

Course Syllabus

Course Information

CS 3345 HON

Data Structures and Introduction to Algorithmic Analysis

Fall 2016, Tu/Thurs 5:30 – 6:45 p.m.

Professor Contact Information

Ivor Page, (972) 813-2160, ivor@utdallas.edu ECS 4.410

Office Hours:

Wednesday 4-6 p.m.

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

CE 2305 or CS 2305 or TE 2305 with a grade of C or better.

Prerequisite or Corequisite: (CS 2336 or CS 2336 with a grade of C or better), CS 3341 or SE 3341 or ENGR 3341).

These prerequisites or corequisites should ideally be taken as Computing Scholars Honors courses. Bridge students will have completed additional exams or assignments in addition to non-honors versions to qualify for entrance to this class.

Course Description

This course covers fundamental algorithms and data structures that form the basis of efficient solutions to the most commonly occurring problems in computer science. It covers basic mathematical techniques for their analysis.

Student Learning Objectives/Outcomes

Ability to use/analyze Asymptotic notations, recurrences, algorithm analysis
Ability to use/analyze Lists, stacks, queues, hashing, priority queues
Ability to use/analyze Binary search trees, Balanced binary search trees
Ability to use/analyze Graphs, Depth-first search, Topological ordering
Ability to use/analyze Breadth-first search, Dijkstra's algorithm
Ability to use/analyze Algorithms of Prim and Kruskal, Disjoint-set Union-Find problem

Required Textbooks and Materials

Weiss, Data Structures and Algorithm Analysis in JAVA, Addison Wesley Longman, latest edition.

Suggested Course Materials

Course Notes on eLearning.

Assignments & Academic Calendar

(Topics, Reading Assignments, Due Dates, Exam Dates)

Week 1,2: Math review, logs, series, recurrence relations, proof by induction.

Week 3: Algorithm Analysis, max subsequence sum, longest increasing subsequence, Euclid's algorithm.

Week 4: Lists, Stacks, Queues.

Week 5,6,7: Trees, balanced trees, AVL Trees, B-Trees, Red-Black trees.

Week 8: Hashing, linear probing, quadratic probing, double hashing.

Week 9: Heaps, Binary Heaps, Binomial Queues

Week 10: Sorting, Insertion Sort, Shell's Sort, Quicksort, Heapsort, Mergesort.

Week 11: Disjoint Sets.

Week 12,13,14: Graph Algorithms, Topological Sort, Shortest Paths, Minimum Spanning Tree, Max Flow, Euler Circuits, Articulation Points, Biconnectivity.

Test Dates:

TBA

Grading Policy

(including percentages for assignments, grade scale, etc.)

There will be about eight home works and four projects. Approximate weights for the assignments will be, Homework: 10%, Projects: 20%, Mid Semester Test: 30%, Final Test: 40%.

Course & Instructor Policies

(make-up exams, extra credit, late work, special assignments, class attendance, classroom citizenship, etc.)

Makeup exams will only be offered in case of documented illness or other acceptable reason for absence. Prior notification is required when possible.

Comet Creed

This creed was voted on by the UT Dallas student body in 2014. It is a standard that Comets choose to live by and encourage others to do the same:

“As a Comet, I pledge honesty, integrity, and service in all that I do.”

UT Dallas Syllabus Policies and Procedures

The information contained in the following link constitutes the University's policies and procedures segment of the course syllabus.

Please go to <http://go.utdallas.edu/syllabus-policies> for these policies.

The descriptions and timelines contained in this syllabus are subject to change at the discretion of the Professor.