NRM 240 – Natural Resources Measurement and Inventory

Instructor – Nancy Fresco
Lectures - MW 1:00-2:00 (via Zoom)
Lab – Monday 2:15 – 5:15 (Outdoors – meet outside on the south side of O'Neill. I'll bring lab materials, but please have a notebook, pen/pencil, phone if possible, and mask.)
Office Hours – by appointment – email me to set up a time to talk, get extra help, etc.
Email – nlfresco@alaska.edu (This is generally the best way to reach me.)

Reading:

There is no textbook for this class.

Reading material will include articles selected from published scientific literature and reports and websites produced by resource management agencies. These materials will be made available via Blackboard and web links. In some cases, you will be asked to search for literature online.

Course Description

How do natural resource managers know what's out there, and how it is changing over time?

Whether you are managing the timber in a forest, the salmon in a watershed, or the scenic vistas in a National Park, you need meaningful ways to measure the quantity, quality, and value of your resources.

This course is intended to familiarize students with terminology, tools, techniques, and statistical analysis used in measuring key components of natural resources. These 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. Critical thinking, field techniques, and data analysis will all be emphasized. This will lead to an improved understanding of resource management problem-solving and decision-making.

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

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.

Course Policies

Attendance, **Participation and Preparation**: Students are responsible for all material distributed and presented in lectures and laboratory. Although lectures are remote, lecture attendance is important. Students are expected to come to class with assigned reading and other assignments completed. If necessary, excused absences must be arranged ahead of time. 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.

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.

All assignments are expected to be legible. Sentences should be grammatical and easy to read. The burden is always on the writer to communicate with the reader. Assignments may be emailed or turned in during class to the instructor. All assignments must be received by the due date unless otherwise arranged. Each assignment must include the student's name.

Grades: It is my intention to grade and respond to student assignments within seven days, and to post these grades in Blackboard as well as returning assignments in class.

Students should feel free to talk to me about comments or grades made on any assignment or exam. All student grades, transcripts and tuition information are available on line at http://ww.uaonline.alaska.edu and in the blackboard grades section.

A student may request an **Incomplete** grade if there are factors beyond his/her control that affect 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.

Academic integrity: Plagiarism is using what another person has written, and using it as your own words and thoughts. Plagiarism is never acceptable. **Collaboration** and correct **referencing**, on the other hand, are not only acceptable, but are important aspects of scientific research and reporting. We'll be talking about this in class.

Grading

The grade received in this course will be based upon performance on exams, homework, and lab assignments. Lab grades will be based on participation (50%) and quality of the write-up (50%). The following weighting scale will be used. Grades will not be curved, although extra credit may occasionally be available.

<table>
<tr><th colspan="2">Components of grade</th><th colspan="2">Requirements for letter grade</th></tr>
<tr><td>Midterm Exam</td><td>20%</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>Homework Assignments</td><td>20%</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).

Disabilities Services

The University has many student support programs. The department will work with the Office of Disability Services to provide reasonable accommodation to assure equal access for all students.

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

Student Support Services

UAF has a wide range of tutoring and mentoring services available to students (474-5314). This includes a writing lab. Remember, science requires coherent writing!

Lecture, Lab and Assignment Schedule

Not that this schedule is approximate. Always check Blackboard to make sure of due dates, etc.

Week	Lecture #	Date	Topic (Lecture and lab Mon., lecture Weds.)	Assignment given	Assignment due
1	1	Mon Aug 24	Introduction; measurement		
1		Mon Aug 24		No lab the first week of class	
1	2	Weds Aug 26	Accuracy, precision, bias, and estimation	#1: Estimation and critical thinking	
2	3	Mon Aug 31	Sampling		#1: Estimation and critical thinking
2		Mon Aug 31	Lab 1: Berry data, veg sampling		
2	4	Weds Sep 2	Statistics -- intro	#2: Conversions	
3		Mon Sep 7	LABOR DAY NO CLASS		
3		Mon Sep 7	LABOR DAY NO LAB		
3	5	Weds Sep 9	Standard error, hypotheses		
4	6	Mon Sep 14	Confidence intervals, Type I and II error		#2: Conversions
4		Mon Sep 14	Lab 2: Measuring individual trees	Lab 2	Lab 1 due
4	7	Wed Sep 16	T-tests	#3 Basic stats problems	
5	8	Mon Sep 21	Point sampling		
5		Mon Sep 21	Lab 3: Tree data collection (TBD)	Lab 3	Lab 2 due
5	9	Wed Sep 23	Point sampling continued		#3 Basic stats problems
6	10	Mon Sep 30	Coordinate systems and mapping		
6		Mon Sep 28	Lab 5: Point sampling	Lab 5	Lab 4 due
6	--	Wed Sep 30	MIDTERM EXAM		
7	11	Mon Oct 5	Maps continued	#4: Ecological Datasets	
7		Mon Oct 5	Lab 6: Map&compass	Lab 6	Lab 5 due
7	12	Wed Oct 7	Land ownership and measurement		

8	13	Mon Oct 12	Stratified sampling		#4: Ecological Datasets
8		Mon Oct 12	Lab 7: Snow Sampling (weather dependent)	Lab 7	Lab 6 due
8	14	Wed Oct 14	Stratified sampling cont.		
9	15	Mon Oct 19	Power and sample size	#5 Wildlife Datasets	
9		Mon Oct 19	Lab 8: Intro to Excel	Lab 8	Lab 7 due
9	16	Wed Oct 21	Paired T tests		
10	17	Mon Oct 26	Population ecology and growth		#5 Wildlife Datasets
10		Mon Oct 26	Lab 9: Probability and CLT	Lab 9	Lab 8 due
10	18	Wed Oct 28	Pop. ecology cont.		
11	19	Mon Nov 2	Meta-populations and life tables	#6 Population Estimations	
11		Mon Nov 2	Lab 10: Hypothesis testing	Lab 10	Lab 9 due
11	20	Wed Nov 4	Estimating wildlife populations		
12	21	Mon Nov 9	Mark/recapture		
12		Mon Nov 9	Lab 11: Population dynamics	Lab 12	Lab 10 due
12	22	Wed Nov 11	Biodiversity		#6 Population Estimations
13	23	Mon Nov 16	Ecosystem valuation		
13		Mon Nov 16	Lab 12: Mark and Recapture	Lab 12	Lab 11 due
13	24	Wed Nov 18	Ecosystem valuation continued		
14	25	Mon Nov 23	Recreation opportunities		
14		Mon Nov 23	Lab 13: Species Richness	Lab 13	Lab 12 due
14	26	Wed Nov 25	NO CLASS -- THANKSGIVING BREAK		
15	27	Mon Dec 2	Rangeland resources and Water Resources		
15		Mon Dec 2	NO LAB THIS WEEK		Lab 13 due
15	28	Wed Dec 4	Lying with statistics		
		Mon Dec 7	NO LAB OR CLASS – possible review session		
		Weds Dec 9	FINAL EXAM – normal UAF schedule 11:15 -- 2:15		