

9-2014

FORS 349.01: Practice of Silviculture

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Recommended Citation

Goodburn, John, "FORS 349.01: Practice of Silviculture" (2014). *Syllabi*. 654.
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FORESTRY 349
PRACTICE OF SILVICULTURE
Fall 2014

Instructor: John Goodburn
Office: Rm. 409 Science Complex
Telephone: 243-4295 Email: john.goodburn@cfc.umt.edu
Office hours: Mon. 4:00 - 5:30 pm, Thur 9:00-11:00am (or by advance appointment)
Teaching Assistant: xxxx xxxxx

Prerequisites: FORS 202 Mensuration and FORS 241 Tree Biology
Corequisite: FORS 330 Forest Ecology (may be taken as a prerequisite)
Lecture and Discussion Mon. & Wed. 10:10 -11:00 a.m. Rm. 301 Forestry Bldg.
Lab/Field Work Wed or Thur. 2:10 - 6:00 p.m Typically In Field
or in assigned room (Wed FOR 106, Th FOR 206)

(Field labs will meet to load vans outside the campus security office across street (east) from Griz Stadium)

Course Description

The FORS 349 - Practice of Silviculture course will examine the major ecological and conceptual foundations behind various silvicultural systems and vegetative management practices, and introduce students to their practical application in forest ecosystems of the Northern Rocky Mountains and elsewhere to meet multiple resource objectives.

The course will consider forest dynamics at multiple scales, ecological site classification schemes, stand-level assessments of structure and composition, alternative silvicultural systems (single and multi-cohort), thinning/stand density concepts, various regeneration practices, and specific vegetative management strategies for diverse objectives. Students will evaluate opportunities and constraints for actual forest stands, develop management prescriptions, and employ modeling and quantitative assessment of alternative prescriptions. We'll discuss ecologically-based forest mgmt strategies aimed at sustainable wood production, wildlife habitat enhancement, watershed protection, and the maintenance of biological diversity, site productivity, & aesthetic quality.

Silviculture can be defined as the theory and practice of influencing forest regeneration, species composition, and growth to accomplish a specified set of resource objectives. Silviculture can be thought of as applied forest ecology directed toward vegetation management objectives.

Learning Objectives for students completing the course will include the following:

- Students will have a clear understanding of key ecological concepts related to forest stand development and the response of forest vegetation to silvicultural practices;
- Students should be familiar with the key silvical characteristics of the common tree species in the northern Rockies;
- Students will demonstrate a familiarity with silvicultural terminology and be able to discuss practical application of regeneration techniques, intermediate treatments, and alternative silvicultural systems;
- Students will be able to diagnose and quantify current conditions in a stand given inventory information, to describe desired conditions given landowner objectives, and to prescribe silvicultural treatments that will move current stand towards desired conditions;
- Students will be able to develop a silvicultural prescription to accomplish identified ownership objectives, to propose alternative silvicultural treatment alternatives that might lead to desired conditions at the stand- and landscape-level, and to compare alternatives in terms of economics, and effectiveness at meeting objectives;
- Students will be able to consider how different silvicultural practices might affect soil resources, forest health, wildlife habitat, biological diversity, wood production, water quality and yield, recreation, and aesthetics;

- Students will also gain an appreciation for the social dimensions of silvicultural planning and need to adapt silvicultural practices to meet landowner objectives and landscape scale issues.

FORS 349 is one of the College's distributed upper-division writing courses.

Approved Writing Course Learning Outcomes

- Use writing to learn and synthesize new concepts
- Formulate and express written opinions and ideas that are developed, logical, and organized
- Compose written documents that are appropriate for a given audience or purpose
- Revise written work based on constructive feedback
- Find, evaluate, and use information effectively and ethically
- Begin to use discipline-specific writing conventions
- Demonstrate appropriate English language usage

Upper-division Writing Requirement in the Major Outcomes

- Identify and pursue more sophisticated questions for academic inquiry
- Find, evaluate, analyze, and synthesize information effectively from diverse sources
- Manage multiple perspectives as appropriate
- Recognize the purposes and needs of discipline-specific audiences and adopt the academic voice necessary for the chosen discipline
- Use multiple drafts, revision, and editing in conducting inquiry and preparing written work
- Follow conventions of citation, documentation, and formal presentation appropriate to discipline
- Develop competence in information technology and digital literacy

