Analytical Methods for Ecology, Evolution, & Natural Resources

11:372:369, 11:216:369 Spring (3 credits)

"Statistical reasoning will one day be as important to good citizenship as the ability to read and write."

- *H.G. Wells*

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Office Hours: Mon, Wed, Thurs: 11:00 am-noon.
I'm generally in my office when I'm not teaching. Students are welcome to visit anytime. If you're coming to campus just to see me, call or email ahead.

LECTURE: Monday, Wednesday 2:15-3:35 (4th period), 123 ENR

TEXT: none; class notes will be provided on Sakai. The course is a smorgasbord of statistical methods, and no book covers all the methods we will discuss.

GRADING:

Homework	60%
Midterm exam	20%
Final exam	20%

Late work will receive a grade of 0 for that assignment (unless special arrangements are made with Dr. Green beforehand). Homework will be assigned *roughly* weekly, however not all assignments will be collected. Students will *not* know beforehand if a particular assignment will be collected. Following the due date, my solutions will be published on the class SAKAI site for all assignments (whether collected or not). Hence the reason for assigning a grade of 0 for late work.

All exams will be take-home exams.

OBJECTIVES:

To familiarize students with common (and a few not-so-common) statistical/quantitative techniques and data analysis procedures used by professionals in Ecology, Natural Resource Management, and Land Use Management, and to introduce computer programming using the **R** language.

LEARNING GOALS:

- Develop a comprehensive understanding of software, hardware, field and laboratory techniques commonly used in the study of ecology, evolution, and natural resources management.
- Demonstrate the ability to design experiments and interpret numeric and graphical data.
- Think criticially and solve problems using evidence-based reasoning.
- Communicate effectively orally and through written text and graphics.

Schedule

Date	Topic
W, Jan 21	Introduction to **R**
M, Jan 26	Introduction to **R**, cont.
W, Jan 28	Probability, Statistical Independence Joint,
M, Feb 2	Marginal, Conditional Probability
W, Feb 4	Conditional Probability, Bayes Theorem
M, Feb 9	Mean, Median, Mode, Variance, Std Error
W, Feb 11	Binomial, Multinomial Distributions
M, Feb 16	Poisson Distribution
W, Feb 18	Normal Distribution
M, Feb 23	Confidence intervals, t-test
W, Feb 25	ANOVA
M, Mar 2	ANOVA, cont.
W, Mar 4	Simple linear regression
M, Mar 9	Simple linear regression, cont.
W, Mar 12	Multiple linear regression
M, Mar 23	Stratified random sampling
W, Mar 25	Cluster sampling
M, Mar 30	Double sampling
W, Apr 1	Capture-recapture models (closed population)
M, Apr 6	Capture-recapture models (open population)
W, Apr 8	Spatial data, point patterns
M, Apr 13	Point patterns
W, Apr 15	Interpolation
M, Apr 20	Variograms
W, Apr 22	Ordinary Kriging
M, Apr 27	Variograms, Universal Kriging
W, Apr 29	Bayesian methods
M, May 4	Bayesian methods, cont.