



## UNSW Course Outline

# MINE5030 Mining Excavations in Rock - 2024

Published on the 08 Sep 2024

## General Course Information

**Course Code :** MINE5030

**Year :** 2024

**Term :** Term 3

**Teaching Period :** T3

**Is a multi-term course? :** No

**Faculty :** Faculty of Engineering

**Academic Unit :** School of Minerals & Energy Resources Engineering

**Delivery Mode :** In Person

**Delivery Format :** Standard

**Delivery Location :** Kensington

**Campus :** Sydney

**Study Level :** Postgraduate

**Units of Credit :** 6

### Useful Links

[Handbook Class Timetable](#)

## Course Details & Outcomes

### Course Description

This course is to address 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 the 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.

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.

## Course Aims

The course aims to provide mining engineers, geologists and other industry professionals, with leading practice knowledge for geotechnical engineering and rock excavations, with the aim of safe and efficient mining operations.

## Course Learning Outcomes

Course Learning Outcomes
CLO1 : Recognise mining induced and in situ stresses in rock masses and their distributions around different excavation shapes and sizes
CLO2 : Apply principles of rock mass response to the excavation process and excavation stability as well as potential failure modes
CLO3 : Identify elastic and inelastic rock behaviours and the effect of time on rock mass behaviour
CLO4 : Evaluate the impact of mining excavations on regional stability

Course Learning Outcomes	Assessment Item
CLO1 : Recognise mining induced and in situ stresses in rock masses and their distributions around different excavation shapes and sizes	<ul style="list-style-type: none"><li>• Rock cutting performance of CM</li><li>• Factor of safety of a coal pillar</li></ul>
CLO2 : Apply principles of rock mass response to the excavation process and excavation stability as well as potential failure modes	<ul style="list-style-type: none"><li>• Rock cutting performance of CM</li><li>• Factor of safety of a coal pillar</li></ul>
CLO3 : Identify elastic and inelastic rock behaviours and the effect of time on rock mass behaviour	<ul style="list-style-type: none"><li>• Rock cutting performance of CM</li><li>• Factor of safety of a coal pillar</li></ul>
CLO4 : Evaluate the impact of mining excavations on regional stability	<ul style="list-style-type: none"><li>• Rock cutting performance of CM</li><li>• Factor of safety of a coal pillar</li></ul>

# Learning and Teaching Technologies

Moodle - Learning Management System

## Assessments

### Assessment Structure

Assessment Item	Weight	Relevant Dates
Rock cutting performance of CM Assessment Format: Individual	40%	Start Date: The first day of lecture Due Date: 15 November 2024
Factor of safety of a coal pillar Assessment Format: Individual	60%	Start Date: the first day of lecture Due Date: 15 November 2024

### Assessment Details

#### Rock cutting performance of CM

##### Assessment Overview

Estimate the performance of the continuous miner when sumping into the coal face:

1. when equipped with all-new picks
2. with picks in an average condition of wear

This is a 5000-word assignment. Marking will be done with a rubric and feedback will be provided via the Learning Management System in class during assignment review.

##### Course Learning Outcomes

- CLO1 : Recognise mining induced and in situ stresses in rock masses and their distributions around different excavation shapes and sizes
- CLO2 : Apply principles of rock mass response to the excavation process and excavation stability as well as potential failure modes
- CLO3 : Identify elastic and inelastic rock behaviours and the effect of time on rock mass behaviour
- CLO4 : Evaluate the impact of mining excavations on regional stability

##### Assignment submission Turnitin type

Not Applicable

##### Generative AI Permission Level

**No Assistance**

This assessment is designed for you to complete without the use of any generative AI. You are

not permitted to use any generative AI tools, software or service to search for or generate information or answers.

For more information on Generative AI and permitted use please see [here](#).

## **Factor of safety of a coal pillar**

### **Assessment Overview**

Modelling of coal pillars and calculating the factor of safety using FEM.

Investigate the cause of pillar failure and provide remedial methods.

This is a 5000-word assignment. Marking will be done with a rubric and feedback will be provided via the Learning Management System in class during assignment review.

### **Course Learning Outcomes**

- CL01 : Recognise mining induced and in situ stresses in rock masses and their distributions around different excavation shapes and sizes
- CL02 : Apply principles of rock mass response to the excavation process and excavation stability as well as potential failure modes
- CL03 : Identify elastic and inelastic rock behaviours and the effect of time on rock mass behaviour
- CL04 : Evaluate the impact of mining excavations on regional stability

### **Detailed Assessment Description**

Further description will be given during class.

### **Assignment submission Turnitin type**

Not Applicable

### **Generative AI Permission Level**

**No Assistance**

This assessment is designed for you to complete without the use of any generative AI. You are not permitted to use any generative AI tools, software or service to search for or generate information or answers.

For more information on Generative AI and permitted use please see [here](#).

## **General Assessment Information**

Question & Answer session will be given during the class regarding the assignments.

