Progressing from data to valid ecological inference requires the use of statistical models. Recent years have seen an explosion in the availability of statistical tools – likelihood-based approaches, Markov chain Monte Carlo techniques, Bayesian methods – yet far too little practical guidance is available to graduate students for choosing among and applying these tools.

The objectives of this course are for students to become:

- comfortable combining models with data to answer ecological questions familiar with frequentist, likelihood, and Bayesian approaches to data analysis,
- knowledgeable of deterministic models and statistical distributions,
- skilled at visualizing, manipulating, and analyzing data using Program R.

How do we achieve this? While only a superficial level of understanding may be required to apply a statistical tool, much greater understanding comes from having to teach one. Thus, each week students will teach a chapter from Ben Bolker’s book “Ecological Models and Data in R” (2008). Lab time will be used to work through data from a wide range of ecological examples. Students will also be tasked with integrating the course material into a team- or individual-based term project, which will undergo peer review towards the end of the term.

**Format:** Discussion TuTh 3-4 pm, Lab Tu 4-6 pm (3 cr)
Extra meetings with the instructors for lesson preparation are required (see Schedule below).

**Instructors:**
Dr. Jacqueline Frair (EFB), 257 Illick; 470-4905; jfrair@esf.edu
Dr. John Stella (FNRM) 344 Illick; 470-4902; stella@esf.edu
Office hours by email appointment

**Graduate Teaching Assistant:**
Elizabeth Hunter (EFB), 305 Illick Hall; 470-6754; ehunte01@syr.edu
Prerequisites: One-year of study at the graduate level, including at least one grad level course in statistics; or permission of instructor. This course is cross-listed between Environmental Forest and Biology (EFB 796, Section 2, #35391) and Forest and Natural Resources Management (FOR 796, section 2, #23583), credit will not be awarded for both sections.


Course Expectations: This course is designed to provide a synthesis of concepts and practice in data analysis and quantitative modeling through active learning. Students are expected to:

1. Critically question and discuss the assigned readings each week in class (which come from the book as well as supplemental materials),
2. Develop and deliver a lesson for one or more chapters of the book as assigned at the start of the semester (and to work with the instructors in advance to do so effectively),
3. Complete weekly lab exercises that challenge students to think beyond the physical process of data analysis to the biological meaning and implications of the analysis, and
4. Successfully apply the quantitative skills developed in class to a novel problem (preferably related to one’s own thesis or dissertation work).

Important: teaching a chapter of the book effectively requires considerable prep time well in advance of the day of delivery - starting with a planning meeting with the professors two weeks in advance, and a dry run the week prior to the lesson.

Grading: Grades will be distributed as follows:

- Participation in discussions: 30%
- Teaching assigned lessons: 30%
- Weekly lab exercises: 20%
- Independent project: 20%

Excused absences for professional reasons (e.g., conferences, field work), personal emergencies, and illness will be granted given notification at least 48 hours in advance of a missed class. College policy on academic integrity will be enforced and can be found at: http://www.esf.edu/students/handbook/integrity.pdf