NRM 240 – Natural Resources Measurement and Inventory

Instructor – Nancy Fresco
Lectures - MWF 10:30 -11:30 (305 O'Neill Bldg)
Lab – Thur 2:00 – 5:00 (359 O'Neill Bldg)
Office Hours – Tues 1:30-3:00, Thurs 9-11, or by appointment
Telephone No. – 474-2405
Email – nlfresco@uaf.edu

Textbook and additional reading material:
There is no textbook for this class. Books to be placed on reserve in the library are:

Husch, Bertram, Charles I. Miller and Tomas W. Beers 1982. Forest Mensuration. John Wiley & Sons. 402 pgs.

Avery, Thomas Eugene and Harold E. Burkhart. 2002. Forest Measurements. McGraw-Hill.456 pgs.

Additional reading material will include articles selected from published scientific literature as well as from reports produced by resource management agencies. These materials will be made available in class and via Blackboard and web links.

Course Description

This course is intended to familiarize students with terminology, tools, techniques, and statistical analysis used in measuring key components of natural resources. The components include land, timber, vegetation, water, wildlife resources, human dimensions, and agriculture/range resources. The course is designed to develop a basic understanding of how to design and set up a survey or inventory, conduct field measurements, and statistically analyze data. This will lead to an improved understanding of resource management problem-solving and decision-making.

The lectures will focus on the theory and application of the inventory techniques and designs used to assess natural resource availability and condition. Students will develop an understanding of the use of these techniques to meet management objectives. The lab component will have a dual focus: on-the-ground inventory methods, and basic analysis of collected data. Field-based labs will introduce traditional and state-of-the-art equipment and methods used for inventory. Computer-based labs will give the students skills necessary to use inventory data in resource planning and problem solving.

Course Goals

This course has been designed to develop students' understanding of how resource management problem-solving and decision-making is based on measurements of the environment of interest, assessment of human interactions with the environment, and statistical analysis of resource measurements. Critical thinking, field techniques, and data analysis will all be emphasized.

Student Learning Outcomes

Upon completion of this course students should be able to:

1) Understand and describe a range of inventory techniques for natural resource measurement;
2) Use critical thinking to select appropriate measurement and inventory techniques for different resource types under differing circumstances and in various landscapes;
3) Statistically analyze inventory results in order to derive sound estimates of resource properties;
4) Meaningfully critique inventory and measurements methods described in published articles or reports;
5) Develop an understanding of the human perceptions tied to natural resource management, and how to measure and account for these perceptions.

Instructional Methods

Presentation of material for this course will include lectures, instructor-led discussions, student-led discussions, and assignments. Students are expected to complete reading assignments prior to each lecture. Assigned homework is expected as scheduled on the course outline.

Assignments

In addition to a mid-term and final exam, students will be responsible for thirteen lab write-ups and six assignments (generally problem sets or short-answer questions) over the course of the semester. Lab write-ups will be due at the next lab session, unless otherwise noted. Assignments will be handed out in class and also made available on Blackboard. The due date will be clearly marked on all assignments. Assigned reading will be posted to Blackboard.

Attendance

The student is responsible for all material distributed and presented in lectures and laboratory. Lecture attendance is important.

The student code of conduct can be found in the current UAF catalog and at the following website: http://www.uaf.edu/catalog/current/academics/regs3.html.

Grading

The grade received in this course will be based upon performance on exams, homework and lab assignments, and attendance. The following weighting scale will be used

<table>
<tr><th colspan="2">Components of grade</th><th colspan="2">Requirements for letter grade</th></tr>
<tr><td>Midterm Exam</td><td>25%</td><td rowspan="2">A+ > 96%
A 93% to 96%
A- 90% to 92%</td><td rowspan="2">C+ 77% to 79%
C 70% to 76%</td></tr>
<tr><td>Final Exam</td><td>25%</td></tr>
<tr><td>Class Assignments</td><td>15%</td><td rowspan="2">B+ 87% to 89%
B 83% to 86%
B- 80% to 82%</td><td rowspan="2">D 60% to 69%</td></tr>
<tr><td>Lab Assignments</td><td>35%</td></tr>
<tr><td>Total</td><td>100%</td><td></td><td>F < 60%</td></tr>
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Homework and lab assignments handed in after the due dates are subject to reduced credit at a rate of 5 points per day or 20 points per week (whichever is less).

Student Support Services and Disabilities Services

The instructor is available during posted office hours and upon appointment for additional assistance outside session hours. In addition, the University has many student support programs. The department will work with the Office of Disability Services to provide reasonable accommodation to students with disabilities. Disability Services provide a variety of services to assure equal access for all students. Interpreting services, educational assistants, note taking, and exam accommodations for students are the most frequently provided accommodations. Disability services also provides assistance to the university's rural campuses; Tanana Valley Campus, Bristol Bay, Chukchi, Interior-Aleutians, Kuskokwim, and Northwest.

