# CIVL2205

## Geotechnical Engineering

Session 2, In person-scheduled-weekday, North Ryde 2022

*School of Engineering*

## Contents

# General Information

Unit convenor and teaching staff
Convenor
Golnaz Alipour Esgandani
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Contact via via email
Room 111, Level 1, 50 Waterloo Road, Macquarie Park
Mondays 3pm-5pm

Credit points
10

Prerequisites
CIVL1001

Corequisites

Co-badged status

Unit description
This unit applies principles of soil mechanics to different design stages of geotechnical structures. The unit will help the students analyse and design different structures associated with soils. Specific topics include introduction to geotechnical design, site investigation and in situ testing, water flow and seepage in soils, lateral stress and retaining structures, slope stability and landslides, shallow and deep foundations, and ground improvement. This unit provides the essential knowledge required for successful completion of a Geotechnical and Transportation Project in the fourth year.

## Important Academic Dates

Information about important academic dates including deadlines for withdrawing from units are available at https://www.mq.edu.au/study/calendar-of-dates

# Learning Outcomes

On successful completion of this unit, you will be able to:

**ULO1:** Carry out site investigation and in-situ testing for geotechnical engineering projects

**ULO2:** Estimate stresses and pore pressures associated with the construction of a geotechnical structure

**ULO3:** Exhibit in-depth understanding of engineering design and analysis

**ULO4:** Appreciate and demonstrate an understanding of the factors affecting the final design and considerations that should be made according to the Australian standards and guidelines.

**ULO5:** Analyse and design retaining walls, foundations and analyse the stability of slopes

# General Assessment Information

**Grading and passing requirement for unit**

There are a set of small projects, the mid session test and a final exam that need to be completed for assessment. In order to pass this unit a student must obtain a mark of 50 or more for the unit (i.e. obtain a passing grade P/ CR/ D/ HD).

For further details about grading, please refer below in the policies and procedures section.

**Late Assessment Submission Penalty**

Students enrolled in Session based units with written assessments will have the following university standard late penalty applied. Please see https://students.mq.edu.au/study/assessment-exams/assessments for more information.

Unless a Special Consideration request has been submitted and approved, a 5% penalty (of the total possible mark) will be applied each day a written assessment is not submitted, up until the 7th day (including weekends). After the 7th day, a grade of '0' will be awarded even if the assessment is submitted. Submission time for all written assessments is set at **11:55 pm**. A 1-hour grace period is provided to students who experience a technical concern.

For any late submission of time-sensitive tasks, such as scheduled tests/exams, performance assessments/presentations, and/or scheduled practical assessments/labs, students need to submit an application for Special Consideration.

**Assessments where Late Submissions will be accepted**

In this unit, late submissions will accepted as follows:

- written reports as part of the project – YES, Standard Late Penalty applies
- Oral presentation as part of the project - NO, unless Special Consideration is Granted
- Mid session exam and final exam - NO, unless Special Consideration is Granted

**Final exam:**

If you receive special consideration for the final exam, a supplementary exam will be scheduled by the faculty during a supplementary exam period, typically about 3 to 4 weeks after the normal exam period. By making a special consideration application for the final exam you are declaring yourself available for a resit during the supplementary examination period and will not be eligible for a second special consideration approval based on pre-existing commitments. Please ensure you are familiar with the policy prior to submitting an application. Approved applicants will receive

an individual notification one week prior to the exam with the exact date and time of their supplementary examination.

# Assessment Tasks

| Name | Weighting | Hurdle | Due |
|---|---|---|---|
| Final Examination | 40% | No | TBA |
| Project | 40% | No | TBA |
| Mid session quiz | 20% | No | Week 7 |

## Final Examination

Assessment Type [1]: Examination
Indicative Time on Task [2]: 26 hours
Due: **TBA**
Weighting: **40%**

Final examination

On successful completion you will be able to:

- Exhibit in-depth understanding of engineering design and analysis
- Appreciate and demonstrate an understanding of the factors affecting the final design and considerations that should be made according to the Australian standards and guidelines.
- Analyse and design retaining walls, foundations and analyse the stability of slopes

## Project

Assessment Type [1]: Project
Indicative Time on Task [2]: 25 hours
Due: **TBA**
Weighting: **40%**

There will be set of small projects through out the session, which are part of a larger project.

On successful completion you will be able to:

- Carry out site investigation and in-situ testing for geotechnical engineering projects
- Exhibit in-depth understanding of engineering design and analysis
- Estimate stresses and pore pressures associated with the construction of a geotechnical structure
- Appreciate and demonstrate an understanding of the factors affecting the final design and considerations that should be made according to the Australian standards and guidelines.
- Analyse and design retaining walls, foundations and analyse the stability of slopes

## Mid session quiz

Assessment Type [1]: Quiz/Test
Indicative Time on Task [2]: 19 hours
Due: **Week 7**
Weighting: **20%**

Mid session quiz

On successful completion you will be able to:

- Carry out site investigation and in-situ testing for geotechnical engineering projects
- Estimate stresses and pore pressures associated with the construction of a geotechnical structure

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[1] If you need help with your assignment, please contact:

- the academic teaching staff in your unit for guidance in understanding or completing this type of assessment
- the Writing Centre for academic skills support.

