

# Forest Ecology of the Pacific Northwest (OR & WA)

CRN UG40069/GRAD40070

Summer Session I – June 27 – July 27 2006 (Evaluations July 31-August 2)

5 Upper-Division U/G Science Credits/4 Graduate-Level Credits

**Instructor:** Anne Fiala

**Office Hours:** Lab I Rm 3064, Tuesday 11-1:00 pm, or by appointment

**Phone Number:** 867-6788

**Email:** [fialaa@evergreen.edu](mailto:fialaa@evergreen.edu) \* most reliable communication, as I check this at least daily\*

**Class Website:** <http://academic.evergreen.edu/f/fialaa/forestecology2006.htm>

PDF versions of all class materials, including powerpoint presentations, articles, etc. will be posted on the website.

## Class Meetings:

- *Lectures:* **Tu, W, Th** 9:00 –11:00 am Sem II A2107 (10 minute break in the middle of class),
- *Labs:* **W** 1-5 p.m., (Labs will all be outdoor field-based labs). We will meet in Parking Lot B, adjacent to the arts annex unless otherwise instructed. Transportation provided.
- *Field Trip:* Our fourth week, we will spend from Tuesday morning (early!) until Thursday evening on a 3-day 2-night field trip to multiple forest types in Washington and Oregon – Day 1 - Wind River Experimental Forest & Canopy Crane in Carson, WA, camp in Metolius Basin near Sisters, OR. Day 2 – Visit East-side forests in Metolius basin and camp in Blue River, OR. Day 3 - HJ Andrews Long-Term Ecological Research Station near Blue River, OR.

**Final Exam (Comprehensive):** Thursday July 27, 9:00 –11:00 am.

## Required Course Materials:

Text: Forest Ecology. 2003. J.P. Kimmins (available from the TESC Bookstore). There is also a course reserve copy in the library available for closed check-out.

## Optional Course Materials:

- Plants of the Pacific Northwest Coast: Washington, Oregon, British Columbia, and Alaska. By Andy Mackinnon and Jim Pojar – For people who are interested in detailed information on the plants of the PNW Coast – note that this book is NOT good for the East-side of the Cascades. - Available in the bookstore.
- Manual of Oregon Trees & Shrubs. By Edward Jensen, Warren Randall, Robert Keniston, and Dale Bever – Good key for people who want to identify local trees and shrubs. – Available online.

## Class Fees:

Anticipated cost is ≤ \$100.00. Costs will be incurred for van rental for the weekly labs and overnight field trip. In addition there will be costs for food and lodging on the overnight field trip. If fees end up being less than \$100.00 your student account will be credited the unused amount.

## Be Prepared:

The labs will be conducted in the field so we can get hands-on experience in forest ecosystems. Please come prepared to spend several hours in ambient weather conditions. Due to possible exposure to cold temperatures, rain, and/or poison oak, **no one should attend lab in shorts and/or sandals.** Please wear sturdy shoes.

## Course Description:

This course is designed for students interested in learning about Pacific Northwest (PNW) forests. Focuses of study will include basic taxonomy, stand structure, forest dynamics and succession, nutrient cycling, disturbance and ecological issues currently facing PNW forests (e.g., post-fire management). Class time is divided between lecture, discussion and field-based labs. Students will develop vegetation data collection skills during the weekly labs. There will also be a 3-day 2-night field trip to visit multiple forest structure types in Washington and Oregon.

## Overall Objectives:

1. To understand how forest ecosystems function and to predict how they are likely to respond to disturbance.
2. To learn techniques for gathering information about forest ecosystems you may use or encounter throughout your life.
3. To expose you to important ecological issues currently faced by natural resource professionals and to show how knowledge of ecology can help you understand and solve similar problems.

During the term, more specific learning objectives will be given with each reading assignment.

## **Attendance:**

**Attendance at lectures, labs, and the field trip is REQUIRED.** Absence from class may result in loss of credit, so please participate and come to class! **If you miss  $\geq 10$  hours of class time you will lose credit.**

## Academic Credit:

This course is upper-division science level. Undergraduates will be awarded a maximum of 5 upper division science credits. However, if a student does not participate in class and/or is not adequately meeting the expectations outlined in the procedures for evaluation, then lower-division or reduced credit may be awarded instead.

## EVALUATION:

I will use five procedures to evaluate your progress toward course goals: weekly quizzes, weekly lab exercises, participation in lectures and discussion, a final presentation to the class, and performance on the final exam.

