute of Technology Kharagpur. His research interests and work experience spans the areas of Computational Intelligence, Data Analytics, Human Computer Interaction, Brain Computing and Biometric Systems. Dr. Samanta currently works as a faculty member at the Department of Computer Science & Engineering at IIT Kharagpur.

COURSE PLAN :

Week 1: 1D array, list and vector, 2D matrices and tables of objects

Week 2: Java implementation of 1D and 2D arrays and its operations

Week 3: Linked lists and its various operations, stack and queue

Week 4: Java implementation of linked lists, stack and queue

Week 5: Binary trees: Representation and operations. Variations of binary tree: Binary search tree, Height balanced search tree, Heap tree

Week 6: Java implementation of binary trees and its variations

Week 7: Graph : Structure, representation and operations

Week 8: Java implementations of graph data structures

Week 9: Algorithms (Part-I): Searching and sorting algorithms

Week 10: Java implementation of Part-I algorithms

Week 11: Algorithms (Part-II): Greedy algorithms, shortest path algorithms

Week 12: Java implementation of Part-II algorithms