Course Outline (Higher Education)

Institute: Institute of Innovation, Science & Sustainability

Course Title: ROCK FRAGMENTATION

Course ID: ENGIN2502

Credit Points: 15.00

Prerequisite(s): Nil

Co-requisite(s): Nil

Exclusion(s): (ENMIN2040)

ASCED: 030303

Description of the Course:

Students will develop their knowledge in the area of drilling and blasting for both surface and underground mining.

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 course but gained a final mark of 45 per cent or above and submitted all major assessment tasks.

Program Level:

Level of course in Program	AQF Level of Program					
	5	6	7	8	9	10
Introductory						
Intermediate			✔			
Advanced						

Learning Outcomes:

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

Knowledge:

K1. Understand the principles of different drilling operations.
K2. Understand the principles of different blasting operations.
K3. Recognise the importance of why drilling and blasting must be considered together in both surface and underground mining operations.
K4. 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 mines.
A2. Synthesise and design short, medium and long-term plans and schedules for drilling and blasting for sub-surface mines.

Course 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
- Case studies and costs
- Kinetics of a particle F = ma, work and energy, impulse and momentum

Values:

V1. Value how the geological, petrological and mineralogical nature of a deposit determines the method and manner of extraction.

V2. Explain how a mine is developed and illustrate how the production rate dictates the number and size of equipment required for the operation.

V3. Understand the environmental effects of blasting.

Graduate Attributes

The Federation University Federation graduate attributes (GA) are entrenched in the Higher Education Graduate Attributes Policy (LT1228). FedUni graduates develop these graduate attributes through their engagement in explicit learning and teaching and assessment tasks that are embedded in all FedUni programs. Graduate attribute attainment typically follows an incremental development process mapped through program progression. **One or more graduate attributes must be evident in the specified learning outcomes and assessment for each FedUni course, and all attributes must be directly assessed in each program**

Graduate attribute and descriptor		**Development and acquisition of GAs in the course**	
		Learning Outcomes (KSA)	**Assessment task (AT#)**
GA 1 Thinkers	Our graduates are curious, reflective and critical. Able to analyse the world in a way that generates valued insights, they are change makers seeking and creating new solutions.	K1 - K4, S1 - S3, A1 - A2	A1-5
GA 2 Innovators	Our graduates have ideas and are able to realise their dreams. They think and act creatively to achieve and inspire positive change.	S1 - S3, A1 - A2	A1-5
GA 3 Citizens	Our graduates engage in socially and culturally appropriate ways to advance individual, community and global well-being. They are socially and environmentally aware, acting ethically, equitably and compassionately.	K1 - K4, S1 - S3, A1 - A2	A3-5

Graduate attribute and descriptor		Development and acquisition of GAs in the course	
		Learning Outcomes (KSA)	Assessment task (AT#)
GA 4 Communicators	Our graduates create, exchange, impart and convey information, ideas, and concepts effectively. They are respectful, inclusive and empathetic towards their audience, and express thoughts, feelings and information in ways that help others to understand.	K1 - K4, S1 - S3, A1 - A2	A2-5
GA 5 Leaders	Our graduates display and promote positive behaviours, and aspire to make a difference. They act with integrity, are receptive to alternatives and foster sustainable and resilient practices.	K1 - K4, S1 - S3, A1 - A2	A4

Learning Task and Assessment:

Learning Outcomes Assessed	Learning Tasks	Assessment Type	Weighting
K1-K4, S1-S3, A1-A2	A comprehensive design exercise(s) will be undertaken that has a range of conceptual questions posed within it.	One or more assignments.	40 - 60%
K1-K4, S1-S3, A1-A2	An examination on any or all of the material covered in the course.	Examination	40 - 60%

Adopted Reference Style:

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

Refer to the library website for more information

Fed Cite - referencing tool