UNSW Course Outline

CVEN4204 Ground Improvement and Monitoring Techniques - 2024

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General Course Information

Course Code : CVEN4204
Year : 2024
Term : Term 3
Teaching Period : T3
Is a multi-term course? : No
Faculty : Faculty of Engineering
Academic Unit : School of Civil and Environmental Engineering
Delivery Mode : In Person
Delivery Format : Standard
Delivery Location : Kensington
Campus : Sydney
Study Level : Postgraduate, Undergraduate
Units of Credit : 6

Useful Links

Handbook Class Timetable

Course Details & Outcomes

Course Description

Assessment of the suitability and design of stabilisation techniques for difficult foundation soils including instrumentation and application of observational techniques to geotechnical engineering. Topics covered will include: principles of the observational method, instrumentation,

braced excavations, dewatering, grouting, underpinning, stone columns, vertical and horizontal drains, vacuum pumping, deep compaction, vibrofloatation, lime stabilisation, reinforced earth and soil nailing.

Course Aims

This course will provide the fundamentals of soil improvement techniques and observational methods in Geotechnical Engineering.

By the end of the course students should be able to:

Have an in-depth engagement with the problems of soft soils and methods of improving their behaviour;

Recommend a suitable ground improvement method for a range of problematic soils;

Analyse and design selected problems in soft grounds;

Perform research into the problems independently;

Design and analyse reinforced earth structures;

Explain the role of the observational method in geotechnical engineering;

List various types of instrumentation used in geotechnical engineering, explain how they function, contrast their advantages;

Plan and describe the observations and instruments you would use to monitor ground behaviour in the context of a geotechnical engineering problem

Course Learning Outcomes

Course Learning Outcomes
CLO1 : Explain the problems of soft soils and the methods of improving their strength and serviceability.
CLO2 : Identify suitable ground improvement methods and their critical parameters and control measures for a range of problematic soils.
CLO3 : Analyse the performance of ground improvement designs.
CLO4 : Describe the types and functions of instrumentation used in geotechnical engineering and their advantages.
CLO5 : Design and analyse reinforced earth structures

Course Learning Outcomes	Assessment Item
CLO1 : Explain the problems of soft soils and the methods of improving their strength and serviceability.	• Online Test • Quiz 1 • Quiz 2
CLO2 : Identify suitable ground improvement methods and their critical parameters and control measures for a range of problematic soils.	• Presentation • Quiz 1 • Quiz 2
CLO3 : Analyse the performance of ground improvement designs.	• Presentation • Quiz 1 • Quiz 2
CLO4 : Describe the types and functions of instrumentation used in geotechnical engineering and their advantages.	• Online Test • Quiz 1 • Quiz 2
CLO5 : Design and analyse reinforced earth structures	• Presentation • Quiz 1 • Quiz 2

Learning and Teaching Technologies

Moodle - Learning Management System

Assessments

Assessment Structure

Assessment Item	Weight	Relevant Dates
Online Test Assessment Format: Individual	5%	Start Date: Not Applicable Due Date: 23:55 Friday 4th October
Quiz 1 Assessment Format: Individual	40%	Start Date: Not Applicable Due Date: Thursday week 5 - 10th October
Quiz 2 Assessment Format: Individual	40%	Start Date: Not Applicable Due Date: Thursday week 10 - 14th November
Presentation Assessment Format: Group	15%	Start Date: Not Applicable Due Date: Thursday week 8 - 31st October

Assessment Details

Online Test

Assessment Overview

This is an online quiz to be marked and returned before the Census Date.

Course Learning Outcomes

- CLO1 : Explain the problems of soft soils and the methods of improving their strength and serviceability.
- CLO4 : Describe the types and functions of instrumentation used in geotechnical engineering and their advantages.

Detailed Assessment Description

This is an online quiz to be marked and returned before the Census Date - due on the 4th of October.

Assignment submission Turnitin type

Not Applicable

Generative AI Permission Level

No Assistance

This assessment is designed for you to complete without the use of any generative AI. You are not permitted to use any generative AI tools, software or service to search for or generate information or answers.
For more information on Generative AI and permitted use please see here.

Quiz 1

Assessment Overview

1.5-2hr open-book quiz which will assess the content covered in the workshops from Weeks 2 - 4. Marks will be returned before the due date of Quiz 2.

Course Learning Outcomes

- CLO1 : Explain the problems of soft soils and the methods of improving their strength and serviceability.
- CLO2 : Identify suitable ground improvement methods and their critical parameters and control measures for a range of problematic soils.
- CLO3 : Analyse the performance of ground improvement designs.
- CLO4 : Describe the types and functions of instrumentation used in geotechnical engineering and their advantages.

