

Math 381 – Syllabus
Discrete Mathematical Modeling
Winter 2012

Time: MWF, 11:30-12:20
Place: Mary Gates Hall 251

Instructor: Patrick Perkins
Office: Communications B-014
e-mail: pperkins@uw.edu
Office hours: Mondays 2:30-3:30

Course webpage: <http://www.math.washington.edu/~perkins/381Awin12/>

Textbook, Notes, References:

Mathematical Modeling by Wayne L. Winston.

This is a selection of chapters from Operations Research by Winston. It is available at the Bookstore.

Several books which may be useful to you are on reserve in Odegaard Library. See the webpage for a list, and also for other references.

Material covered:

This course is an introduction to mathematical modeling using techniques from discrete mathematics. The methods come from Combinatorics, Probability, and Optimization. We will cover topics from linear optimization, integer programming, graph theory, Markov chains and Monte Carlo simulation.

Projects:

A major feature of this course are the three projects. You will choose from a selection of projects to work on. These modeling projects must be typed up neatly. They will be done in groups of two. I will assign you to a different partner for each project. The schedule for the projects is:

Friday, January 27:	First project due.
Friday, February 17:	Second project due.
Wednesday, March 14	By 4:00pm sharp, turn in a copy of the final project to Communications B-014.

Attendance: I will take roll from time to time. Attendance and participation count for some of your grade.

Homework:

There will be frequent homework assignments. Homework will often be discussed in class and will be collected but not always graded in detail. Late homework will be deducted 10% for each day it is late.

Exams:

There are no exams in Math 381.

Grading:

Projects 1 & 2: 20% each, Project 3: 30%, Homework: 20%, Participation: 10%.

Class participation:

It is essential that you come to class each time. Much of what we will discuss is not in the text. In order to fully appreciate the process of mathematical modeling, you must be involved in development of numerous models, which is what we will often do in class. We will often ask you to think about modeling issues between classes and expect you to come to class prepared to contribute to the discussion. Participating in these discussions is worth up to 5% of your grade.

Writing assignments:

Students in Math 381 earn W-credit for the writing assignments in this class. The course projects will be graded partly on the basis of writing style and clarity of explanations. Some homework assignments will also require written descriptions of modeling problems or algorithms.

Computer programming:

Extensive computer programming is not required for this course, but you can tackle more interesting modeling problems if you can use the computer to solve equations or perform simulations. Many examples will be given in class, primarily using the R programming language. This is a very convenient language for testing simple algorithms, analyzing data interactively, and plotting results.

Other resources:

This quarter we are using a textbook from Operations Research. It has a lot more material in it than we can cover in class. You are responsible for augmenting the text as needed with appropriate reading, depending on your background. Some books are on reserve in Odegaard library, see the list on the webpage. In addition to these books, there are *many* other books which discuss mathematical modeling and each of the various topics we will discuss. For the course projects, you will almost certainly have to do additional research on your own.

The old course notes are still available for download on the course web page. They were not intended to be a complete textbook, but give an outline of some things discussed and some of the examples.