## Grading Basis

Standard

## Requirements to pass course

Course completion requires:

- submission of **all assessment items**; failure to submit all assessment items will result in the award of an Unsatisfactory Failure (UF) grade for the Course unless special consideration has been submitted and approved.

# Course Schedule

## Attendance Requirements

Please note that lecture recordings are not available for this course. Students are strongly encouraged to attend all classes and contact the Course Authority to make alternative arrangements for classes missed.

## General Schedule Information

Learning Activities Summary for each day will be provided on the Moodle.

# Course Resources

## Prescribed Resources

There are no required textbooks for this program. The recommended references include:

- Galvin, J.M. (2016). Ground Engineering Principles and Practices for Underground Coal Mining. Springer International Publishing. ISBN 978-3-319-25003-8. DOI 10.1007/978-3-319-25005-2.
- Bieniawski, Z.T. (1984). Rock mechanics design in mining and tunnelling, A.A. Balkema, Rotterdam.
- Bieniawski, Z.T. (1987). Strata control in mineral engineering, John Wiley and Sons. pp. 29-37.
- Bieniawski, Z.T. (1989). Engineering rock mass classifications. Wiley, NY, 251 pp.
- Brady, B. H. G., and Brown, E. T. (2006). Rock Mechanics for Underground Mining. (Third ed.). Cordrecht: Springer.
- Brown, E.T. (1980). Rock Characterisation testing and monitoring – ISRM Suggested Methods. Published for the Commission on testing methods. International Society for Rock Mechanics by Pergamon Press Oxford, 211 pp.
- Deep Mines Coal Industry Advisory Committee (DMCIDC), (1996). Guidance on the use of rockbolts to support roadways in coal mines. HSE Books, UK.
- Deep Mines Coal Industry Advisory Committee, Health and Safety Commission. (1996). Guidance on the use of rockbolts to support roadways in coal mines.
- Galvin, J. (2015). Ground Engineering and Management in Coal Mining. Springer. In press.

- Hoek, E. (2007). Practical Rock Engineering. Rocscience Hoek's corner. <http://www.rocscience.com/hoek/Hoek.asp>.
- Hoek, E. and Brown, E. T. (1980). Underground excavations in rock. Institution of Mining and Metallurgy.
- Hoek, E., Kaiser, P. K., and Bawden, W. F. (1995). Support of Underground Excavations in Hard Rock. Rotterdam: A.A. Balkema.

## Recommended Resources

- Published articles on rock excavations will be provided on Moodle.

## Staff Details

Position	Name	Email	Location	Phone	Availability	Equitable Learning Services Contact	Primary Contact
	Joung Oh					No	Yes

## Other Useful Information

### Academic Information

#### I. Special consideration and supplementary assessment

If you have experienced an illness or misadventure beyond your control that will interfere with your assessment performance, you are eligible to apply for Special Consideration prior to, or within 3 working days of, submitting an assessment or sitting an exam.

Please note that UNSW has a Fit to Sit rule, which means that if you sit an exam, you are declaring yourself fit enough to do so and cannot later apply for Special Consideration.

For details of applying for Special Consideration and conditions for the award of supplementary assessment, please see the information on UNSW's [Special Consideration page](#).

#### II. Administrative matters and links

All students are expected to read and be familiar with UNSW guidelines and policies. In particular, students should be familiar with the following:

- [Attendance](#)
- [UNSW Email Address](#)
- [Special Consideration](#)
- [Exams](#)

- [Approved Calculators](#)
- [Academic Honesty and Plagiarism](#)
- [Equitable Learning Services](#)

### III. Equity and diversity

Those students who have a disability that requires some adjustment in their teaching or learning environment are encouraged to discuss their study needs with the course convener prior to, or at the commencement of, their course, or with the Equity Officer (Disability) in the Equitable Learning Services. Issues to be discussed may include access to materials, signers or note-takers, the provision of services and additional exam and assessment arrangements. Early notification is essential to enable any necessary adjustments to be made.

### IV. Professional Outcomes and Program Design

Students are able to review the relevant professional outcomes and program designs for their streams by going to the following link: <https://www.unsw.edu.au/engineering/student-life/student-resources/program-design>.

*Note: This course outline sets out the description of classes at the date the Course Outline is published. The nature of classes may change during the Term after the Course Outline is published. Moodle or your primary learning management system (LMS) should be consulted for the up-to-date class descriptions. If there is any inconsistency in the description of activities between the University timetable and the Course Outline/Moodle/LMS, the description in the Course Outline/Moodle/LMS applies.*

## Academic Honesty and Plagiarism

UNSW has an ongoing commitment to fostering a culture of learning informed by academic integrity. All UNSW students have a responsibility to adhere to this principle of academic integrity. Plagiarism undermines academic integrity and is not tolerated at UNSW. *Plagiarism at UNSW is defined as using the words or ideas of others and passing them off as your own.*

Plagiarism is a type of intellectual theft. It can take many forms, from deliberate cheating to accidentally copying from a source without acknowledgement. UNSW has produced a website with a wealth of resources to support students to understand and avoid plagiarism, visit: [student.unsw.edu.au/plagiarism](https://student.unsw.edu.au/plagiarism). The Learning Centre assists students with understanding academic integrity and how not to plagiarise. They also hold workshops and can help students one-on-one.

