

# CS 182 Introduction to Computer Science, Honors II Syllabus

The syllabus below describes a recent offering of the course, but it may not be completely up to date. For current details about this course, please contact the course coordinator. Course coordinators are listed on the course listing for undergraduate courses and graduate courses.

## Text Books

### Required

Anany Levitin, *Introduction to The Design & Analysis of Algorithms*, 2nd ed., Pearson Addison Wesley, 2007, ISBN 0-321-35828-7

W. Savitch & M. Carrano, *Java: Introduction to Problem Solving and Programming*, 5th ed., Prentice Hall, 2009 (Students should already have this book from CS 181)

## Week-by-Week Schedule

Week	Topics Covered	Reading	Assignments
1	The Software Life cycle, Complexity Analysis (big-O, big-Theta, big-Omega)	Levitin Chapter 2	
2	Lists, Stacks and Queues	Levitin 1.4	
3	Trees (binary trees, binary search trees)	Levitin pp. 32-37	Assignment 1
4	Max/Min Heaps, Priority Queues	Levitin 6.4, 9.4	
5	Programming in C		Assignment 2
6	Sorting algorithms	Levitin 3.1, 4.1, 4.2, 5.1	
7	Hashing	Levitin 7.3	
8	Self Balancing Binary Trees (AVL Trees, Red-Black Trees)	Levitin 6.3	Assignment 3
9	General Trees (B-Trees, B+Trees, 2-3 Trees, 2-3-4 Trees)	Levitin 7.4	
10	Graphs	Levitin 6.6	
11	More on Graphs (Floyd, Dijkstra, Prim, Kruskal, Warshall)	Levitin 8.2, 9.1, 9.2, 9.3	
12	Maximum-Flow problem	Levitin 10.2	
13	Theory of different problem solving techniques (Brute Force, Greedy, Dynamic Programming, ...)	Levitin Summary of Chapters 3, 4, 5, 6, 8, 9	Final project
14	P, NP and NP-Complete problems	Levitin 11.3, 12.1, 12.2	