Math/AMath 381: Discrete Modeling (Winter 1998)

Lectures:	11:30–12:20, room 214 JHN
Professor:	Anne Greenbaum, C-434 Padelford, 543-1175
Office Hours:	T, Th 1:30–3:00, or by appointment.
e-mail:	greenbau@math.washington.edu
Web Address:	http://www.math.washington.edu/~greenbau
	Course materials: Click on "Math/AMath 381".

Text: *Applied Combinatorics* by Fred S. Roberts, Prentice-Hall, 1984. (available at University Bookstore)

Reserve list: The following books are on reserve in the Mathematics Research Library.

1. *Applied Combinatorics* by Fred Roberts (QA164 R6)
2. *Discrete Mathematical Models with Applications to Social, Biological, and Environmental Problems* by Fred Roberts (QH323.5 R6)
3. *Applied Combinatorics* by Alan Tucker (QA164 T83)

This course will cover:

- Basic Combinatorics: permutations, combinations, number of subsets, sampling with replacement; complexity of algorithms. (Ch. 2 of text)
- Elementary probability: discrete and continuous random variables, expected value, variance, law of large numbers, central limit theorem; Markov chains; Monte Carlo methods. (Handouts to be distributed later)
- Introduction to Graph Theory: connectedness, graph coloring, trees, searching and sorting problems. (Ch. 3 of text)
- Existence Problems in Graph Theory: depth-first search, Eulerian chains and paths, Hamiltonian chains and paths. (Ch. 11 of text)
- Combinatorial Optimization: matching and covering, shortest route problem, network flows. (Chs. 12–13 of text)

Application of the above techniques to mathematical modeling in the physical, biological, and engineering sciences, financial modeling and operations research will be stressed.

There will be homework assignments (with some programming) (30%), a midterm exam (20%), a final exam (20%), and a final project (30%).

You will need an MSCC computer account, if you do not already have one. You can find information about the Mathematical Sciences Computing Center by typing: http://www.ms.washington.edu.