

SAULT COLLEGE

of APPLIED ARTS and TECHNOLOGY

Sault Ste. Marie

COURSE OUTLINE

FOREST MENSURATION
FOR 209-3

revised February 1978 by J. Wiskin

CALENDAR RESUME

FOR

is this self taught?

FOREST MENSURATION
FOR 209-3

The organization of an operational cruise including the preparation of stand maps from aerial photographs, location of sample units, application of sampling methods in the field, tabulation and presentation of data and recommendations for improvements to the study area.

The study of growth of trees and stands, growth measurements and growth predictions.

FOREST MENSURATION

FOR 209-3

Text: Natural Resources Measurements - by T. E. Avery

I. Operational Survey Project

General Objectives:

to identify problems associated with the purpose, organization and implementation of an operational survey for a forest property.

More specifically:

- (a) prepare a forest stand map of a forest property from aerial photographs
- (b) organize and implement a preliminary cruise of the property
- (c) from the preliminary cruise data to design an operational survey that is statistically sound.

II. Forest Inventory Methods in Canada

Obj: to provide an overview of the present status of resource inventories in Canada

Ref: - Canadian Forest Inventory Methods

- Canadian Institute of Forestry Workshop, Dorset, 1974

III. Growth of trees and stands

Obj: to identify the elements of tree growth, techniques of growth measurement and growth prediction.

- (a) elements of tree growth
- (b) current, periodic and mean annual growth
- (c) growth curves
- (d) growth measurements - stem analysis
- increment borings
- permanent sample plots
- (e) growth prediction

Operational Survey Project

INTRODUCTION: Planning for forest management, whether for an immediate operation or for a long term, requires a forest survey as its basis. Surveys may differ greatly according to the purpose for which the data are to be used. Two types of surveys are inventory surveys and operational surveys. The inventory survey covers the area of the management unit with field sampling of relatively low intensity, providing the data required for the preparation of a management plan. The operational survey covers the areas within the unit to be cut or improved during a portion of the management period and provides the detailed information for the preparation of an operating plan.

PURPOSE of project: to acquaint the student with the design and implementations of an operational survey for a forest property.

The basis of an operational survey is an accurate forest stand map. Each student will be required to type the aerial photographs and prepare a forest stand map of the property.

More specifically:

- (i) to accurately locate the property boundaries on the photos
- (ii) to "type" the photos, i.e. to delimit forestry, cultural and other features on the photos
- (iii) to accurately transfer the features from the photos to a base map

- by means of a sketchmaster
- (iv) to prepare an ink tracing of the forest stand map using the correct signs and symbols.
 - (v) to number all stands and features
 - (vi) to identify all stands and features on the map (major species only)
 - (vii) to determine and enter on the map the areas of stands and other features.
 - (viii) to letter (either freehand or mechanically) or draw the required map components--title, scale, true north meridian, legend, name and date.

Submit the typed photos for assessment on or before _____

Submit the forest stand map on or before _____

NOTE: method of assessment is attached.

Each crew (2 students) will be required to design an operational survey for the property. (Ref.--Avery, Natural Resources Measurements)

Factors to be considered in the design of the survey:

- (i) information required for the operating plan and the method of presentation.
- (ii) cost--information should be obtained at a cost which bears realistic relationship to the value of the timber.
- (iii) sample intensity (ref:-Avery, sec 8-9)
- (iv) plot size and shape (ref:-Avery, sec 2-23 and sec 8-8)
- (v) sampling design--systematic, random (ref:--Avery, sections 2-24 to 2-27 inclusive)
- (vi) diameter limits and diameter class intervals.

- (vii) Volume tables and merchantability factors
- (viii) tree species and tree classification
- (ix) tally sheets and map sheets
- (x) method of recording additional information if required. e.g. site and stand descriptions.
- (xi) equipment list
- (xii) personnel (size of crews and crew duties)

"To plan an inventory that is statistically and practically efficient, enough sample units should be measured to obtain the desired standard of precision--no more and no less." (Avery--Natural Resources Measurements)
The desired number of sample units may be determined by measuring a small preliminary sample of the population.

The preliminary sample is the only field cruise required of the students.

This means that the design of the operational survey will be stated and sample units (plots) located on the forest stand map but will not be implemented.

For the preliminary sample (or cruise) each crew will:

- (i) establish cruise specifications and fixed procedures (refer to "Factors to be considered in the design of the survey")
- (ii) locate cruise lines, sample plots, tie-points, and directions of lines on the forest stand map to sample as many stands as possible in the time allotted. The length of cruise line and number of plots established will be largely dependent on the number and condition of stands, topography, accessibility, time available, weather etc. As a guideline, use 2000 m and 15 sample plots, per crew day. Submit a copy of the map with the proposed cruise lines to the instructor.

- (iii) cruise the property according to established procedures.

Cruise Compilations

Each crew will

- (i) calculate volume per ha for each species and each plot.
- (ii) calculate measures of dispersion and number of sample plots required for the operational survey and their distribution.
- (iii) locate the sample plots on the forest stand map.

J. W. W. W.

FOREST MENSURATION FOR 209
GRADING SYSTEM 1983

A. Sampling in forest inventories	(70%)
	<u>Approx. Weight</u>
Assignment #1 400 ha woodlot	15%
#2 Timber inventory design	35%
Test	20%
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B. Growth of trees and stands	30%
Lab assignments	10%
Test	<u>20%</u>
	100%

Letter grades have the following numerical equivalents:-

- A 80-100%
- B 70-79%
- C 60-69%
- I Less than 60%

Assignments are to be handed in for marking on or before an established "Due Date" otherwise marks will be deducted (percentage).