You are also reminded that careful time management is an important part of study and one of the identified causes of plagiarism is poor time management. Students should allow sufficient time for research, drafting and the proper referencing of sources in preparing all assessment tasks.

Repeated plagiarism (even in first year), plagiarism after first year, or serious instances, may also be investigated under the Student Misconduct Procedures. The penalties under the procedures can include a reduction in marks, failing a course or for the most serious matters (like plagiarism in an honours thesis or contract cheating) even suspension from the university. The Student Misconduct Procedures are available here:

[www.gs.unsw.edu.au/policy/documents/studentmisconductprocedures.pdf](http://www.gs.unsw.edu.au/policy/documents/studentmisconductprocedures.pdf)

## **Submission of Assessment Tasks**

Work submitted late without an approved extension by the course coordinator or delegated authority is subject to a late penalty of five percent (5%) of the maximum mark possible for that assessment item, per calendar day.

The late penalty is applied per calendar day (including weekends and public holidays) that the assessment is overdue. There is no pro-rata of the late penalty for submissions made part way through a day. This is for all assessments where a penalty applies.

Work submitted after five days (120 hours) will not be accepted and a mark of zero will be awarded for that assessment item.

For some assessment items, a late penalty may not be appropriate. These will be clearly indicated in the course outline, and such assessments will receive a mark of zero if not completed by the specified date. Examples include:

- Weekly online tests or laboratory work worth a small proportion of the subject mark;
- Exams, peer feedback and team evaluation surveys;
- Online quizzes where answers are released to students on completion;
- Professional assessment tasks, where the intention is to create an authentic assessment that has an absolute submission date; and,
- Pass/Fail assessment tasks.

## **Faculty-specific Information**

[Engineering Student Support Services](#) – The Nucleus - enrolment, progression checks, clash



requests, course issues or program-related queries

[Engineering Industrial Training](#) – Industrial training questions

[UNSW Study Abroad](#) – study abroad student enquiries (for inbound students)

[UNSW Exchange](#) – student exchange enquiries (for inbound students)

[UNSW Future Students](#) – potential student enquiries e.g. admissions, fees, programs, credit transfer

## Phone

(+61 2) 9385 8500 – Nucleus Student Hub

(+61 2) 9385 7661 – Engineering Industrial Training

(+61 2) 9385 3179 – UNSW Study Abroad and UNSW Exchange (for inbound students)

## School-specific Information

### Course completion

Course completion requires submission of all assessment items. Failure to submit all assessment items may result in the award of an Unsatisfactory Failure (UF) grade for the course unless special consideration has been submitted and approved.

### Submission of Assessment Tasks

We encourage you to retain a copy of every assignment submitted for your own record, either in hardcopy or electronic form. All assessments must have an assessment cover sheet attached (if required).

### Student Resources

The School has [student resources](#) section, containing useful advice and information to ensure you're able to focus on your studies.

### Computing Resources and Internet Access Requirements

UNSW Minerals and Energy Resources Engineering provides blended learning using the online Moodle LMS (Learning Management System). Also see - Transitioning to Online Learning: <https://www.student.unsw.edu.au/transitioning-online-learning>

Note that some specialist engineering software is not available for Mac computers.

- Mining Engineering Students: OMB G48
- Petroleum Engineering Students: TETB LG34 & LG35

For more information about system requirements is available at [www.student.unsw.edu.au/moodle-system-requirements](http://www.student.unsw.edu.au/moodle-system-requirements)

### Accessing Course Materials Through Moodle

Course outlines, support materials are uploaded to Moodle, the university standard Learning Management System (LMS). In addition, on-line assignment submissions are made using the assignment dropbox facility provided in Moodle. All enrolled students are automatically included in Moodle for each course. To access these documents and other course resources, please visit: [www.moodle.telt.unsw.edu.au](http://www.moodle.telt.unsw.edu.au)

### School Contact Information

School of Minerals and Energy Resources  
Old Main Building, Level 1, 159 (K15)  
UNSW SYDNEY NSW 2052 AUSTRALIA

For current students, all enquiries and assistance relating to enrolment, class registration, progression checks and other administrative matters, please see [The Nucleus: Student Hub](#).

### Web & Important Links:

[School of Minerals and Energy Resources](#)

[The Nucleus Student Hub](#)

[Moodle](#)

[UNSW Handbook](#)

[UNSW Timetable](#)

[Student Wellbeing](#)

[Urgent Mental Health & Support](#)

[Equitable Learning Services](#)