MATH 409 $\in \supseteq \sum$ Discrete Optimization: Syllabus $\sum \subseteq \ni$ SPRING 2009

WHERE & WHEN? **LOW 113** at 11:30-12:20 a.m., M, W, F

WHO? **Paul Tseng** (Office: Padelford C-344; Tel: 543-1177; Email: tseng@math.washington.edu; Web: http://www.math.washington.edu/~tseng/409.html)

OFFICE HOURS: Tues 2:00–3:30 (or when I am free, usually M, W, F afternoons). If the office hours are inconvenient for you, feel free to drop by at some other time.

TA: Julie/Julia Eaton (Office: Padelford C-404; Email: jreaton@math.washington.edu)

PREREQUISITE: Math **407**. Math **310** is highly recommended. Comfort with math proofs is needed–see Chap. 2 of *Mathematical Thinking*, 2nd ed., by D'Angelo and West, on reserve in the Math Research Library. This is a rigorous course in which less prepared students struggle.

TEXTBOOK: Course Notes (version March 2009). References: *Applied Combinatorics*, either 1st edition by Fred Roberts, 1984 or 2nd edition by Fred Roberts and Barry Tesman, 2003.

GRADING	POINTS	DATE
8 assignments*	30	almost weekly
3 quizzes (15–20 min. each)	45	**April 24**, **May 8**, **May 29**
midterm (50 min.)	50	**Fri, May 15**
final exam (1 hour 50 min.)	100	**Wed, June 10** (2:30-4:20)

* The final grade (in %) will be taken to be the maximum of the scores (in %) computed with and without the assignments being considered. [So the total points would be out of 225 in one case and out of 195 in the other case.]

Final GPAs are guided by the formula below:

% range	GPA range (linear assignment over whole scale)
≥ 90	4.0
75-89	3.0-3.9
60-74	2.0-2.9
45-59	1.0-1.9
< 45	0.0 or 0.7 or 0.8 or 0.9

WHAT? The main topics are Graphs and digraphs, Eulerian paths, spanning trees, minimum spanning trees, shortest path, maximum flow, bipartite (optimal) matching, integer program, NP-completeness, traveling salesman problem. These are in the Course Notes. Related sections in *Applied Combinatorics* are (not necessarily in the order shown):

Chap. 1
Parts of Chap. 3 (especially Secs. 3.1, 3.2, 3.5, 3.7)
Parts of Chap. 11 (especially Secs. 11.1, 11.3, 11.5)
Parts of Chaps. 12 and 13 (especially Secs. 12.1, 12.2, 12.5, 13.1-13.3).

NOTE 1: The lectures will be self-contained, so regular attendance of lectures is important.

NOTE 2: It is important that you attempt the homework problems and review the lectures. Exams will contain both numerical and proof-type questions similar to those on the homeworks and in the lectures. [On average, about 80% of the students that hand in homeworks on a regular basis receive a GPA of 2.9 or better. In contrast, less than 40% of the remaining students receive a GPA of 2.9 or better.] Doing the homeworks in particular enables you to gauge your progress and to check for mistakes.

NOTE 3: This course concerns the mathematical theory of discrete optimization, so *proofs will be expected* $\frown$. Applications will be mentioned, but are not the focus of this course.

NOTE 4: No incompletes without written medical excuse. No make-up exam except in the event of a documented emergency.