MAT 140: Multivariable Calculus and Modeling  
Spring 2012

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Course Web Page: [http://www.davidson.edu/math/heyer/courses/mat140/mat140.html](http://www.davidson.edu/math/heyer/courses/mat140/mat140.html)

Course description: A continuation of the study of calculus and other mathematical methods for modeling change. Topics include multivariable calculus, and systems of linear equations and difference equations. The last three weeks of the course is devoted to the study of uncertainty and developing probability models such as Bayes’ rule and Markov Chains. Students will be guided in the discovery and mastery of mathematical techniques in the context of problems in the life sciences.

Prerequisite: MAT112, Calculus I and Modeling.

Textbooks: *Calculus in the Life Sciences*, Addison Wesley, by Greenwell, Ritchey and Lial

Technology: The TI-89 calculator is required for this course. The symbolic capability of the calculator will be key to solving some problems in this class. We will also occasionally use Excel and Mathematica.

Course goals: This course aims to prepare students for the increasingly important role of quantitative analysis in the life sciences by supplying a foundation in calculus and other mathematical methods for modeling change.

Course components:

Reading: Students are expected to read the text and learn some basic skills independently, so class time may be devoted to deeper understanding of ideas and applications. The ideal approach is to read the assigned sections before class to become familiar with the topic and prepare for class work, and then read more carefully after class to solidify concepts and techniques.

Classwork: Class time will be a mixture of lectures and hands-on problem solving. Students will occasionally work in groups to actively learn concepts and skills during class. Participation and effort in class activities is critical to learning the material.

Homework: Mathematics is a subject best learned by doing. Homework will be assigned and due each class period. Assignments will emphasize both understanding of concepts and application of skills to problems in the life sciences. *No late homework will be accepted for any reason*, but I will drop your lowest 4 assignments when computing your homework average. We will go over homework in class, and you are honor bound to make any corrections in a clearly distinguishable way (e.g. different color of pen, marked as “in class”.)
**Project:** Each student will work with a partner to complete a project at the end of the semester. Projects will consist of reading and understanding a published mathematical model and describing it in your own words in a 5-minute PowerPoint presentation. Projects will be presented in class on May 7 and 9.

**Reviews:** Four reviews will be given during the semester, tentatively scheduled for February 10, March 2, March 30 and April 30.

**Final Exam:** The final will be self-scheduled and cumulative. The final examination period is May 11 – May 16.

**Honor code considerations:** You may discuss homework assignments with anyone in the class, and you may ask me for help. However, what you turn in for grading should reflect your own understanding of the assignment, not a copy of someone else’s written or verbal understanding. Projects must be done with your partner, without consultation with anyone but me. Reviews and exams will be done individually, and with authorized resources only.

**Grades:** Course grades will be computed as follows:
- Homework 15%
- Reviews 15% each
- Final Exam 15%
- Project 10%

**Office Hours:** I will have regular drop-in office hours on Monday and Wednesday from 1:30-3:00 p.m., and Tuesday and Thursday from 3:00-4:15 p.m. Please feel free to drop by anytime I am in the office, or make an appointment for a specific time other than those I have listed. My schedule is posted on my door and on my web page. Email and IM are great ways to reach me, day and night.

**Math & Science Center**

The Math & Science Center (MSC) offers free assistance to students in all areas of math and science, with a focus on the introductory courses. Trained and highly qualified peers hold one-on-one and small-group tutoring sessions on a drop-in basis or by appointment, as well as timely recap sessions ahead of scheduled reviews. Emphasis is placed on thinking critically, understanding concepts, making connections, and communicating effectively, not just getting correct answers. In addition, students can start or join a study group and use the MSC as a group or individual study space. Located in the Center for Teaching & Learning (CTL) on the first floor of the College Library, drop-in hours are Sunday through Thursday, 8-11 PM, and Sunday, Tuesday, Thursday, 4-6 PM, beginning Sunday, January 29. Appointments are available at other times. For more information, visit [www3.davidson.edu/cms/x39569.xml](http://www3.davidson.edu/cms/x39569.xml), or contact Dr. Mark Barsoum (mabarsoum or ext. 2796).