Syllabus for Mathematics 172, Section 001, Fall 2010

TIME AND PLACE: MWF, 1:25 p.m. – 2:15 p.m., LC 412
INSTRUCTOR: Ralph Howard OFFICE: LC 304 PHONE: 777-2913
OFFICE HOURS: TTh 2:00-3:00pm and by appointment
E-MAIL: howard@math.sc.edu
TEXT: *A Primer of Ecology* by Nicholas J. Gotelli, fourth edition.
CALCULATORS: You will need a graphing calculator that can to basic computations with matrices, such as a TI-83. The class demonstrations will be with the TI-83 and most of this should also apply to the TI-82. There are several types of calculators that will do all that is required for the class and you are welcome to use them. However for calculators other than the TI-83 and TI-82 I may not be able to help with the programming.
CLASS WEB PAGE: http://www.math.sc.edu/~howard/Classes/172b/

Tests: There will be three midterms and a final. The midterms count for 100 points each and the final is 150 points. The dates of the tests are

Test 1	Monday, September 20
Test 2	Friday, October 22
Test 3	Monday, November 22
Final	Saturday, December 11, 2:00 p.m.

Homework and quizzes: Homework will be assigned, but usually not collected. There will be daily quizzes based on the homework which will count for 100 points. ***Important note:*** The quiz total counts as much as a test so it is important that you show up and take the quizzes.

Grading: The there is a total of 550 points possible for the term broken down as follows:

Three midterms @ 100 points each	300 points
Total for Quizzes	100 points
Final	150 points
Total	550 points

Your grade will be based on the total out of 550. The last day to drop without a grade of WF is Thursday, October 7 and you should have a good idea of where you stand by then.

Prerequisites: A grade of C or better in math 122 or math 141.

There will not be make up exams or quizzes: If you miss a test, then your score on that exam is 75% of the average of your other test scores including the final. If a second exam is messed the score on it is zero. Exams will be taken in class on the days listed above. So don't ask to take an exam early or late because you have to be "out of town" or some other reason. Late homework will not be accepted. Likewise there will not be make up quizzes. If you miss a quiz then you lose the points. As a reward anyone who takes all the quizzes will get 10 extra points. Missing only one quiz is worth 5 extra points. On the other hand if someone leave class early without permission then I reserve the right to give them a zero on quiz for the day.

Sharing calculators on quizzes and tests is not allowed: You should bring your calculator to every class meeting and especially to tests. If you do not bring

it them you will not be allowed to share a calculator with someone else from the class on quizzes or tests and will thus lose the points on those questions that need a calculator. While some cell phone have calculators built into them, use of cell phones, even as a calculator, during tests or quizzes is not allowed.

About partial credit and bad algebra: Some arithmetic errors do not bother me much. If your get in a hurry and get $7 \times 8 = 48$ it is not going to cost you much, provided you are doing everything else correctly. However, there are certain mistakes (all involving misuse of high school in such a way that always gives wrong answers), that will not be tolerated. If you make these mistakes I will mark the entire problem wrong. Here are some examples of zero point errors:

$$\sqrt{x+y} = \sqrt{x} + \sqrt{y}, \quad (x+y)^2 = x^2 + y^2$$

$$\frac{\log(2x)}{2} = \frac{\log(\not{2}x)}{\not{2}} = \log(x), \quad \frac{2x+3y}{3z} = \frac{2x+\not{3}y}{\not{3}z} = \frac{2x+y}{z}$$

This is not meant to scare you, but just to let you know where things stand.

Getting help: Besides my office hours you can get help in the Math Lab. This is a free tutoring service supplied by the mathematics department. There are three locations LeConte 105, the Towers Area located in the ACE office at 1215 Blossom St., and Bates Area ACE office in Bates House by room with pool tables (south of Blatt P.E. Center) Classroom. A tentative version of the schedule is:

	LeConte - Room 105	Bates House - by Room with pool tables (south of Blatt P.E. Center)	Columbia Hall - Room 113 (Pendleton & Barnwell)	Sims - back table in lounge off front porch (Greene, between Pickens and Bull)
Monday	10:00 AM - 4:00 PM	6:00 PM - 8:00 PM	6:00 PM - 8:00PM	6:00 PM - 8:00 PM
Tuesday	10:00 AM - 4:00 PM	6:00 PM - 8:00 PM	6:00 PM - 8:00 PM	6:00 PM - 8:00 PM
Wednesday	10:00 AM - 4:00 PM	6:00 PM - 8:00 PM	6:00 PM - 8:00 PM	6:00 PM - 8:00 PM
Thursday	10:00 AM - 4:00 PM	6:00 PM - 8:00 PM	6:00 PM - 8:00 PM	6:00 PM - 8:00 PM

An updated version of the schedule along with more information about the Math Lab is at `http://www.math.sc.edu/mathlab.html`

Course content: Our goal is to use *mathematical models* to help understand population growth in biological systems. We start with example of models to get a feel for when a mathematical model is useful, how accurate it is, and if it is appropriate for understanding short term and long term predictions. The two basic types of models used are *difference equations* and *differential equations* and we which is the one to use in a given setting. In some cases the long term behavior behavior (i.e. will it tend toward a fixed size, become extinct, or become chaotic) of a model can analysed without solving them explicitly. In other cases the only way to deal with the is numerically with a calculator or a computer. A few of the population models we will look are unrestricted population growth, population growth with limited resources, population growth of predator systems, population growth of competing species along with several others.

Learning Outcomes: Students will understand the concepts of and be able to solve problems drawn from biological modeling with differential and difference equations; techniques of model modification; analytic, numerical, and graphical solution methods; equilibria, stability, and long-term system behavior; geometric series; vectors and matrics with applications to population dynamics.