Important deadlines for changing course options

Month Day*	Last day for students to Add classes via CyberBear without consent of instructor.
Month Day	Beginning today all class registration adds must be done via the Override Form or and Electronic Override done through CyberBear. Consent of instructor is required.
Month Day	<ul style="list-style-type: none"> • Last day to withdraw from the semester (drop all courses) with a partial refund. • Last day to change grading option to or from audit. • Last day to Buy or Refuse health insurance coverage or add clinical health fee.
Dates (45 th instructional day)	Dropping a course requires a drop/add form with instructor and advisor signature . There is a \$10 fee at the registrar's office.
Month X- Month X	At this point in the semester students are only allowed to drop a class under very limited and unusual circumstances . Not doing well in the class, deciding you are concerned about how the class grade might affect your GPA, deciding you did not want to take the class after all, or deciding you want to change majors are not among those limited and unusual circumstances. If you want to drop a class for these sorts of reasons, make sure you do so before April 8.

*insert dates for specific semester

Disabilities and Student Conduct Code

Students with learning disabilities or disadvantages needing special dispensation or assistance, please see me during the first week of class. All course activities are governed by the Student Conduct Code, which embodies the ideals of academic honesty, integrity, human rights, and individual responsibility. It is your responsibility to read, understand and adhere to the student conduct code (http://life.umt.edu/vpsa/student_conduct.php).

Readings

Background texts: Much of the background reading for this semester we will draw from three different textbooks (that you can decide whether you wish to buy) that cover much of the same material, without major disagreement on terminology, methodology etc. The objective is to provide readings electronically from selected chapters of these and other texts, journal articles, and other sources. The main

“recommended text” that you might want to purchase is “Silviculture and Ecology of Western U.S. Forests”, by Tappeiner et al. We will also draw from silviculture texts by Nyland and Smith et al. Suggested background reading assignments associated with various topics covered during the semester will be listed in the course schedule. The silviculture texts below will also be on traditional reserves at the Mansfield Library for your use.

Silviculture and Ecology of Western U.S. Forests. Tappeiner, Maguire, and Harrington. 2007.

The Practice of Silviculture: Applied Forest Ecology, 9th edition. Smith, Larson, Kelty, and Ashton. 1997.

Silviculture: Concepts and Applications, 2nd edition. Nyland. 2002.

Labs

Wednesday and Thursday field labs will generally meet outside the Campus Security office (east of Griz Stadium) where we will board vehicles. Any indoor lab periods will meet at the assigned room locations as listed above and on Cyberbear. Attendance at scheduled lab sessions is expected, and unexcused absences could negatively affect your grade. Please notify me as soon as possible if you will be unable to attend for some reason.

Labs are scheduled for a four hour block for efficiency in travel and field work logistics. The trade-off is that lab will meet only about ¼ of the weeks (in order to approximate a 3 hour lab).

** Unless lab is scheduled to be indoors, always wear appropriate field clothes and closed-toe shoes to labs. If rain is forecast, bring rain gear and do not expect lab to be canceled on account of bad weather.

*** Please be on time for lab. We will often have a bit of travel to get to field sites (e.g., Lubrecht Experimental Forest) and the vehicles may not be able to wait for you. ***

Class Participation

Class participation is encouraged and will be incorporated into your grade. Your preparation and willingness to ask questions and discuss various topics will benefit not only your own learning experience, but also that of your colleagues in the class.

Please feel free to ask questions and initiate discussions both in and out of class. I will be available during office hours or at other times if you wish to schedule an alternative time. Also feel free to contact me or clarify questions you have via email. No need to wait until *after* an exam to ask questions!

Special Accommodations

Students with disabilities who need accommodations should see me privately during my office hours to make arrangements.

Grading System

Written assignments, Lab exercises	-	48%
Field Lab Write-ups, Silvicultural Prescriptions, Problem set, Quizzes		
Midterm Performance	-	20%
Final exam	-	30%
Class participation	-	2%

Final Grade will be based on a standard +/- grading scale (e.g., 80-82.5= B-; 82.5-87.5=B; and 87.5-89.99 = B+)

Grading Assessment

Lab Assignments (50 points):

Following each field lab during the semester, there will typically be some lab report assignment to be completed, which may include calculations, evaluation of data, synthesis of information, and summary comments. Ten points per day will be subtracted from any late lab report. Absences must be arranged prior to a missed lab.

