SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ON

COURSE OUTLINE

COURSE TITLE: Mapping & Forest Measurement

CODE NO.: FOR 125-4 **SEMESTER:** One

PROGRAM: Forest/Fish & Wildlife/Parks & Rec./Ren. Res.

AUTHOR: Erwin Goertz

DATE: February 1997 **PREVIOUS OUTLINE DATED:** June 1996

APPROVED: _____ Feb 19/97
DEAN DATE

TOTAL CREDITS 4

PREREQUISITE(S): none

LENGTH OF COURSE: 4 Hours/Week **TOTAL CREDIT HOURS:** 64

MAPPING & FOREST MEASUREMENT — COURSE NAME

FOR 125-4 — CODE NO.

I. COURSE DESCRIPTION: The overall aim of this course is to gain the necessary skills to navigate in the out-of-doors, to read and obtain information from natural resources related maps, and gain the skills necessary for the professional presentation of field notes and technical maps. Students will learn to use basic cartographic equipment as well as forest mensuration equipment.

II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:

Upon successful completion of this course, the student will demonstrate the ability to;

1) Use basic cartographic equipment including T-square, metric/imperial scales, Ames lettering guide, technical pen, navigational protractor and mechanical lettering set for the professional presentation of maps.

   Potential Elements of the Performance:
   - use the metric/imperial scales for distance measurement using a variety of maps
   - identify the components of the Ames lettering guide
   - measure directions and apply magnetic declination on maps using a navigational protractor
   - identify the components and properly set up a mechanical lettering set

2) Correctly use mapping signs and symbols in the process of preparing maps.

   Potential Elements of the Performance:
   - use the Single Stroke Commercial Gothic lettering style correctly (vertically & diagonally)
   - be able to convert from one unit of measurement to another (metric/imperial units)
   - be able to round decimals and relate this to significant digits
   - record field information legibly on tally sheets using proper symbols
   - be able to prepare field notes

3) Use and interpret forest stand maps and topographic maps correctly. This includes being able to accurately reference any point using longitude/latitude as well as using UTM co-ordinates.

   Potential Elements of the Performance:
   - recognize the different ways of expressing map scales
   - identify all lines, numbers and symbols on maps
   - properly use the imperial scale for longitude/latitude estimation
   - be familiar with the use of GPS in accurately geographically referencing a point
   - be able to determine if contours increase/decrease in elevation
   - determine gradients

- identify the components of a forest stand description
- identify symbols which relate to non-forested land, unproductive forest land and productive forest land
- draw topographic profiles

4) Be able to determine areas on maps using a dot grid, the line transect method and a digital planimeter.

Potential Elements of the Performance:
- determine the number of hectares per dot on a dot grid for any given scale
- know how to handle dots that fall on the area boundary
- know the components/keys on a digital planimeter
- understand the principles which allow us to calculate (measure) area using a dot grid, the line transect method and a digital planimeter

5) Be able to use a magnetic hand compass and traverse within 5% accuracy.

Potential Elements of the Performance:
- determine azimuths and bearings and convert from one to the other
- understand and set magnetic declination on a compass
- determine pacing factor and be able to pace distances
- use a 30 m tape and 50 m rope for distance measurements
- run computer software for mapping a traverse
- use snowshoes effectively

6) Be able to use a diameter tape, calipers and a 30 m tape to measure tree diameters within 5% accuracy

Potential Elements of the Performance:
- identify the proper side and way of handling a diameter tape
- identify different types of calipers and place diameters in different diameter classes
- define and locate dbh on a tree
- correctly use the DOT TALLY system

7) Be able to use a staff (stick) and a 30 m tape/50 m rope in order to measure tree heights within 10%.

Potential Elements of the Performance:
- understand the principles of similar triangles
- hold the staff (stick) in the correct position for height estimation

8) Be able to use a Haga and Suunto to measure tree heights within 3% accuracy.

