

## **MATH 151 - Fall 2014** Mathematics for the Life Sciences

Time: 10:10-11:00 M,W, recitations/labs in sections on Thursdays

Instructor: Dr. Suzanne Lenhart  
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Office: 235 Ayres Hall  
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TEXT: Mathematics for the Life Sciences, by Bodine, Lenhart, and Gross  
Princeton University Press, 2014

Files and messages will be on the combined course page and grades will be seen on individual section page on Blackboard

When sending me a message about this course, PUT 151 and your section number in the subject line. CONTACT me about an emergency or illness that affects your work in this course. CONTACT me about missing a test.

**Course Overview** This course provides an introduction to a variety of mathematical topics of use in analyzing problems arising in the biological sciences. It is designed for students in biology, agriculture, forestry, wildlife, pre-medicine and other pre-health professions. It is designed to provide an overview rather than a detailed introduction to any particular topic. The general aim of the course is to show how mathematical and analytical tools may be used to explore a wide variety of biological phenomena.

Course Goals:

1. Develop your ability to quantitatively analyze problems arising in the biological areas of interest to you.
2. Illustrate the great utility of mathematical models to provide answers to key biological problems.
3. Develop your appreciation of the diversity of mathematical approaches potentially useful in the life sciences.
4. Provide experience using computer software to analyze data, investigate mathematical models and provide some exposure to programming.

The topics include descriptive statistics, linear regression, exponential and logarithms, non-linear scalings, log-log and semi-log plots, matrix models, discrete probability, and difference equations.

This semester, chapters 1-14 of the textbook will be covered.

Prerequisites are two years of high school algebra, a year of geometry, and precalculus.

Homework will be assigned to help students learn the material and to prepare for quizzes. Homework will not be graded. There will be five quizzes and the lowest quiz grade will be dropped. There will be three projects to be graded.

The software package, MATLAB, will be used in this course. No prior knowledge of this package is expected. The needed skills will be taught.

There will be three tests and a comprehensive final exam. Of the three tests, the one with the lowest grade will be dropped.

DATES of TESTS: September 25, October 23, November 20

FINAL EXAM: Wednesday, Dec 8, at 8-10am

The point totals of the grade components out of TOTAL 420 POINTS:

quizzes 60 points (15, 15, 15, 15)

projects 60 points (10, 25, 25)

tests 200 points (each test counts 100 each, after the lowest test is dropped)

final exam 100 points

The material to be covered for each test:

test 1, chapters 1-4

test 2, chapters 5-9

test 3, chapters 10-14

To prepare for the first recitation class on August 21, your first homework assignment is to get 10 lines of height-weight data from our course page and make a scatter plot of height versus weight (BY HAND). Bring your scatter plot with you to recitation class on Thursday, August 21. The file with the data is up on the course combined blackboard page. If your birth month is 'k', then choose data from lines starting at 10\*k. So for example, if your birthday is in February, choose 10 lines of data starting at line 20.

HOMEWORK for August 21, problems 1.2 - 1.5, 1.8-1.10.

If you have MATLAB on your laptop, bring it to recitation class on August 21. DOWNLOAD MATLAB as soon as possible.