COURSE CALENDAR DESCRIPTION

The course deals with conceptual understanding and the use and application of physical, analytical and 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 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>
<th>Contact Phone</th>
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</thead>
<tbody>
<tr>
<td>Sharma, Jitendra</td>
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<td>416-736-5242</td>
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ADDITIONAL INFORMATION

Textbook
None.

Course Website

Course Learning Outcomes

Upon 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; and,
6. Extract, summarize and critique findings from case histories and published literature to keep themselves abreast of the latest technological advancements in geotechnical engineering.

Lecture Modules
- Unsaturated Soil Mechanics
- Geotechnical Finite Element Method
- Constitutive Modelling of Soils
- Physical Geotechnical Modelling
- Slope Stability Analysis
- Earth and Mine Tailings Dams
- Embankments on Soft Ground
• Soft Ground Tunnelling

[Depending on the flow of the course, the modules may be subject to minor changes.]

**Laboratory Sessions**

• Introduction to GeoStudio 2019 R2
• Steady-state Analysis of Seepage through an Earth Dam
• Transient Analysis of Seepage through and Earth Dam
• Stability Analysis of Earth Dam Slopes
• Stability Analysis of Earth Dam during Rapid Drawdown
• Stress-Deformation Analysis of Embankment on Soft Ground
• Tunnel Excavation in Soft Ground

[The duration of each lab session is 1.5 hours.]

**Examinations**

There will be one mid-term examination and one final examination. The mid-term examination will be held on **Thu Oct 24, 2019** during the regular lecture time slot. It will be of 1-hour duration and will be conducted in HNE B15 unless announced otherwise. The date, time, and location of the final examination will be announced on the course’s York Moodle website.

**Term Papers**

This component of the course involves the students’ reviewing two case history closely related to geotechnical modelling, independently collecting and reviewing relevant published literature (conference and journal papers, reports, articles, blogs, websites, etc.), and communicating their findings in the form of technical term papers. A total weightage of 22% is assigned to the two term papers (11% weightage each). The emphasis is on conducting independent self-study of the relevant materials from the viewpoint of acquiring life-long learning skills. Due date for the submission of the term papers will be established after in-class consultations with the enrolled students.

**Lecture Notes and E-learning Content**

Lecture notes, supplementary materials, lab handouts, practice problems, and e-learning content will be posted on the course’s York Moodle website. Students are strongly advised to visit this website frequently for latest course news, announcements and updates. Students are advised to contact the course instructors or TAs as soon as possible in case of difficulties in accessing the e-learning materials.

**Lab Report Submission**

It is important for the students to complete their computer lab reports on time in order to obtain satisfactory academic performance. Lab reports can only be submitted in electronic form (e.g. scanned PDF file) via the course’s York Moodle website. Paper submission will only be accepted under extenuating circumstances at the discretion of the instructors and/or TAs. Lab reports submitted after the due date will be subject to marks deduction at a rate of 20% marks per day of delay. Failure to submit a lab report 5 days after the due date will be taken as failure to complete that particular lab, resulting in the assigning of an INCOMPLETE grade for the course.

**Evaluation Scheme**

Computer Modelling Lab Reports (6 reports; 3% each) - 18%

Term Papers (3 papers; different weightages) - 22%

Problem-solving Assignments (8 assignments; 2.5% each) - 20%

Final Examination - 40%

[The student must obtain overall marks of 50% or more in order to pass the course.]

**Grading**

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. Term tests, lab reports and final exam will be given either a letter grade designation or a corresponding number grade, e.g. A+ = 90 to 100, A = 80 to 89, B+ = 75 to 79, etc. Please browse the following webpage for a full description of York grading system.

**Missed Lab Sessions, Tests, and Final Exam**
A student who has valid reason(s) for missing a lab session, such as severe illness or trauma affecting the student’s mental state, occurring shortly before or on the day of a lab session, and which is documented by a timely visit to a physician, must submit a formal request with supporting documentation via email to the course instructor for rescheduling of the lab session no later than 24 hours after the start of the missed lab session. Everyday illness that we all deal with such as coughs, colds, minor fever, etc. will generally not be sufficient grounds for missing a lab session. Students taking this course must write the final exam when scheduled by the University. Students are strongly advised to not make plans for other activities during the final exam period. Severe illness or trauma affecting one’s mental state, occurring shortly before or on the day of an exam, and which is documented by a timely visit to a physician, may qualify for final exam deferral. Everyday illness that we all deal with such as coughs, colds, minor fever, etc. will generally not be sufficient grounds. If a student thinks that the student may qualify for final exam deferral, the student’s only option is to file a petition with Lassonde Student Centre. Please do not approach the course instructor or the TAs for this purpose. Note that there is no provision to re-write the final exam.

Classroom Etiquette and NETiquette
The use of electronic devices (e.g. smart phones, tablets, laptops, etc.) during lectures and lab sessions is permitted only for educational purposes. In all online communications (e.g., email, online discussion, or other forms of online communications), please consider the guidelines from the Core Rules of Netiquette by Virginia Shea (http://www.albion.com/netiquette/corerules.html). Sometimes, online behaviour can appear to be inappropriate or disrespectful that it requires attention and follow up. In this case, please make sure you let the course instructors or TAs know immediately so that the right resources can be identified to help.

Important Reminders
• All components of the course (i.e., lab reports, mid-term exam, term paper, and final exam) must be completed in order to pass this course.
• If you are using a personal e-mail address to contact the instructor, the TAs, or the lab technician, please identify yourself as a student registered in this course by providing your student number in your signature block.
• You are responsible for ensuring you are receiving official course information, announcements, and updates in an efficient and timely manner.

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

Moodle @ York University