Potential Elements of the Performance:
- define total height and merchantable height
- describe hypsometers based on trigonometric and geometric principles
- be able to apply the mathematics of Cosine and Sine rules
- understand the best location from which to measure tree heights (i.e. leaning trees)

9) Be able to determine tree age through the use of an increment borer.

Potential Elements of the Performance:
- understand how a tree puts on growth rings
- know the additional years needed to add and calculate total age
- identify the components of an increment borer
- recognize wrong practices which lead to damaging the borer

10) Be able to clean and perform regular maintenance on all equipment handled during this course.

Potential Elements of the Performance:
- know how to properly use, clean and store a technical pen
- know how to properly wind a 30 m tape/50 m rope onto a spool
- be able to clear an increment borer of debris and lubricate it

III. TOPICS:

1. Introduction to course, lettering style and units of measurement and conversions.
2. Determining directions indoors using a navigational protractor.
3. Determining directions outdoors using a magnetic hand compass.
4. Determining distances indoors using the imperial/metric scales.
5. Determining distances outdoors using tapes, ropes and pacing.
6. Compassing and chaining exercise.
7. Using the Ames lettering guide and understanding forest mapping symbols and lettering aids.
8. Using the technical pen and mapping a traverse.
9. Understanding and creating field notes, measuring tree diameters with calipers and diameter tape.
10. Measuring tree heights using a Suunto and Haga height finder. Understanding the staff hypsometer.
11. Review of tree heights. The measurement of tree age using an increment borer.
12. Understanding grid networks and referencing points on the earth's surface. Using Global Positioning Systems (GPS)
13. Determining areas using a dot grid, the line transect method and a digital planimeter.
14. Topographic maps and reading contours.
15. Outdoor field exercise.

IV. REQUIRED RESOURCES/TEXTS/MATERIALS:

1. Mapping & Forest Measurement Manual
2. T-square (30" plastic)
3. Staedtler technical pen set (0.35 & 0.50 pen tips)
4. NTS 1:50000 map sheet # 41K/9
5. Blank white paper (8 1/2" x 11")
6. 11" x 17" mylar sheets (2)
7. Forestry Kit #05 which includes pouch, imperial/metric scales, navigational protractor, Ames lettering guide, set square, HB, H, 6H pencils, lettering templates and masking tape
8. Calculator
9. Clipboard
10. Silva Ranger compass or Suunto MC-1 compass
11. Mapping Software diskette (from Instructor)
12. Dot grid (from Instructor)

V. EVALUATION PROCESS/GRADING SYSTEM:

Evaluation will be based on weekly quizzes, assignments handed out in class, assignments to be completed in the field and tests.

1. Quizzes	10 %
2. Assignments	40
3. Tests (2)	50
	100 %

A passing grade in this course is 60 %. Quizzes are given at the beginning of each class. Students who are late for class will forfeit the quiz mark. Assignments which are conducted in the field must have a passing grade of 60 %.

The following letter grades will be assigned:

A+	Consistently outstanding	(90-100%)
A	Outstanding achievement	(80-89%)
B	Consistently above average achievement	(70-79%)
C	Satisfactory or acceptable achievement	(60-69%)
R	Repeat the course	
CR	Credit Exemption	
X	Incomplete. Additional work must be handed in.	

NOTE: Students may be assigned an "R" grade early in the course for unsatisfactory performance.

VI. SPECIAL NOTES:

- If you are a student with special needs (e.g. physical limitations, visual impairments, hearing impairments, learning disabilities) you are encouraged to discuss required accommodations with the instructor and/or contact the Special Needs Office, Room E1204 (telephone extension 493, 717, or 491) so that support services can be arranged for you.

- Students who engage in "academic dishonesty" will receive an automatic failure for that submission/test and/or such other penalty up to and including expulsion from the course, as may be decided by the professor.

- Your instructor reserves the right to modify the course as he/she deems necessary to meet the needs of the students. This may be due to the availability of equipment, transportation or a result of weather conditions.

VII. PRIOR LEARNING ASSESSMENT:

Students who wish to apply for advanced credit in the course should consult the instructor.