

# ENVS 410 Forest Ecology & Management Information Sheet and Syllabus

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Office hours: Mondays from noon to 2PM in room 137 Huestis Hall or by appointment

This course provides an overview of forest ecology, emphasizing forests of the Pacific Northwest, and also includes discussions of past and current laws and policies affecting management of forests on public lands in this region.

It is intended for environmental studies and environmental science majors who have not completed and do not plan to take Bi 213 or Bi 283H which is the prerequisite to take Forest Biology, Bi 307. There is enough overlap between Bi 307 and this class that students should not take both. Students should have junior or senior standing and have completed ENVS 202 (if ENVS major) or another similar introductory course in an environmental science (if ESCI major).

In addition to learning important concepts, we will discuss current issues, we'll get out in the forest to see first-hand examples of some local management and stewardship projects, and we will examine complex questions. You will be required to read, synthesize, analyze, and evaluate.

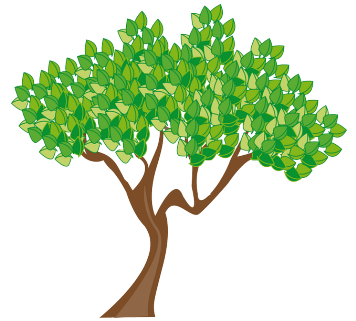
## Students who successfully complete this course will be able to:

- Explain why forests are found in certain areas, and why conifers are so prevalent in the PNW
- Explain how forest communities have changed over ecological time in response to climate and project how forests might be altered with future climate change
- Explain how trees' internal anatomy is related to their physiological ecology
- Describe how nitrogen and carbon cycle within a forest and identify important fluxes and stores
- Explain the roles of some seemingly inconsequential organisms including bacteria, fungi, nematodes, and arthropods.
- Explain varying roles of fire in different forest types
- Describe different kinds of management practices including those practiced by native Americans and those being proposed in response to changing climate
- Evaluate claims about forest management practices and express opinions using credible scientific evidence
- Recognize, name, and briefly describe twenty-four local tree species
- Remain appreciative of the aesthetic values of forests while simultaneously having a better understanding of the biological processes that shape them.

**Class meetings:** Monday and Wednesday: 10:00 to 11:50 AM, room 142 Columbia Hall

**Field trips:** You are encouraged to attend all field trips, but you must attend and write reports for at least three field trips to earn full credit for the field trip portion of the class grade. Field trips may be rescheduled in the case of dangerous weather conditions (ice or wind) but rain will not cause us to cancel.

- Sunday January 14 **Introduction to Forests of the western Cascades** Depart at 10 AM, return ~ 4 PM
- Sunday January 28 **Buford Park – oak/fir/pine woodland restoration** Depart at 11AM, return ~ 5 PM
- Saturday February 3 **Management on private timber land** Depart at 9AM, return ~ 4PM
- Saturday February 17 **Management in mixed conifer forests – Rigdon.** Depart at 9AM, return ~ 5PM
- Saturday, March 3 **Oak Woodland Restoration** Work Party with Long Tom Watershed Council



