

## Directed Study in Forest Health Protection

### Course description

This course will focus on the effects of fire, diseases, and insects on forest ecosystems, fire ecology and management, abiotic and biotic diseases, disease management, effects of defoliators, bark beetles and wood boring insects, pests of intensive forest management and principles of insect management. Course activities include text reading, 6 interviews, 3 exams, 3 meetings TBA (to be arranged), and a term project.

### Required reading materials:

- Text: *Forest Health and Protection* by Edmonds, Agee and Gara, 2011, Second Edition, available online.
- Field guide: *Insects and Diseases Alaskan Forests* available free of cost from the USFS Juneau Forest Sciences Lab.

The student will follow the reading and exam schedule below. In lieu of lectures, the student will conduct in-depth interviews on each of 6 topics: forest ecology, fire ecology, forest pathology, forest entomology, forest disturbance detection & monitoring, and silvicultural management techniques. Interviewees should be professionals in the field. Record the interview date, time, duration, location, name, position, and organization of the interviewee in a journal along with detailed notes from the interview. Prepare by reading the related subject matter in the text and making a list of questions that will be given to the interviewee ahead of the interview.

The 3 TBA meetings depend on opportunities that are available during the term; the student may seek out and/or be notified of events related to forest health. These opportunities will be discussed with the student as they become available. They may include field trips to view forest health conditions.

A final paper, web project, or documentary video is due at the end of the term. The project should integrate forest health topics (examples on page 3 below) and include information and cited references from peer-reviewed journals (example criteria on page 4 below). A proposal is required by week 6, an outline by week 8, a draft by week 12, and the final by week 14.

Once per week the student should speak with the instructor to inform on progress and ask questions.  
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### COURSE OBJECTIVES

1. Understand the concept of forest health and the current and future conditions of the world's forests with emphasis on North America.
2. Be able to determine the cause of forest health problems including fire, wind, abiotic diseases, animal damage, biotic diseases and insects.
3. Comprehend the basic principles of forest ecology.
4. Understand the basics of fire ecology and management.
5. Understand the influence of wind on forests and the management of forests to reduce wind damage.
6. Understand the basics of forest entomology and insect management.
7. Understand the basics of forest pathology and disease management.
8. Understand the interactions of fire, wind, insects, and diseases (including abiotic influences such as air pollution).

## COURSE OUTLINE

Week (date)	Topic	Book chapters
1 (1/16)	Concept of Forest Health	1
	Ecological principals	2
2 (1/22)	Fire as a physical process	3
	Fire ecology and regimes	4
3 (1/29)	Fire management	5
4 (2/5)	Fire strategies	6
	Wind and forest health	7
<b>First midterm exam (TBA)</b>		
5 (2/12)	Introduction to diseases	8
	Abiotic and animal-caused injuries	9
6 (2/19)	Disease causing organisms	10
	Nursery diseases and mycorrhizas	11
7 (2/26)	Root diseases	12
	Foliage diseases and rusts	13
8 (3/5)	Stem and branch diseases	14
	Forest declines and disease management	15, 16
<b>Second midterm exam (TBA)</b>		
9 (3/12)	<b>Spring break</b>	
10 (3/19)	Introduction to forest entomology	17
	Basic entomology	18
11 (3/26)	Principles of forest insect management	19
	Defoliators	20
12 (4/2)	Bark beetles	21
	Ambrosia beetles	22
13 (4/9)	Wood products insects	23
	Insects of seed orchards, nurseries and young plantations	24
	Forest insect quarantine	25
14 (4/16)	Review	
15 (4/23)	Final paper due	
<b>Third midterm exam (TBA)</b>		

Exams and Assignments	Percent of grade
Midterms (3)	30
Interview notes	35
<u>Final paper, web project, or documentary</u>	<u>35</u>
<b>TOTAL</b>	<b>100</b>



## **EXAMPLES OF INTEGRATIVE TERM PAPER OR PROJECT TOPICS**

(Relationships between fire, insects, fire, wind, air pollutants, etc. should be stressed)

