FOREST ECOLOGY
FOR 404 – FALL SEMESTER 2013

INSTRUCTOR

Dr. Sarah Neumann, Department of Forestry
Office location: 125 Natural Resources
Email: sneumann@msu.edu
Office hours: Wednesday 10-12 am, or by arrangement

FORMAT

FOR 404 (3 cr): Lecture: T & Th (12:40 – 2 pm)

Lab, FOR 404L (1 cr): T (2:15 – 5:30 pm)
- Required for Forestry Majors
- Highly encouraged for undergraduate students

OFFICIAL COURSE DESCRIPTION

Ecological interactions crucial to understanding forest ecosystems. Topics include: plant resources, competition, community development and dynamics, biodiversity, primary productivity, nutrient cycling, ecosystem structure and function, and impacts of global environmental change.

COURSE OVERVIEW

This advanced, forest ecology course examines numerous ways in which trees interact with their environments and influence ecological dynamics. We will investigate how trees sense and respond to environmental stimuli, shape patterns of biodiversity, influence ecosystem structure and function, and are impacted by global environmental change.

As we focus on the science of forest ecology, we will also place strong emphasis on the professional development of each individual student. The course will offer significant opportunities to strengthen one's skills in thinking and communicating about scientific research and to consider how these skills can be employed in future careers. Each student will be expected to increase his or her understanding of best practices in scientific research and skills in formulating questions and synthesizing information.

PREREQUISITES

CSS 210 -- Fundamentals of Soil and Landscape Science
BOT 105 Plant Biology or BS 110 Organisms and Populations
CEM 141 General Chemistry (prerequisite for CSS 210)
- Prerequisites may be waived ONLY with Sarah Neumann's permission

COURSE ADMINISTRATION

Course administration, including this syllabus, online lectures, lecture outlines, assignments, grades, and links to primary literature and other resources, will be handled through ANGEL (https://angel.msu.edu); if you need assistance with ANGEL, check the help page or see me.

EMAIL COMMUNICATION
Announcements will be distributed by email, which I assume is checked daily.

COURSE PARTICIPATION
I believe that you are taking this course because *you want to learn more* about forest ecology. Be prepared to actively engage and invest in your learning. First and foremost, attend every session. Second, actively participate by asking questions, taking part in discussions and through connecting new concepts to what you already know. Third, consider how you could use this material in whatever direction you are heading.

COURSE MATERIALS
The Ecology of Plants, 2nd ed. Gurevitch, Scheiner and Fox, 2006. Sinauer Associates, Inc., Sunderland, Massachusetts (ISBN 978-0-87893-294-8). Textbook is available at bookstores and on-line, used and new, for about $69 to $103. Because FOR 404 is an advanced-level course, we will be working largely with primary scientific literature; a standardized textbook is not required. It is valuable to own such a text, however, and **we recommend that you seriously consider getting it**, particularly if your background with plants is limited or if you would like to have a comprehensive reference for your professional library. This text is particularly good—it's clearly written with nice illustrations.

TENTATIVE TOPIC SCHEDULE*

Session	Date	Topic	Required Readings†
		I. Introduction	
1	8/29	Course Introduction & Concepts in Forest Ecology	Ch 1
		II. Individual Plant Interactions with Resources	
2	9/3	A. Light & Temperature	Ch 2
3	9/5	B. Water	Ch 3 & pg 80-82 'Water Movement Within Soils'
4	9/10	C. Mineral Nutrients & Multiple Limiting Resources	Ch 4
		III. Population Dynamics	
5	9/12	A. Population Structure & Plant Demography	Ch 5 & Ch 9 (217-219)
6	9/17	B. Species Life History Traits & "Strategies"	Ch 8
7	9/19	**Exam 1**	
		IV. Community Dynamics	
8	9/24	A. Community Assembly & Island Biogeography	Ch 9 & Gotelli Ch 7
9	9/26	B. Succession	Ch 12 (294-304)
10	10/1	C. Disturbance	Ch 12 (283-294) & Picket & White Ch 1
11	10/3	D. Species Interactions: Overview & Competition	Ch 10
12	10/8	E. Species Interactions: Reproduction & Dispersal Guest Lecture: David Minor	Ch 7 (160-184)
13	10/10	F. Species Interactions: Herbivory & Plant Pathogens	Ch 11
14	10/15	G. Species Interactions: Plant-Soil Feedbacks	Bever et al. 2010