The staff of Disability Services works with faculty in arranging appropriate services in the classroom. Questions should be directed to the Director of Disability Services at (907)-474-5655. http://www.uaf.edu/disability/
UAF Office of Disability Services
612 N. Chandalar, PO Box 755590
University of Alaska Fairbanks
Fairbanks, Alaska 99775-5590

Phone: (907) 474-5655 | TTY: (907) 474-1827 | Fax: (907) 474-5688

Course Calendar – Lecture and Lab Schedule

Week	Date	Topic (Lecture Mon & Weds; Lab Thurs)	Assignment Due
1	8/29	Introduction; measurement	
	8/31	Accuracy, precision, and bias; Basic statistical concepts	
	9/1	Lab 1: Basic statistical concepts	
2	9/5	LABOR DAY – NO CLASS	
	9/7	Basic land measurements	Estimation/critical thinking
	9/8	Lab 2: Veg sampling: fuel loads	Lab 1
3	9/12	Regression and correlation	
	9/14	Individual tree measurement	
	9/15	Lab 3: Measuring individual trees	Lab 2
4	9/19	Tree volume and biomass	Calculations/conversions
	9/21	Fixed area sampling	
	9/22	Lab 4: Fixed area sampling	Lab 3
5	9/26	Point sampling	
	9/28	Social Science: intro	Inventory assignment
	9/29	Lab 5: Point sampling	Lab 4
6	10/3	GIS and Remote Sensing	
	10/5	MIDTERM EXAM	
	10/6	Lab 6: GPS	Lab 5
7	10/10	Hypothesis testing	
	10/12	Statistical confidence	
	10/13	Lab 7: Hypothesis testing	Lab 6
8	10/17	Stratified sampling	Statistics problem set
	10/19	Stocking and stand density	
	10/20	Lab 8: Sampling	Lab 7
9	10/24	Tree growth and yield	
	10/26	Non-timber vegetation	
	10/27	Lab 9: Tree growth	Lab 8
10	10/31	Wildlife population dynamics	Sampling problem set
	11/2	Measuring and calculating diversity	
	11/3	Lab 10: Wildlife population dynamics	Lab 9
11	11/7	Wildlife measurements	
	11/9	Fish life cycles and measurement	
	11/10	Lab 11: Mark and recapture	Lab 10
12	11/14	Recreational resources	Fish age assignment
	11/16	Surveying resource users	

	11/17	Lab 12: Survey	Lab 11
13	11/21	Water resources	
	11/23	Resource competition and interaction	
	11/24	NO LAB -- THANKSGIVING	
14	11/28	Rangeland resources	
	11/30	Allocation of limited resources	
	11/31	Lab 13: Range measurements	Lab 12
15	12/5	Resources under varied management objectives	
	12/7	Resource management in a time of change	
	12/9	NO LAB	Lab 13
	12/12-12/15	NO CLASS – review sessions	
	12/16	FINAL EXAM	

Course Policies

1. **Attendance**: As part of the "Learning Community" all students are expected to attend and participate in class.
2. **Absences and Make-ups**: If necessary, excused absences must be arranged ahead of time with the Instructor.
3. **Tardiness**: Students are expected to arrive in class prior to the start of each class. If a student does arrive late, they are expected to do so quietly.
4. **Participation and Preparation**: Students are expected to come to class with assigned reading and other assignments completed as noted in the Syllabus.
5. **Assignments:** All assignments must be received by the Instructor no later than 12 p.m. on the due date as noted in the Schedule unless otherwise prior-arranged. Each assignment must have the following: Your Name; Date; Assignment Title.
6. **Graded Assignments**: It is the instructor's intention to grade and respond to student assignments within seven days of their receipt. At any time you may call and ask what you received on a specific assignment if you haven't yet received it back.
7. **Reporting Grades**: All student grades, transcripts and tuition information are available on line at http://ww.uaonline.alaska.edu and in the blackboard grades section. If you have difficulty accessing this web site, contact the registrar at your local campus.
8. **Written paper assignments**: All papers are expected to be typed and double spaced, with no misspelled words. Sentences should be grammatical and the paper easy to read. The burden is always on the writer to communicate with the reader. UAF has a writing lab and other tutoring services available to students (474-5314). It is also recommended that you have another person review your

draft before final submission for a grade. Written assignments may be emailed or turned in during class to the instructor.

9. **Plagiarism**: Plagiarism is using what another person has written, and using it as your own words and thoughts. Plagiarism is never acceptable. According to the University, plagiarism is preventable by students "not representing the work of others as their own. A student will attribute the source of information not original with himself or herself (direct quotes or paraphrases) in compositions, theses and other reports." The UAF Honor Code (Student Code of Conduct) defines the academic standards expected at UAF and is adhered to in this class as well.
10. All UA student academics and regulations are adhered to in this course. You may find these in UAF/UAS Catalogs.
11. **Confidentiality:** An important part of this course is the sharing of insights and experiences with other students. To benefit from this discussion, it is essential that we all maintain the confidentiality of children, families, programs and staff. We do not use names. We talk and write about children, families and staff in respectful ways.
12. **Incompletes, Withdrawal and No Basis Grading**: A student may request an Incomplete grade if there are factors beyond his/her control that effect the completion of the course AND the student has a C grade or higher at the end of the semester/course. A Faculty-Initiated Withdrawal is done by the instructor when the student has not met the criteria for passing the class, and is within the University-allowed drop period. A No Basis (NB) grade is provided if the student has not met attendance/assignment criteria, in lieu of a failing grade, provided it is after the University-allowed drop period. All are at the discretion of the Instructor.