Fundamentals of Data Structures (IT2002T)

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Institute Vision and Mission

- **Vision**
  - To establish global leadership in the field of Technology and develop competent human resources for providing service to society
- **Mission**
  - To provide students with comprehensive knowledge of principles of engineering with a multidisciplinary approach that is challenging.
  - To create an intellectually stimulating environment for research, scholarship, creativity, innovation and professional activity.
  - To foster relationship with other leading institutes of learning and research, alumni and industries in order to contribute to National and International development.

Department Vision and Mission

- **Vision**
  - To become the world-class student-centred department which fosters high-quality learning and research for both undergraduate and graduate students.
- **Mission**
  - To equip our graduates with the knowledge and expertise to contribute significantly to the knowledge and information industry and to continue to grow professionally.
  - To collaborate with local, state, national, and international entities in education and research.
  - To engage faculty, students and alumni in research activities.
  - To nurture our graduate's interpersonal and entrepreneurial skills so they can provide leadership within the information industry's diverse culture.

Program Educational Objectives (PEOs)

1. Achieve excellence in their profession and demonstrate leadership skills in multidisciplinary domain.

2. Promote design, analysis, product implementation, research, and services in the field of Information Technology through strong technical, communication and entrepreneurial skills.

3. To complement the class room teaching with live projects, fieldwork, seminars to build selflearning, and lifelong learning capability, and to develop out of box thinking.

COURSE OUTCOMES

- Student will be able to understand
  1. basic data structures such as various linear and nonlinear data structures, concepts, operations like insertion, deletion, traversing etc on them and hash tables.
  2. use of basic data structures in different applications and implement various applications and solve exercises using appropriate data structures.
  3. methods for analysis of algorithms, learn, analyze and implement different searching and sorting techniques and their implementation.
  4. understand and apply fundamental algorithmic problems including Tree traversals, Graph theory and hashing techniques.

Chapters

1. Introduction to data structures and analysis of algorithms
2. Stack and Queue
3. Linked List
4. Binary Tree
5. Graphs
6. Searching Techniques and Hashing
7. Sorting techniques

Text Books and Recommended Reading

1. Y. Langsam, M. J.Augenstein and A. M. Tanenbaum “Data structures using Java”, Pearson Education

2. T. H. Cormen, C. E. Leiserson, R. L.Rivest and C. Stein, “Introduction to Algorithms”, Second Edition, MIT Press/McGraw Hill.

3. Goodrich and Tamassia, Data Structures and Algorithm in Java, John Wiley and Sons.

4. John Kleinberg and Eva Tardos, Algorithm Design, Pearson Education

What Are Data Structures?

- A data structure is an arrangement of data in a computer's memory (or sometimes on a disk).
- Data structures include
  - arrays,
  - linked lists,
  - stacks,
  - binary trees, and
  - hash tables, etc.

What Are Algorithms Good For?

- Algorithms manipulate the data in these structures in various ways, such as searching for a particular data item and sorting the data.
- For most data structures, you need to know how to
  - Insert a new data item.
  - Search for a specified item.
  - Delete a specified item.
  - How to iterate through all the items in a data structure.
  - ways to sort data.
  - Recursion, which involves a method calling itself.

Have you used any datastructure in your programs?