

Unit Outline (Higher Education)

Institute / School:	Institute of Innovation, Science & Sustainability
Unit Title:	INTRODUCTION TO GEOTECHNICAL ENGINEERING
Unit ID:	ENGIN2204
Credit Points:	15.00
Prerequisite(s):	(ENGIN2301)
Co-requisite(s):	Nil
Exclusion(s):	(ENCIV2330)
ASCED:	030911

Description of the Unit:

All aspects of geoengineering are considered at an elementary level, as well as basic engineering geology, formation and weathering processes, sedimentary, igneous and metamorphic rocks, the geotechnical spectrum - soil, rock, weathering, deposition cycle, basic soil and rock properties, void ratio, water content, for example, and the two phase model. All materials are assumed to be granular and frictional. The unit includes the soil description and geological mapping, rock mass classification, soil classification and phase relationships, stress and strain in soils, stress paths, shear failure of soils and analysis and design of shallow foundation. A clear emphasis on sustainable design will be made.

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	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Intermediate	<input type="checkbox"/>	<input type="checkbox"/>	✓	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Advanced	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Learning Outcomes:

On completion of the unit students will be able to:

Knowledge:

- K1.** Recognize the importance of geotechnical engineering in the broader civil engineering discipline
- K2.** Identify and Explain various geological features and their effects on geotechnical engineering systems
- K3.** Recognize the fundamental principles of soil mechanics
- K4.** Explain soil compaction and ground improvement techniques
- K5.** 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.** Analyze and Design basic earth retaining structures
- S4.** 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 Geological Mapping
- Soil Classification for Engineering Purposes
- Soil as a Three-Phase System — Phase Relationships
- Ground Improvement and Soil Compaction
- Stresses and Strains in Soils
- Permeability of Soils
- Shear Strength of Soils
- Compressibility and Settlement of Soils
- Lateral Earth Pressures

Learning Task and Assessment:

Learning Outcomes Assessed	Assessment Tasks	Assessment Type	Weighting
K1-K6, S1, S2, S3, A1, A2, A3	Case studies, Laboratory and Field information/ reports based work	Analysis/ evaluation Reports	10 - 20%
K1-K6, S1-S4, A1-A3	Stress distribution in soils, soil strength and compressibility analysis, bearing capacity of foundations	Written assignment	25 - 45%
K1-K6, S1-S4, A1-A3	All the topics covered in the unit will be accessible.	Mid semester and/or End of semester Test(s)	40 - 60%

Adopted Reference Style:

Other (Refer to the library website for more information: IEEE)

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

Fed Cite - [referencing tool](#)