1. How can healthy forests be maintained?
2. Forest protection in campgrounds and other high hazard areas.
3. Fire, disease, and insect management strategies in National Parks.
4. Ecological relationships between insects, fire, and fungi.
5. Relationships between insects and fungi.
6. "Ecosystem management" practices in the Pacific Northwest U.S. and their impacts on fire, diseases, and insects.
7. The impact of global change on insects, diseases, and fire.
8. Ecological management of insects and diseases.
9. Use of prescribed fire in forestry to manage insects and diseases.
10. Historical disturbance patterns of fire, insects, wind, and disease in western forests.
11. Fire ecology of western forests.
12. The impact of the Yellowstone fires on insects and diseases.
13. The influence of prescribed fire on insects and diseases
14. The log import/export controversy—the potential for introduction of new insects and diseases.
15. Movement of crates and pallets around the world and the spread of exotic insects and diseases.
16. The impact of fire suppression on western forests.
17. Forest declines—how many are human caused?
18. The long-term impact of introduced pests and pathogens on North American forests.
19. Influence of root diseases on forest succession.
20. Interactions of bark beetles, root diseases, and fire
21. Ecological relationships between dwarf mistletoes and fire.
22. Disease and insect problems in exotic plantations.
23. Forest protection—influence on endangered species like the spotted owl.
24. Effects of ozone on forests.
25. Is acid rain still a threat to forests?
26. The influence of defoliators on forests.
27. Use of Integrated Pest Management in forestry.
28. The long-term influence of bark beetles on forests.
29. Modeling of the interactions among insects, diseases, and fire.
30. Insect, disease and fire management in private forests.

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**Example of Paper Grading Criteria**

	Points Possible	Points
<b>ORGANIZATION</b> Paper includes (1 point each) A) A title page <input type="checkbox"/> YES <input type="checkbox"/> NO A <u>Table of Contents</u> <input type="checkbox"/> YES <input type="checkbox"/> NO. This should be two to three levels deep. A " <u>List of Abbreviations</u> " <input type="checkbox"/> YES <input type="checkbox"/> NO. (IF there are abbreviations) A " <u>List of Tables and Figures</u> " <input type="checkbox"/> YES <input type="checkbox"/> NO. A " <u>Literature Cited</u> " page <input type="checkbox"/> YES <input type="checkbox"/> NO, and Headings and subheadings throughout the text <input type="checkbox"/> YES <input type="checkbox"/> NO. Page numbers where appropriate <input type="checkbox"/> YES <input type="checkbox"/> NO.	5	
<b>PAPER REFLECTS EXTENSIVE RESEARCH AND REFLECTION.</b>	50	
<b>GRAPHICS</b> Include _____ TABLES, _____ GRAPHS, _____ MAPS, _____ PHOTOS, _____ VIDEOS (OR LINKS TO THESE), _____ AUDIO RECORDINGS, and _____ DIAGRAMS. (these are REQUIRED if they are at all appropriate to the topic or the data). All Tables and Figures are NUMBERED <input type="checkbox"/> , they are REFERRED to, interpreted and explained in the text <input type="checkbox"/> , each has a TITLE <input type="checkbox"/> , and a SOURCE <input type="checkbox"/> All photos have a CAPTION <input type="checkbox"/> and a SOURCE <input type="checkbox"/>	15	
<b>WRITING QUALITY</b> The TONE of paper is <i>professional</i> , like that found in a good textbook.	10	
<b>SOURCES</b> Whenever the info you cite is "not commonly known" you must cite the source (3 points off for every source that is missing). Number of sources missing = _____ x 3 = _____ points missed. Enter points missed in box $\nearrow$ If the same source applies to the whole paragraph, include citation after first mention of info from that source. If source applies just to one sentence, include citation at end of sentence.	10	
<b>LITERATURE CITED SECTION</b>	10	
The <b>OVERALL QUALITY</b> of the paper is <i>exceptional</i>		
<b>SUBTOTAL for CONTENT</b>	<b>100</b>	

**LESS ERRORS IN SPELLING, GRAMMAR AND FORMAT**

For each spelling error, clearly incorrect word, improper use of homonyms, etc.	1	
For each grammatical or syntax error (subject and verb not in agreement, incomplete or run-on sentences).	1	
For each significant punctuation error.	1	
Pages are not numbered, where appropriate	5	
<b>Subtotal for Content (from page 2)</b>		
<b>Less Subtotal for errors (above)</b>		
<b>Percentage of points (% of 100 pts possible for draft)</b>		