

M255: Calculus for Biological Scientists II

Spring 2012 - MTWF ENGRG E105

Instructor: Sarah Hamilton

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Office Hours: Held in Weber 17 at times TBD and by appointment

Class Website: RamCT

Prerequisite: M155 or equivalent

Course Description: The goal of this course is to introduce some of the standard mathematical techniques used in the biosciences. This course will provide an introduction to differential equations, linear algebra, and multivariable calculus.

Required Text: *Modeling Differential Equations in Biology* by Clifford Henry Taubes (ISBN: 0-13-017325-8). The text is available for purchase online at Amazon.com.

Supplemental Text: *Mathematics for Biologists - 255* by Ryan Croke and Rodney James. The text is available free online at <http://www.math.colostate.edu/~croke/teaching/Calc2/documents/Math255.pdf>.

Grading Policy:

There will be two hourly exams (in-class) and a final project. The final grade will be calculated as follows:

- Homework: 55% (Best 10 scores)
- Exam 1: 15%
- Exam 2: 15%
- Final Project: 15%

Homework:

Homework will be assigned every Wednesday and due in class the following Wednesday. There will be 12 homework assignments in total but two will be dropped. No late assignments will be accepted. If you cannot attend class (for any reason) your homework must be e-mailed to me or put in my mailbox by the end of the class period on the day the assignment is due.

Tentative List of Topics To Be Covered:

- Differential Equations: *1 and 2 component (linear and nonlinear) systems, stability, equilibria, and phase plane analysis.*
- Linear Algebra: *Basic matrix operators, eigenvalues and eigenvectors, Leslie Matrices*
- Calculus: *Taylor series, multivariable differentiation and integration*
- Special Topics: class suggestions

Project:

The project will be due in class the week before finals week (i.e. by Friday May 4, 2012). You will be asked to find an appropriate journal article in your field of study (or any other area that interests you) that uses the mathematical techniques that we have learned in class. There are many undergraduate level journals out there and I can help you find them if necessary. The grade for the project will be split into three parts

- A short paragraph detailing the title, author, name of journal and subject matter of the article (due in class on Friday April 20, 2012 with a copy of the article attached) (5%)
- A 3 page paper giving an overview of the article and explaining what kind of math is used and how it connects to what we have studied in class. Your write up should include a bibliography (not included in the 3 page count) and cite all sources used. When you hand in the assignment I will ask you to sign the CSU Student Honor Pledge "*I have not given, received, or used any unauthorized assistance.*" (5%)
- 5-10 minute presentation to the class summarizing your 3 page paper (5%)

More details to follow.