

**THE UNIVERSITY OF WESTERN ONTARIO  
FACULTY OF ENGINEERING  
DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING**

**CEE 9702a/b GEOTECHNICAL EARTHQUAKE ENGINEERING  
COURSE OUTLINE 2013-2014**

**Objectives:** To develop understanding of the concepts, theories and procedures of geotechnical earthquake engineering. The students will learn to analyze the ground response during earthquake, assess the liquefaction potential and seismic stability of slopes and retaining walls.

**Topics:**

- Introduction: seismology and earthquakes, seismic waves, size of earthquakes and ground motion parameters.
- Wave propagation: one-dimensional and multi-dimensional wave propagation, surface and multi-layered soil wave systems.
- Dynamic soil properties: Field and laboratory tests for measurement of dynamic soil properties, stress-strain behaviour of soil under cyclic loading.
- Ground response analysis: one dimensional and multi-dimensional response analysis, dynamic finite element and dynamic soil-structure interaction.
- Liquefaction: evaluation of liquefaction potential and effects of liquefaction.
- Seismic stability of slopes and dams.
- Seismic design of retaining walls.

**Contact hours:** 2 lectures hour

**Text:** A set of notes will be distributed in the class.

**Project:** A design project will be assigned or critical review of some technical papers will be required.

**Assignments:** Weekly assignments: problems will be assigned and the solutions will be submitted towards the end of the term.

**Examination:** A 3-hour examination is held during the examination period on all work covered during the course. The examination is an Open Book, and a calculator is allowed.

**Evaluation:** The final grade is arrived at as follows:

Project	40%
Assignments	20%
Final Examination	40%

**Instructor:** Professor: Dr. M.H. El Naggar, P. Eng.

SEB2080, Tel: 519-661-4219      e-mail: [naggar@uwo.ca](mailto:naggar@uwo.ca)

Secretary:      **C. Quintus, Room EB3010**

**Computing:**

Assignments will require the processing of data using computer data-analysis software such as Matlab, Excel or similar, and students will be assumed to be proficient in the use of the software of their choice.

**Units:**

SI units will be used in lectures and examinations

**Use of English:**

In accordance with Senate and Faculty Policy, students may be penalised up to 10% of the marks on all assignments, tests, and examinations for the improper use of English. Additionally, poorly written work with the exception of the final examination may be returned without grading. If resubmission of the work is permitted, it may be graded with marks deducted for poor English and/or late submission.

**Scholastic Offences:**

Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at the following Web site: [http://www.uwo.ca/univsec/handbook/appeals/scholastic\\_discipline\\_grad.pdf](http://www.uwo.ca/univsec/handbook/appeals/scholastic_discipline_grad.pdf).

**Plagiarism:**

University policy states that plagiarism, defined as the “act or an instance of copying or stealing another’s words or ideas and attributing them as one’s own.” (excerpted from Black’s Law Dictionary, West Group, 1999, 7th ed., p. 1170) is a scholastic offence. In submitting any written work as part of the coursework requirements for this course students must ensure that this work is written in their own words. Whenever students take an idea or a passage of text from another author, they must acknowledge their debt both by using quotation marks where appropriate and by proper referencing such as footnotes or citations.

All required papers may be subject to submission for textual similarity review to the commercial plagiarism-detection software under license to the University for the detection of plagiarism. All papers submitted for such checking will be included as source documents in the reference database for the purpose of detecting plagiarism of papers subsequently submitted to the system. Use of the service is subject to the licensing agreement, currently between The University of Western Ontario and Turnitin.com (<http://www.turnitin.com>).

A student who is found guilty of plagiarism in respect of any written work submitted as part of the coursework requirements for this course will be given a grade of zero for the submitted work. Repeated acts of plagiarism, either in this course or any other course subsequent to a first offence, will result in the student being given a failing grade for the course in which the subsequent offence occurs, and may also incur further penalties such as requiring the student to withdraw from the program in which they are enrolled in.

**Attendance:**

Any student who, in the opinion of the instructor, is absent too frequently from class, laboratory, or tutorial periods will be reported to the Dean (after due warning has been given). On the recommendation of the Department concerned, and with the permission of the Dean, the student will be debarred from taking the regular final examination in the course.

**Accessibility:**

Please contact the course instructor if you require material in an alternate format or if any other arrangements can make this course more accessible to you. You may also wish to contact Services for Students with Disabilities (SSD) at 661-2111 x 82147 for any specific question regarding an accommodation.

**Conduct:**

Students are expected to arrive at lectures on time, and to conduct themselves during class in a professional and respectful manner that is not disruptive to others. Late comers may be asked to wait outside the classroom until being invited in by the Instructor. Please turn off your cell phone before coming to a class, tutorial, quiz or exam.

On the premises of the University or at a University-sponsored program, students must abide by the Student Code of Conduct: <http://www.uwo.ca/univsec/board/code.pdf>.

**Sickness and Other Problems:**

Students should immediately consult with the Instructor or Department Chair if they have any problems that could affect their performance in the course. Where appropriate, the problems should be documented (see attached). The student should seek advice from the Instructor or Department Chair regarding how best to deal with the problem. Failure to notify the Instructor or Department Chair immediately (or as soon as possible thereafter) will have a negative effect on any appeal.

For more information concerning medical accommodations, please see:  
[http://www.uwo.ca/univsec/handbook/appeals/accommodation\\_medical.pdf](http://www.uwo.ca/univsec/handbook/appeals/accommodation_medical.pdf).

**Notice:**

Students are responsible for regularly checking their email, and the course OWL site for new notices related to the course.