

GRANDE PRAIRIE REGIONAL COLLEGE
DEPARTMENT OF SCIENCE AND TECHNOLOGY

Bachelor of Applied Forest Resource Management

FOREST MENSURATION II: FO4280

Pre-requisite: FO 2370 (Mensuration I)

Calendar Description:

Forest inventory methods. Sampling technique and design. Measurement of non-timber forest resources.

Instructor: Albert Sproule
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Lectures: Monday and Wednesday: 13:00 – 14:20 C316

Course Description:

Forest mensuration is defined (Young and Giese, 1990) as “the science dealing with the measurement of volume, growth and development of individual trees and stands and the determination of various products obtainable from them”. The ‘various products’ refers to fibre products and also to other forest values such as recreation, wildlife.

Our course will deal with the methodology of data collection during a mensuration exercise, i.e. an inventory or timber cruise. Also, in the concept of present-day forestry, it will lead us to consideration of inventories of other forest resources such as wildlife and recreation.

We will study the planning of forest inventories and the different sampling techniques and designs used in collecting inventory data:

- Review of the concept of sampling and sampling terminology.
- Temporary versus permanent sample plots.
- Acceptable levels of error in collected data.
- Sample design:
 - Probability sampling
 - random sampling
 - stratified random sampling
 - multistage sampling
 - multiphase, including ‘double’ sampling
 - horizontal point (angle-guage sampling)
 - 3P sampling
 - Line Intersect Sampling (LIS)
 - Sequential sampling
 - The beetle probe

- Non-random sampling
 - selective sampling
 - systematic sampling
- Estimation of required plot numbers and plot sizes.
- Precision and accuracy.
- Statistical implications of probability versus non-random sampling.
- Sampling with replacement versus sampling with no replacement.
- Point sampling versus fixed area sampling.

Throughout the course students will be kept apprised of the various mensurational strategies and methodologies currently used in the forest industry.

TEXTS AND REFERENCES

RECOMMENDED

Freese, F. (1962). Elementary Forest Sampling. U.S. Dept. Agric. Handbook # 232.

TEXTS AVAILABLE IN THE LIBRARY

Avery, T.A. and H.E. Burkhardt. (1994). Forest Measurements. 4th Ed. McGraw-Hill, New York. 408 pp.

Husch, B., Miller, C.I. and T.W Beers. (1993). Forest Mensuration. Krieger Publishing Company, Malabar, Florida. 402 pp.

Cochran, W.G. (1977). Sampling Techniques. John Wiley & Sons, New York.

SCIENTIFIC JOURNALS AND PERIODICALS AVAILABLE IN THE LIBRARY

Canadian Journal of Forest Research

Forestry Chronicle

Northern Journal of Applied Forestry

Silviculture

WEBSITE

www.canadian-forests.com;

www.fs.fed.us

EXAMINATIONS AND MARK ALLOCATION

Mid-term examination	30%
assignments, reports, quizzes	35%
Final examination	35%

LECTURE SCHEDULE

Week 1	Overview of sampling in forestry
Week 2	Stratified random sampling
Week 3	Regression estimators <ul style="list-style-type: none">• Family of regression estimators<ul style="list-style-type: none">• Mean-of-ratios estimator• Ratio-of-means estimator
Week 4	Double sampling
Week 5	Cluster sampling Two-stage sampling
Week 6	Sampling for discrete variables
Weeks 7, 8	Horizontal point (angle-guage) sampling – includes field lab.
Week 9	3P sampling
Week 10	Line Intersect Sampling (LIS) – includes field lab.
Week 11	Sequential sampling
Week 12	Beetle probe
Week 13	Relative efficiency of sampling plans Design steps in a forest inventory
Week 14	Appropriate application of different sampling techniques