

# Unit Outline (Higher Education)

**Institute / School:** Institute of Innovation, Science & Sustainability

**Unit Title:** ROCK MECHANICS APPLICATION

**Unit ID:** ENGRG2404

**Credit Points:** 15.00

**Prerequisite(s):** Nil

**Co-requisite(s):** Nil

**Exclusion(s):** (ENGIN5507)

**ASCED:** 030303

**Description of the Unit:**

This unit delves into the scientific study of the behaviour of rock materials under various conditions and stresses. It provides a comprehensive understanding of the physical and mechanical properties of rocks, their deformation, and the implications for engineering and geotechnical applications. This unit introduces elasticity, rock mechanics and their applications in rock structure designs, rock support designs and ground control in surface and underground mines. The unit equips students with the knowledge and skills necessary to understand and analyze the behaviour of rocks in engineering and geotechnical contexts, enabling them to make informed decisions and design safe and efficient structures and excavations.

**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"/>
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:

#### Knowledge:

- K1.** Describe the principles involved in theory of elasticity
- K2.** Interpret rockmass classification depending on its structural quality, in-situ stress field and groundwater regime
- K3.** Analyse stress re-distributions due to the excavation processes

#### Skills:

- S1.** Investigate rock stress and strain analysis in mining
- S2.** Investigate ground control analysis, select appropriate support systems; and refine the design processes
- S3.** Apply knowledge in rock mechanics for rock structure designs in surface and underground mines

#### Application of knowledge and skills:

- A1.** Analyse rock stress in mining environment
- A2.** Analyse rock/ground deformation in mining environment
- A3.** Design rock structures used in mining, observing safety and economic requirements

#### Unit Content:

- Overview of Theory of Elasticity
- Rock as a structure
- Strength & Deformation of rock
- In-situ stresses
- Methods of Excavation Analysis
- Stresses around excavations
- Stability evaluation of rock structures
- Evaluation of support requirements

#### Learning Task and Assessment:

Learning Outcomes Assessed	Assessment Tasks	Assessment Type	Weighting
K1-K3, S1-S3, A1-A2	Numerical and conceptual tasks	Written assignments	20-30%
S1-S3, A1-A3	Research based design project.	Written report and associated calculations	20-30%
K1-K3, S1-S3, A1-A2	Any or all material covered in the unit will be examinable.	Final Test	40-60%

#### Adopted Reference Style:

IEEE

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

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