| Wk | Date | Topic   | Readings   | Other Events   |
|----|------|---|--|--|
| 1  | 1/8  | 1) Introduction to course, each other, and forests of the PNW   | Spies & Duncan; <b>Old Growth in a New World</b><br>Rapp; Science Update 1, <b>Restoring Complexity</b>  | <b>Field Trip, Sunday 1/14: Low elevation forests of the western Cascades</b>  |
|    | 1/10 | 2) Forest Biogeography and long term ecosystem change   | Waring <b>Land of Giant Conifers</b><br>Whitlock & Knox; <b>Prehistoric Burning in the PNW</b>   |  |
| 2  | 1/15 | Martin Luther King Holiday - no class   |  | <b>work on homework</b>  |
|    | 1/17 | 3) How trees grow   | Wilson, <b>The Growing Tree</b>  |  |
| 3  | 1/22 | 4) Getting water to the tree tops   | Zimmerman, <b>Piping Water to the Treetops</b>   | <b>Field trip Sunday, 1/28: Buford Park oak/fir/pine woodland</b>              |
|    | 1/24 | 5) Soils, Hydrology, and Soil Processes   | Nardi, - <b>Soil</b>   | <b>Homework #1 due Jan 26</b>  |
| 4  | 1/29 | <b>Quiz #1 (classes 1-5)</b><br>6) Mycorrhizae and Nutrients  | McCoullough <b>Mycorrhizae</b><br>Zimmer <b>The Web Below</b><br>Nardi, - <b>Mycorrhizae and Nutrients</b>   | <b>Field Trip: Saturday, Feb 3 Bauman Tree Farm</b>                            |
|    | 1/31 | 7) Nutrient Cycling in Forests and importance of Nitrogen   | Franzmeier et al. <b>Nitrogen</b><br>Barron <b>Predatory Fungi</b>   |  |
| 5  | 2/5  | 8) Decomposition  | Nardi - <b>Roots and Soil Organisms</b>  | <b>Homework #2 due Feb 9</b>   |
|    | 2/7  | 9) Soil Organisms<br><b>Student Presentations</b>   | Moldenke: <b>Soil Arthropods</b>   |  |
| 6  | 2/12 | <b>10) Soil Organisms Lab</b><br><b>-- meet in rm 21 Klamath Hall</b>                                 |  | <b>Field Trip: Saturday, Feb 17 Rigdon Area (Middle Fork Willamette, USFS)</b> |
|    | 2/14 | <b>Quiz #2 (classes 6 – 10)</b><br>11) Biomass and Productivity                                       |  |  |
| 7  | 2/19 | 12) Carbon Cycling in forests   | Ryan et al <b>Forests and Carbon for US Forests</b>  | <b>Homework #3 due Feb 23</b>  |
|    | 2/21 | 13) Succession and Disturbance  | Schowalter et al <b>Integrating Ecological Roles of Insects, Pathogens, and Mycorrhizae</b>  |  |
| 8  | 2/26 | 14) Oak woodland restoration and stewardship <b>Katie MacKendrick (LTWC)</b>                          | Senos et al. <b>Traditional Ecological Knowledge and Restoration Practice</b>  | <b>Field Trip, Saturday, March 3 Long Tom Watershed Council work party</b>     |
|    | 2/28 | <b>Midterm Exam (cumulative)</b>  |  |  |
| 9  | 3/5  | 15) Fire Ecology and Fire Management - <b>Jay Lininger</b>  | Noss et al <b>Managing Fire Prone Forests</b><br>Kaufman: <b>Perceptions of Fire, Land Use, Restoration</b><br>Cornwall; <b>Against the Grain</b> (Jerry Franklin)       | <b>Tree Page due March 7</b>   |
|    | 3/7  | 16) <b>Campus Tree Walk</b><br><b>dress to be outdoors</b>  | Bring <b>Trees to Know</b> book with you   |  |
| 10 | 3/12 | 17) Landscape Ecology and Forest Management; ODF and USFS partnerships<br><b>Katie Morrison (ODF)</b> | Rapp; SU 3, <b>Dynamic Landscape Management</b><br>Spies et al. <b>Conserving Old Growth in a New World</b><br>OBF <b>Achieving Oregon's Vision</b> ; Federal Forestland | <b>Work on final essay</b>   |
|    | 3/14 | <b>Tree Quiz</b><br>18) Final thoughts and farewells  | Moore <b>Spiritual Value of Old Growth Forests</b>   |  |
| 11 | 3/19 | finals week – no class meetings   |  | <b>Final essay due 3/19</b>  |

Red = exam or assignment

Blue = guests

Green = outdoor activity

## Assigned reading

These are listed in the order we'll get to them in the class. This list may be revised as the class progresses. All of these can be found within the Readings Module on the Canvas website

