

Course Syllabus

CS 6301.002 Implementation of advanced data structures & algorithms; Spring 2016; TR 1:00-2:15; CN 1.120
URL: <http://www.utdallas.edu/~rbk/teach/2016s/iadsa.html>

Professor Contact Information

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Office hours: Tue/Thu 2:15-3:00 PM, Wed 10:30-11:30 AM.

Course Pre-requisites, Co-requisites, and/or Other Restrictions

CS 5343 or equivalent (Data structures and algorithms): Analysis of algorithms. Stacks, queues, and trees. Heaps, hashing, and advanced sorting techniques. Disjoint sets and graphs.
Knowledge of Java or C++.

Course Description

Topics: Implementation of data structures, such as Lists, Trees, B-trees, Splay trees, Skip Lists, Graphs; Algorithm design: Recursion, Divide-and-conquer, Dynamic Programming; Implementation of algorithms.

Projects: Course emphasizes a practical approach to algorithms with many programming projects:

- Type 1: Implementation of data structures and algorithms
- Type 2: Empirical study comparing performance of algorithms

Projects can be done in groups of 2 or 4 students. Programming projects are classified into short and long projects. Each long project has 2 deadlines. Only long projects, submitted by the 1st deadline, are eligible for excellence credits. If a group with x members submits a project that receives excellence credits, then each group member will receive $f(x)$ fraction of the credits ($f(2) = 1$; $f(3) = 0.9$; $f(4) = 0.9$). Students can form their own groups, if needed, with the help of the instructor. Groups must be in place by the end of the second week of classes.

Student Learning Objectives/Outcomes

Design data structures for given situations, study efficient algorithms for a number of practical problems, learn techniques for designing algorithms, and study efficient implementation of data structures. At the end of the course, students are expected to have the following abilities: (1) Use/implement advanced data structures, (2) Use/implement algorithms, (3) Evaluate performance of data structures implementations.

Required Textbooks and Materials

No text book is required. Reference: Any book on DS&A such as Cormen et al's "Introduction to Algorithms."

Assignments & Academic Calendar

Exams: Final exam on the date announced by the Registrar. Regular quizzes (unannounced) will be given.

Grading Policy:

Project with the lowest score will be dropped.

A grade: 90% in projects, 85% in exams, 5 *participation* credits, and 3 *excellence* credits

B grade: 80% in projects, 70% in exams, and 3 *participation* credits

C grade: 65% in projects and 55% in exams

Course & Instructor Policies

- Projects must be submitted online by their deadlines. No submissions will be accepted after the final deadline for any project. All submissions must be your own work. Do not seek outside help in implementing projects.
- Students are expected to participate in discussions (in class and on elearning). Participation credits can be earned by contributing to discussions on elearning forums.
- No makeup quizzes will be given for unapproved absences.
- Regular class attendance and participation is expected and is the responsibility of each individual. There is a strong correlation between regular class attendance and good performance. If a student should elect not to attend a class, (s)he is responsible for any handouts, announcements, reading material and contents of missed lectures.

See also UTD's policies at <http://go.utdallas.edu/syllabus-policies>