

# **NRM 240 – Natural Resources Measurement and Inventory**

**Instructor** – Nancy Fresco

**Lectures** - MWF 10:30 -11:30 (105 Murie Building)

**Lab** – Thur 2:00 – 5:00 (359 O'Neill Bldg)

**Office Hours** – Tues 1:30-3:00, Thurs 9-11, or by appointment, IARC 415A#1

**Telephone No.** – 474-2405

**Email** – nlfresco@uaf.edu (This is generally the best way to reach me, especially outside of normal work hours.)

## **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 in class and via Blackboard and web links.

## **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. 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://www.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.

| <u>Components of grade</u>  |      | <u>Requirements for letter grade</u>           |                               |
|-----------------------------|------|--|-------------------------------|
| <i>Midterm Exam</i>         | 25%  | A+ > 96%<br>A 93% to 96%<br>A- 90% to 92%      | C+ 77% to 79%<br>C 70% to 76% |
| <i>Final Exam</i>           | 25%  |  |                               |
| <i>Homework Assignments</i> | 15%  | B+ 87% to 89%<br>B 83% to 86%<br>B- 80% to 82% | D 60% to 69%                  |
| <i>Lab Assignments</i>      | 35%  |  |                               |
| <b>Total</b>                | 100% |  | F < 60%                       |

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!

## DRAFT Lecture, Lab and Assignment Schedule

| Week | Lecture # | Date  | Topic<br>(Lecture Mon & Weds; Lab Thurs)  | Assignment Due                   |
|------|-----------|-------|---|----------------------------------|
| 1    |           | 8/28  | Introduction; measurement                 |                                  |
|      |           | 8/30  | Accuracy, precision, bias, and estimation |                                  |
|      |           | 8/31  | Lab 1: Berry data, veg sampling           |                                  |
| 2    |           | 9/4   | LABOR DAY – NO CLASS                      |                                  |
|      |           | 9/6   | Land measurements                         | Estimation/<br>critical thinking |
|      |           | 9/7   | Lab 2: Measuring individual trees         | Lab 1 due                        |
| 3    |           | 9/11  | Intro to stats                            |                                  |
|      |           | 9/13  | Intro to sampling                         |                                  |
|      |           | 9/14  | Lab 3: Data collection with Jan Dawe      | Lab 2 due                        |
| 4    |           | 9/18  | Stats continued                           | Calculations/<br>conversions     |
|      |           | 9/20  | T-tests                                   |                                  |
|      |           | 9/21  | Lab 4: Data collection with children      | Lab 3 due                        |
| 5    |           | 9/25  | Point sampling                            |                                  |
|      |           | 9/27  | Point sampling continued                  | Simple stats<br>assignment       |
|      |           | 9/28  | Lab 5: Snow sampling/point sampling       | Lab 4 due                        |
| 6    |           | 10/2  | Stats, regression                         |                                  |
|      |           | 10/4  | <b>MIDTERM EXAM</b>                       |                                  |
|      |           | 10/5  | Lab 6: Point sampling/snow sampling       | Lab 5 due                        |
| 7    |           | 10/9  | Coordinate systems and mapping            |                                  |
|      |           | 10/11 | Mapping continued                         |                                  |
|      |           | 10/12 | Lab 7: Maps and compasses                 | Lab 6 due                        |
| 8    |           | 10/16 | Stratified sampling                       | Sampling<br>problem set          |
|      |           | 10/18 | Stratified sampling cont.                 |                                  |
|      |           | 10/19 | Lab 8: Intro to Excel                     | Lab 7 due                        |
| 9    |           | 10/23 | Case studies -- data                      |                                  |
|      |           | 10/25 | Power, Type I, Type II error              |                                  |
|      |           | 10/26 | Lab 9: Probability and CLT                | Lab 8 due                        |
| 10   |           | 10/30 | Power and paired T-tests                  | Final stats<br>problem set       |
|      |           | 11/1  | Population ecology                        |                                  |
|      |           | 11/2  | Lab 10: Hypothesis testing                | Lab 9 due                        |
| 11   |           | 11/6  | Pop. ecology cont.                        |                                  |
|      |           | 11/8  | Population dynamics                       |                                  |
|      |           | 11/9  | Lab 11: Population dynamics               | Lab 10 due                       |

|    |  |       |                                  |                     |
|----|--|-------|----------------------------------|---------------------|
| 12 |  | 11/13 | Wildlife estimation              | Fish age assignment |
|    |  | 11/15 | Mark and Recapture               |                     |
|    |  | 11/16 | Lab 12: Mark and Recapture       | Lab 11 due          |
| 13 |  | 11/20 | Wildlife case studies            |                     |
|    |  | 11/22 | Rangeland and Water              |                     |
|    |  | 11/23 | NO LAB -- THANKSGIVING           |                     |
| 14 |  | 11/27 | Diversity and Richness           |                     |
|    |  | 11/29 | Diversity continued              |                     |
|    |  | 11/30 | Lab 13: Species Richness         | Lab 12 due          |
| 15 |  | 12/4  | Non-extractive use               |                     |
|    |  | 12/6  | Non-extractive continued         |                     |
|    |  | 12/7  | NO LAB – possible review session | Lab 13 due          |
|    |  | 12/16 | FINAL EXAM – UAF scheduled time  |                     |