
Managing Forest Ecosystems: Silviculture – FR 3411/5411

Spring 2009

Course Website: <http://www.forestry.umn.edu/courses/FR3411/index.html>

Course Meeting Location: Green Hall 110
Days and Meeting Time: Monday, Wednesday, and Friday 11:45 AM – 12:35 PM
Credit Hours: 3 credits
Course Prerequisites: FR 3104/5104 (Forest Ecology) or Cloquet Summer Session or instructor consent

Course Instructor: Anthony W. D'Amato
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Teaching Assistant: Stacy Troumbly
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Office hours: TBD

Required Textbook:

- Smith, D.M., B.C. Larson, M.J. Kelty, and P.M.S. Ashton. 1997. The Practice of Silviculture: Applied Forest Ecology (9th Edition). Wiley and Sons, Inc. 537 p.

Additional silviculture texts and reference materials on Reserve in Forestry Library (B-50 Skok Hall):

- Barrett, J. W. (ed.). 1994. Regional Silviculture of the United States. John Wiley & Sons, NY. (2nd ed.).
- Nyland, R. 2001. Silviculture: Concepts and Applications (2nd edition). McGraw Hill
- Oliver, C.D., and B.C. Larson. 1996. Forest stand dynamics. John Wiley & Sons, NY. 537pp.
- Wagner, R.G. and S.J. Colombo. 2001. Regenerating the Canadian Forest: Principles and Practice for Ontario. Fitzhenry and Whiteside Limited, Markham, Ontario, Canada. 650 p.
- Hunter, M.L. (ed.). 1999. Maintaining Biodiversity in Forest Ecosystems. Cambridge University Press, Cambridge, UK. 698 p.
- U.S. Forest Service. 1990-1991. Silvics of North America. vols. 1 and 2. Agriculture Handbook 654.

Web address: http://www.na.fs.fed.us/spfo/pubs/silvics_manual/table_of_contents.htm

Course description: Silviculture is a multi-faceted discipline that draws upon the fields of forest ecology, economics, and operations to produce and maintain forest conditions that meet an ever-expanding diversity of management objectives. The purpose of this course is to provide students with a working knowledge of silviculture and its underlying ecological concepts. Students are introduced to silvics, forest stand development and dynamics, regeneration practices, intermediate silvicultural practices, silvicultural systems, timber production, and wildlife habitat management. In

addition, approaches are introduced for using ecosystem management and ecological forestry to balance biodiversity, ecosystem health, and commodity objectives.

Course Objectives:

1. Understanding of silvicultural and basic ecological concepts as they relate to forest development and silvicultural practices.
2. Understanding of traditional and contemporary silvicultural practices and how they influence biodiversity, soil and water resources, forest health, timber production, wildlife habitat and biodiversity.
3. Ability to integrate ecological and social considerations into silvicultural practices.
4. Ability to apply silvicultural concepts to actual forest stands and to develop silvicultural prescriptions for a variety of land management objectives.

Attendance and Participation:

Your attendance at lecture sessions is *strongly encouraged* but optional. It is your responsibility to obtain all material missed during absences. This being a three credit course, you are expected to spend an additional six hours per week outside the classroom reviewing course materials and preparing for lecture. This means you should come to class prepared to discuss the reading assignments corresponding to each lecture. These assigned readings are meant to enhance your understanding of the topics we will be discussing and to familiarize you with scientific writing and the latest silvicultural literature.

Web-enhanced Learning:

This course uses a course management tool called Moodle. Please view the Moodle orientation presentation at the following site:

<https://umconnect.umn.edu/moodleorientation>

To access our course visit the main U of M Moodle site:

<http://www.moodle.umn.edu>

From this page you will see courses you are enrolled in as well as learning sites for getting to know Moodle. Lecture slides, outside readings, answers to quizzes and exams, and homework activities will be presented at this course site. **You are expected to read the class summaries and are responsible for the information presented at this site.**

Course grading:

The course is offered only with A-F grading. The +/- system will be used in determining final grades. Marks will be on a standard scale based on the % of total points available (% indicate minimum necessary for a mark). Class participation will be taken into consideration when rounding final grades.

A ≥93	A- 90	B+ 87	B 83	B- 80	C+ 77	C 73	C- 70	D 60	F <60
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Your performance will be evaluated based on the components listed below as well as your participation. Final course grades will be determined as follows:

Homework Assignments		Due
Hw1 – silvics	10 Points	2/2
Hw2 – stand dynamics	15 Points	2/13
Hw3 – stand prescriptions	15 Points	3/25
Hw4 – thinning	15 Points	4/15
Forest Stewardship Plan	50 Points	5/4
3 Quizzes @ 15 points each	45 Points	
3 Exams @ 45 points each	135 Points	
Class participation	<u>15 points</u>	
	300 Points	

All assignments must be turned in at the beginning of class on the date specified in this syllabus unless you have arranged an alternative date and time with the instructor prior to the original due date and time. Under extreme circumstances, unexcused late assignments may be accepted at the discretion of the instructor. Otherwise, **late assignments will be deducted 10% per day until they are received.**

Exams and Quizzes:

There are three quizzes and three exams in this course. The purpose of the quizzes and exams are to help both you and I determine how well you understand assigned readings and the material presented in lecture. Quiz and exam questions will be a combination of matching, short answer, multiple choice, and essay. The final exam will be comprehensive.

