



# Unit Outline (Higher Education)

<b>Institute / School:</b>	Institute of Innovation, Science & Sustainability
<b>Unit Title:</b>	Geotechnical Engineering 3
<b>Unit ID:</b>	ENGRG9105
<b>Credit Points:</b>	15.00
<b>Prerequisite(s):</b>	(ENGRG3102)
<b>Co-requisite(s):</b>	Nil
<b>Exclusion(s):</b>	Nil
<b>ASCED:</b>	030999

## Description of the Unit:

This unit provides a contextualized learning experience on the significance and application of advanced geotechnical engineering topics, including unsaturated soil mechanics, ground improvement and soil stabilization, and environmental geotechnics, in fostering resilient and sustainable civil infrastructure. Through a variety of learning and teaching activities students will gain the knowledge and skills required to address some of the novel challenges facing our built environment through the lens of geotechnical engineering.

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

## Work Experience:

No work experience: Student is not undertaking work experience in industry.

**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	■	■	■	■	■	■

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 unsaturated soil mechanics in developing more efficient and sustainable civil geotechnical engineering designs
- K2.** Describe and Differentiate between the nature, formation and properties of common problematic soils
- K3.** Appreciate the importance of contemporary geotechnical research in the fields of ground improvement, soil stabilization and environmental geotechnics in fostering resilient and sustainable civil infrastructure

#### Skills:

- S1.** Measure basic unsaturated soil properties by laboratory-based testing techniques
- S2.** Recommend suitable ground improvement techniques for common problematic soils
- S3.** Formulate hypotheses about the mechanisms that govern the behavior of stabilized and non-stabilized geomaterials under different environmental conditions

#### Application of knowledge and skills:

- A1.** Produce unsaturated soil functions, particularly for shear strength, based on laboratory measurements.
- A2.** Apply the AS2870 framework to produce suitable designs for residential slabs and footings on expansive soils at a professional level

#### Unit Content:

Topics may include:

- Unsaturated Soil Mechanics
- Problematic Soils; Identification, Classification and Characterization
- Bespoke Ground Improvement and Soil Stabilization Technologies
- Design of Residential Slabs and Footings on Expansive Soils (AS2870)
- Environmental Geotechnics

#### Learning Task and Assessment:

Learning Outcomes Assessed	Assessment Tasks	Assessment Type	Weighting
K1-K3; S2, S3; 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 traffic and road engineering in both invigilated and non-invigilated settings.	Assessed Tutorials; Quizzes; Assignments; and/or Tests	40 - 60%
K1, K2; S1-S3; A1, A2	Relates fundamental knowledge of geotechnical engineering to observations in a controlled environment and/or to solve design-based problems.	Reports; Presentation	40 - 60%

#### Adopted Reference Style:

IEEE

Refer to the [library website](#) for more information

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