



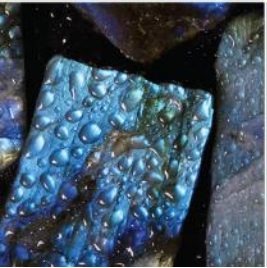
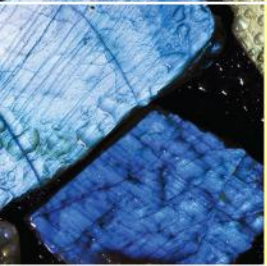
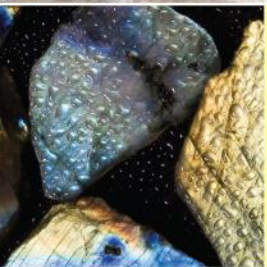
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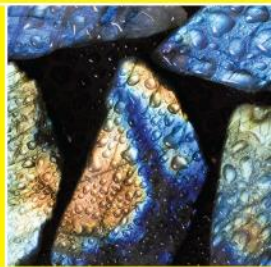


Postgraduate Course Outline

MINE8710 - 6UOC Mine Slope Stability T3 2020



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1. INFORMATION ABOUT THE COURSE

Course Code:	MINE8710	Semester:	T3, 2020	Level:	PG	Units/Credits	6 UOC
Course Name:	Mine Slope Stability						

Course Convenor:	Dr Binghao Li		
Contact Details	Mining Engineering, School of Minerals and Energy Resources Engineering Old Main Building - Rm 164	EMAIL:	binghao.li@unsw.edu.au
		Phone:	+61 2 9385 0783 M: 0425 315 433
Contact times	Contact times are scheduled for: <ul style="list-style-type: none">• 12th to 16th October 2020 as a short course		

1.1. Course Description

This course will deal with the major topics of engineering geology and groundwater controls on surface mining slope stability in the form of discontinuities, variable materials and pore pressures; effect of excavation method and scheduling in pit stability; the fundamental basis of stability analysis; advantages and disadvantages of a range of mathematical models; remedial measures that can be taken to stabilise slopes; pit slope design in the context of overall mine planning. In addition to dealing with the underlying principles, the course may involve workshops and field inspections so that the participants gain hands-on experience of practical cases.

1.2. Course Completion

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.

1.3. Assumed Knowledge

This course assumes a student has knowledge of:

- basic geological terms and descriptions are assumed; a basic understanding of mining would be beneficial.
- as this is a technical course in a postgraduate program, a fundamental understanding of mining geomechanics; fundamental understanding of basic mathematics, physics would be beneficial.

2. AIMS, LEARNING OUTCOMES AND GRADUATE ATTRIBUTES

2.1. Course Aims

This course aims to equip the student with knowledge and skills to design appropriate slope for surface mining applications.

2.2. Learning Outcomes

It is intended that students will be able to:

1. Understand the basic mechanical properties of rock and how these are applied to analyse problems in mine slope stability.
2. Have a sound working knowledge of fundamental mechanisms and geotechnical principles within the context of practical surface mining applications;
3. Recognise the role and importance of these principles in a comprehensive range of surface mining applications, both from a technical perspective, and from the risk and operational management perspective.
4. Have a broad knowledge of key numerical methods used in mine slope designs

2.3. Teaching Strategies

This course will be delivered mainly through formal lectures with a combination of active learning tutorials. Several lecturers from industry will present different topics. The student will also have an opportunity to participate in a field trip.

2.4. Graduate Attributes

This course will contribute to the development of the following Graduate Attributes:

- appropriate technical knowledge
- having advanced problem solving, analysis and synthesis skills with the ability to tolerate ambiguity
- ability for engineering design and creativity
- being able to think and work individually and in teams
- listening, influencing, motivating and communication skills
- being able to work and communicate effectively across discipline boundaries
- having HSEC consciousness
- being active life-long learners.

3. REFERENCE RESOURCES

3.1. Reference Materials

There are no prescribed texts for this course. However, the following references may be of assistance, as are a range of industry and professional journals.

- Guidelines for Open Pit Slope Design. J Read & P Stacey CSIOR (2008)
- Guidelines for Evaluating Water in Pit Slope Stability. G Beale & J Read CSIRO (2013)
- Rock Mechanics and the Design of Structures in Rock. L Obert & WI Duvall, John Wiley & Sons (1967)
- Fundamentals of Rock Mechanics, JC Jaeger & NGW Cook, Chapman & Hall (1979).
- Rock Fracture Mechanics. BN Whittaker, RN Singh & G Sun, Elsevier (1992).
- Geotechnical Instrumentation and Monitoring in Open Pit and Underground Mining. T Szwedzicki (ed.), AA Balkema (1993).
- Rock Slope Engineering. E Hoek & JW Bray, Inst. of Mining & Metallurgy, London (1994).
- ISRM Online Journals

(Note: This is not intended to be a complete list, but a guide only.)

3.2. Other Resources

- *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.
- *Guide to Authors*, 2008. (Australasian Institute of Mining and Metallurgy; Melbourne).

3.3. Online Resources

Selected readings as well as other supporting material (e.g. course outline and lecture material etc.) will be made available on LTMS.

