COURSE CALENDAR DESCRIPTION

The course presents essential topics in engineering geology and soil mechanics, including geological cycle, the origin and nature of soils, soil identification and classification, site investigation techniques, compaction, seepage theory, groundwater flow nets, stresses and strains in soils, effective stress concept, consolidation, and shear strength of soils. Emphasis is on learning of fundamental soil mechanics concepts using examples of their application to geotechnical engineering. Laboratory practicum component of the course provides hands-on experience of laboratory tests that are commonly used for determination of physicochemical and engineering properties of soils. Prerequisites: LE/ESSE 1012 3.00; LE/CIVL 2210 3.00 or LE/CIVL 2210 4.00; LE/CIVL 2220 3.00 or LE/CIVL 2220 4.00.

INSTRUCTOR(S)

<table>
<thead>
<tr>
<th>Name</th>
<th>Section / Format / Term</th>
<th>Contact Email</th>
<th>Contact Phone</th>
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TOPICS AND CONCEPTS

COURSE TOPICS

1. The geological cycle, geological processes, structural geology, the origin and nature of soils
2. Geotechnical site investigation techniques
3. Identification, index properties, and classification of soils
4. Mass-volume relationships
5. Soil compaction
6. Groundwater flow
7. Stresses and strains in soil
8. The principle of effective stress
9. One-dimensional consolidation settlements
10. Time rate of consolidation
11. Shear strength of soils
12. Drained and undrained behaviour of soils

The course has the following six 2-hr laboratory sessions:

1. Interpretation of geological maps
2. Visual identification, index properties and classification of soils
3. Compaction characteristics of soils
4. Permeability of soils
5. Consolidation characteristics of soils
6. Shear strength of soils

LIST OF LEARNING OUTCOMES AND EXAMPLES OF COURSE OBJECTIVES

This course aims to:
1. Provide the students with basic concepts and fundamental principles of soil mechanics;
2. Make use of modern engineering education techniques and learning aids to assist students in their understanding of various topics in soil mechanics; and,
3. Provide sufficient background knowledge using real-life examples and case histories to enable students in terms of life-long learning in geotechnical engineering.

COURSE LEARNING OUTCOMES
By the end of this course, students will be expected to:
1. Understand the importance of engineering geology vis-à-vis the formation and characteristics of soils.
2. Determine index properties of soils and use them to identify, describe and classify soils.
3. Understand the effective stress concept.
4. Understand the effect of seepage on ground behaviour.
5. Determine the magnitude and distribution of stresses and pore-water pressure in the ground.
6. Use Coulomb’s friction law and dilatancy to describe the shear strength of soils.
7. Understand drained and undrained behaviour of soils.
8. Specify, conduct and interpret soil tests to obtain compaction, permeability, shear strength and consolidation characteristics of soils.

GRADED ASSESSMENT

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<th>Component</th>
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<tr>
<td>Lab Reports</td>
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<tr>
<td>Term Tests (3 tests; 15% each)</td>
<td>45%</td>
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<td>Final Examination</td>
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REQUIRED READINGS

SUGGESTED READINGS

ON-LINE RESOURCES
Dedicated course website that will deliver on-line content, such as lecture videos, links to articles and other materials, simulations, quizzes and assignments.

ACADEMIC INTEGRITY LINKS
• Senate Policy on Academic Honesty - http://secretariat-policies.info.yorku.ca/policies/academic-honesty-senate-policy-on/
• Academic Integrity - http://lassonde.yorku.ca/academic-integrity
STUDENT LINKS
• Student Rights and Responsibilities - http://oscr.students.uit.yorku.ca/student-conduct
• Religious Observance - https://w2prod.sis.yorku.ca/Apps/WebObjects/cdm.woa/wa/regobs
• Academic Accommodation for Students with Disabilities - http://secretariat-policies.info.yorku.ca/policies/academic-accommodation-for-students-with-disabilities-policy/
• Counselling and Disability Services - http://cds.info.yorku.ca/

Many courses utilize Moodle, York University’s course website system. If your course is using Moodle, click here to access it.
Moodle @ York University