

## **Syllabus: FORS 330 Forest Ecology**

E-mail and Moodle will be will be the primary mechanism through which course materials, updates, assignments, news and readings are disseminated. Check the website often as it is under construction and will be frequently updated.

### **Instructor**

Andrew J. Larson

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### **Teaching Assistant**

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Office hours: TBA or by appointment

### **Meetings**

Lectures: Tuesday and Thursday 11:10 am – 12:00 pm; CHEM 123

Labs: Tuesday OR Thursday 2:10 pm – 5:30 pm;

Lab locations: Tuesday – LA 235, Thursday – LA 138

Field labs will depart from and return to the Forestry parking lot (between Stone Hall and Forestry).

### **Course Objectives and Learning Outcomes**

Ecology is the study of relationships between organisms and the physical environment, organisms and other organisms, and the cycling of matter and energy.

Forest ecology is concerned with the structure, composition, function and dynamics of forests as three-dimensional ecological systems. In this course, we will focus on factors affecting forest structure and composition, the effects of environmental gradients on plant species distribution, the dynamics of vegetation communities over time, and key ecosystem-level processes such as the cycling of carbon and nutrients.

This course introduces ecological theory and terminology, illustrated with examples from local and regional forest ecosystems. Students will develop their critical analysis ability, and hone the technical communication skills necessary to integrate ecological science into natural resource policies, management plans, and silvicultural and restoration prescriptions.

### **Students completing the course should be able to:**

1. Understand the role of abiotic factors in determining the distribution of species and productivity of forest ecosystems.
2. Develop informed hypotheses about the role of biotic processes in regulation of forest community structure and function.
3. Using measurements of current composition, structure, and abiotic context, describe a forest's past development and disturbances; and speculate about its likely future developmental trajectory, including probable disturbances and their effects.

4. Use field measurements and data analysis to quantitatively describe forest ecosystem conditions and likely ecological factors influencing those conditions.
5. Clearly communicate ecological concepts and ideas verbally and with the written word.

## Readings

Readings will be posted on the course website. There is no required textbook. Read material before the class or lab for which it is assigned. Be prepared to discuss the reading in lecture and lab sessions.

You may find the following textbooks useful.

Forest Ecology: A Foundation for Sustainable Management & Environmental Ethics,  
3rd Ed. Kimmins, J.P. 2004.

Forest Ecology, 4<sup>th</sup> Ed. Barnes, B.V., D.R. Zak, S. Denton, and S.H. Spurr. 1998.

## Academic Integrity

Plagiarism, cheating, and other misconduct are serious violations of your contract as a student. We expect that you will know and follow the University's policies on cheating and plagiarism. Any suspected cases of academic misconduct will be handled according to University regulations. More information, including definitions and examples, can be found at [The Student Conduct Code](#).

## Disability Accommodations

This course is accessible to and usable by otherwise qualified students with disabilities. To request reasonable program modifications, please consult with the instructor. Disability Services for Students will assist the instructor and student in the accommodation process. For more information, visit the Disability Services website at [Disability Services for Students](#).

## Late Assignments

Students participating in official University activities (e.g., sports, etc.) will be allowed extensions on assignments with terms established on a case-by-case basis.

Negotiated excused absences for non-University activities (e.g., family emergency) will be considered on a case-by-case basis. Requests for extensions will only be considered when made at least 1 work day prior to the assignment deadline.

Unexcused late assignments will be accepted up to 4 working days (i.e., weekdays **not** course meetings) after the original due date. The overall grade of the assignment will be diminished by 20% for each day late. E.g., the highest possible score for a "perfect" assignment turned in 3 days would be 40% of the possible points for an on-time assignment.

## Extra Credit

A limited number of extra credit field trips will be offered during September and October. Space will be allocated on a first-come first-served basis. Dates and times of the extra credit fieldtrips TBD.

## FORS 330 Forest Ecology Lecture and Reading Schedule Fall 2015

| Date   | Topic   | Reading                    |
|--------|---|----------------------------|
| 1-Sep  | Course introduction                                       |                            |
| 3-Sep  | Ecosystem structure, composition, pattern and dynamics.   |                            |
| 8-Sep  | Plant carbon gain/group communication plan                |                            |
| 10-Sep | Plant ecophysiology I: water                              | Oliver and Larson          |
| 15-Sep | Plant ecophysiology II: light                             |                            |
| 17-Sep | Primary productivity                                      | Perry Ch 15                |
| 22-Sep | Climate, topography, physiography, orography              | Perry Ch 5                 |
| 24-Sep | Primary succession  |                            |
| 29-Sep | AET/PET and vegetation distributions across the landscape | Stephenson 1998            |
| 1-Oct  | AET/PET and vegetation distributions across the landscape | Lutz 2010                  |
| 6-Oct  | <b>Exam 1</b>   |                            |
| 8-Oct  | Forest structural development: Introduction               | Franklin 2002              |
| 13-Oct | Forest structural development: tree regeneration          |                            |
| 15-Oct | Establishment and self-thinning                           | Perry Ch 12                |
| 17-Oct | <b>Saturday Field Trip: Lolo Pass Transect</b>            |                            |
| 20-Oct | Tree mortality and canopy gaps                            | Franklin 1987              |
| 22-Oct | Forest disturbance ecology and disturbance adaptations    | Agee 1993                  |
| 27-Oct | Fire Ecology I  | Sugihara 2007              |
| 29-Oct | Fire Ecology II   | Larson et al. 2013         |
| 3-Nov  | <b>Exam 2</b>   |                            |
| 5-Nov  | Net Primary Productivity and Carbon                       |                            |
| 10-Nov | Nutrient cycling  | Perry Ch 17                |
| 12-Nov | Nitrogen cycle  | DeLuca et al. 2006         |
| 17-Nov | Decomposition   | Perry Ch 18                |
| 19-Nov | Biodiversity  | Perry Ch 10                |
| 24-Nov | Mutualisms and species interactions                       | Perry Ch 11                |
| 26-Nov | No Class: Thanksgiving                                    |                            |
| 1-Dec  | Herbivores and plant defenses                             |                            |
| 3-Dec  | Top down regulation and trophic cascades                  | Estes et al. 2011          |
| 8-Dec  | Whitebark pine ecosystems                                 | Larson and Kipfmüller 2012 |
| 10-Dec | <b>Exam 3</b>   |                            |

