ICS 311 : Algorithnms (3 cr.)

Description	Design and correctness of algorithms, including divide-and-conquer, greedy and dynamic programming methods. Complexity analyses using recurrence relations, probabilistic methods, and NP-completeness. Applications to order statistics, disjoint sets, B-trees and balanced trees, graphs, network flows and string matching.
Prerequisites	141, 211, 241, or consent
Learning Objectives	• be able to write pseudcode for algorithms described by word problems • be able to analyze the running times for those and other algorithms • have learned to understand, implement and apply among others, greedy, dynamic programing and/or computational geometry and linear programing algorithms • understand issues of comoputational complexity and NP-Completeness • understand and do correctness proofs • be able to implement in a programming language any algorithm under study

Topic List

#	Topic	Lecture Hours
1	Elementary data sets	3.0
2	Analyzing and designing algorithms	3.0
3	Asymptotics, recurrences	3.0
4	Divide-and-conquer algorithms, master theorem	3.0
5	Sorting, order statistics, probabilistic analyses	3.0
6	Hash tables, balanced search trees	3.0
7	Greedy algorithms	3.0
8	Dynamic programming	3.0
9	B-trees, data structures for disjoint sets	3.0
10	Graph algorithms	3.0
11	All-pairs shortest path algorithms, network flow	3.0
12	Pattern matching	3.0
13	Computational geometry or linear programming	3.0
14	NP-completeness	3.0