

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: CIVIL/CONSTRUCTION/ENVIRONMENTAL/WATER
ENGINEERING TECHNOLOGY**

AUTHOR: S. IENCO

DATE: Jan-00 PREVIOUS OUTLINE DATED: AUG-94

APPROVED:

DEAN

DATE

TOTAL CREDITS: 4

PREREQUISITE(S): ARC 133

LENGTH OF COURSE: 16 WEEKS

TOTAL CREDIT HOURS: 64

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*For additional information, please contact
School of Technology, Engineering & Technical Trades
(705) 759-2554, Ext. 600*

Course Name

Code No.**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.

Potential Elements of the Performance:

- Identify the major soil types of gravel, sand silt and clay.
- Describe and explain the method and purpose of classification systems.
- Classify soils using the Unified Classification System.
- Relate the classification of a soil to its potential engineering uses and problems.

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4. Conduct laboratory tests

Potential Elements of the Performance:

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

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Code No.**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:**Essential of Soil Mechanics and Foundations**

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:

Laboratories/Assignments	30%
Three test of equal weight	<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.

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The following semester grades will be assigned to students in postsecondary courses:

<u>Grade</u>	<u>Definition</u>	<u>Grade Point Equivalent</u>
A+	90 - 100%	4.00
A	80 - 89%	3.75
B	70 - 79%	3.00
C	60 - 69%	2.00
R (Repeat)	59% or below	0.00
CR (Credit)	Credit for diploma requirements has been awarded.	
S	Satisfactory achievement in field placement or non-graded subject areas.	
U	Unsatisfactory achievement in field placement or non-graded subject areas.	
X	A temporary grade. This is used in limited situations with extenuating circumstances giving a student additional time to complete the requirements for a course (see <i>Policies & Procedures Manual – Deferred Grades and Make-up</i>).	
NR	Grade not reported to Registrar's office. This is used to facilitate transcript preparation when, for extenuating circumstances, it has been impossible for the faculty member to report grades.	

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 instructor and/or the Special Needs office. Visit Room E1204 or call Extension 493, 717, or 491 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.

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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, as may be decided by the professor. 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.

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.

Testing Absence

If a student is unable to write a test on the date assigned, the following procedure is required:

- The student shall provide the Professor with advance notice preferably in writing of his/her need to miss the test.
- The student may be required to document the absence at the discretion of the Professor.
- All decisions regarding whether tests shall be re-scheduled will be at the discretion of the Professor.
- The student is responsible to make arrangements, immediately upon return to the College with his/her course Professor related to make-up of the missed test prior to the next scheduled class for the course in question.
- In the event of an emergency on the day of the test, the student may require documentation to support the absence and must telephone the College to identify the absence. The college has a 24 hour electronic voice mail system (759-2554)

VII. PRIOR LEARNING ASSESSMENT:

Students who wish to apply for advanced credit in the course should consult the instructor. Credit for prior learning will be given upon successful completion of the following:

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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.