# Course Syllabus

CS 6301.502 Implementation of advanced data structures and algorithms; Fall 2017; WF 5:30-6:45; SLC 1.102
URL: http://www.utdallas.edu/~rbk/teach/2017f/iadsa.html

**Professor Contact Information**
Balaji Raghavachari; (972) 883-2136; rbk@utdallas.edu; ECSS 4.225; Office hours: Wed/Fri 3:00-5:00 PM.

**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, Python, or C++.

**Course Description**
**Wednesday Topics**: Introduction [1]; Lists, Queues and Stacks [2]; Bignum arithmetic, Parsing algorithms [1]; Recursion, Divide and conquer, Sorting and searching [2]; Priority queues [1]; Trees, search trees (AVL, Splay, Red-Black, B) [2]; Skip lists [1]; Hashing, Bloom filters, Advanced hashing algorithms [2]; Multi-dimensional search [1]; Enumeration [1].
**Friday Topics**: Java, Code quality [1]; Graphs [1]; Depth-first search (DFS) [1]; Euler tours [1]; Minimum spanning trees [1]; MST in directed graphs (Branching) [1]; Shortest paths [2]; Matching in bipartite and general graphs [2]; Flows, min-cost flows [1]; Dynamic Programming [2]; String algorithms [2].
**Projects**: Course emphasizes a practical approach to algorithms, with many programming projects (short, long). Long projects have 2 deadlines, each. Only 1st deadline submissions are eligible for excellence credits.
**Excellence Credits**: First 25% of each long project submitted will be eligible for up to 10 excellence credits. Projects not meeting software quality guidelines, or failing test cases, will not receive any excellence credits.
**Groups**: Projects can be done in groups of 4 students. Students can form their own groups, or, with the help of the instructor. Groups must be in place by the end of the second week of classes.

**Student Learning Objectives/Outcomes**
Use/implement advanced data structures and algorithms. Empirical evaluation of different implementations.

**Required Textbooks and Materials**
No textbook 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:**
**A grade:** 300 in short projects, 450 in long projects, 85% in exams and quizzes, 30 excellence credits
**B grade:** 250 in short projects, 350 in long projects, 70% in exams and quizzes
**C grade:** 200 in short projects, 250 in long projects, 55% in exams and quizzes

**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.
- No makeup quizzes will be given for unapproved absences.
- CS department policy: one grade reduction for missing 3 classes (without prior permission from instructor), and a grade of "F" for missing 4 classes without proper excuse.
- 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.

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