- Spies, Thomas, and Sally Duncan. 2009. Chapters. 1-3 in **Old Growth in a New World**. Island Press.
- Rapp, Valerie. 2002. **Restoring Complexity: Second-Growth Forests and Habitat Diversity**. Science Update Issue 1, Pacific Northwest Research Station. <http://www.fs.fed.us/pnw/publications/sci-update.shtml>
- Waring, Richard H. 1983. **Land of the Giant Conifers**. Natural History. October, pp. 55-62.
- Whitlock, C. and M. Knox. 2002. **Prehistoric Burning in the Pacific Northwest: Human versus Climatic Influences**. In Vale, T.R. ed. **Fire, Native Peoples, and the Natural Landscape**. Island Press. (focus on pp. 195-216)
- Wilson, Brayton F. 1984. **The Growing Tree**. University of Massachusetts Press. pp. 1-7; 9-17; 19-28; 87-100; 121-127
- Zimmerman, Martin H. 1982. **Piping Water to the Treetops**. Natural History, July pp.6-13.
- Nardi, James. B. 2007. **Life in the Soil**. University of Chicago Press. pp. 1-10; 36-45
- McCullough, Patrick. 1998. **Mycorrhizae, your silent partner**. Western Arborist 24(4) <http://www.wcisa.net/magDetails.asp?MagazineID=8&Detail=1>
- Zimmer, Carl. 2001. **The web below**. Western Arborist 26(4). <http://www.wcisa.net/magDetails.asp?MagazineID=15&Detail=1>
- Nardi, James. B. 2007. **Life in the Soil**. University of Chicago Press. pp. 11-22; 239-251
- Franzmeier et al. 2016. **Soil Science Simplified**. Waveland Press. pp. 115-120.
- Barron, G.L. 2003. **Predatory fungi, wood decay, and the carbon cycle**. Biodiversity, Volume 4:3-9. <http://www.uoguelph.ca/~gbarron/MISC2003/feb03.htm>
- Nardi, James. B. 2007. **Life in the Soil**. University of Chicago Press. pp. 22-36;47-67; 251-256
- Moldenke, Andy. 2002. **The Soil Biology Primer**. chp 7. **Arthropods**. [http://soils.usda.gov/sqi/concepts/soil\\_biology/arthropods.html](http://soils.usda.gov/sqi/concepts/soil_biology/arthropods.html)
- Ryan, M.G et al. 2010. **A Synthesis of the Science on Forests and Carbon for US Forests**. Issues in Ecology, report # 13. . [http://esa.org/science\\_resources/issues.php](http://esa.org/science_resources/issues.php)
- Schowalter et al. 1997. **Integrating the Ecological Roles of Phytophagous Insects, Plant Pathogens, and Mycorrhizae in Managed Forests**. Chp. 11 in *Creating a Forestry for the 21st Century*. edited by Kathryn A. Kohm and Jerry Franklin. Island Press.
- Senos, R. et al. 2006. **Traditional Ecological Knowledge and Restoration Practice** pp. 393-426 in *Restoring the Pacific Northwest; the art and science of ecological restoration in Cascadia*. D. Apostol and M Sinclair, eds. Island Press.
- Noss, Reed, et al. 2006. **Managing fire-prone forests in the western United States**. *Frontiers in Ecology and Environment* 4(9):481-487.
- Kaufman, J.B. 2004. **Death Rides the Forest: Perceptions of Fire, Land Use, and Ecological Restoration of Western Forests**. *Conservation Biology* 18(4): 878-882
- Cornwall, W. 2017. **Against the Grain**. *Science* 358(6359), 24-27
- Rapp, Valerie. 2003. **Dynamic Landscape Management**. Science Update Issue 3, Pacific Northwest Research Station. <http://www.fs.fed.us/pnw/publications/sci-update.shtml>
- Spies, Thomas, et al. 2009. **Conserving Old Growth in a New World**. Chp. 27 in *Old Growth in a New World*. Island Press.
- Oregon Board of Forestry. 2009. *Achieving Oregon's Vision for Federal Forestlands*. [http://www.oregon.gov/ODF/Board/Documents/BOF/20160309/BOFATTCH\\_20160309\\_05\\_02.pdf](http://www.oregon.gov/ODF/Board/Documents/BOF/20160309/BOFATTCH_20160309_05_02.pdf) focus on pp.10-29 of the report.
- Moore, Kathleen Dean. 2007. **In the Shadow of the Cedars: the Spiritual Values of Old-Growth Forests** *Conservation Biology* 21(4): 1120-1123

I may change or add readings as we go along, but will give advance notice if I do.

## Field Trips:

There are five different field trips planned (but ice or wind could postpone or cancel one or more). You earn three points for attending and up to two points for a report for each trip. It is possible to earn the maximum points by attending any three field trips, but you are encouraged to attend all, and points accrue until you reach fifteen points. Field trip reports should be approximately two pages (typed, double-spaced) and are due the week following the field trip. We will travel in state vans and unless otherwise instructed will depart from the parking lot that is immediately behind (north of) Klamath Hall or Onyx Bridge and south of Franklin Blvd. Dress for field conditions: it is usually a good idea to bring several layers of clothes -- more than you think you may need. If it has rained in the past week, be prepared for damp vegetation; umbrellas often work well, but rain coats, rain pants, and water-proof shoes or boots are a good idea if it is really wet. **Bring any food and water you might want.** Markets and restrooms are rare to non-existent where we will be on most of our field trips.

## Homework and late policies

There are three homework assignments. They are meant to help you study so as to do well on the quizzes and exam. Do them as you go along, not all at the last minute. Each is worth 5% of your course grade. Late assignments will have ten percent deducted per day late up until the time of the next exam.

You will also be responsible for researching two organisms: one will be a tree, the other something that isn't a plant. For the tree, you will post information on a page in a Canvas Module to help other students learn interesting features of your tree. You will be tested on all twenty-four trees at the end of the term. For the non-plant organism, you will prepare a two to three minute long presentation to give in class on February 7.

