CS2700 + CS2710: Programming and Data Structures

July-November 2019
CS 26; C + R slots (Mon 10, Tue 9, Wed 8 and 14, Fri 13)
Instructor: Rupesh Nasre (rupesh@cse)
TA(s): To be decided.

Note: Course related communication will be on IITM Moodle site (`https://courses.iitm.ac.in/course/view.php?id=4605` and 4606).

1 Course objectives

To teach programming (with an emphasis on problem solving) and introduce elementary data structures. The student should, at a rudimentary level, be able to prove correctness (loop invariants, conditioning, etc) and analyze efficiency (using the 'O' notation).

2 Learning Outcomes

- Design correct programs to solve problems.

- Choose efficient data structures and apply them to solve problems.

- Analyze the efficiency of programs based on time complexity.

- Prove the correctness of a program using loop invariants, pre-conditions and post-conditions in programs.

3 Course prerequisite(s)

CS1200 Discrete Mathematics

4 Classroom Mode

Traditional lectures, with one 50-minute tutorial slot per week. Tutorials would be interspersed with theory lectures.

5 Textbooks

- Data Structures and Algorithm Analysis in C++, by Mark Allen Weiss (Pearson 2007).

6 Reference Books

- Data structures and Algorithms in C++ – by Adam Drozdek (1994 2001).

- How to solve it by Computer – by R G Dromey (PHI 1982, Paperback 2008).

- Fundamentals of Data Structures in C – by Horowitz, Sahni and Anderson-Freed (Silicon Press 2007).

- Data Structure Using C and C++ – by Y. Langsam, M. J. Augenstein and A. N. Tanenbaum (Pearson Education, 2nd Edition, 2015).

7 Course Requirements

Standard institute rules apply.

8 Planned Syllabus

The following topics will be covered:

1. Overview

2. Correctness

3. Complexity

4. Arrays

5. Lists

6. Trees

7. Dictionary

8. Priority Queues

9. Graphs

9   Tentative Grading Policy

Quiz 1	04/09	20%
Quiz 2	16/10	30%
EndSem	19/11	50%
Quiz 1	28/08	15%
Quiz 2	09/10	20%
EndSem	13/11	25%
Programming Assignments	(almost) weekly	40%

10   Academic Honesty

Standard institute rules apply.