Special Topics Course: REM 660, Applied Quantitative Ecology (5 credits)

Wed., 12:30-2:20 AQ 4115
Fri., 2:30-4:20 (computer lab, room TBD)

NOTE: This course will being on Jan 12 and end April 13 (e.g., shifted from regular schedule due to a later start)

PURPOSE:

The main focus of this course will be on hypothesis testing and parameter estimation for ecological processes in a management or decision-making context. The goal is teach students many of the quantitative methods they're likely to encounter in either the literature or in their careers. Most of the examples will be fisheries examples with some wildlife examples, but the techniques should be transferable to other systems. The purpose is expose the students to these methods, give them hand-on experience using these methods, provide enough of a background so that they may begin to apply the methods on their own (and know when to ask for help!), and how interpret and apply the results to management and policy questions. I am aiming for breadth rather than depth, as there could be a full course designed for almost any of the topics we'll discuss.

COURSE CONTENT AND FORMAT:

Each week will consist of a 2 hour lecture and 2 hour computer lab. This course will compliment what students might have learned in STATS 650, but will not overlap. The course will follow this general outline:

Week 1 (Jan 12 and 13): Welcome and introduction to R
Week 2 (Jan 19 and 20): Basics of probability distributions and intro to R (continued)
Week 3 (Jan 26 and 27): Mark recapture models (closed populations)
Week 4 (Feb 2 and 3): Bayesian methods
Week 5 (Feb 9 and 10): Linear Regression
Week 6 (Feb 16 and 17): NO CLASSES
Week 7 (Feb 23 and 24): Linear regression
Week 8 (March 2 and 3): Generalized Linear models (GLMs)
Week 9 (March 9 and 10): Generalized Linear models (GLMs)
Week 10 (March 16 and 17): Mixed-effects models
Week 11 (March 23 and 24): Mixed-effects models
Week 12 (March 30 and 31): Hierarchical models
Week 13 (April 6 and 7): Hierarchical models
Week 14 (April 13): Non-linear hierarchical models

READINGS AND COMPUTATIONAL TOOLS

Readings will be selected from various texts such as *The Ecological Detective*, *A Perimer of Ecological Statistics*, *Ecological Models and Data in R*, *Hierarchical Modeling and Inference in Ecology*, and *Models for Ecological Data*. All work will be done in R (the first 2 labs will focus on getting students familiar with R) and winBugs.

GRADES

Grades will be based on approximately 5 individual assignments.