Faculty of Engineering

School of Minerals and Energy Resources Engineering

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Course Code:	MINE5030	Semester:	T3	Level:	PG	Units/Credits	6 UOC
Course Name:	Mining Excavations in Rock						

Course Convenor:	Dr Joung Oh				
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Contact times	Contact times are by appointment				

Stress in rock and the effect of depth on pre-mining stress state; other factors influencing stress in rock; mining-induced stress and the rock mass response to excavation process; stress distributions around different excavation shapes and sizes - elastic and inelastic rock materials; excavation stability and potential failure modes; interaction between different excavations (horizontal and vertical interaction); regional stability considerations; effect of time on rock behaviour around excavations. Activities include course presentations, student presentations and numerical modelling demonstration responsibility to manage and plan workloads as much as possible to enable a minimum of 8 hours per week, plus time for assessments. Some weeks may require more than 20 hours.

MINE5030 is part of the Graduate Diploma in Coal Mine Strata Control. It is offered as a specialist postgraduate coursework qualification for people who currently, or stream in the future to, work within the underground coal mining industry with particular responsibilities in the field of strata control. The program has been designed to cater for people with different backgrounds, including either engineering or scientific tertiary qualifications and/or relevant experience. The program may be undertaken on either a part-time or full-time basis.

The overall program content provides an initial grounding in fundamental principles of rock mechanics and geotechnical engineering, followed by a comprehensive coverage of practical strata control applications, from the point of view of both the technologies involved, together with their implementation and management. The learning outcomes of this program will therefore provide a student with both the fundamental and practical knowledge base to be able to fulfil the role of a mine Strata Control Professional.

The program is particularly designed for people working at mine sites, or those who have access to a mine site for practical assignments. The program is offered in a flexible delivery format, with a large component available in a distance format, plus a limited number of face-to-face workshops/sessions. Assessments will include a number of practical, site-based assignments, including group and interactive work and presentations.

The program consists of the following eight courses:

- 1. MNNG5010 Fundamentals of Rock Behaviour
- 2. MNNG5020 Geotechnical Assessment
- 3. MINE8680 Geotechnical Data Collection and Analysis
- 4. MNNG5030 Mining Excavations in Rock
- 5. MNNG5040 Applied Geomechanics (coal)
- 6. MNNG5050 Ground Control Principles (coal)
- 7. MNNG5060 Operational Geotechnical Management
- 8. MINE8690 Mining Geotechnical Project (Research specific to Coal Mine Strata Control)

MINE8690 is a 6UOC mini research project for 1 semester for Graduate Diploma students who may articulate to Masters - See more at: https://www.engineering.unsw.edu.au/mining-engineering/study-

Course completion requires:

- x submission of ; failure to submit all assessment items will result in the award of an Unsatisfactory Failure (UF) grade for the Course.
- x achievement of at least a 50%+ pass in the exam that is part of MNNG5060.

This program assumes a student has knowledge of:

- x geological terms and descriptions are assumed and an understanding of mining process
- x fundamental understanding of basic mathematics, physics would be beneficial.
- x to register for this program significant industry experience in underground mining is strongly recommended. Those with at least two years of experience may also gain entry with permission, based on the portfolio and interview.

The program aims to provide mining engineers, geologists and other industry professionals, with leading practice knowledge for geotechnical engineering for all stages of mining operations. It will cover the major geotechnical design methodologies in use and new developments in leading practice, with the aim of safe and efficient mining operations.

At the conclusion of this program the student will learn:

- 1. A practical competence and understanding in all areas presented in course description.
- 2. Knowledge of geotechnical engineering practices for mining from feasibility assessment to operations.
- 3. Laboratory testing.
- 4. Principles of effective operational geotechnical management
- 5. Understanding of elements of geotechnical engineering designs, including pillar design, ground support design, subsidence assessment and design, wind-blasts and pillar extraction.
- 6. Practical hazard plan development and assessment.
- 7. Geotechnical instrumentation.
- 8. Fundamentals and application of numerical modelling.
- 9. Longwall geomechanics and interaction of support and rock mass.
- 10. Undertake presentations that develop essential communications skills and teamwork.
- 11. How to conduct research to achieve the outcomes of a project.

- x Deep Mines Coal Industry Advisory Committee, Health and Safety Commission. (1996). Guidance on the use of rockbolts to support roadways in coal mines.
- x Galvin, J. (2015). Ground Engineering and Management in Coal Mining. Springer. In press.
- x Hoek, E. (2007). Practical Rock Engineering. Rocscience Hoek's corner. http://www.rocscience.com/hoek/Hoek.asp.
- x Hoek, E. and Brown, E. T. (1980). Underground excavations in rock. Institution of Mining and Metallurgy.
- x Hoek, E., Kaiser, P. K., and Bawden, W. F. (1995). Support of Underground Excavations in Hard Rock. Rotterdam: A.A. Balkema.
- x Hutchinson, D. J., and Diederichs, M. S. (1996). Cablebolting in Underground Mines. Richmond, BC: BiTech Publishers.
- x Jaeger, J. C., and Cook, N. G. W. (1979). Fundamentals of Rock Mechanics (Third ed.). London: Chapman and Hall.
- x Mark, C. (1990). Pillar Design Methods for Longwall Mining. Information Circular IC 9247. U.S Bureau of Mines.
- x Mark, C. (2007). Multiple-seam Mining in the United States. Design Based on Case Histories. Paper presented at the New Technology for Ground Control in Multiple-seam Mining, 15-27. NIOSH.
- x Mark, C., and Chase, F. E. (1997). Analysis of Retreat Mining Pillar Stability (ARMPS). Paper presented at the New Technology for Ground Control in Retreat Mining., Pittsburgh, 17-34. U.S. Bur. Mines.
- x Peng, S. S., and Chiang, H. S. (1984). Longwall Mining (First ed.). New York: John Wiley and Sons.
- x Peng, S.S. (1986). Coal mine ground control, 2nd edition, John Wiley and Sons, Inc. U.S.A.
- x Van der Merwe, J.N. and Madden, B.J. (2002). Rock engineering for coal mining. Safety in Mines Research Advisory Committee (SIMRAC). SAIMM Special Publications Series 7. April.

During the program many other publications and papers will be available in Moodle.

3.2.

- x *Report Writing Guide for Mining Engineers,* 2011. P Hagan & P Mort (Mining Education Australia (MEA) ISBN 978 0 7334 3032 9. Available on-line on course homepage.
- x *Guide to Authors,* 2008. (Australasian Institute of Mining and Metallurgy; Melbourne)

TIME	Content/Activities	Presenter
0900 - 0930	Course Introduction	JO
0930 – 1030	Rock Excavation Overview	JO
1030 – 1100	Morning Tea	
1100 – 1230	Rock-2 (k36 Tm ()Tj ET E2.Don)Tj ET (on)]TJ 0 Tc 0()on on	

MINE5030 Mining Excavations in Rock32020

At times, the School or your lecturers may need to contact you about your course or your enrolment. Your lecturers will use the email function through Moodle or we will contact you on your @student.unsw.edu.au email address.

We understand that you may have an existing email account and would prefer for your UNSW emails to be redirected to your preferred account. Please see these instructions on how to redirect your UNSW emails: <u>https://student.unsw.edu.au/email-rules</u>

Full marks for an assignment are only possible when an assignment is received by the due date. In fairness to those students who0.261 0 Td (an)Tj 0 Tc 0 Tw ()Tj -0.1j -0.1j -0.1j -8vvdueignm 16 (gnm0 11.04 Tc 0