

SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ON



COURSE OUTLINE

COURSE TITLE: FOREST MENSURATION

CODE NO.: NRT 1190

SEMESTER: 1

**PROGRAM: FORESTRY TECHNICIAN, ABORIGINAL RESOURCE
TECHNICIAN**

AUTHOR: BOB CURRELL

DATE: May 2002 PREVIOUS OUTLINE DATED: June 2001

APPROVED: _____
DEAN

DATE

TOTAL CREDITS 3
PREREQUISITE(S): NONE

LENGTH OF COURSE: 3 HRS/WEEK X 16 WEEKS

TOTAL CREDIT HOURS: 48

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For additional information, please contact School of Natural Resources,
(705) 759-2554, Ext. 688

I. COURSE DESCRIPTION:

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This is a foundational course which introduces students to the techniques and instruments used in forest inventory field measurements. Background theory is reinforced with a great deal of outdoor practice in measuring tree diameters, heights and ages. The wedge prism, Normal Yield Tables and Ontario's forest Resource Inventory are introduced. Acquired forest measurement skills in this course will have direct application in many other forestry courses.

II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:

(Generic Skills Learning Outcomes placement on the course outline will be determined and communicated at a later date.)

Upon successful completion of this course the student will demonstrate the ability to:

1) Complete accurate, clear and legible field notes

Potential Elements of the Performance:

- fully complete area identification information headings on tally sheets and maps
- record inventoried trees by species and diameter class using a dot tally
- record all tally information clearly and completely

This learning outcome will constitute 5% of the course grade

2) Measure, classify and record tree diameters using accepted equipment and techniques.

Potential Elements of the Performance:

- explain the reasons for measuring tree diameters
- show the standard location (breast height) where diameter measurements are made on trees exhibiting different stem characteristics
- assign trees to different diameter classes given actual diameter measurements to 0.1 cm. Accuracy
- calculate basal area of trees given their diameters
- measure the diameters of trees to 95% accuracy using diameter tapes and parallel calipers

This learning outcome will constitute 20% of the course grade.

3) Measure and record tree heights

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Potential Elements of the Performance:

- show and describe five different height measurements it is common to make on forest trees
- describe five methods of measuring tree height
- calculate tree heights from measurements using hypsometers equipped with different scales; degree, per cent, 15, 10
- measure tree heights to 95% accuracy using a **Suunto** clinometer
- measure tree height to 95 % accuracy using a height pole
- construct and use a staff hypsometer to measure tree height to 92.5 % accuracy

This learning outcome will represent 20% of the course mark.

4) Measure the age of trees and explain the importance of these measurements

- illustrate how a tree grows in height and age over a number of years
- distinguish between annual rings of conifers and 2 types of hardwoods
- determine the age of conifers to 95 % accuracy using an increment borer
- list and describe the applications of tree aging
- describe dendrochronology and explain its applications

This learning outcome will represent 15% of the course grade.

5) Measure the Basal Area of Individual Trees and Entire Forest Stands

- determine the basal area of a tree of a known diameter
- describe the importance of basal area/ hectare information
- show the principle of calculating basal area through the use of angle gauges
- list the types of equipment which can be used to measure basal area per hectare
- demonstrate proficiency in the use of a wedge prism
- determine the basal area of sample plots to 95% accuracy

This learning outcome will represent 15% of the course total

6) Understand the Forest Resource Inventory system of measuring and recording forest information

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Potential Elements of the Performance

- describe the components of an FRI survey
- list the types of information collected in FRI ground plots and show the measurement error tolerances for each measurement
- calculate the basal area by species and the species composition of a forest area if you are given FRI ground plot tally information
- identify the area covered by an FRI map, based on its basemap reference number
- locate a spot on an FRI basemap, if given its complete UTM reference number
- prepare the stand number for an FRI forest stand, if given the UTM coordinates of its centre
- decode an FRI stand description as it appears on an FRI map or Stand Data Table
- prepare a complete FRI Stand Table notation if provided with FRI ground plot information for that area

This learning outcome will represent 20% of the course's grade

7) **Maintain and properly care for tree measurement equipment**

- wind and unwind a 30 m and/or 50 m tape onto a spool
- carry height poles, hypsometers, increment borers, diameter tapes and other equipment in order to avoid equipment damage
- Know how to sharpen and maintain an increment borer

This learning outcome will represent 5% of the course total. Up to 5% will be deducted for documented mis-use or loss of equipment.

