Forest Ecology (ESRM 490c/ SEFS 501; 5 credits)

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Course Description (in course catalog)
Forest ecology through a lens of community ecology, using examples from the Pacific Northwest and around the world. Builds on foundational knowledge to develop a deep understanding of current research and application from a diversity of perspectives and topics (fire, insect outbreaks, windstorms, succession, ecophysiology, ecosystem processes, wildlife habitat, climate change, and forest management). Two weekend field trips to PNW forests.

Course Description (in syllabus)
Welcome to Forest Ecology! Over the next 10.5 weeks, on our journey together we will explore and build a solid foundation in forest ecology, using examples from the Pacific Northwest and other forests around the world through a lens of community ecology. We will survey current research in a variety of aspects of forest ecology, and examine topics from a diversity of perspectives. This course is designed for undergraduate students who have taken at least one course in ecology/biology/environmental science and graduate students who are, or will be, conducting research in forest ecology or community ecology. In this class, we support an inclusive and equitable learning environment where we draw strength from the diversity of perspectives we, and others bring to our science. Our diversity is our strength, and it makes us better at all we do. In this course, we will collectively and collaboratively foster a welcoming and inclusive learning environment, and co-develop our course code of conduct at the start of the term.

Course Prerequisites
ESRM 490c students: ESRM 201 or least one previous course in ecology/biology/environmental science or permission of instructor.
ESRM 501 students: at least one previous course in ecology/biology/environmental science or permission of instructor.

Class meetings:
All students: Monday, Wednesday, and Friday, 1:30 - 2:20 pm in Winkenwerder Hall (WFS) 201
Graduate students enrolled in SEFS 501 also need to attend an additional section Wednesdays 2:30 - 3:20 pm (immediately following lecture) in Winkenwerder Hall (WFS 201

Class website: https://canvas.uw.edu/courses/1520621

Textbook: There is one text for this course, which is required for students in ESRM 490c and SEFS 501. Chapters will be assigned periodically in the term, corresponding to material covered in lecture. The text is "Ecological Forest Management" By Jerry F. Franklin, K. Norman Johnson, and Deborah L. Johnson, published in 2018 by Waveland Press, Inc. Hard copy and electronic versions of the textbook can be found at the UW bookstore **here**.

Additional required readings, which are largely drawn from the peer-reviewed literature, as well as background reading will be posted to Canvas.

Course Learning Goals

This course has three primary learning goals:

1. ***Build and apply a solid foundation of forest ecology,*** relying on theory/advances/examples from community ecology but also several other ecological sub fields: organismal, population, ecosystem, disturbance, and landscape ecology. We will do this through a combination of interactive lectures and discussions where we cover the foundations of the field and important/interesting papers in across several aspects of the field.
2. ***Develop and hone our skills to synthesize scientific literature and apply knowledge to critical challenges in ecology, using forests as a focal ecosystem.*** We will do this through reading the primary literature, organizing scientific information, and applying this information in a series of written reflections designed to help you incorporate insights into solutions to challenges in forest ecology.
3. ***Foster and practice the ability to read the forest!*** We will be taking field trips this quarter to some of the most spectacular forested landscapes in the Pacific Northwest (and the world!). During these field trips, we will practice how to read the clues around you that can tell us the past, present, and likely future of a forest where we're standing.

Class meetings structure

Our regular meeting time for this course is Monday, Wednesday, and Friday from 1:30p to 2:20p (PDT) in Winkenwerder Hall 201, and from 2:30 to 3:20p on Wednesdays (for graduate students in SEFS 501 only). In general, these class meetings will be structured as:

Mondays, Wednesdays, and Fridays from 1:30p to 2:20p:
a 50 minute interactive lecture where material will be presented in lecture slides interspersed with Q/A and occasional short breakout group discussions.

Wednesdays from 2:30p to 3:20p (Graduate students in SEFS 501 only):
a 50 minute student-led and facilitated discussion of the assigned paper for the week's topic.

Field trips
We will be taking four 1-day long field trips where we will learn how to observe, measure, and quantify forest ecosystem composition and structure. We will identify key forest plant species, and record observations about species composition and forest structure. Students are expected to take field notes and become competent in the identification of tree species and common woody understory species. We will also observe different landscape patterns and effects of disturbance agents. Hands-on field experience will form the foundation of ecological understanding that is necessary to interpret key concepts in the course.

These field trips will involve hiking in varying weather conditions, which could range from hot and sunny to cold and snowy/rainy. Students will need to wear field-appropriate clothing (long pants, rain jacket, layers for warmth, hiking boots) on both trips for safety and comfort. Please let the instructors know if there is critical gear that you are missing, as we may be able to lend you something.

