

Ecological Statistics and Design – WIS 6934/FAS 6932

Summer A 2011

2 credits

Course Objective:

The purpose of this class is to extend basic statistical knowledge obtained in introductory statistics classes, giving students experience with real-world data analyses. This course is meant to compliment the theory-based courses, with a more applied treatment of modeling topics in ecology and natural resources. Each topic will be presented with data and examples.

Instructors:

This course is team taught by:

Dr. Mike Allen, Professor, Fisheries and Aquatic Sciences
email: msal@ufl.edu

Dr. Bill Pine
Assistant Professor, Wildlife Ecology and Conservation and Fisheries and Aquatic Sciences Program
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Dr. Rob Ahrens
Assistant Professor, Fisheries and Aquatic Sciences
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Special Guests

Course Pre-requisite:

STAT 6166 or equivalent, or approval of instructors

Course Website:

http://floridarivers.ifas.ufl.edu/ecological_stats_2011.htm

Computers and software:

There will be extensive use of computers inside and outside of class. Examples and assignments will be given in commonly used programs such as R, Excel, and/or SAS. Students may choose the platform which best fits their needs; however, programming support may not always be possible in each platform. Students are required to have their own laptop for the course.

Required Text:

None

Assignment	Points
Labs (6 @ 15)	90
Participation	10
Course total	100

Grades:

There will be 6 assignments based on analysis techniques presented in the labs (15 points each). You must turn in all assignments.

Because discussion and interaction is a key component of the class, your participation will be worth 10 points. To receive full participation, students should regularly demonstrate (via informed comments or questions) that they have completed the required readings and lab exercises.

Class Topics:

1. NOTE: NO CLASS ON MAY 13
2. May 20: Capture-Recapture Models – *Bill Pine*
 - a. Estimating abundance, survival, detection
 - b. Line transect methods
 - c. Closed models
 - i. Removal methods
 - d. Open models
 - e. Robust design
 - f. LAB: Simulations to assess and evaluate model assumptions, simple spreadsheet abundance models, program MARK
3. May 27: Regression – *Mike Allen*
 - a. Review of linear regression
 - b. Non-linear regression
 - i. Choosing a non-linear model
 - ii. Estimation techniques
 - iii. Comparing the fit of two (or more) models
 - iv. Evaluating assumptions
 - v. Models for non-normal data
 1. Overview of Generalized linear models (GzLMs)
 2. Models for count data
 3. Logistic models for discrete response
4. June 3: Assessment of community composition – *Special guests*
 - a. Sampling Considerations
 - b. Measures of Richness and Diversity
 - i. Bootstrap approaches to assessing incomplete detection
 - c. Occupancy Models
5. June 10: *Two part lecture and lab*
 - a. Survival Estimation (*Pine*)
 - i. Known fate telemetry

- ii. Kaplan-Meier
 - iii. Catch-curves
 - iv. Change-in-ratio
 - b. Resource selection (*Allen*)
 - i. Diet
 - ii. Habitat
6. June 17: Spatial inference and modeling space – *Rob Ahrens*
- a. Assessing movement rates
 - b. Basic spatial models

POLICY ON ACADEMIC HONESTY

As a student, you have already agreed to the following statement:

I understand that the University of Florida expects its students to be honest in all their academic work. I agree to adhere to this commitment to academic honesty and understand that my failure to comply with this commitment may result in disciplinary action, up to and including expulsion from the University.

UF COUNSELING SERVICES

Resources are available on-campus for students having personal problems or lacking clear career and academic goals, which interfere with their academic performance. These resources include:

- **University Counseling Center**, 301 Peabody Hall, 392-1575, personal and career counseling
- **Student Mental Health**, Student Health Care Center, 392-1171, personal counseling
- **Sexual Assault Recovery Services**, Student Health Care Center, 392-1161
- **Career Resource Center**, Reitz Union, 392-1601, career development assistance and counseling