Syllabus
ESM 232: Environmental Modeling

Instructors: Brandon Chasco, Dawn Dougherty
T.A.: Steve Miller

Spring 2012

1 Course Overview

The objective of this course is to expose students to the development, programming, evaluation, and interpretation of mathematical models as applied to environmental problems. Students will learn modeling and programming skills useful in solving complex environmental problems. Students will also be exposed to a suite of modeling tools that will be demonstrated through applied examples.

This course is intended for students that have an interest in developing mathematical models and the technical details of the modeling process. No previous programming experience is required, but students should have a strong interest in developing quantitative skills and learning a programming language.

2 Course Schedule

Tuesdays 1:00 - 2:00 pm (Bren 1424)
Thursdays 1:00 - 2:30 pm (Bren 3022)

Weeks 1-2: Programming skills in R
Weeks 3-8: Mathematical modeling tools and applications
Weeks 9-10: Final project presentations

In weeks 3-8 we will introduce a modeling tool or topic. On Tuesdays, we will hold lecture and discuss the theory and motivation behind these tools. Thursdays will be in the computer lab using these tools on applied examples.
3 Contact Information

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4 Course Content

This course will focus on tools used in environmental models. We will cover several important tools and then directly apply them to examples in environmental management. We will cover the following topics:

- Programming skills
- Modeling terminology and complexity
- Simulation modeling
- Fitting models to data

We will also cover additional topics, which may include:

- Sensitivity analysis
- Extinction risk
- Multi-species population dynamics
- Decision trees
- Spatial models

While our examples will draw from our experience in population dynamics and fisheries management, the models and techniques are applicable broadly in quantitative conservation biology. We will try to provide examples in other disciplines such as wildlife management, landscape ecology, and others.
5 Grading

Your course grade will be determined as follows:

- 3 homework sets: 75% (25% each)
- Final project: 25%

10% of the homework grade will be deducted for each day that an assignment is submitted late.

Details about the final project will be distributed in week 2 of class.