Suggested items to bring on the field trip:

- Rain gear/wind gear—high elevations in the Cascades can be very windy
- Warm gear – It could get cold, down jackets, fleeces, beanies, gloves
- Sturdy footwear for the field (closed toe required)
- Long pants
- Camera
- A daypack
- Sunscreen
- any medication needed (especially for known allergies)
- Water bottles—at least 2 liters
- First Aid kit (if you have one)
- Lunch and snacks to keep you happy from 730a to 500p :)

Field trips will occur on the following dates and to the following locations:

- Saturday Oct 1 - westside cascade forests around Mt Rainier National Park (young forests to old growth)
- Sunday Oct 2 - westside cascade forests around Mt Rainier National Park (recent fires and the pre-forest)
- Saturday Oct 8 - eastside cascades forests near Blewett Pass (high elevation and subalpine forests)
- Sunday Oct 9 - eastside cascades forests near Blewett Pass (low elevation frequent-fire forests)

We will be taking our field trips as a series of four 1-day trips where we will depart from UW campus at approximately 730a in the morning and return by 500p in the evening. More specific details will be made available for each of the field trips prior to preparation for departure. The field trips are *strongly* recommended as an integral (and often favorite!) part of the course. If you are unable to make the field trips for any reason, please contact Prof. Brian Harvey and we can sort out alternative arrangements.

Grading
Your total grade will be out of 100 points for the class, distributed in the following manner:

For students enrolled in ESRM 490c

Assignment(s)	Grade %
Weekly quizzes (10 2-pt quizzes, one per week; CR/NC)	20%
Journal article reflections (2 10-pt written reflections on peer-reviewed papers) [1]	20%
Take-home written exams (3 20-point take-home exams spaced through the term)[1]	60%

For students enrolled in SEFS 501

Assignment(s)	Grade %
Discussion engagement/facilitation (10 2-pt discussions, one each Wed of quarter)	20%
Journal article reflections (2 10-pt written reflections on peer-reviewed papers) [1]	20%
Take-home written exams (3 20-point take-home exams spaced through the term)[1]	60%

[1] see separate guidelines and rubric depending on enrollment in ESRM 490c or SEFS 501

The final course grades will adhere to the following grading scales, consistent with UW grading systems:

General UW grading system (ESRM 490c):
https://www.washington.edu/students/gencat/front/Grading_Sys.html

Graduate School Grading System for Graduate Students (SEFS 501):
https://grad.uw.edu/policies-procedures/graduate-school-memoranda/memo-19-grading-system-for-graduate-students/

Accommodations for students with disabilities
It is crucial that all students in this class have access to the full range of learning experiences. At the University of Washington, it is the policy and practice to create inclusive and accessible learning environments consistent with federal and state law.
Full participation in this course requires the following types of engagement:

Course Component: Lecture and Discussion
Requirement(s): Ability to attend 3x-weekly lectures (all students) and 1x-weekly (SEFS 501 students) discussion sections of 50 minutes with up to 60 other students

Course Component: Field trips
Requirement(s): Physical conditioning ability to hike up to 2 miles on trails of varying steepness with regular breaks/stops over the course of 2-3 hours spread throughout the course of a full day.

A complete description of the disability policy of the College of the Environment can be found here. If you have, or think you have, a temporary or permanent disability that impacts your

participation in any course, please also contact Disability Resources for Students (DRS) at: 206-543-8924 V / 206-543-8925 TDD / uwdrs@uw.edu e-mail / http://www.uw.edu/students/drs. It is the role and responsibility of each student to inform the instructor as soon as possible of any accommodation(s) you will or may potentially require. It is the role and responsibility of the instructor and TA to maintain strict confidentiality of any student's disability and accommodation(s) and help all students meet the learning objectives of this course.

Religious Accommodations
Washington state law requires that UW develop a policy for accommodation of student absences or significant hardship due to reasons of faith or conscience, or for organized religious activities. The UW's policy, including more information about how to request an accommodation, is available at:
Religious Accommodations Policy (https://registrar.washington.edu/staffandfaculty/religious-accommodations-policy/)
Accommodations must be requested within the first two weeks of this course using the Religious Accommodations Request form (https://registrar.washington.edu/students/religious-accommodations-request/)."

Academic integrity
At the University level, you must do your own scholarly work. Presenting anyone else's scholarly work (which can include written material, exam answers, graphics or other images, and even ideas) as your own, without proper attribution, is considered academic misconduct. Plagiarism, cheating, and other misconduct are serious violations of the University of Washington Student Conduct Code (WAC 478-120). 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 of Washington regulations. For more information, see the College of the Environment Academic Misconduct Policy and the University of Washington Community Standards and Student Conduct website.

