GRANDE PRAIRIE REGIONAL COLLEGE

DEPARTMENT OF SCIENCE AND TECHNOLOGY

Bachelor of Applied Forest Resource Management

Forest Mensuration II: FO4280

Pre-requisite: FO 2370 Forest Mensuration I

Calendar Description:
Measurement of timber and non-timber forest resources. Forest inventory methods. Sampling technique and design. Development and use of growth and yield models. Analytical methods in forest mensuration.

Instructor: Jennifer Hacking
Office: C408
Phone: 539-2873
e-mail: jhacking@gprc.ab.ca

Lectures: Mondays/Wednesdays 10:00 – 11:20 a.m.
B207

Texts:

Recommended:
Avery, T.E., and H.E. Burkhart, 1994.**Forest Measurements, 4th ed.,** McGraw-Hill.

References 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.

Compendium of Canadian Forestry Statistics. (1996). Canadian Council of Forest Ministers.

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

Scientific Journals and Periodicals available in the library
Canadian Journal of Forest Research
Forestry Chronicle
Northern Journal of Applied Forestry
Silviculture

Websites
www.canadian-forests.com
www.fs.fed.us

Course Outline

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, etc.

The following topics will be covered in this course:

- purpose of the inventory
- 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
    - non-random sampling
        - selective sampling
        - systematic sampling
- estimation of required plot numbers and plot sizes
    - fixed area plots
    - variable radius plots
- precision and accuracy
- regression analysis
- multiple linear regression
- statistical implications of probability versus non-random sampling
- sampling with replacement versus sampling with no replacement
- point sampling versus fixed area sampling

- estimating growth and yield
- measures of density
- site quality
- sampling design stages
- examples of forest inventory design

Traditionally, inventories of non-timber forest values have not received as much attention as inventories of fibre values. In part this was because they were not regarded as important and in part was probably also due to the difficulty of conducting an inventory and attaching actual monetary values to the results. Providing that time is available, we will consider the measurement of:

- rangeland resources
- fish and wildlife resources
- water resources and
- recreational resources

Course Evaluation:

Five assignments	40%
Midterm exam	25%
Final exam	35%

Important dates:

Assignment #1 due	January 16
Assignment #2 due	January 30
Midterm exam	February 13 (negotiable)
Assignment #3 due	March 6
Assignment #4 due	March 20
Assignment #5 due	April 3
Final exam	TBA

Barring tragic circumstances, late assignments will not be accepted, marked, or included in the course mark.

Assignments will consist of questions drawn directly from readings and material covered in classes. Assignments may be submitted by e-mail, but be aware that typing mathematical symbols can sometimes cause confusion.

Lecture Schedule

Week	Date	Topic
1	Jan 7	Introduction, review concepts, purpose of inventory, precision, accuracy
1	Jan 9	Sampling design – simple random sampling
2	Jan 14	"
2	Jan 16	Stratified random sampling
3	Jan 21	"
3	Jan 23	Non-random sampling – selective and systematic – line intersect and point sampling
4	Jan 28	"
4	Jan 30	Ratio/regression sampling
5	Feb 4	Simple linear regression
5	Feb 6	"
6	Feb 11	Review class
6	Feb 13	**Midterm**
7	Feb 18	No classes – Family Day
7	Feb 20	Multiple linear regression
8	Feb 23 – Mar 3	Break
9	Mar 4	Multiple linear regression
9	Mar 6	Cluster samples – fixed area and variable radius plots
10	Mar 11	Fixed area plots – stand and stock tables
10	Mar 13	Variable radius plots – stand and stock tables
11	Mar 18	Analysis of measurement data
11	Mar 20	Estimating growth and yield
12	Mar 25	"
12	Mar 27	Sampling design steps
13	Apr 1	Examples of forest inventory design
13	Apr 3	Measurement of non-timber forest resources
14	Apr 8	"
14	Apr 10	Review class