

SAULT COLLEGE OF APPLIED ARTS & TECHNOLOGY  
SAULT STE. MARIE, ONTARIO

COURSE OUTLINE

COURSE TITLE: Soil Mechanics

CODE NO.: ARC 217

PROGRAM: Environmental Engineering

SEMESTER: III

AUTHOR: S. Ienco

DATE: August 1991

NEW: \_\_\_\_\_ REVISION: X

APPROVED: *L.P. Crozath*  
CHAIRPERSON

9/08/23  
DATE

*M. Usher*

08-22-91

Soil Mechanics

ARC 217

COURSE NAME

CODE NO.

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Total Credit Hours 48  
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Prerequisite (s) None  
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I. PHILOSOPHY/GOALS:

This course is an introductory soil mechanics course.

The topics covered will include: rock/soil origins, of soil identification and classification system, laboratory testing, movement of water through soil and engineering properties of soils.

II. STUDENT PERFORMANCE OBJECTIVES:

Upon successful completion of this course the student will:

1. Describe the main types of natural soil deposits, their formation and their characteristics.
2. Describe the process that occurs during the formation of igneous, sedimentary and metamorphic rocks and classify several rocks from each group.
3. Classify soils using the Unified Classification System.
4. Relate the soil classification to its potential for engineering uses or problems.
5. Perform standard laboratory tests for the following: specific gravity of soils, mass-volume measurements, sieve analysis, hydrometer analysis, Atterburg limits test, constant head permeability test, falling head permeability test and compaction.
6. Describe the manner in which water moves through soils such as permeability and capillary action and the effects that water movement has on drainage and frost heave.

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III. TOPICS TO BE COVERED:

1. Rock/soil origins.
2. Soil Identification Classification System.
3. Laboratory testing of soils.
4. Movement of water through soils.
5. Engineering properties of soil.

IV. TOPIC DESCRIPTION

| TOPIC NO. | TOPIC DESCRIPTION   | REFERENCE                        |
|-----------|---|----------------------------------|
| 1.        | <u>Rocks/Soils Origins</u><br>- Introduction<br>- Classification of Rocks<br>- The Cycle of Rock Weathering and Soil Formation<br>- Deposited and Transported Soils   | Chapter 1                        |
| 2.        | <u>Soil Identification and Classification System</u><br>- Main Types of Soil Deposits<br>- Geological Soils Maps<br>- Interpretation of Aerial Photographs<br>- Recognition of Landforms<br>- Soil Types and Structure<br>- Soil Composition<br>- Mass-Volume Relationship<br>- Unified Classification System | Chapter 1,<br>2 and<br>Hand-outs |

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IV. TOPIC DESCRIPTION

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| TOPIC NO. | TOPIC DESCRIPTION   | REFERENCE                    |
|-----------|---|------------------------------|
| 3.        | <u>Laboratory Testing of Soils</u><br><br>- Relative Density<br>- Moisture Content Determination<br>- Atterburg Limits Test<br>- Sieve Analysis<br>- Hydrometer Analysis<br>- Compaction Test<br>- Percolation Test<br>- Permeability Test for Fine-Grained Soils<br>- Permeability Test for Coarse-Grained Soils | Chapter 1<br>& 3             |
| 4.        | <u>Movement of Water Through Soil</u><br><br>- Permeability of Soils<br>- Darcy's Law of Flow<br>- Capillary Tension in Soils<br>- Seepage<br>- Drainage<br>- Frost Heave   | Chapter 1<br>& Hand-<br>outs |

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V. REQUIRED STUDENT RESOURCES (including textbooks and workbooks)

HIGHWAY MATERIALS SOILS AND CONCRETES

Latest Edition

Atkins

Reston

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VI. METHOD OF EVALUATION

A final grade will be derived from the results of field testing, laboratory testing and three tests weighed as follows:

|                              |             |
|------------------------------|-------------|
| Laboratory testing           | 30%         |
| Two term test each worth 20% | 40%         |
| Final Test                   | 30%         |
| TOTAL                        | <u>100%</u> |

The grading system used will be as follows:

|    |            |
|----|------------|
| A+ | 90% - 100% |
| A  | 80% - 89%  |
| B  | 70% - 79%  |
| C  | 55% - 69%  |
| R  | Repeat     |

- 1) Minimum acceptable grade for this course is 55%.
- 2) Each laboratory assignment will carry equal weight, and is due in my office no later than one week after it has been assigned.
- 3) If at the end of the semester your overall average of the combined laboratories and three tests is below 55%, then it will be up to the instructor whether you receive an R repeat or a rewrite. The criteria employed for arriving at that decision is class attendance, class participation and overall grade, which should be a least 45%.
- 4) In case a rewrite is granted, it will be permitted only once it will cover the entire course outline and will limit the maximum obtainable grade for the course to 60%.