

Math 5110
Mathematical Biology
Fall Semester, 2013

Time: TH 9:10–10:30
Place: JTB 320
Instructor: Fred Adler
Offices: 304 LCB and 319 South Biology
Office Hour: 11:00 - 12:00 Wednesday in SB 319
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Web page: <http://www.math.utah.edu/~adler/math5110/index.html>
TA: Anna Miller
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Office Hours: 1:00 - 2:00 Monday and 10:45-11:45 Thursday
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Supplementary texts:
L. Edelstein-Keshet *Mathematical Models in Biology*
F. R. Adler *Modeling the Dynamics of Life*
J. D. Murray *Mathematical Biology*

The Course. Math 5110 is designed to introduce the mathematically apt to some of the basic models and methods of mathematical biology. No previous knowledge of biology is necessary.

Homework. Written homework will be handed out each Tuesday (and posted on the web page) and due at the beginning of class on the following Tuesday (after the first week). There will also be a computer component, based on the free language R. We'll give lots of instructions and links on how to get this essential modern applied math tool to work for you.

Part of class each Tuesday can be used to work out any homework problems that caused widespread confusion. Homework will be worth 40% of your grade. Feel free to consult other students, but only after thinking hard about the problems yourself. Hand in only your own work, of course.

Tests. There will be one midterm on October 10, worth 20% of your grade, and a comprehensive final on December 20 at 8:00 a.m., worth 40% of your grade.

ADA statement. The University of Utah seeks to provide equal access to its programs, services and activities for people with disabilities. If you will need accommodations in the class, reasonable prior notice needs to be given to the Center for Disability Services, 162 Olpin Union Building, 581-5020 (V/TDD). CDS will work with you and the instructor to make arrangements for accommodations.

Accommodations policy. The instructor does not grant content accommodation requests as the course content fulfills legitimate pedagogical goals

Academic Misconduct. Academic misconduct includes, but is not limited to, cheating, misrepresenting one's work, inappropriately collaborating, plagiarism, and fabrication or falsification of information. It also includes facilitating academic misconduct by intentionally helping or attempting to help another to commit an act of academic misconduct. Any assignment or test associated with academic misconduct will receive no credit, and may lead to a failing grade and reporting to the higher administration.

COURSE OUTLINE
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Week of	Topic
Aug 26	Introduction to math biology
Sept 2	Linear discrete-time dynamical systems: Matrices
Sept 9	Nonlinear discrete-time dynamical systems
Sept 16	Two-dimensional nonlinear discrete-time dynamical systems
Sept 23	Models of parasitoids and hosts
Sept 30	Harvesting, game theory, evolution, or catching up
Oct 7	Review and midterm
Oct 14	FALL BREAK
Oct 21	The spruce budworm and the phase-line
Oct 28	The ecology of natural enemies
Nov 4	The ecology of competition
Nov 11	Birth-death processes
Nov 18	Kinetics
Nov 25	Molecular switches
Dec 2	Delay differential equations
Dec 9	Models of neurons