BSC-4933, Biomathematics, Fall 2015

Lecture: Tues & Thurs, 2:00-3:15, BIO 0307
Lab: Thurs, 11-12 or 12:30-1:30, KIN 1058

Instructor: Dr. Leithen M'Gonigle
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Office Hours: Tues 12:30-1:30, Thurs 10-11

Course Description: The lectures cover basic mathematical models used in ecology and evolutionary biology. Topics include models of population growth, species interactions, demography, natural selection, and disease dynamics. The computer labs will focus on learning to use mathematical software packages that aid in the solution of models of interest in biology.

Requirements: All students will be required to do weekly readings and homework assignments (due on Thursdays in class). In addition, there will be weekly computer labs (see above), where you will learn to use the software package *Maple* to help analyse models. There are computer labs in King (1057) that are open weekdays. These can be used to work on homework assignments/labs/projects.
Prerequisite(s): First year calculus or equivalent.

Text: *Biologist's Guide to Mathematical Modeling in Ecology and Evolution*
Authors: Otto & Day; **ISBN**: 9781400840915

Grade Distribution:

Assignments	25%
Labs	10%
Project	10%
Midterm Exam	20% (Thursday, October 15)
Final Exam	35% (Friday, December 11, 3pm)

Preliminary question and equations or diagram due Tuesday, November 19. Final project due Friday, December 4.

Letter Grade Distribution:

59:99	60:00 69:99	70:00 79:99	80:00 89:99	90:00
F	D	C	B	A

Plus/minus grades may be assigned for scores within 2 percentage points of a cut-off, at the discretion of the instructor.

Course Policies:

General

- Quizzes and exams are closed book, closed notes, unless instructed otherwise.

- Assignments are due in class on Thursdays. Assignments handed in after class but before Friday at 5PM will receive 90% credit. Assignments handed in by Monday at 5PM will receive 70% credit. Assignments handed in after this point will be corrected but will not receive credit.
- No makeup assignments or exams will be given.

Grades: Grades in the C range represent performance that meets expectations; Grades in the B range represent performance that is substantially better than the expectations; Grades in the A range represent work that is excellent.

University Attendance Policy: Excused absences include documented illness, deaths in the family and other documented crises, call to active military duty or jury duty, religious holy days, and o cial University activities. These absences will be accommodated in a way that does not arbitrarily penalize students who have a valid excuse. Consideration will also be given to students whose dependent children experience serious illness. Students must provide advance notice of absences (when possible) as well as relevant documentation regarding absences to the instructor as soon as possible following the illness or event that led to an absence. Regardless of whether an absence is excused or unexcused, the student is responsible for making up all work that is missed.

Academic Honor Policy: The Florida State University Academic Honor Policy outlines the Universitys expectations for the integrity of students academic work, the procedures for resolving alleged violations of thosewillis

Tentative Course Outline:

The weekly coverage might change as it depends on the progress of the class.

Week	Content
Week 1	Introduction Constructing a model (example: Deriving the Hardy-Weinberg Law) Reading assignment: Chapters 1 and 2 of Otto and Day.
Week 2	An introduction to *Maple* Exponential population growth Reading assignment: Chapter 3 of Otto and Day.
Week 3	Logistic population growth One-locus selection models Reading assignment: Chapter 3 of Otto and Day.
Week 4	Methods of analysis I: Graphs Methods of analysis II: Equilibria Reading assignment: Chapter 4 of Otto and Day.
Week 5	Methods of analysis III: Stability Reading assignment: Chapter 5 of Otto and Day.
Week 6	Methods of analysis III: Stability cont... Methods of analysis IV: General Solutions Reading assignment: Chapter 6 of Otto and Day.
Week 7	Example (Methlyation Levels) - *last new material to be included in mid-term* Applications of the theory Reading assignment: None
Week 8	Midterm Review Midterm Exam

Week	Content
Week 9	Introduction to matrix algebra Reading assignment: Primer 2 of Otto and Day
Week 10	Matrix algebra cont... Solving linear equations Reading assignment: Primer 2 of Otto and Day
Week 11	Example: Red blood cell production Introduction to demography Reading assignment: Chapters 7 and 10 of Otto and Day
Week 12	Nonlinear equations Stability analysis with multiple-variable models Reading assignment: Chapter 8 of Otto and Day
Week 13	Stability analysis with multiple-variable models Spread of disease Reading assignment: Chapter 8 of Otto and Day
Week 14	Probability Theory (discrete probability distributions)