NRM 240 – Natural Resources Measurement and Inventory

Instructor – Dr. John Yarie
Lectures - MWF 10:30 -11:30 (305 O'Neill Bldg.)
Lab – Thur 2:00 – 5:00 (359 O'Neill Bldg.)
Office Hrs – 337 O'Neill, 1P – 4:30P TWF,
Telephone No. - 474-5650 (Yarie);
Email - jayarie@alaska.edu

Textbook and additional reading material:
Avery, Thomas Eugene and Harold E. Burkhart. 2002. Forest Measurements. McGraw-Hill.456 pgs

In addition course material will be provided via Blackboard, with occasional handouts in class and web links.

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 could include:

Ravindranath, N. H. and Madelene Ostwald. 2008. Carbon Inventory Methods; Handbook for Greenhouse Gas Inventory, Carbon Mitigation and Roundwood Production Projects. Vol 29. Advances in Global Change Research. Springer. 304 pgs.

Hoover, Coeli M. (ed). 2008. Field Measurements for Forest Carbon Monitoring: A landscape-Scale Approach. Springer. 240 pgs.

Course Description

This course is intended to familiarize the student 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 an understanding of how basic field measurements/survey research and data analysis can lead to an understanding of resource management including problem-solving and decision-making.

The lectures will focus on the theory and application of inventory techniques and design used to assess natural resource availability and condition. The student will develop an understanding of the use of these techniques to meet management objectives. The lab component will focus on traditional and state-of-the-art equipment used for inventory. Basic analysis of information collected in the laboratory will give the students an idea of how the field measurements can be used to develop a knowledge base of the natural resource that is being managed and yield information that is needed for resource planning and potential problem solving

Course Goals

This course has been designed to develop an understanding of how resource management problem-solving and decision-making is based on measurements of the environment of interest and the human interaction. Data analysis techniques will be emphasized to gain an understanding of the natural and human characteristics tied to management of a natural resource.

Student Learning Outcomes

Upon completion of this course students should be able to:

1) Develop an understanding of inventory techniques.
2) Develop an understanding of methods used to derive sound estimates of resource properties.
3) Critical thinking about methods used to obtain resource information on specific landscapes and the management suggested as a result of those measurements.
4) Critical thinking about methods described in published articles.
5) Develop an understanding of how to measure the human perceptions tied to natural resource management.

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...

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>Exams</td><td>15% each</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>10%</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

The University has many student support programs. If you need assistance please contact any of the following service programs or departments. The instructor is available during posted office hours and upon appointment for additional assistance outside session hours.

Disabilities Services

The Forest Sciences 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 Schedule

Date	Lecture Topic (M, W)	Reading Assignment	Class Assignment Due
9/8	Introduction; measurement (L1)	Chapter 1	
9/10	Accuracy, precision, bias (L2)	Chapter 2	
9/15	Basic Statistical Concepts and Computations (L5)	Chapter 2	
9/17	Regression and Correlation (L8)	Chapter 2	Fermi problem set
9/22	Basic land measurements (L10 & L11)	Chapter 4	
9/24	Standing Tree Measurements	Chapter 7	
9/29	Individual tree measurement – Volume, cords, weight scaling	Chapter 5	Calculations/conversions
10/1	Tree Volume and Weight (L15 & L16)	Chapter 8	
10/6	**EXAM #1**		
10/8	Stand parameters (L17 &L18)		
10/13	Stand parameters (L17 &L18)		
10/15	Forest Inventory (L4 & L6)	Chapter 9	Inventory assignment
10/20	Sampling Designs (L9)	Chapter 3	
10/22	Fixed area sampling (L7)	Chapter 10	
10/27	Point sampling (L8)	Chapter 11	
10/29	Stratified, multistage, double sampling (L14)	Chapter 3	Statistics problem set
11/3	Stocking and stand density	Chapter 15	
11/5	Tree Growth (L19)	Chapter 16	
11/10	Stand Tables (L20)	Chapter 16	
11/12	**EXAM #2**		
11/17	Growth and Yield Models	Chapter 17	
11/19	Primary Forest Products		Sampling problem set
11/24	Non-timber vegetation (L21)	Chapter 18	
11/26	Wildlife population dynamics (L24)	Chapter 18	
12/1	Measuring and calculation diversity (L22)		
12/3	Rangeland (L23)		Fish age assignment
12/8	Water (L25)		
12/10	Recreational (L26)		
	FINAL EXAM		

A Tentative lab schedule is:

Date	Lab Topic (Thursday)	Lab Assignment Due
9/11	Vegetation sampling: fuel loads	
9/18	Measuring individual trees	Lab #1 due
9/25	Fixed area sampling	Lab #2 due
10/2	Point sampling	Lab #3 due
10/9	Compass and Maps	Lab #4 due
10/16	Probability and CLT	Lab #5 due
10/23	Hypothesis testing	Lab #6 due
10/30	Sampling	Lab #7 due
11/6	Tree growth	Lab #8 due
11/13	Wildlife population dynamics	Lab #9 due
11/20	Mark and recapture	Lab #10 due
12/4	Survey	Lab #11 due
12/11	Range measurements	Lab #12 due

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 grammatically correct

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.