## Quizzes and Exam

You may be asked to apply or to synthesize information. This is harder than simply recalling facts. Note the dates of the exams and don't make plans to be gone on any of those dates. The midterm will be cumulative.

## Final Essay

Worth ten percent of the course grade, the final essay will be on a general question, given to you at least one week in advance, and will allow you to apply some of what you have learned this quarter. It is not meant to be a long research paper, and will be on the order of three pages of typed response. You can think of it as a short, take-home final exam.

## Participation and Engagement

Ten percent of your final grade is attributed to participation and engagement. Attendance and active involvement in class is the primary basis for this score. It is not simply a measure of how vocal you are in class, however. Other ways to participate include sharing course-related news and events with classmates and in the thoughtfulness put into one-minute essays given from time to time at the end of class. Causing a distraction in class by texting or inappropriate use of electronic devices may result in a lowering of your engagement score.

## How to do well in this course

- Attend all class functions, arrive on time, and participate actively
- Do the assigned reading. You don't have to read it thoroughly in advance, but skim the material so that you know what is there and can go back and read in more depth later.
- Use slides posted to Canvas for studying, but do not use these as a replacement for attending class.
- Ask questions.
- Get together with someone else in the class once a week to study. Without looking at notes, reconstruct the most important concepts studied in class that week. Then use your notes to fill in the gaps in your understanding.
- Ask yourself how what you are learning matters. If it isn't apparent, then ask. Pay attention to issues in the news that are relevant concepts covered in this course.
- Don't believe everything you hear or read; back up your own opinions with credible evidence and logic.
- Don't miss the forest for the trees; the big picture is essential.

## Grading Philosophy and Criteria

If you earn 70% or more of the total possible points, you are guaranteed a C; earn 80% and you receive at least a B-; earn 90% and receive at least an A-. I may lower these cutoffs, but I will not raise them. What does this mean for you? If you do satisfactory work (in my judgment), you earn a C, good work earns a B, and excellent work earns an A. I grade on performance, not on effort, but it is extremely unlikely that anyone who comes to class regularly, does the reading, and puts a serious effort into studying will not pass with a C or better.

## Grade Criteria

| Component                                     | Percent of total |
|---|------------------|
| homework (three @ 5% each)                    | 15               |
| quizzes (two @ 10% each)                      | 20               |
| tree page contribution                        | 5                |
| tree quiz                                     | 10               |
| midterm exam                                  | 15               |
| field trips and field notes (three @ 5% each) | 15               |
| participation and engagement                  | 10               |
| final essay                                   | 10               |
| <b>total</b>                                  | <b>100</b>       |

## Process and Conduct

I expect everyone to follow University rules and guidelines for behavior. Academic dishonesty, which includes cheating and plagiarism, is a serious offense and will be treated according to the guidelines in the [student conduct code](#) (located at [uodos.uoregon.edu](http://uodos.uoregon.edu)). This doesn't mean you shouldn't talk with other students about what you are thinking or writing; it does mean that when you write something, it should be in your own words, not copied from someone else or slightly paraphrased from another source.

I ask that we all do our best to be intellectually honest while also being tolerant of personal differences. I welcome and encourage intellectual controversy--I think it is essential to real learning. At the same time, I ask that we all respect the rights of others to hold different opinions, even as we challenge the ideas supporting those opinions. I promise to value each of you as individuals; I view the grades you earn to be a reflection of the quality of work you do, but not of you as a person.

You should plan to arrive at class on time and to stay until class is over. If, on occasion, you do arrive late, please be considerate of others and enter in such a way that you don't disturb other students. I ask that you not interfere with the ability of other students to learn by making noise, texting, etc. when someone else (instructor or classmate) is talking.

If you have a documented disability and anticipate needing accommodations in this course, please make arrangements with me soon.

I may use the Canvas email function to communicate with you between class periods occasionally (e.g. field trip modifications) so be sure to check your uoregon email account.

Crises happen. If you have problems that interfere with your ability to do the work in this class, please let me know promptly. I am willing to make special arrangements when the need is real **and** when you have done your best to deal with the situation in a timely manner. The University of Oregon Counseling Center provides students with confidential consultation 24 hours a day, 7 days a week. From 8-5 Monday through Friday you will be connected with the front desk, and after hours, the same number connects to their support line. **Their number is (541) 346-3227.** Students often believe that their issues are not "severe" enough for them to call, but at the Counseling Center, no problem is too small.

**Note:** This is a new class and I may make changes to the schedule and readings as we proceed. I will let you know if/when this happens and will post updated an updated syllabus on Canvas in that event. I will not change grading criteria or due dates without class consent.

I welcome suggestions for ways to improve the class at anytime.