



# Unit Outline (Higher Education)

<b>Institute / School:</b>	Institute of Innovation, Science & Sustainability
<b>Unit Title:</b>	Geotechnical Engineering 1
<b>Unit ID:</b>	ENGRG2102
<b>Credit Points:</b>	15.00
<b>Prerequisite(s):</b>	ENGRG1002
<b>Co-requisite(s):</b>	Nil
<b>Exclusion(s):</b>	ENGIN2204
<b>ASCED:</b>	030999

## Description of the Unit:

Geotechnical Engineering 1 primarily delves into soil mechanics, addressing the essential elements of soil mechanical behavior, including composition, classification, compaction, permeability, settlement and shear strength. Beyond gaining a comprehensive understanding of the mechanical properties of soils and their relevance to various civil engineering projects, this unit equips students with the foundational knowledge and skills necessary to design safe, resilient and sustainable geo-structures in their future geotechnical engineering units.

**Grade Scheme:** Graded (HD, D, C, P, MF, F, XF)

## Work Experience:

No work experience

**Placement Component:** No

**Supplementary Assessment:** Yes

Where supplementary assessment is available a student must have failed overall in the Unit but gained a final mark of 45 per cent or above, has completed all major assessment tasks (including all sub-components where a task has multiple parts) as specified in the Unit Description and is not eligible for any other form of supplementary assessment

## Course Level:

Level of Unit in Course	AQF Level of Course					
	5	6	7	8	9	10
Introductory	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Level of Unit in Course	AQF Level of Course					
	5	6	7	8	9	10
Intermediate	■	■	✓	■	■	■
Advanced	■	■	■	■	■	■

### Learning Outcomes:

#### Knowledge:

- K1.** Recognize the importance of geotechnical engineering in the broader civil engineering discipline
- K2.** Recognize the fundamental principles of soil mechanics
- K3.** Explain soil compaction and ground improvement techniques
- K4.** Explain soil compressibility and shear strength

#### Skills:

- S1.** Classify and examine soils for various civil engineering applications
- S2.** Explain the effective stress concept and its influence on soil behavior
- S3.** Interpret laboratory data to determine soil physical and mechanical properties

#### Application of knowledge and skills:

- A1.** Solve a range of geotechnical problems involving water flow, soil settlement/consolidation and soil strength
- A2.** Measure basic soil properties in the laboratory for soil classification purposes
- A3.** Produce reports of geotechnical designs and laboratory test results at a professional standard

#### Unit Content:

Topics may include:

- Geological Processes and Soil Formation
- Soil Classification for Engineering Purposes
- Soil as a Three-Phase System — Phase Relationships
- Ground Improvement and Soil Compaction
- Stresses and Strains in Soils, and the Effective Stress Concept
- Permeability of Soils
- Compressibility and Settlement of Soils
- Shear Strength of Soils

#### Learning Task and Assessment:

Learning Outcomes Assessed	Assessment Tasks	Assessment Type	Weighting
K1-K4, S1, S2, A1, A2	(A) Participation in all learning activities, including attendance and participation in lectures and tutorials, exercises, recommended and supplementary readings, and/or other activities. (B) Undertake problem-solving of engineering problems relevant to geotechnical engineering in both invigilated and non-invigilated settings.	Assessed Tutorials; Quizzes; Assignments; Tests	40% - 60%
K3, K4, S1-S3, A1	Relates fundamental knowledge of geotechnical engineering (specifically soil mechanics) to observations in a controlled environment and/or to solve design-based problems.	Reports; Presentation	10% - 30%

Learning Outcomes Assessed	Assessment Tasks	Assessment Type	Weighting
K4, S3, A2, A3	Undertake an experiment relevant to soil mechanics.	Laboratory Report	10% - 30%

**Adopted Reference Style:**

IEEE

Refer to the [library website](#) for more informationFed Cite - [referencing tool](#)