15	10/17	H. Species Diversity	Ch 9 (213-217), Ch 13 & Ch 19
16	10/22	**Exam 2**	
		V. Ecosystem Dynamics	
17	10/24	A. Decomposition & Soil Organic Matter Guest Lecture: Dr. Stephanie Grand	Ch 14 (337-340) Aber & Melillo Ch 13
18	10/29	B. Ecosystem Productivity Guest Lecture: Dr. Richard Kobe	Ch 14 (332-337 & 340-342) & Barbour et al Ch 12
19	10/31	C. Nutrient Cycling **Online lecture**	Ch 14 (342-350)
		VI. Human-Accelerated Environmental Change	
20	11/5	B. Fire Ecology Guest Lecture: Dr. Jessica Miesel	TBA - ANGEL
21	11/7	A. Invasions of Non-Indigenous Plants & Plant Pests	Callaway & Marin 2006
22	11/12	C. Climate Change & Effect on Forests	Ch 21
23	11/14	**VII. Restoration Ecology** Guest Lecture: Ellen Holste	TBA - ANGEL
24	11/19	**Exam 3**	
		VIII. Controversial Topics	
25	11/21	A. Transgenic Plants B. Alternative Fuels	TBA - ANGEL
26	11/26	C. Wildfire Suppression D. Salvage Logging	TBA - ANGEL
27	11/28	THANKSGIVING – NO CLASS	
28	12/3	E. PES – Benchmarks F. Climate Mitigation vs Adpatation	TBA - ANGEL
29	12/5	**Controversial Topic Discussion and Class Party**	
30	12/10	**Class survey (12:45-2:45)**	

** Exam dates will not change.*
† Refer to ANGEL for additional supplementary readings, including those not yet listed here.

TOPIC ASSIGNMENTS

Reflection Essays (15% of your course grade)
We learn more and retain information longer if the content is directly applicable to what we currently do or what we hope to do in the future. In this course, you will be writing 25 reflection essays that are each worth 6 points. The essays should focus on a particular section of the lecture or controversial topic debate and how you would apply that information as a forest manager, wildlife specialist, conservationist, restoration specialist, researcher, gardener et etc. Use this opportunity to connect what you are learning in this course with other courses you have taken and/or work, research or volunteer experience that you have had. Your essays should be well written (i.e., have logical organization, be

thought-provoking and use correct spelling and grammar) and show a good understanding of the content presented and why it is important or applicable in a real world context. Essays should be ~1/2 page, double spaced, with 12 point Times New Roman font and MUST be uploaded onto ANGEL by 5 pm the day prior to the next scheduled class (i.e. 5 pm on Wednesday's or Monday's). Late submission will result in penalties with 3 points lost if submitted after 5 pm and all 6 points lost if submitted after the beginning of the next lecture (i.e., 12:40 pm on Tuesday's or Thursday's). I expect that you will read each other's essay submissions as we will discuss them during the beginning of the next class period.

Controversial Topic Presentation (17.5% of your course grade)

We learn much more by having to teach and defend something to others, so you will have the opportunity to thoroughly research, present, and defend one of several topics relating to forest ecology to your peers, who will critically question both sides. Possible topics include:

- Transgenic Plants – Should plants be genetically modified for human use?
- Wildfire Suppression – Should wildfires be suppressed?
- Salvage Logging – Should salvage logging be allowed on federal lands?
- Logging Old-Growth Forests – Should logging occur in old-growth forests?
- Subsidization of Alternative Fuels – Should alternative fuels be federally subsidized?
- Forestry Based Carbon Offsets – Are forestry based carbon offsets effective?
- Pre-European Settlement Benchmarks (PES) – Should PES be the benchmark for forest management and restoration efforts?

Additional topics can be submitted by students until September 12th. On September 17th all students MUST submit in order of preference three topics and whether they wish to work on the pro- or con-group. I will assign the topic, position and date to all students by September 24th. The pro- and con-position for each topic will be presented by a distinct group composed of 2-3 students. You may include economic, societal and political arguments into your discussion, but the primary focus MUST be scientific and if should directly relate to plant/forest ecology.

