FOR 274: Forest Measurements and Inventory – Syllabus and Important Course Information

Instructors:
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Office Hours: by appointment only

Course Web Site: http://www.webpages.uidaho.edu/for274new/

Lecture Location and Times:  CNR 10, MWF 9:30-10:20

Labs and Field Trips:
Shattuck Arboretum, TR 1:30-4:20 – Actual location will be announced each week in class. Most will be held outside, students attending without appropriate equipment (closed toe shoes, hardhat, measurement equipment) will be asked to leave and will not receive credit for the lab. For field trips please wear boots and long pants.

Before the 1st week of class, please purchase the following equipment (If you already own these items – bring your own):

1 Silva Ranger Compass: Azimuth model, with sighting mirror, and adjustable declination. Typical cost: up to $45
1 Bullard Fire Helmet: We recommend a fire-fighter's helmet with Ratchet support. Typical cost: up to $45
1 x 100 foot Spencer Loggers Tape + nail: We recommend a 100’ combination tape - this includes distance and diameter measurements. Typical cost: up to $75
A calculator with trigonometric functions.

These are required BEFORE the first lab. If you have your own, please make sure they meet the specified minimum characteristics. If you do not own these items, please purchase them before arriving at the class. We recommend the following suppliers: Forestry Suppliers Inc or Ben Meadows. You will use this equipment in several of your courses as they are essential to a forestry career.

Text:
- Forest Measurements by Avery and Burkhart
This text is required as a supplement to lecture materials. There will also be several assigned readings from other sources throughout the semester. All reading material will be considered fair material for assignments, quizzes, and exams.

Lab Activities:
Students are expected to come to lab with appropriate attire, equipment, and field sheets. Lab will rotate between a hands-on demonstration period, intended to develop student proficiency in various techniques, and group proficiency evaluation labs, were students will be given a task intended to evaluate their competency of technique principals.

Assignments:
Assignments will consist of numerical, data analysis, and critical thought exercises. Students are encouraged to work together, but all work handed in must be your own. Please show all work on a separate sheet, organize your answers and prepare your work neatly. Be sure to double check your answer and determine if your answer is reasonable. Credit for assignments will only be given if students show their work

Extra Credit Policy:
Extra credit (maximum of 100) will only count towards your grade if you get at least a D in the course. i.e. Extra Credit can improve your grade but will not make you pass.
Grades:
90+ = A, 80-89 = B, 70-79 = C, etc This class rounds up but does not grade on a curve. Close grades (67s, 77s, etc) may be rounded up depending on attendance and effort at the discretion of the instructor.

Grading Rubric:
Assignments 350
Quizzes 200
Lab Hand-ins 100
Stand Exam (individual) 200
Final Exam 150
Total 1000

Late Work Policy:
Students can email the instructor for reasonable extensions to the deadlines. Otherwise, 10% will be deducted from the maximum score each day it is late (up to 50%). Work late past 5 days will be graded with the permission of the instructor up to the day of the final exam - these very late submissions will be graded at 50% deducted from the total possible score (i.e. there is no such thing as too late). However, no late work will be graded after the final exam has been taken.

Disability Support Services Reasonable Accommodations Statement:
Reasonable accommodations are available for students who have documented temporary or permanent disabilities. Please notify your instructor(s) during the first week of class regarding accommodation(s) needed for the course. All accommodations must be approved through Disability Support Services located in the Idaho Commons Building, Room 306.

Plagiarism and Cheating:
There is zero tolerance for plagiarism and Cheating. I am interested in your independent thoughts; plagiarism in any assignment will result in a grade of F in the course and will be reported to the Student Conduct Board. Students are encouraged to work together to understand concepts, but this should not include any level of direct copying.

Schedule: Subject to change, but available on course website
FOR 274: Forest Measurements and Inventory – Course and University Learning Objectives

Course Objectives:
This course provides an introduction to measurements methods in natural resources from plant and stand-level variables. It primarily focuses on measurements related to forest resources and management, including topics such as measurements of tree heights, diameters, etc. Later in the course we will briefly cover sampling methods and concepts related to other natural resource problems including fire fuels and cover measurement techniques of shrubs and litter.

A major objective of the course is not only for students to learn how to measure vegetation but to also make them ‘see’ the forest (or rangeland) in terms of what the measures could mean. Discussion of the statistics you covered in Stat251, measurement standards, sampling methods, and errors will be discussed and reinforced throughout this course.