[2] Indicative time-on-task is an estimate of the time required for completion of the assessment task and is subject to individual variation

# Delivery and Resources

Lecture starts in Week 1, Practical sessions starts in week 3. All the materials given as lectures are online. Students are expected to go through the materials, do the work and be prepared for the upcoming practical session. Practical sessions are face to face and students are expected to attend the classes which will be held at Room 111, 13 Research Park drive on the main campus..

As practicals are face to face, students who are not able to be on campus in week 3 should contact unit convenor urgently.

All essential content will be provided by the lecturer on iLearn. The following resources are recommended if you want to read more:

1- Geotechnical Engineering Soil and Foundation Principles and Practice, Richard L. Handy and M. G. Spangler, McGraw Hill, Fifth edition

2- Soil Mechanics in Engineering Practice,  K.Terzaghi, R.B. Peck, and G. Mesri, John Wiley and Sons, 1996

Rocscience software will be used in some practical sessions

Other resources such as calculators and drawing tools are required in some weeks.

# Unit Schedule

Refer to iLearn and lecture notes for the unit schedule.

# Policies and Procedures

Macquarie University policies and procedures are accessible from Policy Central (https://policies.mq.edu.au). Students should be aware of the following policies in particular with regard to Learning and Teaching:

- Academic Appeals Policy
- Academic Integrity Policy
- Academic Progression Policy
- Assessment Policy
- Fitness to Practice Procedure
- Assessment Procedure
- Complaints Resolution Procedure for Students and Members of the Public
- Special Consideration Policy

Students seeking more policy resources can visit Student Policies (https://students.mq.edu.au/support/study/policies). It is your one-stop-shop for the key policies you need to know about throughout your undergraduate student journey.

To find other policies relating to Teaching and Learning, visit Policy Central (https://policies.mq.edu.au) and use the search tool.

## Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: https://students.mq.edu.au/admin/other-resources/student-conduct

## Results

Results published on platform other than eStudent, (eg. iLearn, Coursera etc.) or released directly by your Unit Convenor, are not confirmed as they are subject to final approval by the

University. Once approved, final results will be sent to your student email address and will be made available in eStudent. For more information visit ask.mq.edu.au or if you are a Global MBA student contact globalmba.support@mq.edu.au

# Academic Integrity

At Macquarie, we believe academic integrity – honesty, respect, trust, responsibility, fairness and courage – is at the core of learning, teaching and research. We recognise that meeting the expectations required to complete your assessments can be challenging. So, we offer you a range of resources and services to help you reach your potential, including free online writing and maths support, academic skills development and wellbeing consultations.

# Student Support

Macquarie University provides a range of support services for students. For details, visit http://students.mq.edu.au/support/

## The Writing Centre

The Writing Centre provides resources to develop your English language proficiency, academic writing, and communication skills.

- Workshops
- Chat with a WriteWISE peer writing leader
- Access StudyWISE
- Upload an assignment to Studiosity
- Complete the Academic Integrity Module

The Library provides online and face to face support to help you find and use relevant information resources.

- Subject and Research Guides
- Ask a Librarian

# Student Services and Support

Macquarie University offers a range of Student Support Services including:

- IT Support
- Accessibility and disability support with study
- Mental health support
- Safety support to respond to bullying, harassment, sexual harassment and sexual assault
- Social support including information about finances, tenancy and legal issues

# Student Enquiries

Got a question? Ask us via AskMQ, or contact Service Connect.

## IT Help

For help with University computer systems and technology, visit http://www.mq.edu.au/about_us/offices_and_units/information_technology/help/.

When using the University's IT, you must adhere to the Acceptable Use of IT Resources Policy. The policy applies to all who connect to the MQ network including students.

# Changes from Previous Offering

Weighing of the assessment taskes are changed to better reflect the learning outcomes and students performance.

# Engineers Australia Competency Mapping

| EA Competency Standard | | Unit Learning Outcomes |
|---|---|---|
| Knowledge and Skill Base | 1.1 Comprehensive, theory-based understanding of the underpinning fundamentals applicable to the engineering discipline. | ULO2 |
| | 1.2 Conceptual understanding of underpinning maths, analysis, statistics, computing. | |
| | 1.3 In-depth understanding of specialist bodies of knowledge | |
| | 1.4 Discernment of knowledge development and research directions | |
| | 1.5 Knowledge of engineering design practice | ULO3 |
| | 1.6 Understanding of scope, principles, norms, accountabilities of sustainable engineering practice. | ULO4 |
| Engineering Application Ability | 2.1 Application of established engineering methods to complex problem solving | ULO3 |
| | 2.2 Fluent application of engineering techniques, tools and resources. | ULO1 |
| | 2.3 Application of systematic engineering synthesis and design processes. | ULO5 |
| | 2.4 Application of systematic approaches to the conduct and management of engineering projects. | ULO4 |
| Professional and Personal Attributes | 3.1 Ethical conduct and professional accountability. | |
| | 3.2 Effective oral and written communication in professional and lay domains. | ULO5 |
| | 3.3 Creative, innovative and pro-active demeanour. | |
| | 3.4 Professional use and management of information. | ULO1 |

| | | |
|---|---|---|
| | 3.5 Orderly management of self, and professional conduct. | |
| | 3.6 Effective team membership and team leadership | ULO1 |

## Engineers Australia Competancy Mapping