Homework Assignments:

Over the course of the semester four short problem sets will be assigned that deal with: 1) silvics of major tree species in the Lake States, 2) forest stand dynamics and development, 3) developing silvicultural prescriptions, and 4) the effects of thinning on stand growth and yield. Specific details on these assignments will be provided in later handouts.

Forest Stewardship Plan:

This exercise will require students to work in small groups to prepare a forest stewardship plan for a private landowner. Each group will have a unique parcel with management objectives specific to the parcel and surrounding properties. At the end of the semester groups will present their stewardship plans to the class. More information will be provided at the time this exercise is assigned.

FR 5411 – Graduate Students

Graduate students should expect additional questions on quizzes and exams. In addition, the expectation for the quality of homework assignments (i.e. internal logic and quality of writing) is higher than for undergraduate students.

University Grading Policy:

According to the college-wide policy determined by the University's faculty senate:

A – Achievement that is outstanding relative to the level necessary to meet course requirements.

B – Achievement that is significantly above the level necessary to meet course requirements.

C – Achievement that meets the course requirements in every respect.

D – Achievement that is worthy of credit even though it fails to meet fully the course requirements.

S – Achievement that is satisfactory, which is equivalent to a C- or better.

F (or N) – Represents failure (or no credit) and signifies that the work was either (1) completed but at a level of achievement that is not worthy of credit or (2) was not completed and there was no agreement between the instructor and the student that the student would be awarded an I (see also I).

I – (Incomplete) Assigned at the discretion of the instructor when, due to extraordinary circumstances, e.g., hospitalization, a student is prevented from completing the work of the course on time. Requires a written agreement between instructor and student.

Academic dishonesty:

Academic dishonesty in any portion of the academic work for the course shall be grounds for awarding a grade of F or N for the entire course. With the exception of specific group assignments, each student is responsible for their own work. Students with questions regarding the expectations for a specific assignment or exam or who are in doubt about plagiarism, quoting, or collaboration are encouraged to contact me for clarification.

Cell Phones

Out of courtesy and respect for me and your fellow classmates, please make sure your cell phones are turned off during class. If you need to be reachable during class time, turn your phone's ringer tone off and take any calls outside the classroom. Absolutely no cell phones can be visible during examinations. If you are found to have a visible cell phone in your possession anytime during an exam, you will receive no credit for that exam

Policy on students with disability:

Any student with a documented disability condition (e.g., physical, learning, psychiatric, systemic, vision, hearing, etc.) who needs to arrange reasonable accommodations should contact the instructor and the Disability Services Office 180 McNamara Alumni Center (612.626.1333) at the beginning of the course.

Policy on sexual harassment:

Sexual harassment by or toward a member of the University community is prohibited.

<http://www1.umn.edu/regents/policies/humanresources/SexHarassment.pdf>

Resources for student writers:

Student Writing Support (SWS): Center for Writing, 306b Lind Hall and satellite locations (612.625.1893) <http://writing.umn.edu/sws/>. SWS offers personal writing consultations to all UMN undergraduate and graduate students by appointment (Lind Hall) or walk-ins (satellites). Hours and locations can be found on the above listed website.

Online Writing Center: <http://writing.umn.edu/home/mission.htm>. Writing consultations via email and online resources for undergraduate and graduate student writers.

General College Writing Center: Academic Resource Center, 11 Appleby Hall (612.624.0342) <http://writing.umn.edu/home/mission.htm>. Personal tutoring on a walk-in basis or by appointment. Available to students outside of GC on a limited basis.

University Libraries: <http://www.lib.umn.edu>

Non-Native Speakers: 337 Nolte Center (612.624.4524) http://composition.cla.umn.edu/student_web/

University of Minnesota Counseling Program: 109 Eddy Hall (612.624.3323) <http://www.uccs.umn.edu/>