## FOR 330 Forest Ecology Lab Schedule Fall 2015

| Week | Date   | Topic   |
|------|--------|---|
| 1    | 1-Sep  | Introduction to class project (campus)                      |
| 1    | 3-Sep  |   |
| 2    | 8-Sep  | Plant diversity assessment (field)                          |
| 2    | 10-Sep |   |
| 3    | 15-Sep | Forest structure I: stand structure and development (field) |
| 3    | 17-Sep |   |
| 4    | 22-Sep | Forest structure II: woody debris (field)                   |
| 4    | 24-Sep |   |
| 5    | 29-Sep | Proposal discussion meetings (campus)                       |
| 5    | 1-Oct  |   |
| 6    | 6-Oct  | Proposal discussion meetings (campus)                       |
| 6    | 8-Oct  |   |
| 7    | 13-Oct | Project Data collection (field)                             |
| 7    | 15-Oct |   |
| 8    | 20-Oct | Project Data collection (field)                             |
| 8    | 22-Oct |   |
| 9    | 27-Oct | Project Data collection (field)                             |
| 9    | 29-Oct |   |
| 10   | 3-Nov  | NPP and Carbon stocks lab (campus)                          |
| 10   | 5-Nov  |   |
| 11   | 10-Nov | Data analysis/intpretation workshop (campus)                |
| 11   | 12-Nov |   |
| 12   | 17-Nov | Data analysis/intpretation workshop (campus)                |
| 12   | 19-Nov |   |
| 13   | 24-Nov | No lab: Thanksgiving  |
| 13   | 26-Nov |   |
| 14   | 1-Dec  | Data analysis/intpretation workshop (campus)                |
| 14   | 3-Dec  |   |
| 15   | 8-Dec  | Final Presentations (campus)                                |
| 15   | 10-Dec |   |

## FORS 330 Forest Ecology Assignment Schedule Fall 2015

**Assignment** **Due Date** **Pts. possible** **Pts. earned**

| <b>Exams</b> |        |     |  |
|--------------|--------|-----|--|
| Exam 1       | 6-Oct  | 150 |  |
| Exam 2       | 3-Nov  | 150 |  |
| Exam 3       | 10-Dec | 150 |  |

| <b>Individual Lab Assignments</b>               | <b>Tue. Lab</b> | <b>Th. Lab</b> |     |  |
|---|-----------------|----------------|-----|--|
| Understory lab report                           | 15-Sep          | 17-Sep         | 50  |  |
| Forest structure lab report                     | 22-Sep          | 24-Sep         | 50  |  |
| Woody debris lab report                         | 29-Sep          | 1-Oct          | 50  |  |
| Lolo Pass field trip report                     | 22-Oct          | 22-Oct         | 50  |  |
| NPP and Carbon lab report                       | 17-Nov          | 19-Nov         | 50  |  |
| <b>Research Project: Individual Assignments</b> |                 |                |     |  |
| Literature review and critique                  | 9-Oct           | 9-Oct          | 100 |  |
| Final research paper                            | 12-Dec          | 12-Dec         | 150 |  |

| <b>Research Project: Group Assignments</b> |        |        |     |  |
|--|--------|--------|-----|--|
| Group communication plan and contract      | 8-Sep  | 8-Sep  | 50  |  |
| Draft proposals due                        | 29-Sep | 1-Oct  | 50  |  |
| Research proposal                          | 13-Oct | 13-Oct | 150 |  |
| Data analysis/intrep workshop I            | 10-Nov | 12-Nov | 75  |  |
| Data analysis/intrep workshop II           | 17-Nov | 19-Nov | 75  |  |
| Data analysis/intrep workshop III          | 1-Dec  | 3-Dec  | 75  |  |
| Final presentation                         | 8-Dec  | 10-Dec | 150 |  |

**Total**

**1575**

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Final grades calculated as % of total points possible.

| Grade | % of possible pts. |
|-------|--------------------|
| A     | >93%               |
| A-    | 90.0% - 93.0%      |
| B+    | 87.0% - 89.9%      |
| B     | 83% - 86.9%        |
| B-    | 80.0% - 82.9%      |
| C+    | 77.0% - 79.0%      |
| C     | 73% - 76.9%        |
| C-    | 70% - 72.9%        |
| D     | 60% - 69.9%        |
| F     | <60%               |