

MATHEMATICAL MODELING IN BIOLOGICAL SCIENCES, MA/BMA 591E, Spring 2008

Prerequisites: Undergraduate course in calculus and some knowledge of differential equations.

3 Credit Hours, TRACS: MA/BMA 591E 006, TUE-THUR 10.15-11.30 am.

A mathematical modeling course designed for graduate students in mathematical and biological sciences

This course will discuss the art of mathematical modeling. The main emphasis will be to bring together students from mathematical and biological sciences. Students from biological sciences are expected to bring a problem that can be analyzed using mathematics, while mathematics students are expected to use their mathematical knowledge to help solve the proposed problems. During the course we will discuss a number of techniques for modeling including compartment models, Lotka Volterra's predator prey models, and more advanced models including fluid dynamics models and models predicting behavior of physiological systems. We will use a collection of notes supplemented with journal articles. To learn to design models we will spend a significant amount of time discussing how modeling comes about, how is a model designed, what assumptions should be made, and how do we choose adequate model parameters. A significant component of this course will be to work on projects in groups or individually to solve or analyze problems related to the students research interests. We will:

- Discuss mathematical concepts and techniques used to formulate mathematical models. Examples will be drawn from biological journals and books.
- Introduce mathematical modeling, the art of describing biological processes mathematically, via differential equations.
- Learn about methods for parameter identification and parameter estimation.
- Employ the computer package MATLAB to simplify computations and to enhance understanding of the basic of the models, and the biological processes modeled.

For further information contact:

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