

# Unit Outline (Higher Education)

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

**Unit Title:** Rock Fragmentation

**Unit ID:** ENGRG2403

**Credit Points:** 15.00

**Prerequisite(s):** Nil

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

**Exclusion(s):** (ENGIN2502)

**ASCED:** 030303

**Description of the Unit:**

This unit provides a comprehensive understanding of the fundamental principles, techniques, and safety protocols involved in the process of rock excavation. Students learn about various drilling methods, explosive types, blast design, and environmental considerations. The unit equips students with the expertise needed to plan, execute and oversee safe and efficient rock excavation operations across different geo-mining conditions.

**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						

Level of Unit in Course	AQF Level of Course					
	5	6	7	8	9	10
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.** Recognize the principles of different drilling and blasting operations.
- K2.** Recognise the importance of why drilling and blasting must be considered together in both surface and underground mining operations.
- K3.** Identify the potential environmental effects of blasting.

#### Skills:

- S1.** Analyse and solve problems of complex drilling and blasting.
- S2.** Select different explosive types and their use for particular applications.
- S3.** Evaluate different drilling and blasting design methods for both surface and underground operations.

#### Application of knowledge and skills:

- A1.** Synthesise and design short, medium and long-term plans and schedules for drilling and blasting for surface and sub-surface mines.
- A2.** Design appropriate drill and blast design for the given geo-mining conditions.

#### Unit Content:

Topics may include:

1. Production drilling machines
2. Bits and drilling accessories
3. Explosive types
4. Explosive properties and characteristics
5. New explosive products
6. Principles of blasting
7. Initiation systems
8. Small scale drilling and blasting
9. Large scale methods and mass blasting
10. Crater blasting systems
11. Controlled blasting techniques
12. Vibrations and air blast
13. Secondary breaking

#### FEDTASKS

Federation University Federation recognises that students require key transferable employability skills to prepare them for their future workplace and society. FEDTASKS (**T**ransferable **A**tttributes **S**kills and **K**nowledge) provide a targeted focus on five key transferable Attributes, Skills, and Knowledge that are embedded within curriculum, developed gradually towards successful measures and interlinked with cross-discipline and Co-operative Learning opportunities. *One or more FEDTASK, transferable Attributes, Skills or Knowledge must be evident in the specified learning outcomes and assessment for each FedUni Unit, and all must be directly*

assessed in each Course.

FEDTASK attribute and descriptor		Development and acquisition of FEDTASKS in the Unit	
		Learning Outcomes (KSA)	Assessment task (AT#)
FEDTASK 1 Interpersonal	Students will demonstrate the ability to effectively communicate, inter-act and work with others both individually and in groups. Students will be required to display skills in-person and/or online in: <ul style="list-style-type: none"> <li>Using effective verbal and non-verbal communication</li> <li>Listening for meaning and influencing via active listening</li> <li>Showing empathy for others</li> <li>Negotiating and demonstrating conflict resolution skills</li> <li>Working respectfully in cross-cultural and diverse teams.</li> </ul>	Not applicable	Not applicable
FEDTASK 2 Leadership	Students will demonstrate the ability to apply professional skills and behaviours in leading others. Students will be required to display skills in: <ul style="list-style-type: none"> <li>Creating a collegial environment</li> <li>Showing self-awareness and the ability to self-reflect</li> <li>Inspiring and convincing others</li> <li>Making informed decisions</li> <li>Displaying initiative</li> </ul>	Not applicable	Not applicable
FEDTASK 3 Critical Thinking and Creativity	Students will demonstrate an ability to work in complexity and ambiguity using the imagination to create new ideas. Students will be required to display skills in: <ul style="list-style-type: none"> <li>Reflecting critically</li> <li>Evaluating ideas, concepts and information</li> <li>Considering alternative perspectives to refine ideas</li> <li>Challenging conventional thinking to clarify concepts</li> <li>Forming creative solutions in problem solving.</li> </ul>	Not applicable	Not applicable
FEDTASK 4 Digital Literacy	Students will demonstrate the ability to work fluently across a range of tools, platforms and applications to achieve a range of tasks. Students will be required to display skills in: <ul style="list-style-type: none"> <li>Finding, evaluating, managing, curating, organising and sharing digital information</li> <li>Collating, managing, accessing and using digital data securely</li> <li>Receiving and responding to messages in a range of digital media</li> <li>Contributing actively to digital teams and working groups</li> <li>Participating in and benefiting from digital learning opportunities.</li> </ul>	Not applicable	Not applicable
FEDTASK 5 Sustainable and Ethical Mindset	Students will demonstrate the ability to consider and assess the consequences and impact of ideas and actions in enacting ethical and sustainable decisions. Students will be required to display skills in: <ul style="list-style-type: none"> <li>Making informed judgments that consider the impact of devising solutions in global economic environmental and societal contexts</li> <li>Committing to social responsibility as a professional and a citizen</li> <li>Evaluating ethical, socially responsible and/or sustainable challenges and generating and articulating responses</li> <li>Embracing lifelong, life-wide and life-deep learning to be open to diverse others</li> <li>Implementing required actions to foster sustainability in their professional and personal life.</li> </ul>	Not applicable	Not applicable

**Learning Task and Assessment:**

Learning Outcomes Assessed	Assessment Tasks	Assessment Type	Weighting
K1, K2, K3, S1, S2	A comprehensive theoretical and numerical question will be undertaken that has a range of conceptual questions posed within it.	Assessed tutorials and Quizzes	20-40%
K3, S3, A1, A2	Design of drilling and blasting rounds in surface and sub-surface geo-mining conditions	Design project/Presentation	20-40%
K1, K2, K3, S1, S2, S3, A2	An examination on any or all of the material covered in the unit.	Test/Exam	30-50%

**Adopted Reference Style:**

IEEE ()

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