

SAULT COLLEGE
of APPLIED ARTS and TECHNOLOGY
Sault Ste. Marie

COURSE OUTLINE

FOREST MENSURATION

FOR 109-34



revised February 1978 by J. Wiskin

FOREST MENSURATION

FOR 109-3 4

Text:

Natural Resources Measurements - by T. E. Avery

General Objectives:

to provide the student with a foundation in measurement principles and techniques applicable to measurement problems in forestry.

I. Review of selected metric (SI and Derived) units and ratios.

II. Measurement of the standing tree

1. Diameter - the basic importance of tree diameter measurement is that it is one of the directly measurable variables from which cross-sectional area and volume can be computed.
 - (a) Diameter measuring techniques:
 - definitions and location of dbh
 - diameters for irregular trees
 - diameter - class midpoints
 - diameter - class limits
 - diameter - inside and outside bark
 - (b) Basal area
 - derivation of cross-sectional area
 - (c) Relationship of tree-stem and tree-crown diameters for aerial volume tables.
 - (d) Instrument for measuring diameter
 - description and method of calibration
 - correct use of the instruments
 - comparison of instruments, advantages and disadvantages.
 - (i) Tree calipers
 - (ii) Diameter tape
 - (iii) Biltmore stick
 - (iv) Upper-stem dendrometers
 - Spiegel Relaskop
 - Wheeler Pentaprism

2. Height - the basic importance of tree height measurement is that it is one of the directly measurable variables from which volume can be computed.
- (a) definition of total and merchantable height, height class
 - (b) height measuring techniques
 - measurement of leaning trees
 - (c) Instruments for measuring heights of trees (hypsonometers)
 - (i) Hypsonometers based on trigonometric principles:
 - Abney hand level
 - Haga Altimeter
 - Suunto Clinometer
 - Speigel Relastop
 - Derivation of formulae for degree scale, percent scale and topographic scale.
 - Correct use of the instruments in the field
 - Comparison of instruments, advantages and disadvantages.
 - (ii) Hypsonometers based on geometric principles (similar triangles)
 - Staff Hypsonometers
 - Merritt hypsonometers
 - method of calibration
 - correct use of the instruments
 - comparison of instruments, advantages and disadvantages.
3. Maps and Field Notes
- Maps -
- (a) Introduction - importance of maps and various types of maps related to forestry
 - (b) Essential map components - title, scale, true and magnetic meridians, legend, other
 - (c) Measurement of length and area
 - (d) Types of Map scales - statement, ratio, representative fraction, bar scale
 - (e) Determination of area from maps of various scales - planimeter, det grid, line transect, squared paper

Field Notes

- (a) the purpose, requirements and essentials of good field notes
- (b) field mapping techniques
- (c) tally sheets - purpose, essentials and techniques

IV. Timber Cruising

An introduction to timber cruising as a sampling process

- (a) reasons for sampling
- (b) sampling terminology
- (c) types of sample units - fixed - area sample units - strips and plots
- variable - area sample units - point sampling
- (d) intensity of sample
- (e) application of sampling techniques in the field and methods of compilation and presentation of field data:
 - compassing
 - chaining
 - tree measurement
 - tallying
 - mapping
 - compilations - stand and stock tables, volume per unit area, total stand volume
 - forest stand map

PROPOSED SCHEDULE

FOR 109-3⁴

Semester 2, January 9 - April 28, 1977

Week	Lecture	Lab
1	Introduction of Course	Metric System Review Tree Diameters - Instruments
2	Tree Heights - Instruments Based on Right Triangles	Tree Heights - instruments
3	Tree Heights - Instruments Based on similar triangles	Tree Heights - instruments
4	Tree Diameter and Height Review	<u>Field</u> - Tree Diameter and Height
5	<u>Theory Test</u> - Tree Dia- meter and Height	<u>Field Test</u> - Tree Diameter and Height
6	Field Notes	<u>Field Mapping</u> - Conventional Signs and Forest Cover Legends
7	Field Notes	Timber Cruise - organization
8	W I N T E R	B R E A K
9	Timber Cruising	<u>Field</u> - Demonstration Cruise
10	Timber Cruising	<u>Field</u> - all day cruise
11	Timber Cruising	Area Determination
12	Volume Tables	Cruise Compilation
13	Review	<u>Map</u> - Pantograph, lettering
14	<u>Theory Test</u>	Cruise Compilation and map
15	Wedge Prism-Theory	Wedge Prism-Field
16	Rewrites	Rewrites