1. **Weekly Quizzes:** Quizzes are given each week, except for the week we are on our field trip. Quizzes will consist of defining terms, true/false questions, and short answer questions. Answers should be short and to the point. The quizzes will help to make sure you understand some of the important topics covered.
2. **Research Paper Discussion:** Each student (in groups of 3-4) will be responsible for leading a discussion of a class reading from the peer-reviewed primary literature. In preparation for leading a discussion, the students will prepare a list of issues and questions related to the reading. Additional data, tables, figures, or bibliographic references are welcome (but not required). These should be distributed at the beginning of the discussion if they are provided. When leading a discussion, begin with a brief summary of the “why”, “what”, and “who cares” of the paper. Then begin the discussion with a question, prompt when the discussion gets off course, and move on to the next question when you think it is time. The articles will be available for download from the class website. One hour in duration.
3. **Lab Assignments:** During labs, you will be working in groups on an assigned project. Each student must turn in a separate, **self-created** lab assignment. Identical write-ups are **unacceptable**. **Laboratory reports will be due at the beginning of the next week’s laboratory session unless otherwise noted.** Attendance will be taken at each lab. If you miss a lab, do not turn in the assignment for that lab since labs require your active participation.
4. **Presentation:** In the final week of the course, each student will give a short (~8-minute oral presentation + 2 minutes for questions) to the class on a topic of their choosing that pertains to forests of the PNW. A projector and laptop will be available for students who wish to use powerpoint, and the use of powerpoint is encouraged. An optional demonstration of powerpoint will be given during week 2.
5. **Exams:** There will be a final exam. The final exam will be comprehensive, covering topics presented in lecture and assigned readings during the course. Types of questions will include multiple choice, true/false, and mini-essay questions. Mini-essay questions will take 2 to 4 sentences to answer and will be scored on content and coherence.

**Honesty Code: I trust that your completed assignments will be of your own creation.** It is acceptable to work in groups and discuss assignments, but the final product should be your own. If you use outside resources (e.g. textbook, web sites, journal articles) to complete your work, please reference them accordingly.

**Plagiarism is NOT tolerated.**

**Note on the Text:**

Kimmins' Forest Ecology is a comprehensive textbook describing the basic ecological principles relating to Pacific Northwest forests. This book is also challenging for an undergraduate class. I use this text because I think it is the best basic forest ecology reference we have. The principal strengths of Forest Ecology are that it strives to link human activities and ecosystem processes, and that it includes information on both plants and animals. On the other hand, it contains enough details and additional references to last a lifetime!

We will work our way through most of the text! This does not, however, mean that we will emphasize everything equally, or that I will expect you to remember everything you read! I will give you reading objectives that help you focus on what I think is most important in the context of this course. At the same time, you must learn to **read with an eye toward generalization, rather than detail**. After reading a section, summarize its main points in one or two sentences.

We will begin the term by looking at "the big picture" - we will discuss the whole forest ecosystem and some of its functions. We will then step back and look at individual components involved in these functions. Many of the lectures will be centered around textbook content. I will introduce the course with Chapters 1-3 then skip to Chapters 14-15 to focus on biological organization in ecosystems. We will then return to Chapters 4-5 to examine forest ecosystem processes. Next we will learn about how forests change over time in Chapter 17. Finally we will conclude with Chapters 8-10 and 12 to learn about the effects of the physical environment on forest ecosystems.

**Discussion Articles That We Will Read:**

**Discussion 1:**

Hansen, A.J., Neilson, R.P., Dale, V.H., Falther, C.H., Iverson, L.R., Currie, D.J., Shafer, S., Cook, R., and Bartlein, P.J. 2001. Global Change in Forests: Responses of Species, Communities, and Biomes. *Bioscience*. 51(9): 765-779.

**Discussion 2:**

Beedlow, P.A., Tingey, D.T., Phillips, D.L., Hogsett, W.E., and Olszyk, D.M.. 2004. Rising atmospheric CO<sub>2</sub> and carbon sequestration in forests. *Frontiers in Ecology and the Environment*. 4(5): 315-322.

**Discussion 3:**

Agee, J. 2002. The fallacy of passive management. *Conservation Biology in Practice*. 3(1): 18-25.

AND

Donato, D.C., Fontaine, J.B., Campbell, J.L., Robinson, W.D., Kauffman, J.B., and Law, B.E.. 2006. Post-wildfire logging hinders regeneration and increases fire risk. *Science*. 311: 352.

**Reference that is useful during discussion and of interest:**

Waring, RH, and JF Franklin. 1979. Evergreen coniferous forests of the Pacific Northwest. *Science* 204:1380-1386.

