



Catalog Description:

Introduction to quantitative and qualitative analysis and numerical computations of several mathematical models for biological systems

Prerequisite:

C- or better in Math 2255, 2415, 5520H; or credit for 255, 415.xx, or 521H.

Text:

Lecture Notes and

Introduction to Mathematical Biology (Modeling, Analysis, and Simulations), by Ching-Shan Chou and Avner Friedman, Springer International Publishing, 2016. (eBook ISBN: 978-3-319-29638-8; Hardcover ISBN: 978-3-319-29636-4)

Purpose:

This course provides students with experience and knowledge in mathematical analysis of differential equations models, as well as with numerical tools for simulating those models.

Topics List:

1. Population dynamics: Logistic growth.
2. Population dynamics: Lotka-Volterra predator-prey model.
3. Modeling infectious diseases.
4. Competition models.
5. Stochastic models: Markov chains and the Galton-Watson model.
6. Introduction to parameter estimation.
7. Bifurcation theory.
8. Enzyme kinetics.
9. Final numerical modeling projects and presentation.