Course Outline (Higher Education)

School / Faculty: Faculty of Science and Technology

Course Title: ADVANCED ROCK MECHANICS

Course ID: ENGIN5506

Credit Points: 15.00

Prerequisite(s): Nil

Co-requisite(s): Nil

Exclusion(s): ENMIN7030 ADVANCED ROCK MECHANICS

ASCED Code: 030303

Grading Scheme: Graded (HD, D, C, etc.)

Program Level:

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

Learning Outcomes:

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

Knowledge:

- **K1.** Evaluate and critique the principles involved in theory of elasticity applied to rock mechanics.
- **K2.** Critique rock as a structural material and to analyse the applicability of classical elasticity principles to rock structures.
- **K3.** Apply rock mass classification systems.
- **K4.** Analyse stress re-distributions due to the excavation processes.
- **K5.** Propose support systems appropriate to a particular excavation based on different analyses.

Skills:

- **S1.** Produce solutions to complex stability problems in mining.
- **S2.** Generate and evaluate complex ideas in rock mechanics.
- **S3.** Apply appropriate tools to solve problems in rock mechanics.
- **S4.** Analyse using advanced computer aided design rock structures and support methodologies used in mining.

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ENGIN5506 ADVANCED ROCK MECHANICS

Application of knowledge and skills:

A1. Implement and evaluate short, medium and long term plans in terms of rock mechanics for a mine.

Course Content:

Topics may include:

- Overview of theory of elasticity.
- Rock as a structure.
- Strength and deformation of rock.
- In-situ stresses.
- Methods of excavation analysis.
- Stresses around axcavation.
- Stability evaluation of rock structures.
- Evaluation of support requirements.
- Mine fill and the design of filling systems.
- Rock and cable bolt systems.
- Hydraulic yielding roof support systems.
- Strengthening of rock.
- Design of caving mining systems.
- Case studies.
- Mine seismicity.

Values and Graduate Attributes:

Values:

V1. Generate the diversity of factors influencing the design and analysis of typical rock structures used in mining, such as process characteristics, environmental and human factors, legal and economic issues.

V2. Develop a commitment to quality, ethical standards, occupational health and safety.

Graduate Attributes:

FedUni graduate attributes statement. To have graduates with knowledge, skills and competence that enable them to stand out as critical, creative and enquiring learners who are capable, flexible and work ready, and responsible, ethical and engaged citizens.

Attribute	Brief Description	Focus
Knowledge, skills and competence	Mining engineering is a fast-changing technological area which impacts on our every-day life. Students will develop an appreciation that learning is a life-long process.	High
Critical, creative and enquiring learners	Development of independent, critical and creative learners is an essential feature of engineering education. Assessments tasks are individualised, so students need to rely on their personal efforts to arrive at their conclusions.	High
Capable, flexible and work ready	Mining engineering study requires a team work approach to execute tasks to achieve common objectives. Training for engagements is built in to them mining program. A student will graduate with a new outlook as an engaging capable, flexible and work ready individual.	Medium
Responsible, ethical and engaged citizens	Through the mining program delivery, a student will value the engineering input for the advancement of humanity. Students are made aware that the engineer does not work or act in isolation, but is part of a wider community that includes many stakeholders, some of which may have no technical knowledge of what the engineer does. An awareness of community as a responsible, ethical and engaged citizen is important when finding a design solution.	Medium

Learning Task and Assessment:

Learning Outcomes Assessed	Assessment Task	Assessment Type	Weighting
K1-5, S1-4, A1	Numerical and conceptual research tasks	Written assignments	40-50%
K1-5	Design projects.	Written reports	50-60%

Adopted Reference Style:

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