SCIE 608: Forest Ecology

Dr. Helen M. Poulos

Lecture: Thursdays 6:00-8:30; Location TBA
Field: Saturdays 9am – noon; Location TBA

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COURSE OBJECTIVES:
Ecology, the study of the interactions of organisms and their environment, forms the essential foundation of the management and conservation of the world's ecosystems. This course examines basic ecological principles through the lens of forest ecosystems, exploring the theory and practice of forest ecology at various levels of organization from individuals to populations, communities and ecosystems. The lectures, field, and lab assignments we cover this semester will emphasize the quantification of spatial and temporal patterns of forest change at stand, landscape, and global scales.

READINGS:
We will be reading mostly primary literature for this class which will be posted weekly on Moodle. Download and read the readings for each class PRIOR to coming to class. I will administer occasional pop quizzes on the readings to ensure that you are coming to class prepared to fully engage with the materials presented each day.

STUDENT LEARNING GOALS:

Learning requires you to take an active role in the course. Students in this course are expected to participate in all of the course components including lecture, field exercises, labs, and lab write ups. Your acquisition of the course material depends on your own personal interpretation of the concepts we cover in class. As an instructor, it is my job to facilitate your learning of forest ecology in an active manner, but ultimately it is up to you to process the information I present to you in this course. During class time we will all be involved in working towards the common goal of learning ecological concepts. Although facts and vocabulary are important to any discipline, I ask you to go beyond simple memorization of details and to interconnect those facts to concepts, applications and problems; to ask meaningful questions; to test well developed hypotheses; to develop a range of intellectual abilities, including critical thinking, logical argument, appropriate uses of evidence and interpretation of varied kinds of information; and communication of your understanding orally and in writing.

ACHIEVING LEARNING GOALS:

Active class participation and attendance is a must for your success in this course. You will be expected to participate in cooperative group projects, complete assigned homework and lab assignments, complete reading assignments in advance of class meetings, and critically analyze the themes presented in the course material.

INSTRUCTOR GOALS:

As the instructor of this course, my goal is to train you in the fundamental principals of forest ecology using a combination of lecture, field-based learning, statistical analysis, and writing intensive assignments. Through this course, I will lead you through the process of forming research questions, designing experiments, performing statistical analyses, drawing conclusions, and synthesizing results. Through this experience, I hope to help you develop higher-order thinking and reasoning skills so you can successfully explore and demonstrate your abilities to design and execute scientific research projects.

COURSE FORMAT:

This is a combined lecture/field/lab course. The Saturday class meetings will be devoted entirely to collecting forest inventory data that we will analyze throughout the rest of the semester. Classes later in the semester will be divided into lecture for the 1st half of class and a lab for the 2nd half of class.

During field trips, we will be taking measurements in the field and carrying out statistical analyses to extract the major trends in the datasets we generate. The week prior to each field exercise, we will discuss: 1) the conceptual problem; 2) procedures in the field; 3) data analysis; and 4) project write up. You will also be provided with some additional references on Moodle that you can read to place each project in a broader theoretical context and to provide additional details on the field procedures and data analysis.

FIELD EXERCISES AND LAB ASSIGNMENTS:
During the field trips we will visit a variety of forested sites near Wesleyan. The purpose of these field trips is threefold: 1) They will provide you the opportunity to learn the major tree species of Connecticut, 2) They will introduce you to the forest dynamics of Connecticut from prior to Euro-American settlement to the present, and 3) They will present you with common methods for forest inventory and analysis.

Field exercises will be completed in groups when we are collecting, summarizing, and analyzing project data. However, project write up must be completed individually.

Students will have to become familiar with the species composition of local forests. **You will need to purchase or share an identification manual for eastern forest trees with one or two other students.** Three potential tree identification guides include:

Field Guide to Eastern Trees and Shrubs by Petrides, G., Peterson Guide Series

Tree Finder, Watts, T.

Winter Treefinder, Watts, T., Watts, M.

We will be performing some basic statistical analyses on the data we collect. Most analyses can be done using common spreadsheet software (i.e. Excel), though several analyses require other software. Software will be posted on Moodle for you to download and use on your personal computers.

GRADING:
40% Field exercises and lab assignments
30% Exams and quizzes
20% Final paper
10% Attendance and participation

ATTENDANCE
Attendance of lectures and field trips is mandatory. Missing more than one class meeting will result in the loss of 5 percentage points off of your final grade.

FIELD EXERCISE PREPARATION
Come to field exercises prepared to do field work. We will complete our projects regardless of weather. Be sure to bring a pencil, a clipboard, the field exercise handout, raincoats, rain pants, an umbrella (so you can take notes), warm clothing (if cold), sunscreen and hats for hot days, insect repellent, and appropriate footwear (boots or tennis shoes).

DISABILITY RESOURCES
Wesleyan University is committed to ensuring that all qualified students with disabilities are afforded an equal opportunity to participate in and benefit from its programs and

services. To receive accommodations, a student must have a documented disability as defined by Section 504 of the Rehabilitation Act of 1973 and the ADA Amendments Act of 2008, and provide documentation of the disability. Since accommodations may require early planning and generally are not provided retroactively, please contact Disability Resources as soon as possible.

If you believe that you need accommodations for a disability, please contact Dean Patey in Disability Resources, located in North College, Room 021, or call 860-685-5581 for an appointment to discuss your needs and the process for requesting accommodations.

ACADEMIC CONDUCT

Each student's agreement to adhere to the standards of academic integrity set by Wesleyan's Honor Code is affirmed by the following pledge. For papers and similar written work: "In accordance with the Honor Code, I affirm that this work is my own and all content taken from other sources has been properly acknowledged." For tests and other academic exercises: "In accordance with the Honor Code, I affirm that this work has been completed without improper assistance." Full details are available here: http://www.wesleyan.edu/studentaffairs/studenthandbook/standardsregulations/studentconduct.html

TENTATIVE COURSE SCHEDULE

NOTES:

- ALL DATES MARKED WITH AN ASTERISK (*) WILL INVOLVE FIELD WORK. DRESS ACCORDINGLY!
- BRING A LAPTOP AND CALCULATOR FOR DATA ANALYSIS AND COMPUTER LAB DATES WHICH ARE MARKED WITH A HASHTAG (#)

DATE	**TOPIC**
Sept 15	Course Introduction Succession
Sept 17*	Field exercise I: Historical ecology of New England's forests
Sept 22	Introduction to forest stand dynamics
Sept 29#	Data analysis of field exercise I **Quiz I**
Oct 1*	Field exercise II: Species distribution patterns across topographic gradients **WRITE UP OF FIELD EXERCISE I DUE IN CLASS**
Oct 6#	Ordination Gradient Analysis Lab
Oct 13	Plant interactions and limitations to growth **WRITE UP OF GRADIENT ANALYSIS LAB DUE IN CLASS**
Oct 15*	**QUIZ: TREE ID** Field exercise III: Gap dynamics
Oct 20#	Modeling forest succession using Markov Chains **Quiz II**
Oct 22*	Field exercise IV: Forest Carbon Sequestration **WRITE UP OF FIELD EXERCISE III DUE IN CLASS**
Oct 27#	Quantifying carbon sequestration using field data Disturbances
Nov 3#	Tree architecture and growth Stand development exercise **WRITE UP OF FIELD EXERCISE IV DUE TO MOODLE BY 5 PM**
Final paper	Take home case study due by Nov 17