

MAP 4481 **Instructor: Nick Cogan**
Modeling in Biology **Office: LOV 002-E**
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Text : Mathematical Models in Biology, by Leah Edelstein-Keshet, SIAM publishers, 2005, ISBN: 0-89871-554-7

Course Content: Biological models based on discrete and continuous processes. Both difference and differential equations will be covered including eigenvalues and eigenvectors, phase plane analysis. Application topics include: population growth, competition, and predator-prey interactions; models of the spread of infectious diseases; chemical kinetics; physiology models.

Prerequisite: A course in Calculus (MAC2311), with grade of C- or better. Differential equations is recommended.

Course Objective: By the end of this course you should be able to construct simple mathematical models of biological systems. Also, you should be able to analyze biological models and determine long-term behaviors and stability of solutions. Finally, you should be able to identify model assumptions, parameters, and variables.

Expectations: You are expected to attend class and participate in discussions. A student absent from class bears the full responsibility for all subject matter and procedural information discussed in class. Homework problems will be assigned every 2–3 weeks and will be graded. It is likely that there will be several quizzes that will be announced at least one week in advance. There will also be graded in-class presentations and two examinations.

Quizzes: Quizzes will be given covering each of the sections where homework is assigned. The homework is separated into quiz-type problems and longer, more detailed homework problems.

Assignments: Homework problems will be assigned approximately every 2–3 weeks. The due date will be given with the assignment (typically 7-10 days). The grading scheme for the homework is O (outstanding, A-range), S (satisfactory, B-Range), U (unsatisfactory c or lower)

Presentations: I will divide the class into groups. Each group will give a presentation before spring break and a second during the last week of the class. The topic of a presentation should be a biomathematics article (or articles) published in a scientific journal, and must be approved by me (and I will

have some examples of articles that you may want to choose from).

Exams: There will be a midterm exams at the end of each major section (i.e. discrete and continuous). Make-up exams will only be given with a written doctors note or with approval from the dean and myself.

The final exam is scheduled for April 26 from 5:30 - 7:30 p.m.

Grading: The midterm exam counts 20% of the grade, and the final exam counts 20%. Presentations count 10% for each presentation. Assignments and quizzes count 40%.

Letter grades will be determined from numerical grades as follows: A: 92-100; B: 85-89; C: 75-85; D: 70-75; F: 0-70. Plus or minus grades may be assigned in a manner consistent with standard University practice. A grade of I will not be given to avoid a grade of F or to give additional study time. Failure to process a course drop will result in a course grade of F.

- Please feel free to contact me by e-mail, phone, after class, before class or during office hours.
- HONOR CODE. The Academic Honor System of The Florida State University is based on the premise that each student has the responsibility 1) to uphold the highest standards of academic integrity in the student's own work, 2) to refuse to tolerate violations of academic integrity in the University community, and 3) to foster a high sense of integrity and social responsibility on the part of the University community. Please note that violations of this Academic Honor System will not be tolerated in this class. Specifically, incidents of plagiarism of any type or referring to any unauthorized material during examinations will be rigorously pursued by this instructor. Before submitting any work for this class, please read the "Academic Honor System" in its entirety (as found in the [FSU General Bulletin](#) and in the [FSU Student Handbook](#) and ask the instructor to clarify any of its expectations that you do not understand.
- AMERICAN DISABILITIES ACT. Students with disabilities needing academic accommodations should: 1) register with and provide documentation to the Student Disability Resource Center (SDRC); 2) bring a letter to the instructor from SDRC indicating you need academic accommodations. This should be done within the first week of class.