One week prior to topic discussion a short paper (< 10 pages from either primary or secondary literature) supporting your group's assigned viewpoint needs to be e-mailed to me or put in the appropriate Dropbox in ANGEL for the entire class to read. All papers turned in after the deadline will have 10 points deducted each day. I strongly urge students to meet with me briefly after class prior to turning in this paper to discuss your search and/or suitability of the paper you have found. A good place to search for this article as well as additional articles needed for preparing your presentation is to go to http://er.lib.msu.edu and click on Web of Science link. I suggest first checking articles published by BioScience, Trends in Ecology Evolution, Science or Nature since they all publish good articles that are short and/or easy to read.

Upload to ANGEL a copy of your PowerPoint presentation by 5 pm the day prior to your presentation. On the day of the topic discussion, each group will present the history, background, and support for their case for 15 minutes. Afterwards, the two groups will lead a class-wide discussion on the presentations and assigned readings for 10 min. I encourage PowerPoint to be used for your group's presentation and you should acknowledge the sources you use for preparing the content of your presentation. Everyone will be expected to attend these student led-debates. Students who are not presenting **MUST** come to the debate prepared with at least one question from each of the readings assigned by each group and fill out a short assessment

EXAMS (60% of your course grade)
There will be three equally-weighted exams on September 19th, October 22nd and November 19th with each worth **20%** of your total course grade. These exams will be non-cumulative and cover material from in-class lectures and discussions.

Make-up exams are allowed only for legitimate reasons (e.g., illness) supported with official documentation, including phone number of the disinterested party. Absence from an exam due to a university-sanctioned event must be approved with appropriate documentation at least one week before the exam date. Please contact me immediately upon knowing that you will need a make-up exam.

INTELLECTUAL ENGAGEMENT (7.5% of your course grade)
7.5% of your grade will come through ***active*** contributions to class discussions and activities.

COURSE GRADE
Your final course grade will depend on scores from three exams, lecture reflection essays, controversial topic debate and intellectual engagement. To calculate your course score, sum the point (not percentage) scores from each item. Final course grading will be done on a straight scale without fitting the grade distribution to a normal curve:

	Points
Hourly exam #1	200
Hourly exam #2	200
Hourly exam #3	200
Reflection essays	150
Controversial topic debate	175
Intellectual engagement	75
Total	1000

Points	Course grade
900-1000	4.0
850-890	3.5
800-840	3.0
750-790	2.5
700-740	2.0
650-690	1.5
600-640	1.0
<600	0.0

While most students are wonderfully honest, there are on occasion a few who mistakenly believe that cheating is OK. Thus, we may take a few precautionary measures that do not seem to be very warm and friendly but that help safeguard your work and your grades. These measures may include requiring special seating during exams and use of software to help identify plagiarism. Any student who plagiarizes (including falsifying data or results) may receive a 0.0 on the assignment and/or fail the course, at the discretion of the instructor. I expect that we will have very few, if any, issues in this class.

DROPPING THIS COURSE

The last day to drop this course with a 100% refund and no grade reported is September 23rd (8 pm). The last day to drop this course with NO refund and no grade reported (the mid-semester date) is October 16th (8 pm). You should immediately make a copy of your amended schedule to verify you have dropped this course.

Making Arrangements at the Beginning of the Term

Accommodations for disabilities. If you have a disability or special need that requires accommodations, please inform me during the first week of class, so we can develop a plan that works for you. If you have not yet contacted the Resource Center for People with Disabilities, please call 353-9642 (voice) or 355-1293 (TTY) to make an appointment with a counselor.

Religious holidays. If you will be absent from class to observe a religious holiday during the term, please let me know within the first two weeks of class, so that we can make arrangements.

Missing class because of conflicts with other university activities. If you need to be excused from this class to participate in a one-time required activity for another course or university-sanctioned event, please talk with Dr. Neumann right away and bring *written authorization* from the faculty member of the other course or from a university administrator. I will do my best to accommodate you by assigning make-up activities.

Conflicting final exam schedules. If another course in which you are enrolled has scheduled a final exam for the same time as this one, or you have three or more final exams on that day, please see Dr. Neumann immediately.

Commercialized lecture notes. Please do not sell your lecture notes or the course materials.

