EXPANDED COURSE DESCRIPTION
CIVIL ENGINEERING
Lassonde School of Engineering
Civil Engineering
LE / CIVL 3210 3.0 SECTION M
GEOTECHNICAL ENGINEERING
FALL 2019 / WINTER 2020

Last Modified Date: 08/07/2019

COURSE CALENDAR DESCRIPTION

The course focuses on practical applications of soil mechanics concepts to the analysis and design of foundations, excavations, earth-retaining systems and slopes. Topics include: analysis and design of shallow foundations in terms of bearing capacity and settlement; analysis and design and deep foundations including driven and bored piles; analysis and design of earth retaining systems; and, slope stability. Practicum component includes hands-on experience in extracting design parameters from results of site investigation and laboratory tests and preparing a geotechnical design report. Prerequisite: LE/CIVL 3110 3.00.

INSTRUCTOR(S)

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<th>Name</th>
<th>Section / Format / Term</th>
<th>Contact Email</th>
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<tr>
<td>Bashir, Rashid</td>
<td>Sec. M / LECT / W</td>
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ADDITIONAL INFORMATION

TOPICS

Material Behavior and Site Characterization:
• Plan a subsurface exploration program for foundation design
• Specify necessary laboratory tests to understand the site-specific behavior of foundations
• Evaluate field data to select appropriate shear strength values for use in foundation design
• Idealize a soil profile and develop a geotechnical site model

Analysis and Design of Shallow Foundations:
• Apply the concept of Load-Resistance Factored Design to design foundations
• Apply bearing capacity equations in the correct manner
• Evaluate appropriate bearing capacity correction factors to use in design
• Evaluate effects of water and layered soil systems on foundation performance
• Estimate time-rate of foundation settlement for different soil types

Analysis and Design of Deep Foundations:
• Identify the appropriate deep foundation type for different soil profiles
• Identify the phenomena which may affect foundation settlement and capacity
• Calculate side and tip capacity of driven piles in sands & clays
• Specify pile material types for various applications
• Estimate capacity of drilled shafts
• Apply soil-structure interaction concepts to predict the load-settlement curve and lateral load capacity of deep foundations

Analysis and Design of Earth Retaining Structures:
• Calculate lateral pressure in cohesion less and cohesive soils
• Determine lateral earth pressures applied to foundations
• Design simple earth retaining structures
Slope Stability:
- Estimate the stability of slopes with simple geometry and geology.
- Understand the factors that lead to slope instability
- Understand the effect of geology, seepage and pore-water pressures on the stability of slopes

COURSE LEARNING OUTCOMES
1. Interpret site investigation and lab testing data to develop a geotechnical site model.
2. Plan a site investigation program for a geotechnical project.
3. Determine bearing capacity and settlement of foundation systems.
4. Determine lateral earth pressure distribution behind retaining walls.
5. Design simple foundation and earth retaining systems.
7. Write a geotechnical design report.

GRADE ASSESSMENT
Assignments: 10%
Design Project: 20%
Mid Term: 30%
Final Examination: 40%

The grading scheme for the course conforms to the 9-point grading system used in undergraduate programs at York (e.g., A+ = 9, A = 8, B+ = 7, B = 6, etc.).

Assignments and tests will bear either a letter grade designation or a corresponding number grade (e.g. A+ = 90 to 100, A = 80 to 90, B+ = 75 to 79, etc.)

(For a full description of York grading system see the York University Undergraduate Calendar - http://calendars.registrar.yorku.ca/2010-2011/academic/index.htm

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
- Student Accessibility Services (SAS) - https://accessibility.students.yorku.ca/
- 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.

Moodle @ York University