DOC.#141

SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ON

COURSE OUTLINE

COURSE TITLE: MAPPING AND FOREST MEASUREMENT

CODE NO.: FOR125-4 SEMESTER: I

PROGRAM: FISH & WILDLIFE/FORESTRY/PARKS & OUTDOOR RECREATION TECHNICIAN

AUTHOR: ERWIN GOERTZ

DATE: JUNE 1996 PREVIOUS OUTLINE DATED: NEW

APPROVED: _____ June 28/96

DEAN, SCHOOL OF SCIENCES AND NATURAL RESOURCES DATE

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TOTAL CREDITS: 64

I. PHILOSOPHY/GOALS:

The overall aim of this course is to teach the skills necessary for the professional presentation and reading of a technical map. It emphasizes the use of the magnetic hand compass, the understanding of azimuths and bearings. It also covers the practical use of various instruments for measuring tree age, height and diameters.

II. STUDENT PERFORMANCE OBJECTIVES:

Upon successful completion of this course the student will:

1. Understand and use correct signs and symbols related to mapping.
2. Use and interpret various types of maps e.g. forest stand map, base map, topographic map.
3. Use basic drafting equipment such as T-square, metric/imperial scale, Ames lettering guide, navigational protractor and mechanical lettering set.
4. Demonstrate, skill in line work and area determination (dot grid, line transect method and digital planimeter).
5. Prove competency in the use of the magnetic hand compass.
6. Prove competency in the use of dendrometers (diameter tape, calipers) to measure tree diameters.
7. Prove competency in the use of hypsometers (Haga, Suunto).
8. Determine tree age through the use of an increment borer and be able to describe the steps required for the care and maintenance of an increment borer.

III. TOPICS TO BE COVERED:

1. Introduction to course, lettering style and Units of Measurement and Conversions.
2. Determining directions indoors using a navigational protractor.
   Determining directions indoors using a magnetic hand compass.
3. Determining distances indoors using the imperial and metric scales.
   Determining distances outdoors using tapes, ropes and pacing.
4. Compassing and chaining exercise.
5. Using the Ames lettering guide and understanding forest mapping symbols and lettering aids.
6. Using the technical pen and mapping a traverse.
7. Understanding and creating field notes. Measuring tree diameters with calipers and diameter tape.
8. Measuring tree heights using a Suunto and Haga height finder.
   Understanding the staff hypsometer.

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III. TOPICS TO BE COVERED: (cont'd)

9. Review of tree heights. The measurement of tree age using an increment borer.
10. Understanding grid networks and referencing points on the Earth's surface. Using global positioning systems (GPS).
11. Determining areas using a dot grid, the line transect method and a digital planimeter.
12. Topographic maps and reading contours.
13. Outdoor field exercise.

IV. LEARNING ACTIVITIES — REQUIRED RESOURCES

INTRODUCTION, LETTERING STYLE & UNITS OF MEASUREMENT & CONVERSIONS

1. Correctly letter upper and lower case letters and numbers in the proper lettering style.
2. Correctly letter the alphabet and numbers using both diagonally and vertically.
3. Be familiar with metric units in general and be able to identify the units used for forest measurement.
4. Be able to convert metric units to imperial and vice versa.
5. Be able to round decimals.

- HB, H, 6H pencils
- blank white paper
- eraser
- T-square
- set square
- masking tape
- calculator

DETERMINING DIRECTIONS INDOORS & OUTDOORS

1. The student will be able to identify the difference between azimuths and bearings.
2. The student will know what magnetic declination is and how it affects direction readings.
3. The student will be able to use a navigational protractor.
4. The student will be able to use a magnetic hand compass and be able to set the declination on the compass.

- HB, H, 6H pencils
- imperial/metric scales
- eraser
- navigational protractor
- T-square
- masking tape
- Ames lettering guide
- Silva Ranger compass
- hardhat/boots

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DETERMINING DISTANCES INDOORS & OUTDOORS

1. The student will be able to use the metric/imperial scales for distance measurements on maps.
2. The student will determine his/her pacing factor.
3. The student will be able to recognize the different ways of expressing map scales.
4. The student will be able to convert from one distance unit to another.

- HB, H, 6H pencils
- imperial/metric scales
- eraser
- calculator
- Silva Ranger compass
- clipboard
- hardhat/boots

COMPASSING & CHAINING EXERCISE

1. Students will correctly use the Silva Ranger hand compass.
2. Students will correctly use a 30 m tape or a 50 m rope to measure distances.
3. Students will be able to record field information legibly on tally sheets.