Our code of conduct (norms and agreements), will be co-developed together in week 1 and posted here:
In this class, we agree to each:

- Do our best to be present and mindful
- Actively and respectfully engage
- Be kind to yourself and others
- Critique ideas, not people
- Share the space (ask yourself if you are speaking + or – 2% of the time)
- Assume good intentions, but recognize that someone with good intentions can still cause harm
- Acknowledge our perspectives/biases/privileges vary
- Encourage questions when any term/concept is confusing

Schedule

We will adhere to this schedule, reflected in the **weekly modules** as much as possible.

Week	Day	Date	Topic	Reading (generally corresponds to lecture material)	Assignments / Activities due
ESRM 490 / SEFS 501: Forest Ecology Schedule and Assignments (updated November 15, 2021)					
Part 1: Setting the stage: Physical environment and the nature of forest communities					
0	W	29-Sep	Introduction, overview, setting the stage		
	F	1-Oct	Forest Ecosystems: a foundation	Franklin et al. 2018 - Chapter 2	First day starting point questionnaire (not graded)
	WE	*2-3-Oct*	*Field trip to westside of Cascades*		
1	M	4-Oct	PNW climate and east-west forests	Van Pelt (West_02); Van Pelt (East_01)	
	W	6-Oct	Ecophysiology: water and energy		Discussion 1 (SEFS 501) - Waring and Franklin 1979
	F	8-Oct	The niche and nature of forest communities	Van Pelt (East_02)	
	WE	*9-10-Oct*	*Field trip to eastside of Cascades*		
2	M	11-Oct	Treelines and limits		Quiz 1 (ESRM 490b)
Part 2: Stand dynamics: Old growth, early seral, and back again					
2	W	13-Oct	Old growth: characteristics and importance	Franklin et al. 2018 - Chapter 3, Parts 1 and 2	Discussion 2 (SEFS 501) - Adams et al. 2014
	F	15-Oct	Disturbances and legacy creation	Franklin et al. 2018 - Chapter 3, Part 3	
3	M	18-Oct	Early seral ecosystems	Van Pelt (West_03)	Quiz 2 (ESRM 490b)
	W	20-Oct	Forest stand development through time		Discussion 3 (SEFS 501) - Franklin et al. 2002
	F	22-Oct	Tree death and coarse woody debris	Franklin et al. 2018, Box 2.4	
Part 3: Forest disturbances as a key driver of forest structure and function					
4	M	25-Oct	Virtual field trip: Olympic Peninsula		Quiz 3 (ESRM 490b); Take home exam 1 due
	W	27-Oct	Disturbances and legacy creation		Discussion 4 (SEFS 501) - Talucci et al. 2020
	F	29-Oct	Fire ecology in forests - basics	Franklin et al. 2018 - Chapter 12	
5	M	1-Nov	Fire ecology - frequent fire systems	Van Pelt (East_03 and East_04)	Quiz 4 (ESRM 490b)
	W	3-Nov	Virtual field trip: East side ponderosa pine forests		Discussion 5 (SEFS 501) - Schoennagel et al. 2004
	F	5-Nov	Fire ecology - infrequent fire systems		
6	M	8-Nov	Virtual field trip: Western Cascadia forests & fire*		Quiz 5 (ESRM 490b)
	W	10-Nov	Forests, disturbances, and wildlife habitat	Van Pelt (East_05)	Discussion 6 (SEFS 501) - Reilly et al. 2022
	F	12-Nov	Insect outbreaks*		
7	M	15-Nov	Disturbance interactions - linked		Quiz 6 (ESRM 490b) ; Journal article reflection 1
	W	17-Nov	Disturbance interactions- compound		Discussion 7 (SEFS 501) - Kane et al. 2017
Part 4: Managing forests in a context of rapidly accelerating global change					
7	F	19-Nov	Virtual field trip: forests in Australia*		
8	M	22-Nov	Ecological forestry / NW Forest Plan*	Franklin et al. 2018 - Chapter 1, Chapter 4	Quiz 7 (ESRM 490b);
	W	24-Nov	No class - Holiday ----------	----------	Take home exam 2 due
	F	26-Nov	No class - Holiday ----------	----------	----------
9	M	29-Nov	Fire ecology - management challenges*	Franklin et al. 2018 - Chapter 13	Quiz 8 (ESRM 490b)
	W	1-Dec	Understanding & managing pathways of complexity	Franklin et al. 2018 - Chapter 14	Discussion 8 (SEFS 501) - Donato et al. 2012
	F	3-Dec	Canopy soils and fungal communities*		
10	M	6-Dec	Climate change and direct effects on forests	Franklin et al. 2018 - Chapter 3 (Part 4), Box 11.1, 18.2, 20.8	Quiz 9 (ESRM 490b); Journal article reflection 2
	W	8-Dec	Changing disturbance regimes		Discussion 9 (SEFS 501) - Johnstone et al. 2016
	F	10-Dec	Future forests, resilience, and wrap up	Franklin et al. 2018 - Chapter 21	
Finals Week (December 13-17)					Take home exam 3 due

