

SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ON



COURSE OUTLINE

COURSE TITLE: FOREST MENSURATION

CODE NO.: NRT 119 SEMESTER: 1

**PROGRAM: FORESTRY TECHNICIAN
ABORIGINAL RESOURCE TECHNICIAN**

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DATE: MAY 2000 PREVIOUS OUTLINE DATED: JUNE 1999

**APPROVED: _____
DEAN DATE**

TOTAL CREDITS 3 PREREQUISITE(S): NONE

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I. COURSE DESCRIPTION:

This is a foundation 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 and normal yield tables are introduced. These skills will have direct application in many other forestry courses.

II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:

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:

- complete area identification information headings on tally sheets
- produce accurate and neat plot location maps
- use appropriate materials for recording data (pencil, rite in rain paper, etc.)
- record inventoried trees by species and diameter class using a dot tally
- prepare accurate cruise maps using standard mapping symbols

This learning outcome will constitute 10% 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 callipers

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

3) **Measure and record tree heights.**

Potential Elements of the Performance:

- describe five different height measurements commonly applied to 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 and a Haga 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.**

Potential Elements of the Performance:

- 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 4 applications of tree ageing (i.e. stand disturbance history – fire/insects, historical drought patterns)

This learning outcome will represent 10% of the course grade.

5) **Understand the Forest Resource Inventory system of measuring and recording forest information.**

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
- read Normal Yield Tables and calculate MAI, CAI and Gross Total Volume for any forest stand given a FRI map description
- calculate site class for any forested area given working group species, age and height

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

6) **Maintain and properly care for tree measurement equipment.**

Potential Elements of the Performance:

- 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 to avoid damage
- sharpen and maintain an increment borer

This learning outcome will represent 10% of the course total. Up to 5% will be deducted for documented mis-use or loss of equipment.

7) **Demonstrate proficiency in the use of a wedge prism.**

Potential Elements of the Performance:

- describe the importance of holding the prism at the centre of the plot
- explain the theory behind, and the operation of, the wedge prism
- define the term basal area
- determine the basal area of permanent sample plots to 95% accuracy

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

III. TOPICS:

- 1) Introduction to Forest Measurements
- 2) Completing field notes
 - using the dot tally system
 - completing area identification information
 - introduction to standard cruise mapping symbols
 - preparing cruise maps
- 3) Measuring Tree diameter
 - reasons for measuring tree diameter
 - 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
- 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 ageing techniques
- measuring tree age using increment borers
- care and use of increment borers and increment cores
- applications of tree aging

6) Forest Resource Inventory

- how an FRI inventory is carried out
- information collection in FRI ground plots
- using Normal Yield Tables and FRI map information to calculate stand MAI, CAI and Gross Total Volume

7) The wedge prism

- use the wedge prism to determine the basal area on permanent sample plots

IV. REQUIRED RESOURCES/TEXTS/MATERIALS:

Currell, B. 1999. **Forest Mensuration Study Guide**. Sault College of Applied Arts and Technology

Silva Ranger or Suunto MC-1 compass

Distance Education Students will require the following additional equipment:

- Suunto or Haga hypsometer
- 30 m. tape
- Diameter tape or parallel callipers
- Increment borer

V. EVALUATION PROCESS/GRADING SYSTEM:

Tests (2) 50%

Assignments and quizzes 50%

(A tree height and diameter test must be successfully completed to pass the course)

The following semester grades will be assigned to students in post-secondary 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 report grades.	

VI. SPECIAL NOTES:

Distance Education Students

Must complete a 2-day field session during their time at Sault College in the winter semester to evaluate their forest measurement skills. This will include a tree height and diameter test, which must be completed successfully to pass the course. These on-campus exercises will make up 20 of the 50 per cent course assignment mark. Students will receive an X grade until this fieldwork is completed.

Special Needs

Students 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.

Substitute Course Information is available at the Registrar's Office.

Health and Safety:

The operation, transport (carrying) and use of mensuration equipment in rough terrain and in inclement weather are inherently physically demanding. It is the responsibility of the student to discuss any potential difficulties with the Learning Assistance Centre. Students must wear appropriate safety gear during field operations (eye, hearing, head, foot protection) and dress appropriate to the weather.

Attendance:

Attendance at labs, lectures and field trips is important. There is a great deal of effort in planning, scheduling, budgeting, etc. involved in all aspects of the course. Students missing more than one lecture, one lab and one field trip will receive an "R" grade, unless there are exceptional circumstances.

A field trip schedule will be provided to students before the end of September. **Data gathered on these trips will form the basis for other assignments.**

Notetaking:

While the course study guide is a significant source of information for the course, it is not the only source. Students must take notes summarizing additional material that is presented in class. All material is valid test material.

Rewrites/Supplementary Exams:

There will be no rewrites/supplementary exams in this course.

Assignments:

All assignments must be submitted on time to pass the course, or be penalized 10% of the total mark per day including weekends. Check each assignment for the due date and time. Anything handed in past this time is late.

Assignments must be word-processed and follow formatting specifications outlined by the instructor. Students are responsible for ensuring that their assignments are received by the instructor.

Class Conduct:

Classes will be conducted in the same manner as would a meeting in the work place environment. Eating is not permitted, except for light snacks during group work or study periods.

VII. PRIOR LEARNING ASSESSMENT

Students who wish to apply for advanced credit in the course should consult the instructor.