CIVIL ENGINEERING

LE / CIVL 3110 3.0 SECTION A
SOIL MECHANICS
FALL 2018 / WINTER 2019

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>
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<tr>
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ADDITIONAL INFORMATION

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-hour computer hands-on modelling sessions with one session scheduled every two weeks:
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

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
Component Weightage
Lab Reports: 12%
In-class Quizzes: 18%
Term Tests (2 tests; 15% each): 30%
Final Examination: 40%

REQUIRED READINGS
None.

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://eds.info.yorku.ca/
• York University’s Policies on Sexual Violence - http://secretariat-policies.info.yorku.ca/policies/sexual-violence-policy-on/
• York University’s Policies on Gender/LGBTQ*/Positive Space - http://rights.info.yorku.ca/lgbtq/

LAND ACKNOWLEDGEMENT
• We acknowledge our presence on the traditional territory of many Indigenous Nations. The area known as Tkaronto has been care taken by the Anishinabek Nation, the Haudenosaunee Confederacy, the Huron-Wendat, and the Métis. It is now home to many Indigenous Peoples. We acknowledge the current treaty holders, the Mississaugas of the New Credit First Nation. This territory is subject of the Dish With One Spoon Wampum Belt Covenant, an agreement to peaceably share and care for the Great Lakes region.
• The Indigenous Framework for York University: A Guide to Action can be found here: http://indigenous.info.yorku.ca/
• Meaning of a land acknowledgement: http://healthydebate.ca/opinions/indigenous-land-acknowledgements

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

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