NRM 73 Course Outline as of Fall 2015

CATALOG INFORMATION

Dept and Nbr: NRM 73 Title: INTRO FOREST MEASUREMENT
Full Title: Introduction to Forest Measurements
Last Reviewed: 3/23/2015

Units		Course Hours per Week		Nbr of Weeks	Course Hours Total	
Maximum	3.00	Lecture Scheduled	2.00	17.5	Lecture Scheduled	35.00
Minimum	3.00	Lab Scheduled	3.00	6	Lab Scheduled	52.50
		Contact DHR	0		Contact DHR	0
		Contact Total	5.00		Contact Total	87.50
		Non-contact DHR	0		Non-contact DHR	0

Total Out of Class Hours: 70.00 Total Student Learning Hours: 157.50

Title 5 Category:	AA Degree Applicable
Grading:	Grade Only
Repeatability:	00 - Two Repeats if Grade was D, F, NC, or NP
Also Listed As:	
Formerly:	FOR 73

Catalog Description:
Introduction to timber inventory systems, cruise designs, aerial photographic interpretation, and log scaling. Measurement of timber stand growth, quantity and quality, and other forest products including water, range, wildlife and outdoor recreation. Field trips are mandatory.

Prerequisites/Corequisites:

Recommended Preparation:
Eligibility for ENGL 100 or ESL 100; AND Eligibility for MATH 150A

Limits on Enrollment:

Schedule of Classes Information:
Description: Introduction to timber inventory systems, cruise designs, aerial photographic interpretation, and log scaling. Measurement of timber stand growth, quantity and quality, and other forest products including water, range, wildlife, outdoor recreation, carbon storage and fuel loading. Field trips are mandatory. (Grade Only)
Prerequisites/Corequisites:
Recommended: Eligibility for ENGL 100 or ESL 100; AND Eligibility for MATH 150A

Limits on Enrollment:
Transfer Credit: CSU;
Repeatability: Two Repeats if Grade was D, F, NC, or NP

ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:

AS Degree:	**Area**			Effective:	Inactive:
CSU GE:	**Transfer Area**			Effective:	Inactive:
IGETC:	**Transfer Area**			Effective:	Inactive:
CSU Transfer:	Transferable	Effective:	Spring 1984	Inactive:	Fall 2020
UC Transfer:		Effective:		Inactive:	

CID:

Certificate/Major Applicable:
Both Certificate and Major Applicable

COURSE CONTENT

Student Learning Outcomes:
At the conclusion of this course, the student should be able to:
1. Apply and use timber inventory systems, cruise designs, aerial photographic interpretation, and log scaling.
2. Measure and determine timber stand growth, quantity, and quality.
3. Evaluate other forest attributes on the site including water, range, recreational use, wildlife, carbon storage and fuel loading.

Objectives:
Upon successful completion of this course, students will be able to:
1. Discuss the objectives and goals of a forest inventory project.
2. Apply fundamental measurement and statistical methods to the mensuration of a variety of ecosystem components.
3. Measure and record data from a forest setting using state-of-the-art technologies utilized in the forest industry as well as simple measurement devices.
4. Select and apply appropriate problem solving techniques to specific measurement situations.
5. Collect and analyze data on the growth and yield of forest products over time.
6. Select appropriate software and measurement tools to perform forest inventory, cruising, and scaling in an efficient manner and according to industry standards.
7. Download GPS (Global Positioning System) data from recorder to PC to generate map and data tables.
8. Manipulate stand data using modeling software.
9. Apply various field-sampling methods.
10. Cruise standing timber and determine the quantity and quality of wood.
11. Scale logs for the board foot volume based on mathematical formulations.
12. Delineate timber types, cultural features and areas using stereoscopic aerial photography.
13. Identify commercial species of logs by bark and wood characteristics.
14. Assess the damage to wood volumes from insect, fire, suppressed conditions, and human factors, and estimate the financial loss.

