

SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ONTARIO



Sault College

COURSE OUTLINE

COURSE TITLE: SOIL MECHANICS

CODE NO. : ARC217 **SEMESTER:** 4

PROGRAM: ARC/CIVIL/CONSTRUCTION
ENGINEERING TECHNICIAN

AUTHOR: S. VERMA P. Eng.

DATE: Jan, 05 **PREVIOUS OUTLINE DATED:** JAN-00

APPROVED:

DEAN

DATE

TOTAL CREDITS: 4

PREREQUISITE(S): None

LENGTH OF COURSE: 16 WEEKS **TOTAL CREDIT HOURS:** 64

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*For additional information, please contact C. Kirkwood, Dean
School of Technology, Skilled Trades & Natural Resources
(705) 759-2554, Ext.688*

I. COURSE DESCRIPTION:

This is an introductory soil mechanics course. Topics covered include: rock/soil origins, landform analysis, soil identification and classification system, site investigation, laboratory testing, movement of water through soils and compaction control.

II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:

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

1. Identify soil types, origins and properties.

Potential Elements of the Performance:

- Outline the geological and weathering processes that resulted in rock formations and soil deposits.
- Describe the characteristics of common soil deposits in Ontario.
- Review soil and geological maps for probable site conditions.

2. Solve applied problems in soils mechanics

Potential Elements of the Performance:

- Calculate mass/volume relationships for given units of soil.
- Solve compaction problems

3. Use the Unified Classification System and assess the capabilities and limitations of soil groups in engineering applications.

4. Conduct laboratory tests

Potential Elements of the Performance:

- Perform a mass-volume relationship test.
- Perform a sieve analysis.
- Perform a hydrometer analysis.
- Perform an Atterberg Limits test.
- Perform a constant head permeability test.

5. Describe the manner in which water moves through soils such as permeability and capillary action and the effect that water movement

has on drainage and frost heave.

Potential Elements of the Performance:

- Describe the process of water movement through soil particles.
 - Outline and illustrate the types of water found in soils
 - Explain the mechanics of capillarity.
 - Solve permeability problems using Darcy's law of flow.
 - Construct simple flow nets for various soil-water conditions.
 - Explain and illustrate dewatering systems for construction sites.
 - Explain the mechanics of frost heave.
6. Research, schedule and execute a procedure for performing a field investigation.

Potential Elements of the Performance:

- Describe what information should be sought in a preliminary soil reconnaissance investigation.
- Outline the equipment and techniques used in soil sampling and testing in the field.
- Describe methods used to identify location of water table.
- Prepare site plans showing borehole locations.
- Document borehole logs.
- Draw profiles from given borehole logs.

III. TOPICS:

1. Rock/Soil Origins
2. Soil Mechanics Problems
3. Soil Classification Systems
4. Laboratory Testing of Soils
5. Movement of Water Through Soils
6. Site Investigation

IV. REQUIRED RESOURCES/TEXTS/MATERIALS:

Course Manual on Soil technology, Basic properties of soils by BCIT

Essential of Soil Mechanics and Foundations, 6th edition

David F. McCarthy

V. EVALUATION PROCESS/GRADING SYSTEM:

You will be assigned a final grade on successful completion of laboratories assignments, and tests, weighted as follows:

Lab work and reports	30%
Quiz Tests	<u>70%</u>
TOTAL	100%

Each Laboratory or assignment carries equal weight. Late submittals receive only a maximum grade of 60%. However, laboratories or assignments handed in later than one week will receive a grade of 0%.

An average of 60% on laboratories/assignments and 60% on tests is required for successful completion of this course.

The following semester grades will be assigned to students:

Grade	<u>Definition</u>	<i>Grade Point Equivalent</i>
A+	90 – 100%	4.00
A	80 – 89%	3.00
B	70 - 79%	2.00
C	60 - 69%	1.00
D	50 – 59%	0.00
F (Fail)	49% and below	
CR (Credit)	Credit for diploma requirements has been awarded.	
S	Satisfactory achievement in field /clinical placement or non-graded subject area.	
U	Unsatisfactory achievement in field/clinical placement or non-graded	

	subject area.
X	A temporary grade limited to situations with extenuating circumstances giving a student additional time to complete the requirements for a course.
NR	Grade not reported to Registrar's office.
W	Student has withdrawn from the course without academic penalty.

VI. SPECIAL NOTES:

Special Needs:

If you are a student with special needs (e.g. physical limitations, visual impairments, hearing impairments, or learning disabilities), you are encouraged to discuss required accommodations with your professor and/or the Special Needs office. Visit Room E1101 or call Extension 703 so that support services can be arranged for you.

Retention of Course Outlines:

It is the responsibility of the student to retain all course outlines for possible future use in acquiring advanced standing at other postsecondary institutions.

Plagiarism:

Students should refer to the definition of “academic dishonesty” in *Student Rights and Responsibilities*. Students who engage in “academic dishonesty” will receive an automatic failure for that submission and/or such other penalty, up to and including expulsion from the course/program, as may be decided by the professor/dean. In order to protect students from inadvertent plagiarism, to protect the copyright of the material referenced, and to credit the author of the material, it is the policy of the department to employ a documentation format for referencing source material.

Course Outline Amendments:

The professor reserves the right to change the information contained in this course outline depending on the needs of the learner and the availability of resources.

Substitute course information is available in the Registrar's office.

<include any other special notes appropriate to your course>

VII. PRIOR LEARNING ASSESSMENT:

Credit for prior learning will be given upon successful completion of a challenge exam or portfolio.

VIII. DIRECT CREDIT TRANSFERS:

Students who wish to apply for direct credit transfer (advanced standing) should obtain a direct credit transfer form from the Dean's secretary. Students will be required to provide a transcript and course outline related to the course in question.