



UNSW
AUSTRALIA

CVEN9521 Slope Instability and Stabilisation

Semester 2, 2016

Never Stand Still

Faculty of Engineering

School of Civil and Environmental Engineering

COURSE DETAILS

Units of Credit	6
Contact hours	35 hours
Class	Short Course: 10-12 August 15-16 August
Course Coordinator and Lecturer	Associate Professor Adrian Russell email: a.russell@unsw.edu.au office: room 504 – Civil Engineering Building phone: (02) 9385 5035
Lecturer	Garry Mostyn Principal, Pells Sullivan Meynink, Consulting Engineers

INFORMATION ABOUT THE COURSE

Students enrolling in this course are assumed to have knowledge of soil mechanics to Bachelor of Civil Engineering standard. Students without a civil engineering degree (or equivalent) should have completed (or be currently enrolled in) CVEN9525 Fundamentals of Geomechanics.

HANDBOOK DESCRIPTION

Landslide classification and recognition; relation to topography and geology. Site investigations for landslides – the specific issues. Analysis of stability; selection of shear strengths, shear strength of fissured clays; review of limit equilibrium analysis, back-analysis; slope stabilisation, pre-failure deformations of soil slopes. Slope stabilisation techniques including geometry change, control of piezometric pressures, anchoring, retaining walls, reinforced soil. Pre- and post-failure deformations of excavated rock slopes. Stability analysis involving unsaturated soils. Quantitative Risk Analysis, including assessment of the probability of failure, travel distance, risk estimation and risk acceptance criteria.

OBJECTIVES

To introduce students to the state of the art of assessment and design of the stability of soil and rock slopes and the Quantitative Risk Assessment of slopes. The course is specialised and designed for those who will work in Geotechnical Engineering, Engineering Geology and Civil Engineering.

TEACHING STRATEGIES

The teaching strategies that will be used and their rationale. Give some suggested approaches to learning in the course.

(An example of the approaches to learning are)

Private Study	<ul style="list-style-type: none">• Review lecture material and any textbooks that you can find• Do set problems and assignments• Reflect on class problems and assignments• Download materials from Moodle• Keep up with notices and email messages
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Lectures	<ul style="list-style-type: none"> Find out what you must learn Follow worked examples Hear announcements on course changes
Assessments (examinations, assignments)	<ul style="list-style-type: none"> Demonstrate your knowledge and skills Demonstrate higher understanding and problem solving

EXPECTED LEARNING OUTCOMES

Student-centred and self-directed learning skills to apply an advanced understanding of soil mechanics to solve fundamental problems and practical problems involving real data.

For each hour of contact it is expected that you will put in at least 1.5 hours of private study.

ASSESSMENT

- Assignment 1, due in Week 9 (20th September) value 30%
- Assignment 2, due in week 11 (11th October) value 15%
- Two hour final exam, held in the formal exam period (which commences on 4th November) value: 55%

If you do not live in the Sydney region you may apply to sit the exam remotely under the supervision of a responsible person. Contact Renata Melis for more information (r.melis@unsw.edu.au).

COURSE PROGRAM

Wednesday 10 August

8:30-9:00	Registration		
9:00-10:30	Classification, geology, hydrogeology, topography	Lecture and slide show	Russell
10:30-11:00	Break		
11:00-12:30	Site investigations, mapping, pitting, drilling, instrumentation, model development, the observational method	Lecture	Russell
12:30-13:30	Lunch		
13:30-15:00	Site investigations, mapping, pitting, drilling, instrumentation, model development, the observational method	Lecture cont. and Tutorial	Russell
15:00-15:30	Break		
15:30-17:00	Limit equilibrium methods of stability analyses	Lecture and Tutorial	Russell

Thursday 11 August

9:00-10:30	Limit equilibrium methods of stability analyses	Lecture cont. and Tutorial	Russell
10:30-11:00	Break		
11:00-12:30	Limit equilibrium methods of stability analyses	Lecture cont. and Tutorial	Russell
12:30-13:30	Lunch		
13:30-15:00	Limit equilibrium methods of stability analyses	Lecture cont. and Tutorial	Russell

Tutorial

15:00-15:30	Break		
15:30-16:00	Limit equilibrium methods of stability analyses	Lecture and Tutorial	Russell
16:00-18:00	Limit equilibrium methods of stability analyses	Tutorial - computer analysis using SlopeW	Russell

Friday 12 August

9:00-10:30	Introduction to unsaturated soil mechanics	Lecture/Tutorial	Russell
10:30-11:00	Break		
11:00-12:30	Analysis of slope stability in unsaturated soils	Lecture/Tutorial	Russell
12:30-13:30	Lunch		
13:30-15:00	Probabilistic slope analysis	Lecture/Tutorial	Mostyn
15:00-15:30	Break		
15:30-17:00	Case study	Lecture/Tutorial	Mostyn

Monday 15 August

9:00-10:30	Laboratory testing, selection of parameters	Lecture	Russell
10:30-11:00	Break		
11:00-12:30	Laboratory testing, selection of parameters	Lecture/Tutorial	Russell
12:30-13:30	Lunch		
13:30-15:00	Stabilisation techniques	Lecture	Russell
15:00-15:30	Break		
15:30-17:00	Stabilisation techniques	Tutorial	Russell

Tuesday 16 August

9:00-10:30	Mechanics of rapid failure and estimation of travel distance	Lecture	Russell
10:30-11:00	Break		
11:00-12:30	Mechanics of rapid failure and estimation of travel distance	Lecture/Tutorial	Russell
12:30-13:30	Lunch		
13:30-15:00	Quantitative Risk Assessment (QRA), principles and system framework	Lecture	Russell
15:00-15:30	Break		
15:30-17:00	QRA cont.	Lecture/Tutorial	Russell

Selected topics from:

- Estimating probability and frequency of failure,
- Estimating travel distance and vulnerability,
- Examples and case studies

RELEVANT RESOURCES

It is not necessary to buy a text book as the notes provided are extensive and sufficient. These will include references to several books and numerous articles in the technical literature. Completion of the assignments may require students to refer to these works.

DATES TO NOTE

Refer to MyUNSW for Important Dates available at:

<https://my.unsw.edu.au/student/resources/KeyDates.html>

PLAGIARISM

Beware! An assignment that includes plagiarised material will receive a 0% Fail, and students who plagiarise may fail the course. Students who plagiarise are also liable to disciplinary action, including exclusion from enrolment.

Plagiarism is the use of another person's work or ideas as if they were your own. When it is necessary or desirable to use other people's material you should adequately acknowledge whose words or ideas they are and where you found them (giving the complete reference details, including page number(s)). The Learning Centre provides further information on what constitutes Plagiarism at:

<https://student.unsw.edu.au/plagiarism>

ACADEMIC ADVICE

(Formerly known as Common School Information)

For information about:

- Notes on assessments and plagiarism,
- School policy on Supplementary exams,
- Special Considerations,
- Solutions to Problems,
- Year Managers and Grievance Officer of Teaching and Learning Committee, and
- CEVSOC.

Refer to Academic Advice on the School website available at:

<https://www.engineering.unsw.edu.au/civil-engineering/student-resources/policies-procedures-and-forms/academic-advice>