CS 482 Summer 2004
Syllabus and Schedule

CS482 is an introduction to the design and analysis of algorithms. The primary goal of this course is to introduce some common techniques and issues that arise in the study of algorithms. The topics include dynamic programming, network flows, NP-completeness, intractability, and muchos more. We expect the students are familiar with the topics from CS211, CS 280, and CS 312. (CS 381/481 is also a prerequisite, but as far as CS482 is concerned, serves primarily to ensure the ability to write clear and mathematically rigorous proofs, and provides some exposure to the concept of a reduction).

We want our students to come out of the course with the confidence, tools, and techniques to tackle difficult problems. They will learn how to assess the main challenges of a problem, find one or more solutions, and determine which solution is best for the application. Finally, they will learn how to recognize and prove that certain problems are computationally intractable, and what can be done in these situations.

A tentative schedule is listed on the back of this page. I intend to stick to it as much as possible, but I'm not perfect (well... almost maybe :-), so expect changes.

Meeting	Date	Topic	Suggested Reading
Lec. 1	July 9	Course Overview, Syllabus, Stable Matchings	1.1, Ch 2 (optional)
Lec. 2	12	Graphs Review & Representative Problems	1.2, Ch 3 (optional)
Lec. 3	13	Greedy Algorithms	4.1
Lec. 4	14	Greedy Algorithms	4.2
Lec. 5	15	Minimum Spanning Trees	4.4
Lec. 6	16	Divide & Conquer	Ch 6
Lec. 7	19	Dynamic Programming	5.1, 5.2
Lec. 8	20	Dynamic Programming	5.3
Lec. 9	21	Dynamic Programming	5.4
Lec. 10	22	Dynamic Programming	5.5, 5.6
Lec. 11	23	Problem Solving Session	4.3, 5.7
Prelim I	**26**	**Matchings, Greedy, D& C, Dynamic Programming**	
Lec. 12	27	Network Flows	7.1, 7.2
Lec. 13	28	Network Flows	7.3, parts of 7.6
Lec. 14	29	Network Flows	7.5, 7.6
Lec. 15	30	Network Flows	7.6, 7.8
Lec. 16	Aug 2	Network Flows	7.11
Lec. 17	3	NP Completeness	intro to 8, 8.1
Lec. 18	4	NP Completeness	8.2, 8.3
Lec. 19	5	NP Completeness	8.4, 8.5, 8.8
Lec. 20	6	NP Completeness	8.6
Lec. 21	9	Problem Solving Session	
Prelim II	**10**	**Greedy, D& C, Dynamic Programming, Flows, and NP**	
Lec. 22	11	Special Cases of NP Problems	10.1, 10.2
Lec. 23	12	Approximation Algorithms	
Lec. 24	13	Approximation Algorithms	
Lec. 25	16	Probabilistic Algorithms	13.1, 13.2, 13.4
Lec. 26	17	Online Algorithms	not in text
Lec. 27	18	Local Search	12.1, 12.2
Lec. 28	19	Problem Solving Session	
Final Exam	**20**	**Everything. Place & time to be determined**	