EXPANDED COURSE DESCRIPTION
CIVIL ENGINEERING
Lassonde School of Engineering
Civil Engineering
LE / CIVL 4011 3.0 SECTION A
GEOTECHNICAL MODELLING
FALL 2018 / WINTER 2019

COURSE CALENDAR DESCRIPTION
The course deals with conceptual understanding and the use and application of physical, analytical and
techniques for the analysis and design of geotechnical systems, such as foundations,
numerical modelling techniques for the analysis and design of geotechnical systems, such as foundations,
embankments, natural and constructed slopes, excavations, earth and mine tailings dams, and tunnels. Key
structures. Key concepts as well as analysis and design methodologies are emphasized and reinforced using hands-on
concepts as well as analysis and design methodologies are emphasized and reinforced using hands-on
computer modelling sessions involving the use of state-of-the-art geotechnical modelling software.

Prerequisites: LE/CIVL 3140 3.00; LE/CIVL 3210 3.00

INSTRUCTOR(S)

<table>
<thead>
<tr>
<th>Name</th>
<th>Section / Format / Term</th>
<th>Contact Email</th>
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ADDITIONAL INFORMATION

COURSE TOPICS
1. Review of unsaturated soil mechanics concepts
2. Physical geotechnical modelling
3. Constitutive models of soil behaviour
4. Numerical geotechnical modelling
5. Soft ground tunnelling
6. Earth and mine tailing dams
7. Embankments on soft ground
8. Natural and man-made earth slopes and excavations
9. Fundamentals of frozen ground engineering
10. Geotechnical systems for permafrost regions

The course has the following six 2-hour computer hands-on modelling sessions with one session scheduled
every two weeks:
1. Steady-state and transient seepage through an earth dam
2. Tunnel excavation in soft ground
3. Geosynthetic-reinforced embankments on soft ground
4. Stability analysis of a natural slope
5. Effect of water infiltration on stability of a slope
6. Thermal modelling of frozen ground

COURSE OBJECTIVES
This course aims to:
1. Provide the students with fundamental geotechnical modelling concepts;
2. Use modern engineering education techniques and learning aids and industry-standard software to assist
   students in their understanding of various geotechnical modelling tools and techniques; and,
COURSE LEARNING OUTCOMES
After completing this course, the students should be able to:
1. Understand and evaluate the consequences of approximations and assumptions that are inherent in physical, constitutive and numerical modelling of geotechnical systems
2. Select appropriate soil constitutive models and model input parameters for analyzing the behaviour of a given geotechnical system
3. Use industry-standard numerical modelling software to develop idealized computational models of geotechnical systems
4. Judge the validity of the results obtained from geotechnical modelling and use them for the design of a given geotechnical system
5. Communicate results obtained from geotechnical modelling in the form of a formal written report
6. Extract, summarize and critique findings from case histories and published literature to keep themselves abreast of the latest technological advancements in geotechnical engineering

GRADED ASSESSMENT
Computer Modelling Lab Reports: 12%
In-class Quizzes: 12%
Term Paper: 16%
Mid-term Test: 20%
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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