MAT 112
Calculus I and Modeling, Section C
Fall 2011

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Course Web Page: http://www.davidson.edu/math/heyer/courses/mat112/mat112.html
Please do not print the webpage; it is not a static document. You should check the webpage regularly for updates and assignments.

Course description: Life consists of change. Growth, metabolism, and senescence are examples of changes that occur in every living thing. In humans, change is evident in movement, circulation, learning, and disease. This course investigates mathematical approaches to describing and understanding change. Topics include single variable differential and integral calculus, difference equations and differential equations. Students will be guided in the discovery and mastery of mathematical techniques in the context of problems in the life sciences.

Prerequisites: You should have strong pre-calculus preparation for this course, and some previous exposure to actual calculus. Proficiency in calculus is not required, but I will assume and expect that you already know the rules for derivatives and similar basic facts from calculus. Students with AP credit for MAT 111, Calculus I (i.e., a 3 or higher on the AB test), will LOSE that course credit by taking this course, and should consider enrolling in MAT 113, Calculus II, instead. Students with BC calculus experience and at least a 4 on the BC test should consider enrolling in MAT 160, Calculus III.


Technology: The TI-89 calculator is required for this course. The symbolic capability of the calculator will be key to solving problems in this class. We will also occasionally use Excel. I will help you learn to use these tools, but you will also need to do some outside reading and experimentation to become comfortable with the technology.

Course goals: This course aims to prepare students for the increasingly prevalent role of quantitative analysis in the life sciences by supplying a foundation in calculus and other mathematical methods for modeling change. After MAT 112, students can choose to continue to either Multivariable Calculus and Modeling (MAT 140) or Calculus II (MAT 113), either of which counts toward a minor or major in mathematics, and satisfies medical school requirements. Premed students may also wish to consider a course in statistics.
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 skim the assigned reading 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, question-and-answer, and hands-on problem solving activities. You should always bring your calculator to class. You need not bring your book every day.

 Unless you have a dire emergency, you should not get up and leave class, because it interrupts concentration for other students. Texting and emailing in class are rude and disruptive. You should always turn OFF your phone before class starts.

**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. A subset of the problems will be graded by a student assistant and returned to you the following class period. You are responsible for checking the accuracy of problems that are not graded. Please see me if you have any questions or concerns about the way your homework is graded.

**Projects:** Pairs of students will complete a project during the semester. Projects will consist of reading and understanding a published mathematical model in the life science literature, and presenting it to the class in the form of a scientific poster. Projects will be presented on class on December 2nd and 5th.

**Reviews:** Three reviews will be given during the semester, scheduled for September 21, October 19 and November 21. Put these dates on your calendar now!

**Final Exam:** The final will be self-scheduled and cumulative.

**Additional resources and strategies for success:**

**Office Hours:** The best place to get help with the course material is from the instructor. Office hours are times that are specifically set aside to meet with students. If these times are not convenient for you, I encourage you to email me for appointments at other times, or simply drop by and see if I am available to help. I am typically on campus from 9:00-6:00 every day. My regular daily schedule is posted on my web page, so you can see the best times to find me.
I will have the following regular drop-in office hours, for which you need no appointment, first-come, first-served:

**Monday – Thursday 2:00-3:30**

Email and IM are great ways to reach me, day and night.

**Peer Instruction:** Mathematics is the perfect subject to study with a group of friends. I strongly encourage you to work together on homework. Use the diversity of previous experience and gifts for different subjects among your classmates. Even the strongest students will realize significant learning gains by explaining concepts and problem-solving techniques to other students.

**Free Tutoring:** 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 new 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, September 4. 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).

**Private Tutoring:** Some mathematics majors do private tutoring. The department maintains a list of tutors, and I would be happy to recommend someone to you if you would like extra help beyond all the resources listed above. Private tutors generally charge $15-20 per hour.

**Honor code considerations:** You may discuss homework assignments with anyone in the class, and you may ask me or the Math and Science Center tutors for help. However, what you turn in for grading should reflect your own understanding of the assignment, not simply a copy of someone else’s written or verbal understanding. Projects will be done in pairs, without consultation outside of the pair (other than me). Reviews and exams will be done individually, and with authorized resources only. You will be asked to sign the honor code pledge on each review.

**Grades:** Course grades will be computed as follows:

- Homework: 15%
- Reviews: 20% each
- Final Exam: 20%
- Project: 5%