

Library

SUR 231-3

SOIL MECHANICS AND HIGHWAY ENGINEERING

SAULT COLLEGE OF APPLIED ARTS & TECHNOLOGY

SAULT STE. MARIE, ONTARIO

The student will reinforce his/her basic understanding of soil formation, identification and classification. In addition the student will be introduced to the engineering properties of soil and movement of water through soil. Sub-grade pavement materials will also be covered.

COURSE OUTLINE

METHOD OF ASSESSMENT:

Course title: SOIL MECHANICS AND HIGHWAY ENGINEERING

Code No.: ARC 231-3

Program: CIVIL/CONSTRUCTION

Semester: III

Date: AUGUST 1988

Author: S. IENCO

New: _____ Revision: X

Approved: [Signature]
Chairperson

Date August 24/88

If a re-write is granted it will be given for the examination portion the course work, that is 50% of the overall grade and the maximum obtainable mark is 50%.

TEXT: Highway Materials, Soils & Concrete
Harold R. Atkins

SOIL MECHANICS AND HIGHWAY ENGINEERING

SUR 231-3

Course Name

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PHILOSOPHY/GOALS:

The student will reinforce his/her basic understanding of soil formation, identification and classification. In addition the student will be introduced to the engineering properties of soil and movement of water through soil. Sub-grade pavement materials will also be covered.

METHOD OF ASSESSMENT:

Labwork	40%
Mid Term Examination	25%
Final examination	35%

100%

A+	90% - 100%
A	80% - 89%
B	70% - 79%
C	55% - 69%
R	Repeat
X	A temporary grade, limited to situations with extenuating circumstances, giving a student additional time to complete the requirements of the course.

- 1) Minimum acceptable grade is 55%.
- 2) Each lab assignment will carry equal weight.
- 3) If at the end of the semester your overall average of the combined labwork, assignments, mid semester examination and final semester examination is below 55%, then it will be up to the instructor whether you receive an "R" grade or a rewrite. The criteria employed for arriving at that decision is class attendance, class participation and overall grade.
- 4) If a re-write is granted it will be given for the examination portion the course work, that is 50% of the overall grade and the maximum obtainable mark is 60%.

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TOPIC NO.	PERIODS	TOPIC DESCRIPTION
1.	8	<u>Site Investigation</u> <ul style="list-style-type: none">- Sample recovery- Bore hole logs- Record keeping of field observations
2.	25	<u>Laboratory Soils</u> <ul style="list-style-type: none">- Soil classification- Mass volume measurements- Grain size by sieve analysis- Grain size by hydrometer analysis- Atterburg limits test- Constant head permeability test- Falling head permeability test- Unconfined compression test- Compaction test- Determination of In-place soil density- California bearing ratio test
3.	12	<u>Highway Construction</u> <ul style="list-style-type: none">- Sub grade treatment- Frost protection- Aggregates and sub grade preparation- Earthwork operations- Compaction equipment
4.	15	<u>Movement of Water Through Soil</u> <ul style="list-style-type: none">- Permeability- Darcy's law of flow- Flow nets- Drainage

COURSE OBJECTIVES

SOIL MECHANICS AND HIGHWAY ENGINEERING

ARC 231-3

Site Investigation

1. Identify those topographical features of a site that indicate its subsoil properties.
2. Prepare a schedule of equipment for a typical subsoil investigation.
3. Schedule a procedure for carrying out such an investigation.
4. List the steps necessary to ensure satisfactory sample recovery.
5. Participate in a field crew investigating party.
6. Recover at least three bored samples in an "undisturbed" form, and three "disturbed samples.
7. Submit a written report on the site exercise together with site plan and logs.

Soil Mechanics

1. Using the disturbed samples determine the water content.
2. From an undisturbed sample determine the Mass - volume measurement.
3. Using the disturbed samples determine the soil classification.
4. Perform a grain size analysis by sieve.
5. Perform a hydrometer test for fines passing the 200 sieve.
6. Classify the in situ soils
7. Determine the Atterburg limits for the sample soil.
8. Perform a constant head permeability test on at least two samples.
9. Perform an unconfined compression test on at least two undisturbed samples.
10. Solve basic soil problems using all of the above experimental findings.

Highway Construction

1. Identify the sub-grade materials, treatment of unsuitable material and compaction requirements.
2. State the conditions that must be present for frost damage to occur.
3. Identify the major components of a sub-grade structure.
4. Identify different types of earthmoving equipment.