III. TOPICS:

- 1) Introduction to Forest Measurements
- 2) Completing field notes
 - using the dot tally system
 - completing area identification information
- 3) Measuring Tree diameter
 - reasons for measuring tree diameter

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- location where tree diameter is measured on trees exhibiting different stem characteristics and slope positions
 - how to measure tree diameter, tree diameter classes
 - concept of Basal Area introduced
 - measuring tree diameters with diameter tapes, callipers, 30 m. tapes
- 4) Measuring Tree Height
- types of tree height measurements commonly obtained
 - methods of measuring tree height
 - calculating tree heights using readings obtained from a variety of clinometers
 - use of the Degree scale, % scale, 15 and 20 scales
 - calculating horizontal distances from slope distance information
 - measuring tree heights using Suunto, Haga, and staff hypsometers
 - an introduction to electronic clinometers
- 5) Tree Ages
- how trees grow in height and age
 - identifying annual growth rings in different species classes of trees
 - tree aging techniques
 - measuring tree age using increment borers
 - care and use of increment borers and increment cores
 - applications of tree aging
 - dendrochronology
- 6) Measuring Forest Density
- measurement of forest basal area
 - uses of basal area information
 - theory of angle gauges
 - measuring basal area with a wedge prism
 - using your thumb as an angle gauge
- 7) Forest Resource Inventory
- how an FRI inventory is carried out
 - information collection in FRI ground plots
 - measuring FRI ground plots
 - allowable error for FRI cruise data
 - reading FRI maps

IV. REQUIRED RESOURCES/TEXTS/MATERIALS:

Forest Mensuration Study Guide; 2002 edition

Note: revisions since 2001

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Silva Ranger or Suunto MC-1 compass

Computer account at Sault College in order to access:
Web CT course OEL 816 (Forest Mensuration Theory)

V. EVALUATION PROCESS/GRADING SYSTEM:

Tests (2) 50%

Assignments

And quizzes 50% There will be weekly field exercises and/or short written assignments. Field exercises include a tree height and diameter test which must be successfully completed to pass the course)

The following semester grades will be assigned to students in postsecondary courses:

<u>Grade</u>	<u>Definition</u>	<u>Grade Point Equivalent</u>
A+	90 - 100%	4.00
A	80 - 89%	3.75
B	70 - 79%	3.00
C	60 - 69%	2.00
R (Repeat)	59% or below	0.00
CR (Credit)	Credit for diploma requirements has been awarded.	
S	Satisfactory achievement in field placement or non-graded subject areas.	
U	Unsatisfactory achievement in field placement or non-graded subject areas.	
X	A temporary grade. This is used in limited situations with extenuating circumstances giving a student additional time to complete the requirements for a course (see <i>Policies & Procedures Manual - Deferred Grades and Make-up</i>).	
NR	Grade not reported to Registrar's office. This is used to facilitate transcript preparation when, for extenuating circumstances, it has been impossible for the faculty member to	

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report grades.

VI. SPECIAL NOTES:

This course will use the Web CT course OEL 816 (Forest Mensuration Theory) as an educational resource. Students will be expected to access this course frequently for additional information and occasional assignments.

- Special Needs
If you are a student with special needs (e.g. physical limitations, visual impairments, hearing impairments, learning disabilities), you are encouraged to discuss required accommodations with the instructor and/or contact the Special Needs Office, Room E1204, Ext. 493, 717, 491 so that support services can be arranged for you.
- Retention of Course Outlines
It is the responsibility of the student to retain all course outlines for possible future use in acquiring advanced standing at other post-secondary institutions.
- Course Modification
The instructor reserves the right to modify the course as deemed necessary to meet the needs of students.
- Disclaimer for Meeting the Needs of the Learners
- Substitute Course Information is available at the Registrar's Office.

Rewrite Policy

Students obtaining between 55% and 60% as a final mark in the entire course and who have an acceptable level of attendance will be offered the opportunity to write a supplemental test covering the whole course. A pass on this test will result in a pass in the course.

Field exercises will not be assigned other than at the scheduled class time. Students missing assignments will receive a mark of 0 for that activity.

Late Assignments

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There will be a 10%/day penalty for assignments received late (after 4:00 pm. on the due date)

VII. DIRECT CREDIT TRANSFERS:

Students who wish to apply for direct credit transfer (advanced standing) should obtain a direct credit transfer form from the Dean's secretary. Students will be required to provide a transcript and course outline related to the course in question.

VIII. PRIOR LEARNING ASSESSMENT

Students who wish to apply for advanced credit in the course should consult the instructor. Credit for prior learning will be given upon successful completion of the following: