

Syllabus: AMSC/MATH 420, Spring 2011

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Office Hours: M3 Th2 in MTH 2314 (for Slud)

Web-page: <http://www.math.umd.edu/~evs/MATH420>

Texts (recommended):

D. Edwards & M. Hamson, *Guide to Mathematical Modeling*, CRC.

Walter Meyer, *Concepts of Mathematical Modeling*, Dover.

K. Tung, *Topics in Mathematical Modeling*, Princeton.

Course Description

This is a course on mathematical modeling as a process, not as a collection of techniques. After a first HW set which will be done individually, students will work in groups on projects motivated by real-life problems, and will, with the aid of the instructors, complete the entire process from formulating a mathematical model to mathematical and computational analysis of the model to oral and written presentation of the results. Some background in ordinary differential equations, basic probability and statistics, and computational methods is expected. Additional mathematics will be introduced as dictated by the projects. Here is the approximate schedule we will follow this semester.

- First 2.5 weeks: Introduction & HW/Project 1, due Feb. 11.
- Next 3 weeks: First round of Mini-projects.
- Next 3.5 weeks: Second round of Mini-projects.
- Last 5 weeks: Third round of projects.

The first HW set is to be worked on individually; the other assignments are group projects. The general procedure for each round of projects is as follows.

- Each group will work on a different project.
- Projects may be selected from choices offered by the instructor or, in the second and third rounds, may be formulated by the students in consultation with the instructor.
- Before the round starts, students will be asked to submit their choices for project. Group assignments will be decided by the instructor based on these choices.
- Groups may change from one round to the next.

Group Responsibilities

Class Time. Each group will present weekly oral progress reports, as well as a final oral report for each project. People in the other groups will be asked to provide both oral and written feedback on these reports. As the semester progresses, class time will be spent less on material from the texts and more on discussion of strategies and methods for the projects in progress. Groups are expected to meet regularly outside of class.

Project Reports. For each project, the group must submit a final report describing (among other things) the problem that was investigated, the model used and the justification for it, results from analysis and simulation of the model, and the conclusions drawn from the results. In addition to a paper copy of the final report for the instructor, groups must submit an electronic version to be posted for the rest of the class.

Individual Responsibilities

Occasional assignments will be given from the text and are to be done individually. Each person in a group is expected to take a turn presenting in their weekly oral reports. For each oral report, every person in the other groups is expected to submit a paragraph or two on a separate sheet of paper summarizing and critiquing the report – what did you feel were the main points of the report, what was hard to understand, what did you find particularly effective, etc. These comments will be passed on from the instructor to the presenting group.

Honor Pledge. In accordance with campus policy, you should write by hand and sign on every assignment submitted an honor pledge using the following wording.

I pledge on my honor that I have not given or received any unauthorized assistance on this assignment/examination.

The basic principle to keep in mind is to avoid representing the work of others as your own. Individual homework problems should be attempted first individually; you are welcome to compare notes with classmates, but your solutions must be in your own words based on your own understanding of the problems. For group projects, any help from sources outside the group (other than the instructor) must be cited.

Final Grade

There will be no exams. The HW and project due dates and the weights for your final grade are as follows:

HW1:	Friday, Feb. 11	10%
Other HW	various	10%
1st Project:	Friday, March 4	20%
2nd Project:	Wednesday, April 6	20%
3rd Project:	Friday, May 13	25%
Class Participation:	(always!)	15%

As a rough guideline: an “A” grade should reflect excellent work on group projects, regular attendance and participation in class; “B” should reflect good work on group projects, regular attendance and occasional participation in class; and “C” would reflect marginal work on group projects, sporadic attendance and participation in class.