

SAULT COLLEGE OF APPLIED ARTS & TECHNOLOGY  
SAULT STE. MARIE, ONTARIO

COURSE OUTLINE

Course Title: FOREST MENSURATION II

Code No.: FOR 109-4

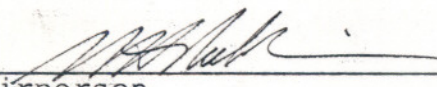
Program: FORESTRY TECHNICIAN

Semester: TWO

Date: SEPTEMBER, 1989

Author: J. G. WISKIN

New: \_\_\_\_\_ Revision: X

APPROVED:  July 25/89  
Chairperson Date

CALENDAR DESCRIPTION

**FOREST MENSURATION II**

**FOR 109-4**

COURSE NAME

COURSE NUMBER

**PHILOSOPHY/GOALS:**

To provide the student with a foundation in measurement principles and sampling techniques.

FOR 109 is a pre-requisite for FOR 203.

**METHOD OF ASSESSMENT (GRADING METHOD):**

Student assessment is based on:

**Practical Tests (lab and field)**

**Weight**

Log identification

Tree diameter

Tree height

> 25%

**Theory Tests (written)**

40%

**Assignments and Projects**

College woodlot cruise

Fish Hatchery cruise

Lab assignments

}  
}

35%

100%

Tests and projects are assigned a numerical grade. Letter grades have the following numerical equivalent:

**Projects, assignments and tests**

A+ = 90-100%

A = 80-89%

B = 75-79%

C = 60-74%

R = < 60%

Consistently Outstanding

Outstanding Achievement

Consistently Above Average Achievement

Satisfactory or Acceptable Achievement

Repeat- Objectives of the course not achieved and course must be repeated

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### Practical Tests

Students are required to attain competency standards in the use of the tree measuring instruments, consequently, a pass mark of 60% must be achieved on each test. One rewrite will be scheduled after each test.

### Projects and Assignments

Projects and assignments are assessed on the basis of accuracy (computations, measurements, etc.) and neatness, (proper format and drafting skills).

Projects and assignments handed in after the "due date" will be penalized by loss of marks up to a maximum of 10% per day.

### BOOKS, EQUIPMENT & SUPPLIES:

Manual of Forest Measurements and Instruments  
Lab Manual - Forest Mensuration - FOR 109  
Metric Scale  
Protractor, set squares  
T-square, Ames lettering guide  
Drawing pens  
Lettering templates  
Hand lens  
Calculator  
Computation paper  
Graph paper  
Hard hat (liner)  
Boots, warm clothing, rain gear  
Snowshoes  
Silva Ranger Compass

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<u>COURSE NAME</u>		<u>COURSE NUMBER</u>
<u>REF. NO.</u>	<u>TOPIC NO.</u>	<u>OBJECTIVES</u>
2967.04	1	<u>LOG IDENTIFICATION</u> <ul style="list-style-type: none"><li>- identify commercial tree species in the log form</li></ul>
	2	<u>METRIC (SI) UNITS</u> <ul style="list-style-type: none"><li>- state the unit symbol for a given measurement use</li><li>- use the correct form for writing metric units and symbols</li><li>- state equivalent values between millimetres, centimetres, metres and kilometres and between square metres and hectares</li></ul>
2967.04	3	<u>MEASUREMENT OF TREE DIAMETER</u> <ul style="list-style-type: none"><li>- define and locate dbh</li><li>- determine diameters for irregular trees</li><li>- determine diameter class midpoints and class limits</li><li>- define and derive tree basal area</li><li>- use the dendrometers (parallel calipers, diameter tape, Biltmore stick and parabolic calipers) to measure tree diameter</li><li>- use upper stem dendrometers to measure tree diameter</li><li>- calculate the calibrations for the Biltmore stick</li><li>- state four reasons why dbh is considered to be the primary tree measurement</li></ul>

FOREST MEASUREMENT II

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OBJECTIVES

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MEASUREMENT OF TREE HEIGHT

- define total and merchantable height
- describe the results of measuring a leaning tree
- name and describe hypsometers based on trigonometric principle (Abney, Haga, Suunto)
- use these hypsometers to determine total tree height
- from the degree scale, derive the percent and Haga scales
- name and describe hypsometers based on geometric principle (Staff, Merritt)
- describe how to use these hypsometers
- calculate the calibrations for the Merritt hypsometer

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FIELD NOTES

- name four important requirements of field notes
- list the type of information required in the design of tally sheets and map sheets
- use the dot-dash method for tallying tree diameters
- list the type of information to be included on site and stand description sheets
- write the common signs and symbols used for mapping forestry, land, water and cultural features
- list the abbreviations for commercial tree species (Ontario Ministry of Natural Resources)
- define the following land classifications, give examples and show the map symbol used:
  - (a) non-productive forest-land
  - (b) non-forested land
- apply field mapping techniques to actual field conditions
- use acceptable drafting skills to prepare a forest stand map

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SAMPLING IN FORESTRY

- define the following terms:
  - (a) sample
  - (b) sample unit
  - (c) stand table
  - (d) stock table
- state two basic differences between fixed-area and variable-area sample units
- describe how stand variability affects plot size or strip width
- compare the advantages and disadvantages of strips vs. plots
- describe two types of errors that may occur in forest sampling
- calculate the radius of circular plots and the side and diagonal of square plots, given the area
- calculate the area of a forest property in hectares, given the dimensions in metres
- define and calculate: -
  - (a) sample area in hectares
  - (b) sample volume in  $m^3$
  - (c) volume per hectare in  $m^3$
  - (d) total stand volume in  $m^3$
  - (e) sample intensity
- locate plot and strip sample units in the field; tally trees on the sample units by species and diameter

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THE MEASUREMENT OF TREE GROWTH AND AGE

- name and describe five ways of expressing tree growth
- name and describe three field methods for measuring past growth and predicting future growth
- define the following terms: -
  - o Periodic Increment (P.I.)
  - o Periodic Annual Increment (P.A.I.)
  - o Current Annual Increment (C.A.I.)
  - o Mean Annual Increment (M.A.I.)
- calculate average P.A.I. from increment cores
- determine past growth from stem analysis
- describe the relationship between P.A.I. and M.A.I.
- describe three stages in the pattern of tree height growth
- determine a future stand table using the stand-table projection method for predicting future growth
- express rate of growth as a percentage value
- from stand table data on permanent sample plots determine:
  - .mean basal area
  - .mean dbh
  - .percent change in growth

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THE MEASUREMENT OF TREE VOLUME

VOLUME TABLES

- list the variables commonly associated with
  - a) local volume tables
  - b) standard volume tables
- state whether these variables are dependent or independent
- define:
  - a) Gross Total Volume
  - b) Gross Merchantable Volume
  - c) Net Merchantable Volume
- state the advantage and the restriction of local volume tables