COURSE OUTLINE and READING ASSIGNMENTS: FR 3411/5411 – Spring Semester 2009

Date	Topic	Readings
21-Jan	Introduction and course overview	
23-Jan	Purpose and objectives of silviculture	Chapter 1
26-Jan	Ecological foundations: site factors, cover and habitat types	234-236
28-Jan	Ecological foundations: silvics and ecological classification systems (ECS)	236-247
30-Jan	Applications of ECS in Minnesota	#1
2-Feb	Ecological foundations: stand dynamics and succession; HW#1 due	#2
4-Feb	Ecological foundations: stand and landscape structure	20-41
6-Feb	Ecological foundations: disturbances and succession-Lee Frelich	#3
9-Feb	Natural regeneration: mechanisms and ecological principles	161-191;301-304
11-Feb	Artificial regeneration: direct seeding,	287-294
13-Feb	Artificial regeneration: planting; HW #2 due	264-286
16-Feb	Regeneration: genetic considerations (Andy David)	247-291
18-Feb	Regeneration: animal damage and protection, assessing density and stocking	486-489
20-Feb	Site preparation and treatment: mechanical and chemical approaches;	196-227
23-Feb	Site preparation and treatment: prescribed fire	210-217
25-Feb	Exam 1	
27-Feb	Silvicultural systems	301-315
2-Mar	Natural regeneration methods (even-aged methods): seed tree and shelterwood	347-362
4-Mar	Natural regeneration methods (even-aged methods): clear-cutting	316-328
6-Mar	Natural regeneration methods (coppice method): aspen management	330-345
9-Mar	Natural regeneration methods (two-aged stands): irregular shelterwood, reserves	398-400, Handout
11-Mar	Natural regeneration methods (uneven-aged stands): single tree and group selection	364-388
13-Mar	Intermediate treatments: release treatments, pre-commercial thinning; Quiz 1	121,133-147
16-Mar to 20-Mar Spring Break		
23-Mar	Managing tree quality: crown development, wood formation, pruning	47-68, #4
25-Mar	Thinning and stand density: growth and yield concepts; HW #3 due	69-93
27-Mar	Thinning and stand density: size-density relationships	77-79
30-Mar	Thinning and stand density: thinning methods and regimes	99-116
1-Apr	Thinning and stand density: stocking guides and density management diagrams	117-130
3-Apr	Exam 2	
6-Apr	Managing complex stands: uneven-aged stands (I); F.S.P. assigned	#5
8-Apr	Managing complex stands: uneven-aged stands (II)	#5 (cont)
10-Apr	Managing complex stands: mixed species stands	391-417, #6
13-Apr	Silviculture and forest health-Mike Ostry	p. 464-478
15-Apr	Silviculture and harvesting technology; HW #4 due	p. 438-448
17-Apr	Conservation and maintenance of soil and water resources	449-460
20-Apr	Management of riparian areas and forested wetlands	#7
22-Apr	Ecological forestry and silviculture: overview of concepts and principles	#8
24-Apr	Ecological forestry and silviculture: stand-level considerations; Quiz 2	#9
27-Apr	Ecological forestry and silviculture: landscape-level considerations	#10
29-Apr	Forest wildlife habitat management	483-506
1-May	Forest Stewardship Plan Presentations	
4-May	Forest Stewardship Plan Presentations- F.S.P. due	
6-May	Forest Stewardship Plan Presentations	
8-May	Exam 3	

Additional Reading Assignments

- #1** Ecological Classification System: Minnesota DNR. <http://www.dnr.state.mn.us/ecs/index.html>
- #2** Oliver, C.D., and B.C.Larson. Forest stand dynamics. John Wiley & Sons, New York. Pp. 145-170.
- #3** Frelich, L.E. 2002. Forest dynamics and disturbance regimes. Cambridge University Press, Cambridge, UK. Pp. 15-43.
- #4** O'Hara, K.L. 2007. Pruning wounds and occlusion: A long-standing conundrum in forestry. *Journal of Forestry* 105: 131-138.
- #5** Nyland, R. 2001. *Silviculture: concepts and applications* (2nd edition). Waveland Press, Illinois. Pp. 218-235.
- #6** M.J. Kelty. 2006. The role of species mixtures in plantation forestry. *Forest Ecology and Management* 233: 195–204.
- #7** Palik, B.J., J.C. Zasada, and C.W. Hedman. 2000. Ecological Principles for riparian silviculture. In: E.S. Verry, J.W. Hornbeck, and C.A. Dolloff (Eds.), *Riparian management in forests of the continental eastern United States*. Lewis Publishers, CRC Press, Boca Raton, FL. Pp. 233-254.
- #8** Seymour, R.S., and M.L. Hunter, Jr. 1999. Principles of ecological forestry. In: Hunter, M.L., Jr. (Ed.), *Maintaining biodiversity in forest ecosystems*. Cambridge University Press, Cambridge, UK. Pp. 22-61.
- #9** Franklin, J.F., D.R. Berg, D.A. Thornburgh, and J.C. Tappeiner. 1997. Alternative silvicultural approaches to timber harvesting: variable retention harvest systems. In: Kohm, K.A. and J.F. Franklin (Eds.), *Creating a Forestry for the 21st Century*. Island Press, Washington, D.C. Pp. 111-139.
- #10** Seymour, R.S., and M.L. Hunter, Jr. 1992. *New forestry in eastern spruce-fir forests: principles and applications to Maine*. Maine Agricultural Experiment Station, Miscellaneous Publication #716, 36 pp.