REVISED SYLLABUS
FOREST ECOLOGY LAB
FOR 404L – FALL SEMESTER 2013

INSTRUCTOR

Dr. Sarah Neumann, Department of Forestry
Office location: 125 Natural Resources Building
Email: sneumann@msu.edu
Office hours: Wednesday 10-12 am, or by arrangement

LAB GRADUATE ASSISTANT:

Megan Edwards, Masters student, Department of Forestry
Office location: 154 Natural Resources Building
E-mail: saund100@msu.edu

FORMAT

FOR 404 (3 cr):	Lecture: T and TH (12:40 – 2 pm)
FOR 404L (1 cr):	Labs: T (2:15 – 5:30 pm)

The lab is required for Forestry majors and is highly recommended for undergraduate students enrolled in FOR 404. The lab course will bring to life many of the concepts that are covered in lectures.

COURSE DESCRIPTION: Field studies and data analysis of ecological processes central to the sustainable management of forest resources. Field exercises cover primary production, community structure, soil resources, density-dependence, biodiversity and succession.

MAIN OBJECTIVE: To enhance lectures in FOR 404 with hands-on studies of forest ecosystems.

PREREQUISITES: FOR 404 must be taken concurrently or previously.

EMAIL COMMUNICATIONS: Announcements will be distributed by email, which I assume is checked at least daily.

FIELD ATIRE: For these labs, please dress appropriately for the weather including mud. We'll go to the field rain or shine. You should also bring a notebook / clipboard for taking field notes and drinking water.

LAB SCHEDULE

Lab	Date	Topic	Meeting Place	Report Due	Points
1	9/03	Introduction to FOR 404L Quantitative Analysis	NR 218	9/3	25 (assignment)
2	9/10	Sapling growth responses to resources: Field & Data work-up	SE Door NR		10 (participation)
3	9/17	Forest succession: Field work	SE Door NR		10 (participation)
3	9/24	Forest succession: Data work-up & writing	NR 218	9/27	35 (report)
4	9/28	Soil resources & forest community structure: Field Trip to MNF (Saturday)	7am*		30 (participation)
5	9/29	Effects of Eastern hemlock on the establishment of interspecific sdlg's: Field Trip to Hope College's Biology Nature Preserve (Sunday)	9am*		30 (participation)
5	10/01	Eastern hemlock lab: Field patterns, hypotheses, experimental design, writing successful research reports	NR 218 TRC	10/04	70 (proposal)
5	10/08	No formal lab: Work on Eastern hemlock experiments			
4	10/15	Soil resources & forest community structure: Data work-up & writing	NR 218	10/25	75 (paper)
6	10/22	Disturbance & species diversity: Field work	SE Door NR		10 (participation)
6	10/29	Disturbance & species diversity: Data work-up & writing	NR 218	11/01	35 (report)
7	11/05	Productivity: Data work-up & writing	NR 218	11/15	75 (paper)
5	11/12	Eastern hemlock lab: Progress interview & Workshop (PowerPoint and presentation tips)			Literature citation list due
5	11/19	No formal lab: Work on Eastern hemlock experiments			
5	11/26	No formal lab: Work on Eastern hemlock experiments			
5g	12/3	Eastern hemlock research symposium	NR 216		100 (presentation) Copy of raw data due

Notes:

1. **Labs meet 20 minutes after lecture** and not at 2:30 published meeting time; see me if this is a problem.
2. Students who do not participate in collecting data may not use that data for the lab reports unless a legitimate excuse is given.
3. Lab reports in Word format should be submitted to the designated Angel drop box no later than 5:00 pm on the due date (except for Lab 1 where you will be handing in a hardcopy answer sheet). Late reports will be penalized 5 points / day late, starting at 5:01 pm on the due date.
4. Reports must be typed**,** double-spaced, using 12 point, Time New Roman font, with computer-generated graphs.
5. * For field trips to MNF and Holland, MI we will leave at 7am (Sept 28th) and 9am (Sept 29th) from the northern section of MSU's commuter parking lot on Farm Lane.

COURSE GRADE

To calculate your course score, sum the point (not percentage) scores from each item. Final course grading will be done on a straight scale without fitting the grade distribution to a normal curve:

	Points
Lab 1: Quantitative analysis	25
Lab 2: Sapling growth	10
Lab 3: Forest succession	45
MNF field trip	30
Lab 4: Forest community structure	75
Lab 5: Eastern hemlock	200
Lab 6: Disturbance & species diversity	45
Lab 7: Productivity	75
Total	505

Points	Course grade
453-505	4.0
427-452	3.5
402-426	3.0
378-401	2.5
351-376	2.0
326-350	1.5
303-325	1.0
<303	0.0

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