

SAULT COLLEGE OF APPLIED ARTS & TECHNOLOGY

SAULT STE. MARIE, ONTARIO

COURSE OUTLINE

**COURSE TITLE:** FOREST SOILS

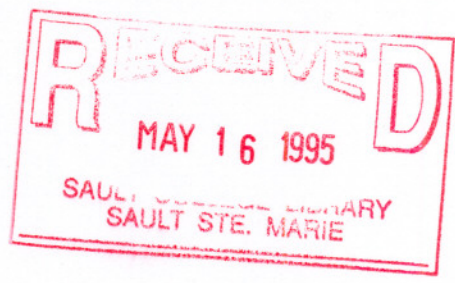
**CODE NO:** FOR218-3 **SEMESTER:** III

**PROGRAM:** ABORIGINAL RESOURCE TECHNICIAN

**AUTHOR:** MARK HARVEY

**DATE:** MAY 1995 **PREVIOUS OUTLINE DATED:** JUNE 1994

**APPROVED:** *[Signature]* **DEAN** May 15/95 **DATE**



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**TOTAL CREDIT HOURS: 48**

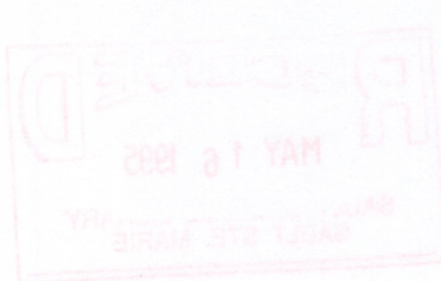
**I. PHILOSOPHY/GOALS:**

This is an introductory soils course. Students will examine rocks, minerals, soil making processes, glacial geomorphology and soil profile development. The physical, chemical and biological properties of soils and site will be related to forest ecology, productivity, silvicultural and environmental concerns. There will be a strong emphasis on the ecological classification of forest sites.

**II. STUDENT PERFORMANCE OBJECTIVES:**

Upon successful completion of this course students will be able to:

1. Describe the formation of and identify in the field and from aerial photos, landforms found in Ontario.
2. Describe the major physical and chemical properties of soils including texture, colour, pH, bulk, density, organic matter content, soil fertility and cation exchange capacity.
3. Describe and classify common forest soil profiles using a standard soil pit and field guide.
4. Complete a comprehensive site analysis according to the Ontario Institute of Pedology and Ontario Ministry of Natural Resources guidelines.
5. Relate conditions of site to site productivity and forest management practices using soil maps, aerial photos, field and lab sampling and site description guide books.
6. Identify the major rock and mineral forming processes, classification of rocks and minerals and the relationships between bedrock and soil characteristics.



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III. TOPICS TO BE COVERED:

TOPIC NO.	PERIODS	TOPIC DESCRIPTION
1	1	<u>Rocks, Minerals and Weathering</u> <ul style="list-style-type: none"><li>- identification of three major classes of rocks, and major minerals</li><li>- weathering of rocks and minerals and soil forming processes</li></ul>
2	2	<u>Glaciation and Glacial Deposits and Bedrock Formations</u> <ul style="list-style-type: none"><li>- recognition of landforms</li><li>- glacial history</li><li>- soil characteristics of glacial deposits</li><li>- relationships between forest growth potential and landforms</li></ul>
3	2	<u>Forest Site Description</u> <ul style="list-style-type: none"><li>- describing Site and Soils in the field</li><li>- designing and implementing a forest soil and site survey</li><li>- drainage and soil moisture classification in Ontario</li></ul>
4	2	<u>Physical Properties of Soil</u> <ul style="list-style-type: none"><li>- textural analysis, bulk density, particle density, porosity, structure, colour</li><li>- field and lab assessment techniques of soil physical properties</li><li>- relationships between forest site quality and physical properties</li></ul>

