



# Unit Outline (Higher Education)

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

**Unit Title:** Production Drilling and Blasting

**Unit ID:** ENGRG4402

**Credit Points:** 15.00

**Prerequisite(s):** ENGRG2403

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

**Exclusion(s):** ENGIN5508

**ASCED:** 039999

**Description of the Unit:**

ENGRG4402 introduces some technologies demanded in modern engineering practices, including, but not limited to, modern tunnelling technologies, data analytics, sensor technologies, industrial robots, and artificial intelligence. It aims to enable the students ready for tomorrow's professionals in engineering and applied science.

**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 checked="" type="checkbox"/>	<input type="checkbox"/>
Intermediate	<input type="checkbox"/>	<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:

This unit qualifies students to apply smart or emerging technologies for engineering applications. Students enrolled in this unit will be exposed to a range of technologies, including, but not limited to, modern tunnelling technologies, sensor technologies, industrial robots, data analytics and artificial intelligence, empowering students to undertake engineering professional practices using smart technologies in the digital era.

### Knowledge:

- K1.** Explain shaft sinking and tunnelling by drilling and blasting method.
- K2.** Describe mechanised tunnelling method.
- K3.** Recognise engineering applications of data analytics.
- K4.** Identify sensing technologies for engineering application.
- K5.** Appreciate engineering applications of robots.
- K6.** Distinguish engineering applications of artificial intelligence.

### Skills:

- S1.** Select appropriate tunnelling method for applications in mining and civil engineering.
- S2.** Analyse tunnelling projects and provide solutions to complex underground tunnelling problems.
- S3.** Investigate emerging technologies for engineering applications to improve performance, including, but not limited to, new tunnelling technologies, sensor technologies, industrial robots, data analytics and artificial intelligence.

### Application of knowledge and skills:

- A1.** Apply a tunnelling system for a mining project.
- A2.** Use appropriate approaches in data analytics and sensing technologies to solve engineering problems in mining industry.
- A3.** Investigate and interpret advanced technologies including smart sensors, industrial robots and artificial intelligence efficiently utilized in mining applications.

### Unit Content:

Topics may include:

- Tunnelling by drilling and blasting.
- Mechanised tunnelling.
- Data analytics.
- Sensor technologies.
- Industrial robots.
- Artificial intelligence.

### Learning Task and Assessment:

Learning Outcomes Assessed	Assessment Tasks	Assessment Type	Weighting
K1-6, S1-2, A1	Numerical and conceptual tasks	Assignments	15-30%
K3-6, S1-S3, A1-A3	Up to three projects covering tunnelling technologies, sensor technologies, industrial robots, data analytics or artificial intelligence, or other emerging technologies specified by the unit coordinators.	Reports / Presentations	70-80%

**Adopted Reference Style:**

Other (IEEE)

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

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