



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: 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:

On successful completion of the unit the students are expected to be able to:

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:

- Production drilling machines
- Bits and drilling accessories
- Explosive types
- Explosive properties and characteristics
- New explosive products
- Principles of blasting
- Initiation systems
- Small scale drilling and blasting
- Large scale methods and mass blasting
- Crater blasting systems
- Controlled blasting techniques
- Vibrations and air blast
- Secondary breaking

Learning Task and Assessment:

Learning Outcomes Assessed	Assessment Tasks	Assessment Type	Weighting
K1-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	20-30%

Learning Outcomes Assessed	Assessment Tasks	Assessment Type	Weighting
K3, S3, A1-A2	Design of drilling and blasting rounds in surface and sub-surface geo-mining conditions	Design project	20-30%
K1-K3, S1-S3, A2	An examination on any or all of the material covered in the unit.	Test/Exam	40-60%

Adopted Reference Style:

IEEE

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