**Summer 2006 - Lecture and Lab Schedule –Subject to Modification!**

WEEK	Time	Topic	Text Chapters	Comments/Deadlines
<b>6/27-6/29</b>				
Tue – Lec	9-10	Course Structure, Introduction to Forest Ecology	1,2	
	10-11	Ecosystem Ecology	3	
Wed – Lec	9-10	Forest Ecosystems & types in the PNW	n/a	
	10-11	Population Ecology	14	
Wed – Lab	1-5	<u>Community Diversity of Trees&amp;Shrubs Combined</u>		Meet at the beach trail entrance in Parking Lot F
Thur – Lec	9-10	Community Ecology	15	
	10-11	Community Ecology – cont'd	15, 4	
<b>7/4 (4<sup>th</sup> of July is a holiday)-7/6</b>				
Tue - Lec	9-10	<b>Discussion: Global Change in Forests: Responses of Species, Communities, and Biomes -</b>	Journal article Hansen <i>et al.</i> 2001	
	10-11	<b>Productivity</b>	4	
Wed – Lec	9-10	Productivity cont'd/ Biogeochemistry	5	
	10-11	Biogeochemistry/ Forest structure		
Wed - Lab	1-5	<u>Forest Management: Examining different management intensities</u>		<b>Week One Lab DUE</b> meet in Parking Lot B adjacent to the Arts Annex
Thur - Lec	9-10	<b>Discussion: Rising atmospheric CO<sub>2</sub> and carbon sequestration in forests</b>	Journal article Beedlow <i>et al.</i> 2004	
	10-11	Stand development/Forest structure cont'd		
<b>7/11-7/13</b>				
Tue - Lec	9-10	Succession	17	
	10-11	Succession	17	
Wed - Lec	9-10	Physical Determinants in Ecosystems – Fire	12	
	10-11	<b>Discussion: The fallacy of passive management for firesafe forest reserves, Post-wildfire logging hinders regeneration and increases fire risk</b>	Journal article Agee 2002 Donato <i>et al.</i> 2006	
Wed - Lab	1-5	<u>Forest Succession - Forest Structure &amp; Composition through Time</u>		<b>Week Two Lab DUE</b> meet in Parking Lot B adjacent to the Arts Annex
Thur - Lec	9-10	Wildlife – guest field-based presentation by Tara Chestnut (WDOT) & Aimee McIntyre (DFW) wildlife biologists		
	10-11	Wildlife cont'd		
<b>7/18-7/20</b>				
Tue –Th		3-day 2-night field trip to Wind River Experimental Forest & Canopy Crane, Metolius Region of Oregon, and H.J. Andrews Long Term Ecological Research Forest – All day Tuesday through Thursday		<b>Week Three Lab Due at the BEGINNING of the field trip</b>

WEEK	Time	Topic	Text Chapters	Comments/Deadlines
<u>7/25-7/27</u>				
Tue – Lec	9-10	Student oral presentations		
	10-11	Student oral presentations		
Wed – Lec	9-10	Physical Determinants in Ecosystems – solar radiation, temperature, wind	7-9	
	10-11	Soils	11	
Wed - Lab	1-3:30	<u>Soils</u>		No lab report required!
	3:30-4:30	<u>Optional REVIEW period</u>		
Thur	9-11	<u>COMPREHENSIVE FINAL EXAM</u>		
<u>7/31-8/2</u>				
		Evaluations – self-evaluation and evaluation of faculty required.		Students sign up for a time slot – sheet will be posted outside of Canopy Lab (Lab I Rm 3064)

### Lab Schedule -

Lab Times: All labs are on Wednesdays from 1:00 – 5:00 pm and **will meet in Parking Lot B adjacent to the Arts Annex, unless otherwise announced.** Transportation in motor pool vans will be provided for all off campus labs and is the preferred mode of transport.

#### June 28: Community Diversity of Trees&Shrubs Combined

Purpose: To begin to systematically examine forest sites. We will observe biotic (the living components of the environment) features of multiple forest types, comparing species composition, diversity, and distribution. (Outdoor Lab - **\*Meet at the trail entrance in the back corner of Parking Lot F\***). Lab report required.

#### July 5: Forest Management: Examining different management intensities

Purpose: To examine forests of a similar age that have had differing levels of thinning applied to them; To understand how management can alter the forest structure (Outdoor Lab - McClane Creek Demonstration Forest). Lab report required.

#### July 12: Forest Succession - Forest Structure and Composition through Time.

Purpose: To examine changes in community structure and composition over time so you will be better prepared to evaluate and project the past, present, and future development of an ecosystem. (Outdoor Lab – Capitol Forest). Lab report required.

#### July 18-20: 3-day 2-night field trip to Wind River Experimental Forest & Canopy Crane, Metolius/Sisters Ranger District, and HJ Andrews Long-Term Ecological Research Forest.

Purpose: In the Pacific Northwest, much of our new information about forest ecosystems and forest practices comes from research activities at these sites. During this 3-day 2-night field trip we'll examine studies that have shaped many of our current concepts of old-growth forests and long term-productivity. We will also get to see the perspective of the canopy from above the treetops when we go up in the Wind River Canopy Crane.

#### July 26: Soils

Purpose: To become familiar with abiotic and biotic characteristics of soils and to understand the incredible influence soils have on forest plant growth and development. (Outdoor Lab – TESC -**\*Meet at trail entrance in the back corner of Parking Lot F**). No lab write up!