- CLO5 : Design and analyse reinforced earth structures

Detailed Assessment Description

1.5-2hr open-book quiz which will assess the content covered in the workshops from Weeks 2 - 4. Marks will be returned before the due date of Quiz 2.

The quiz is in person and will take place during the class time on 10th October.

Assessment Length

2 hours

Submission notes

in person quiz

Assignment submission Turnitin type

Not Applicable

Generative AI Permission Level

No Assistance

This assessment is designed for you to complete without the use of any generative AI. You are not permitted to use any generative AI tools, software or service to search for or generate information or answers.
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Quiz 2

Assessment Overview

1.5-2hr open-book quiz which will assess the content covered in the workshops from Weeks 7 - 10. Marks will be returned at the end of term.

Course Learning Outcomes

- CLO1 : Explain the problems of soft soils and the methods of improving their strength and serviceability.
- CLO2 : Identify suitable ground improvement methods and their critical parameters and control measures for a range of problematic soils.
- CLO3 : Analyse the performance of ground improvement designs.
- CLO4 : Describe the types and functions of instrumentation used in geotechnical engineering and their advantages.
- CLO5 : Design and analyse reinforced earth structures

Detailed Assessment Description

1.5-2hr open-book quiz which will assess the content covered in the workshops from Weeks 7 - 10. Marks will be returned at the end of term.

Te quiz is in person and will take place during the class time on 14th Novemebr.

Assessment Length

2 hours

Submission notes

in person quiz

Assignment submission Turnitin type

Not Applicable

Generative AI Permission Level

No Assistance

This assessment is designed for you to complete without the use of any generative AI. You are not permitted to use any generative AI tools, software or service to search for or generate information or answers.
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Presentation

Assessment Overview

Students will form groups of 4 to work on selected ground improvement topics, and present this in the form of a 10 minute group presentation. Marks will be returned at the end of term.

Course Learning Outcomes

- CLO2 : Identify suitable ground improvement methods and their critical parameters and control measures for a range of problematic soils.
- CLO3 : Analyse the performance of ground improvement designs.
- CLO5 : Design and analyse reinforced earth structures

Detailed Assessment Description

Students will form groups to work on selected ground improvement topics, and present this in the form of a 10 minute group presentation. Marks will be returned at the end of term.

taking place during the class time on 31st October.

Assignment submission Turnitin type

Not Applicable

Generative AI Permission Level

No Assistance

This assessment is designed for you to complete without the use of any generative AI. You are not permitted to use any generative AI tools, software or service to search for or generate information or answers.
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General Assessment Information

Grading Basis

Standard

Course Schedule

Teaching Week/Module	Activity Type	Content
Week 0 : 2 September - 8 September	Other	
Week 1 : 9 September - 15 September	Lecture	Monday 1) Introduction to ground improvement technics 2) In-situ testing methods (no workshop for this week)
Week 2 : 16 September - 22 September	Lecture	Monday Compaction and deep dynamic compaction
	Workshop	Thursday Workshop #1
Week 3 : 23 September - 29 September	Lecture	Monday Preloading and vibro-technics
	Workshop	Thursday Workshop #2
Week 4 : 30 September - 6 October	Blended	Monday Deep soil mixing and workshop #3
	Workshop	Thursday Workshop for quiz #1
Week 5 : 7 October - 13 October	Assessment	No Lecture on Monday the 7th (Public Holiday) Thursday Quiz #1
Week 6 : 14 October - 20 October	Other	Non-teaching week
Week 7 : 21 October - 27 October	Lecture	Monday Guest lecturer from industry (no workshop)
Week 8 : 28 October - 3 November	Lecture	Monday Dewatering
	Presentation	Thursday Project Presentation
Week 9 : 4 November - 10 November	Lecture	Monday Reinforced earth walls
	Workshop	Thursday Workshop #4
Week 10 : 11 November - 17 November	Workshop	Monday Workshop for quiz #2
	Assessment	Thursday Quiz #2

Attendance Requirements

Students are strongly encouraged to attend all classes and review lecture recordings.

General Schedule Information

Undergraduate students must attend at least 80% of the workshop/lab in which they are enrolled for the duration of the session.

Staff Details

Position	Name	Email	Location	Phone	Availability	Equitable Learning Services Contact	Primary Contact
Convenor	Asal Bidarma ghz		Room 502, Building H20			No	Yes

Other Useful Information

Academic Information

I. Special consideration and supplementary assessment

If you have experienced an illness or misadventure beyond your control that will interfere with your assessment performance, you are eligible to apply for Special Consideration prior to, or within 3 working days of, submitting an assessment or sitting an exam.

Please note that UNSW has a Fit to Sit rule, which means that if you sit an exam, you are declaring yourself fit enough to do so and cannot later apply for Special Consideration.