Learning Objectives by Unit:
Topic 1: Fundamentals of Forest Measurements
The purpose of this section of the class is to become familiar with the principals of measurements as they are applied to forestry and other natural resource disciplines. The lectures, assignments, and labs in this section, will enable the student to achieve the following learning objectives:

1. **Understand** that there are different kinds of numbers and be able to **Explain** why we should always seek to use quantitative, rather than qualitative, measurements
2. **Recognize** the identifying characteristics of the main tree, shrub, and grass species highlighted in this class and **Remember** their 4-letter codes
3. **Understand** the critical need for units when you report measurements
4. **Explain** why we use both the English and Metric measurement systems
5. **Understand** the different ecosystems and how they differ
6. **Recognize** common vegetation species in this region
7. **Evaluate** whether two quantities describe the same measurable by analyzing their units
8. **Understand** sources of errors and Uncertainty and be able to **Explain** what the terms **accuracy**, **bias**, and **precision** mean?
9. **Know** how fundamental statistics are commonly used in forestry
10. **Know** how to combine different sources of error and **Display Graphs** of data with error bars in Excel

Topic 2: Land Area Determination
The purpose of this section of the class is to become familiar with the principals of land area determination methods as they are applied to forestry and other natural resource disciplines. The lectures, assignments, and labs in this section, will enable the student to achieve the following **learning objectives**:

1. **Know** how to pace out a chain and how to do traditional chaining
2. **Understand** the concepts of land surveying and the importance of topographic maps, GIS, and GPS
3. **Explain** the use of a theodolite and laser rangefinder for determining distances
4. **Recognize** the different tools used in the determination of land area
5. **Explain** the concepts of aspect and slope position
6. **Explain** the concepts of the U.S. Public Land Survey system and be able to **Understand** public survey data

Topic 3: Overstorey Measurements
The purpose of this section of the class is to become familiar with the principals of overstory measurement methods as they are applied to forestry and other natural resource disciplines. The
lectures, assignments, and labs in this section, will enable the student to achieve the following learning objectives:

1. Know how to measure diameter at breast height and diameter at root collar for tree shrubs under a large variety of commonly seen conditions
2. Understand the difference between a "fork" and a "branch"
3. Know how to measure the maximum height of a tree
4. Understand how to measure tree heights on sloped terrain
5. Know how to measure tree age
6. Explain whether a tree is dominant, co-dominant, or immediate
7. Understand how to measure canopy bulk density
8. Understand how to measure tree and wood volume
9. Understand how to scale logs and Explain the importance of defects
10. Know how to use prisms, angle gauges, and reloksops to measure stand basal area
11. Understand when to use fixed or variable radius plots
12. Know the basis of site indices and Understand what they mean in terms of stocking rates
13. Understand the concept of Site Quality
14. Know how to measure basal area
15. Know how to measure relative spacing and site index
16. Understand the concept of basal area and basal area factors

Topic 4: Understorey Measurements

The purpose of this section of the class is to become familiar with how to measure understory including shrubs, litter, fuel loadings via photo guides, and Brown's line intercept method. The lectures, assignments, and labs in this section, will enable the student to achieve the following learning objectives:

1. Understand and Describe the differences between density, frequency, cover, and biomass
2. Know how to measure abundance of shrubs, forbs, and grasses
3. Know how to use a fuel photo guide to estimate fuel loading
4. Know how to take duff and litter measurements
5. Know how to take downed wood and snag measurements
6. Understand and Describe different line intercept methods
7. Understand and Describe different point intercept methods
8. Understand and Describe different quadrat methods
9. Understand and Describe the Daubenmire and Wandering Quarter Distance methods
10. Know how to use Brown's line intercept method to estimate surface fuel loading
11. Understand and Describe the cover, density, and frequency

Topic 5: LiDAR and Ecosystem Metrics

The purpose of this section of the class is to become familiar with how to use lidar datasets in natural resources. Understand and Describe the theory and potential of lidar. Understand and Describe the common ecosystem metrics related to energy, meteorology, pressures, and potentials

Alignment with University of Idaho Learning Outcomes:

2. Think and create: In FOR 274 we use multiple thinking strategies to examine natural resource examples. For example, in multiple assignments and field labs we try different forestry sampling strategies to infer stand volume (PPS, fixed area plots) and analyze how different approaches may impact decisions.

3. Communicate: In FOR 274 we require the students to practice multiple forms of communication, including writing memo’s and formal reports.