



CIVL2205

Geotechnical Engineering

Session 2, In person-scheduled-weekday, North Ryde 2026

School of Engineering

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General Information

Unit convenor and teaching staff

Unit Convenor

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Contact via via email

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By arrangement

Unit Convenor

Steven Hansen

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Credit points

10

Prerequisites

CIVL1001 or MECH1001

Corequisites

Co-badged status

Unit description

This unit introduces the fundamental principles and analytical methods of geotechnical engineering, with a focus on the behaviour of soils and rocks in the context of civil engineering design. Students will learn to classify geomaterials, assess in-situ stresses and pore pressures, and evaluate groundwater flow through porous media. The unit covers core topics including geotechnical site investigation, rock and soil classification, seepage and flow nets, lateral earth pressures and retaining structures, slope stability analysis, shallow and deep foundation design, and ground improvement techniques. Emphasis is placed on applying soil mechanics principles to the analysis and design of geotechnical systems across different stages of engineering projects. This unit provides the essential knowledge required for successful completion of a Geotechnical and Transportation Project in the fourth year.

Learning in this unit enhances student understanding of global challenges identified by the United Nations Sustainable Development Goals ([UNSDGs](#)) Industry, Innovation and Infrastructure; Sustainable Cities and Communities; Climate Action

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:** Classify rock and soil materials
- ULO2:** Apply principles of soil mechanics
- ULO3:** Analyse groundwater flow
- ULO4:** Evaluate and design geotechnical structures
- ULO5:** Analyse the stability of slopes

General Assessment Information

Grading and passing requirement for unit

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/assessments-t-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:

- Embankment Project – YES, Standard Late Penalty applies
- Geotechnical assessment - NO, unless Special Consideration is Granted
- 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	Groupwork/Individual	Short Extension	AI Approach
Final Exam	40%	No	Exam Period	Individual	No	Observed
Embankment project	30%	No	08/11/2026	Individual	Yes	Open
Geotechnical assessment	30%	No	Week 7	Individual	No	Observed

Final Exam

Assessment Type **1**: Examination

Indicative Time on Task **2**: 28 hours

Due: **Exam Period**

Weighting: **40%**

Groupwork/Individual: Individual

Short extension **3**: No

AI Approach: Observed

You will undertake a final examination during the formal examination period.

On successful completion you will be able to:

- Apply principles of soil mechanics
- Analyse groundwater flow
- Evaluate and design geotechnical structures
- Analyse the stability of slopes

Embankment project

Assessment Type **1**: Written Submission

Indicative Time on Task **2**: 28 hours

Due: **08/11/2026**

Weighting: **30%**

Groupwork/Individual: Individual

Short extension ³: Yes

AI Approach: Open

You will analyse stability of an embankment based on the given conditions.

On successful completion you will be able to:

- Apply principles of soil mechanics
- Analyse groundwater flow
- Analyse the stability of slopes

Geotechnical assessment

Assessment Type ¹: Problem-based task

Indicative Time on Task ²: 20 hours

Due: **Week 7**

Weighting: **30%**

Groupwork/Individual: Individual

Short extension ³: No

AI Approach: Observed

You will solve a set of problems that cover the concepts of rock classification, ground stress analysis, groundwater flow and retaining wall analysis.

On successful completion you will be able to:

- Classify rock and soil materials
- Apply principles of soil mechanics
- Analyse groundwater flow
- Evaluate and design geotechnical structures

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
- [Academic Success](#) 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.

³ An automatic short extension is available for some assessments. Apply through the [Service Connect Portal](#).

Delivery and Resources

Lectures meet in-person and practical class starts in week 2. Students are expected to attend the lectures and go through the materials provided on iLearn page, do the work and be prepared for the upcoming practical session. Practical sessions are also face to face and students are expected to attend the classes which will be held on the main campus. Please refer to your timetable for your practical time and location.

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 package will be used in some practical sessions

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

Communication

Outside of class, we will communicate with students primarily through iLearn announcements and occasionally via your university email account. Queries to convenors can either be placed on the iLearn discussion board or sent to CIVL2205@mq.edu.au from your university email address. One-on-one meetings can be scheduled by appointment. Students are encouraged to raise questions in class or on iLearn, rather than emailing staff directly.

Policies and Procedures

Macquarie University policies and procedures are accessible from [Policy Central](https://policies.mq.edu.au) (<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) (<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 \(https://policies.mq.edu.au\)](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 connect.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/>

Academic Success

[Academic Success](#) provides resources to develop your English language proficiency, academic writing, and communication skills.

- [Ask a Study Coach](#)
- [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 Advocacy](#) provides independent advice on MQ policies, procedures, and processes

Student Enquiries

Got a question? Ask us via the [Service Connect Portal](#), or contact [Service Connect](#).

IT Help

For help with University computer systems and technology, visit <https://students.mq.edu.au/support/technology/service-desk>.

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

All lectures are now in person (rather than online) and the lecture material has been updated accordingly.

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.	1-5
	1.2 Conceptual understanding of underpinning maths, analysis, statistics, computing.	3-5
	1.3 In-depth understanding of specialist bodies of knowledge	1-5
	1.4 Discernment of knowledge development and research directions	4
	1.5 Knowledge of engineering design practice	2,4
	1.6 Understanding of scope, principles, norms, accountabilities of sustainable engineering practice.	3-4
Engineering Application Ability	2.1 Application of established engineering methods to complex problem solving	2,4
	2.2 Fluent application of engineering techniques, tools and resources.	1-5

	2.3 Application of systematic engineering synthesis and design processes.	4
	2.4 Application of systematic approaches to the conduct and management of engineering projects.	2,4
Professional and Personal Attributes	3.1 Ethical conduct and professional accountability.	3-5
	3.2 Effective oral and written communication in professional and lay domains.	4
	3.3 Creative, innovative and pro-active demeanour.	4
	3.4 Professional use and management of information.	1-5
	3.5 Orderly management of self, and professional conduct.	4
	3.6 Effective team membership and team leadership	

Unit information based on version 2026.03 of the [Handbook](#)