** = potential guest speaker*

Van Pelt Readings Key (corresponds to pdf files on canvas)

West_02 = "West_02_EnvironmentalSettingWesternWashington.pdf"

West_03 = "West_03_StandDevelopment_Douglas-fir_western_hemlock.pdf"

East_01 = "East_01_Intro_EnvironmentalSetting.pdf"

East_02 = "East_02_EastsideForestZones.pdf"

East_03 = "East_03_FireEastsideForests.pdf"

East_04 = "East_04_SevereFireEastside"

East_05 = "East_05_BioticDisturbanceEastside.pdf"

Assignments (ESRM 490c and SEFS 501 students; differences noted in each assignment)

Journal article reflection
Guidelines and rubric

The journal article reflection assignment are intended to give students an opportunity to engage with scientific literature in a way that fosters critical thinking, assessing information, and integrating/synthesizing that information into your understanding of the themes for the course. To earn full credit on these assignments, we will be assessing the level to which you have given thorough consideration to the question(s) and your clear and concise response to the question(s).

Journal article reflections will be submitted as a word doc or pdf in canvas (pdf can avoid potential formatting issues when uploading that can otherwise appear on a word doc).

Formatting guidelines:

- 12 point font, single spacing
- ***For ALL students: 1 page maximum (0.75 page minimum) journal article reflection***
- ***For SEFS 501 students –additional component for 1 additional page (maximum):***
    - ***A short annotated bibliography highlighting 2 additional papers that relate to the assigned paper, which will be helpful to you and your research. For each of the two additional papers, prepare a paragraph or bulleted list (whatever your preference) that covers all of the following: the citation, type of study (e.g., observational, experimental), research questions, major findings, and how this paper will be useful to you in the future.***

<u>The following 10-point scale is what we will use for the grading rubric:</u>

9-10 points	fully completed assignment (i.e., all questions/prompts are addressed), response demonstrates critical thought / logical flow and a clear understanding of the paper assigned, and follows formatting instructions.
8 points	fully completed assignment (i.e., all questions/prompts are addressed), and follows formatting instructions, but is lacking demonstration of critical thought / logical flow and a clear understanding of the paper assigned.
6-7 points	fully completed assignment (i.e., all questions/prompts are addressed), but is lacking demonstration of critical thought / logical flow and a clear understanding of the paper assigned and deviates from formatting instructions.
1-5 points	less than fully completed assignment is submitted.
0 points	no assignment was submitted.

Take home exams
Guidelines and rubric

The take home exams in our class are intended to give you all an opportunity to critically assess and integrate/synthesize the material in each of the three thematic sections of the course. To earn full credit on these exams, we will be assessing the level to which you have given thorough consideration to the question(s) and your clear and concise response to the question(s).

All take home exams will be submitted as a word doc or pdf in canvas (pdf can avoid potential formatting issues when uploading that can otherwise appear on a word doc).

Formatting guidelines:

- 12 point font, single spacing
- ***1 page maximum for ESRM 490c students***
- ***1.5 page maximum (0.75 page minimum) for SEFS 501 students***
- References or any added figures or tables do not count toward or against the page limits
- Include references for all supporting material that is cited in your response, using a consistent citation format (can be any format you want, but must all be consistent)
- If included (though not required to receive full credit!) any figures and tables must have captions, and again, do not count toward or against the page limits

The following 20-point scale is what I will use for the grading rubric:

18-20 points	fully completed assignment (i.e., all questions are answered), response demonstrates critical thought / logical flow and use of evidence to support statements, and follows formatting instructions.
16-17 points	fully completed assignment (i.e., all questions are answered), and follows formatting instructions, but is lacking demonstration of critical thought / logical flow and use of evidence to support statements.
13-15 points	fully completed assignment (i.e., all questions are answered), but is lacking critical thought / logical flow and use of evidence to support statements and deviates from formatting instructions.
10-12 points	less than fully completed assignment is submitted.
0 points	no assignment was submitted.

Additional assignment for SEFS 501 students only

Leading a paper discussion

Students will sign up for leading one paper discussion over the course of the quarter. We will pass around a signup sheet during the first week of class for students to select their week to lead discussion; these will start during week 2.