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

TOPIC NO.	PERIODS	TOPIC DESCRIPTION
5	2	<u>Soil Profile Development, Mineral Soil Classification</u> <ul style="list-style-type: none"><li>- differentiation of mineral soils into orders and great groups</li><li>- parent material and the soil profile and soil forming processes</li></ul>
6	1	<u>The Organic Soil Order and Forest Humus Classification</u> <ul style="list-style-type: none"><li>- wetland classification</li><li>- forest humus classification</li><li>- organic soil classification</li><li>- Von Post's Scale of Decomposition</li></ul>
7	2	<u>Soil Water and Forest Hydrology</u> <ul style="list-style-type: none"><li>- energy status of soil water and osmotic, matric and gravitational forces</li><li>- soil moisture, plant, atmospheric relationships</li><li>- measuring soil moisture, and soil moisture tension</li><li>- growth and soil moisture</li></ul>
8	1	<u>Chemical Properties of Soil</u> <ul style="list-style-type: none"><li>- soil colloids and sources of negative charges</li><li>- cation exchange capacity</li><li>- soil acidity and alkalinity, and nutrient availability</li><li>- soil acidification</li></ul>
9	1	<u>Soil Organic Matter &amp; Soil Biology</u> <ul style="list-style-type: none"><li>- decomposition and distribution of organic matter in soils</li><li>- soil microbes, mycorrhizae and nitrogen fixation</li><li>- nutrient cycling</li><li>- organic soils, peat lands and forest productivity</li><li>- humus types and organic soil classification</li></ul>

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

TOPIC NO.	PERIODS	TOPIC DESCRIPTION
10	2	<u>Soil Nutrients &amp; Tree Growth</u> - essential plant nutrients, deficiencies - relationship between soil physical - chemical properties and soil nutrient status - measuring soil fertility - milliequivalents, ppm, percentages and soil test results - commercial fertilizer analysis - fertilizer application, fertilizer calculations
11		Tests, Assignments and Participation

IV. METHODS OF EVALUATION:

Assignment #1	10%
Assignment #2	15%
Term Test #1	35%
Term Test #2	40%
	<u>100%</u>

GRADES:	A+	=	90 - 100%
	A	=	80 - 89%
	B	=	70 - 79%
	C	=	60 - 69%
	R	=	< 60%

Marks will be deducted using a sliding scale for overdue assignments. Assignment more than 5 school days overdue may not be accepted. 80% class attendance is a mandatory requirement of the course to achieve a C grade or better.

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**V. REQUIRED STUDENT RESOURCES:**

Ontario Institute of Pedology and University of Guelph, 1985. Field Manual for Describing Soils, 3rd Edition. O/P Pub. No. 85-3.

Harpstead, M.I., and Hole, F.D., 1980. Soil Science Simplified. Iowa State University Press. Ames, Iowa, U.S.A. 121 p.

Harvey, M.H. 1993. Forest Soils Study Guide, Second Edition. Sault College of Applied Arts and Technology.

**VI. ADDITIONAL RESOURCE MATERIALS AVAILABLE IN THE COLLEGE LIBRARY BOOK SECTION:**

Canada Soil Survey Committee, Subcommittee on Soil Classification, 1978.

The Canadian System of Soil Classification Can. Dep. Agr. Publ. 1646. Supply and Services Canada, Ont. 164 pp.

Expert Committee of Soil Survey: The Canada Soil Information System (CanSis), Manual for Describing Soils in the Field, 1982, revised, 1983. J.H. Day, Editor. Land Resource Research Institute, Res. Branch, Agri. Can., Ottawa. 97 p. and Append.

Armson, K.A., 1977. Forest Soils: Properties and Processes. University of Toronto Press. 390 p.

Aerial photos of glacial lands 17 p.

**VII. SPECIAL NOTES:**

Students with special needs (e.g. physical limitations, visual impairments, hearing impairments, learning disabilities) are encouraged to discuss required accommodations confidentially with the instructor.

Your instructor reserves the right to modify the course as he/she deems necessary to meet the needs of students.