Topics and Scope:

I. Forest Inventory
 A. Goals and objectives
 B. Scope of forest measurements
 C. Theory of forest measurements
 D. Units of measure
 E. U.S. customary vs. metric
 F. Volumes
 G. Area determination
II. Forest Measurements
 A. Scope of forest measurements
 B. Theory of forest measurements
 C. Units of measure
 D. U.S. customary vs. metric
 E. Volumes
 F. Area determination
III. Measurement Analysis Tools and Technologies
 A. Tools
    1. Field data collectors
    2. Hypsometers
    3. Loggers tapes
    4. Prisms
    5. Clinometers
    6. Relaskops
    7. Hand held distance lasers
    8. Cruisers sticks
    9. Scaling sticks
    10. Hand compass
    11. Planimeters
  B. Technologies
    1. Programmable hand held data collectors
    2. Hand held GPS units
    3. Laser range finders
    4. Stereoscopes
    5. Basic forest modeling software
    6. Increment borers
    7. Compensating polar planimeters
IV. Timber Cruising
  A. Identification of species
  B. Measurement of Trees
    1. Inventory equipment
    2. Utilization standards
    3. Height and diameter measurements
    4. Gross Volume Determination
  C. Grading of logs
    1. Recognition of defect types
    2. Cull Allowance for Defects
    3. Log Grade Estimation
    4. Net Tree Volume Determination
  D. Types of Cruises

1. Strip Cruising
2. Plot Cruising
3. Variable Plot Cruising

E. Volume tables
1. Local Volume Tables
2. Standard Volume Tables
3. Form Class Volume Tables
4. Volume Table Construction

F. Growth studies

V. Log Scaling
A. Log scaling defined
B. Gross and net volumes
C. Defects
1. Recognition of Defect Types
2. Cull Allowance for Defects
3. Log Grade Estimation
4. Net Log Volume Determination

D. Log scale tables and tools
1. Board Foot Log Rules
2. Cubic Foot Log Rules
3. Diagram Rules
4. Formula Rules

E. Identification of species of logs and finished lumber

VI. Timber Type Mapping
A. Aerial photo interpretation
B. Species identification
C. Delineation methods

VII. Other Forest Measurements
A. Wood products
B. By-products
C. Water
D. Range
E. Wildlife
F. Recreation
G. Soils
H. Fisheries
I. Carbon storage
J. Fuel loading

VIII. Inventory Analysis and Techniques
A. Data collection
B. Data analysis

Assignment:

Assignments may include:
1. Reading assignments that will average 10 - 15 pages per week.
2. Four timber inventory reports totaling twenty pages.
3. Timber inventory field notebook totaling twenty-five pages of field measurements, including measurements of tree heights, diameters, basal area, slope, aspect, stocking levels, species composition, log volumes and defects, growth rates fuel loading, and stand types, using measurement and analysis tools.
4. Five practice sets totaling fifteen pages of computations.

5. Laboratory exercises: field trips emphasizing the collection, examination, and evaluation of field data.
6. Locate points on the ground from a map or photo and stratify timber stands and identify species differences on aerial photography.
7. Prepare simple and accurate maps from field data.
8. Quizzes; final exam.

Methods of Evaluation/Basis of Grade:

Writing: Assessment tools that demonstrate writing skills and/or require students to select, organize and explain ideas in writing.

Timber inventory reports	Writing 20 - 30%

Problem Solving: Assessment tools, other than exams, that demonstrate competence in computational or non-computational problem solving skills.

Homework problems, field work, field notebook; lab exercises	Problem solving 40 - 50%

Skill Demonstrations: All skill-based and physical demonstrations used for assessment purposes including skill performance exams.

None	Skill Demonstrations 0 - 0%

Exams: All forms of formal testing, other than skill performance exams.

Quizzes and final exam: completion, short essay questions	Exams 30 - 40%

Other: Includes any assessment tools that do not logically fit into the above categories.

Attendance and participation	Other Category 0 - 10%

Representative Textbooks and Materials:
Introduction to Forestry. Sharpe, Grant; Henlee, John; and Sharpe, Wenonah. McGraw-Hill College, 2003 (classic)
Forest Mensuration (Managing Forest Ecosystems), Anthonie Van Laar, Springer. 2010.
Trees and Forest Measurement. West, Phil. Springer Verlag, 2009
Introduction to Remote Sensing, James B. Campbell. The Guilford Press. Fifth Edition. 2012
Instructor prepared materials