- HB pencil
- clipboard
- Silva Ranger compass
- hardhat/boots
- map/tally sheet

FOREST STAND MAP SYMBOLS & LETTERING AIDS

1. Students will be able to identify all lines, numbers and symbols on a forest stand map.
2. Students will be able to professionally letter maps using the lettering template or the mechanical lettering set.
3. Students will be able to use the Ames lettering guide.

- HB, H, 6H pencils
- eraser
- T-square/set square
- masking tape
- lettering templates
- blank white paper
- Ames lettering guide
- 11" x 17" mylar sheet

TECHNICAL PENS & MAPPING A TRAVERSE

1. Students will know how to properly use/store a technical pen.
2. Students will be able to map a field traverse from tally sheets.
3. Students will be able to run computer mapping software for mapping traverses.

- HB, H, 6H pencils
- blank white paper
- eraser
- T-square/set square
- masking tape
- navigational protractor
- technical pen set
- lettering templates
- metric scale
- Ames lettering guide
- 11" x 17" mylar sheet

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FIELD NOTES & THE MEASUREMENT OF TREE DIAMETER

1. Create a tally sheet and map sheet.
2. Use the correct signs and symbols to map a compass line.
3. Define and locate dbh on trees.
4. Use and describe instruments that measure tree diameters.

- HB, H, 6H pencils
- eraser
- clipboard
- hardhat/boots
- Silva Ranger compass

THE MEASUREMENT OF TREE HEIGHT

1. Define total height and merchantable height.
2. Use and describe hypsometers based on trigonometric and geometric principles.
3. Students will be able to measure tree heights with a Suunto and Haga clinometer.

- HB, H, 6H pencils
- eraser
- clipboard
- hardhat/boots
- Silva Ranger compass

THE MEASUREMENT OF TREE AGE

1. Understand how tree ages can be determined.
2. Be able to use and maintain an increment borer.
3. Determine tree age from annual rings using an increment borer.

- HB, H, 6H pencils
- eraser
- clipboard
- hardhat/boots
- Silva Ranger compass

GRID NETWORKS & GLOBAL POSITIONING SYSTEMS (GPS)

1. The student will understand grid systems and how to geographically reference a point on the Earth's surface.
2. The student will know how to use a GPS unit in the field an understand the accuracies involved.

- HB, H, 6H pencils
- eraser
- clipboard
- hardhat/boots
- Silva Ranger compass
- NTS map #41 K/9
- metric/imperial scales

AREA DETERMINATION

1. The student will be able to determine ground areas using maps at scales of 1:10000, 1:15840, 1:20000, and 1:50000.
2. The student will be able to use a dot grid, the line transect method and a digital planimeter.

- HB, H, 6H pencils
- eraser
- imperial/metric scales
- calculator
- technical pen set
- masking tape

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TOPOGRAPHIC MAPS & READING CONTOURS

1. Students will be able to read a topograhic map.
2. Students will understand the rules for reading contours.
3. Students will be able to draw a topograhic profile.
4. Students will be able to calculate the gradient of a slope.

- HB, H 6H pencils
- NTS map # 41 K/9
- imperial/metric scales
- calculator

OUTDOOR FIELD EXERCISE

1. The student will be able to compass along a given line, prepare field notes and gather data.
2. The student will acquire additional snowshoeing skills.

- HB, H, 6H pencils
- eraser
- hardhat/boots
- snowshoes
- clipboard
- Silva Ranger compass

V. EVALUATION METHODS:

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 the 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%. These assignments are repeated (up to 3 times until the 60% is obtained.

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VI. REQUIRED STUDENT RESOURCES

Equipment required by each student -

- Mapping & Forest Measurement Manual
- T-square (30" plastic)
- Staedtler technical pen set (0.35 & 0.50 pen tips)
- NTS 1:50000 map sheet #41 K/9
- blank white paper (8 1/2" x 11")
- 11" x 17" mylar sheets (2)
- Forestry Kit #05 which includes: pouch, imperial/metric scale, navigational protractor, Ames lettering guide, set square, HB, H, 6H pencils, Lettering templates, masking tape

- Calculator
- Clipboard
- Silva Ranger compass
- Mapping Software Diskette (from Instructor)

VII. SPECIAL NOTES

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

It is the responsibility of the student to retain all course outlines for possible future use in acquiring advanced standing at other post-secondary institutions. Your instructor reserves the right to modify the course as he/she deems necessary to meet the needs of students.

VIII. PRIOR LEARNING ASSESSMENT

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