Lab reports will be graded on the accuracy of the calculations and assessments, as well as the quality of the writing and the accuracy of the factual information presented. At least one lab report may be resubmitted to earn back up to one-half the missed points. Resubmitted reports must be turned in within one week of when they were returned to the student.

Prescription Assignments (100+ points):

Throughout the semester, we will have writing assignments to build on the components of a silvicultural prescription. Early papers will include statement of landowner objectives and site/stand conditions, while later efforts will be more synthetic, incorporating inventory information, assessments of current and desired conditions, and the quantification of dynamics and products through time through simulation modeling.

Exams will be a mix of short answer questions, quantitative calculations, and short essay questions graded on completeness, correct use of terminology, and soundness of reasoning.

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FALL 2014

General Course Outline and Reading Assignments*

Lecture/Lab Schedule

<u>Date</u>	<u>Topic</u>	<u>Initial Readings in Text</u>
Week 1		
M	Introduction,	
W	Silviculture in relation to forest management	Smith Chap. 1 **
W or H Lab	No Lab	
Week 2		
M	Labor Day Holiday (No Class)	
H	Forest stand dynamics (cont)	Smith Chap 2,
W or H Lab	Stand dynamics; Forest structure evaluation - (Blue Mountain NRA)	
Week 3		
M	Forest stand dynamics, Interpreting stand structure and history	Spies, Tappeiner Ch3
W	Stand Types, Silvicultural Objectives, and Silvicultural Systems	Tappeiner Ch2
W or H Lab	Stand Dynamics II: (Deer Creek)	
Week 4		
M	Regeneration Ecology, and Plant strategies	Smith Chap 7
W	Ecological Site Classification; Forest Habitat Typing	Pfister_Arno 1980, Barnes etal 1982
W or H Lab	Site Classification and Regeneration surveys (Blue Mtn NRA)	
Week 5		
Regeneration of Forests		
M	Regeneration Ecology, and Plant strategies	Nyland Ch4
W	Regeneration of Forests: Natural vs. Artificial Regen	Tappeiner Ch9
W or H Lab	Stand Inventory and Assessment (Rattlesnake NRA)	
Week 6		
M	Site preparation: Concepts and Applications	Miller and
W	Site preparation Alternatives: Fire, Mechanical, Chemical	other ERES
W or H Lab	TBA	
Week 7		
Intermediate Stand Treatments - Thinning		
M	Stand density concepts; Natural self-thinning	Tappeiner Ch 5
W	Pre-commercial thinning; Release and Improvement cuts	Smith Chap. 6, 147-156
W or H Lab	Alternative thinning strategies (Elk Meadows Rd)	

Week 8

M Application of thinning; Commercial thinning methods **Nyland Ch 17-18**
 W Thinning frequency and intensity; Quantitative Assessment **Tappeiner Ch 6**
 W or H Lab Crown thinning (Lubrecht Exp. Forest)

Week 9

M Catch-up, Wrap up, and Midterm Review
 W **Midterm Performance** (Covering material through 10/25)
 W or H Lab **No Lab**

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Course Outline and Reading Assignments

Week 10 Developing Silvicultural Prescriptions to meet Multiple Objectives

M Thinning for fuel hazard reduction
 W Seed-Tree & SW Systems, Regen under partial retention harvests
 W or H Lab

Week 1

T Introduction to single-tree
 H Introduction to single-tree and group selection
 W or H Lab **NO LAB – VETERAN'S DAY HOLIDAY (H)**

Week 12

M Quantitative methods of managing Uneven-aged stands
 W Developing Silvicultural Prescriptions and Quantifying Effects
 W or H Lab TBA - Uneven-aged Mgmt in Ponderosa Pine; Silv Prescriptions (Lubrecht)

Week 13

M Silvicultural control of damaging agents
 W Silvicultural techniques for wildlife objectives and biological diversity
 W or H Lab Work on Silvicultural Prescriptions - Modeling

Week 14

T Silvicultural Prescription Development and Defense
 H
 W or H Lab Silvicultural Prescription Development and Defense

Week 15

12/6 M Silvicultural Prescription Development and Defense
 12/8 W Review and Synthesis Lecture
 12/13 M Final Review

Finals Week**Final Exam Performance**

* Course outline and reading assignments may be subject to minor changes as necessary.