For details of applying for Special Consideration and conditions for the award of supplementary assessment, please see the information on UNSW's Special Consideration page.

II. Administrative matters and links

All students are expected to read and be familiar with UNSW guidelines and polices. In particular, students should be familiar with the following:

- Attendance
- UNSW Email Address
- Special Consideration
- Exams
- Approved Calculators
- Academic Honesty and Plagiarism
- Equitable Learning Services

III. Equity and diversity

Those students who have a disability that requires some adjustment in their teaching or learning environment are encouraged to discuss their study needs with the course convener prior to, or at the commencement of, their course, or with the Equity Officer (Disability) in the Equitable

Learning Services. Issues to be discussed may include access to materials, signers or note-takers, the provision of services and additional exam and assessment arrangements. Early notification is essential to enable any necessary adjustments to be made.

IV. Professional Outcomes and Program Design

Students are able to review the relevant professional outcomes and program designs for their streams by going to the following link: https://www.unsw.edu.au/engineering/student-life/student-resources/program-design.

Note: This course outline sets out the description of classes at the date the Course Outline is published. The nature of classes may change during the Term after the Course Outline is published. Moodle or your primary learning management system (LMS) should be consulted for the up-to-date class descriptions. If there is any inconsistency in the description of activities between the University timetable and the Course Outline/Moodle/LMS, the description in the Course Outline/Moodle/LMS applies.

Academic Honesty and Plagarism

UNSW has an ongoing commitment to fostering a culture of learning informed by academic integrity. All UNSW students have a responsibility to adhere to this principle of academic integrity. Plagiarism undermines academic integrity and is not tolerated at UNSW. *Plagiarism at UNSW is defined as using the words or ideas of others and passing them off as your own.*

Plagiarism is a type of intellectual theft. It can take many forms, from deliberate cheating to accidentally copying from a source without acknowledgement. UNSW has produced a website with a wealth of resources to support students to understand and avoid plagiarism, visit: student.unsw.edu.au/plagiarism. The Learning Centre assists students with understanding academic integrity and how not to plagiarise. They also hold workshops and can help students one-on-one.

You are also reminded that careful time management is an important part of study and one of the identified causes of plagiarism is poor time management. Students should allow sufficient time for research, drafting and the proper referencing of sources in preparing all assessment tasks.

Repeated plagiarism (even in first year), plagiarism after first year, or serious instances, may also be investigated under the Student Misconduct Procedures. The penalties under the procedures

can include a reduction in marks, failing a course or for the most serious matters (like plagiarism in an honours thesis or contract cheating) even suspension from the university. The Student Misconduct Procedures are available here:

www.gs.unsw.edu.au/policy/documents/studentmisconductprocedures.pdf

Submission of Assessment Tasks

Work submitted late without an approved extension by the course coordinator or delegated authority is subject to a late penalty of five percent (5%) of the maximum mark possible for that assessment item, per calendar day.

The late penalty is applied per calendar day (including weekends and public holidays) that the assessment is overdue. There is no pro-rata of the late penalty for submissions made part way through a day. This is for all assessments where a penalty applies.

Work submitted after five days (120 hours) will not be accepted and a mark of zero will be awarded for that assessment item.

For some assessment items, a late penalty may not be appropriate. These will be clearly indicated in the course outline, and such assessments will receive a mark of zero if not completed by the specified date. Examples include:

- Weekly online tests or laboratory work worth a small proportion of the subject mark;
- Exams, peer feedback and team evaluation surveys;
- Online quizzes where answers are released to students on completion;
- Professional assessment tasks, where the intention is to create an authentic assessment that has an absolute submission date; and,
- Pass/Fail assessment tasks.

Faculty-specific Information

Engineering Student Support Services – The Nucleus - enrolment, progression checks, clash requests, course issues or program-related queries

Engineering Industrial Training – Industrial training questions

UNSW Study Abroad – study abroad student enquiries (for inbound students)

UNSW Exchange – student exchange enquiries (for inbound students)

UNSW Future Students – potential student enquiries e.g. admissions, fees, programs, credit transfer

Phone

(+61 2) 9385 8500 – Nucleus Student Hub

(+61 2) 9385 7661 – Engineering Industrial Training

(+61 2) 9385 3179 – UNSW Study Abroad and UNSW Exchange (for inbound students)

School Contact Information

For assistance with enrolment, class registration, progression checks and other administrative matters, please see the Nucleus: Student Hub. They are located inside the Library – first right as you enter the main library entrance. You can also contact them via http://unsw.to/webforms or reserve a place in the face-to-face queue using the UniVerse app.

For course administration matters, please contact the Course Coordinator.

Questions about the this course should normally be asked during the scheduled class so that everyone can benefit from the answer and discussion.