UNSW Mining and Petroleum subject guide (including a link to ACARP and how to find the reports in the catalogue) <http://subjectguides.library.unsw.edu.au/engineering/miningpetroleum>

UNSW Library services for Postgraduate students <https://www.library.unsw.edu.au/study/services-for-students>

New postgraduate course students are strongly advised to visit the above website, and complete the ELISE and ELISE Plus tutorials. These will help develop skills in finding, using and evaluating scholarly information.

Videos are often provided to students as a web stream within the Moodle learning management system. Videos are not available for download by students, unless approved by the Course Convenor and either the Undergraduate or Postgraduate Coursework Director. Special consideration can be provided for students to access videos off-line (eg. working remotely). Please contact the Course Convenor for more information. Note that UNSW reserves the right to deliver videos as a web stream rather than off-line, and cannot provide videos that are copyright from other providers.

4. COURSE CONTENT AND LEARNING ACTIVITIES

4.1. Learning Activities Summary

Following is the short course schedule for MINR8710. Dates 12th to 16th October 2020

Day	Date	Theme (S)	Time	Topic	Presenter
1	Mon 12 Oct	Lectures	10:00 – 11:00	Introduction & Course Description Remote access MERE Lab Computer	Binghao Li/ Mark Fowler
			11:00 – 11:30	Morning Tea	
			11:30 – 12:30	Philosophy of Investigations in Mining Developments	Mark Fowler
			12:30 – 13:00	Lunch Break	
			13:00 – 14:00	Pit Slope Design-Principles	Felicia Weir
			14:00 – 15:00	Discontinuity in Soils and Rocks	Mark Fowler
			15:00 – 15:30	Afternoon tea	
			15:30 – 16:30	Hard Rock Failure Modes	Felicia Weir
			16:30 – 17:00	Intro Assignment 1	Mark Fowler/ Richard Brehaut
2	Tue 13 Oct	Lectures and Assignment 1	09:00 – 10:00	Assignment 1 Mapping Exercise	Richard Brehaut
			10:00 – 10:30	Morning Tea	
			10:30 – 12:30	Assignment 1 Mapping Exercise	
			12:30 – 13:30	Lunch Break	
			13:30 – 15:00	Soil and Soft Rock	Gareth Swarbrick
			15:00 – 15:30	Afternoon tea	
			15:30 – 17:30	Rock Mass Strength	Alex Duran
3	Wed 14 Oct	Lectures	08:30 – 10:30	Numerical Methods in Rock Slope Engineering	Gareth Swarbrick
			10:30 - 11:00	Morning Tea	
			11:00 – 12:30	Rock Slope Support	Alex Duran
			12:30 – 13:30	Lunch Break	
			13:30 – 15:00	Groundwater	Mark Fowler
			15:00 – 15:30	Afternoon tea	
			15:30 – 17:00	Assignment 2 Introduction	Mark Fowler
4	Thu 15 Oct	Lectures	08:30 – 10:00	Assignment 1 Data processing & analysis	Richard Brehaut
			10:00 - 10:30	Morning Tea	
			10:30 – 12:30	Assignment 1 Data processing & analysis	Richard Brehaut
			12:30 – 13:30	Lunch Break	
			13:30 – 15:00	GSPI	Mark Fowler
			15:00 – 15:30	Afternoon tea	
			15:30 – 17:00	Hydro Mechanical Coupling	Mark Fowler

5	Fri 16 Oct	Lecturers and Assignment 2	09:00 – 10:30	Monitoring and Pit Slope Management	Mark Fowler
			10:30 – 11:00	Morning Tea	
			11:00 – 12:30	Introduction to Slope Monitoring Radar	To be confirmed IDS
			12:30 – 13:30	Lunch Break	
			13:30 – 15:00	Waste Dumps	Alex Duran
			15:00 – 15:30	Afternoon tea	
			15:30 – 16:00	Pit Slope Design Conclusions	Mark Fowler

4.2. Convenor and Presenters

Convenor

Binghao Li

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Engineering Associate & Geologist:
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Email: richard.brehaut@psm.com.au

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Address: PSM Sydney office

	G3 56 Delhi Road, North Ryde, NSW 2113 Australia
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COURSE ASSESSMENT

Completion of this course usually requires around 150 hours of work. Course delivery accounts for around 40 hours, hence 110 hours of additional online and assessment work is required. The formal lectures and laboratory classes are delivered in a Short Course at UNSW. (See course overview for schedule). Attendance at all Short Course sessions is compulsory. Prior to the short course you should log into Moodle where teaching and related material is available.

5.1. Assessment Summary

All assessments are due **12:00 pm Sydney time on the due date.**

Assessment task	Due date	Release date	Weight	Assessment	Learning outcomes assessed
A1.0	16 Nov	14 Oct	50%	Report- Field Excursion – Mittagong Bypass.	1,2
A2.0	16 Nov	16 Oct	50%	Report- Mine Slope stability- Rock Mass	3,4

All the course materials and assignments will be available online through Moodle. Access to the Moodle site is via the Moodle icon on the MyUNSW homepage, or at <https://moodle.telt.unsw.edu.au>

5. ASSESSMENT CRITERIA

The student should be cognisant that a range of factors is often being assessed in any one assignment; not just whether the final results are numerically correct. Consideration is given to other relevant elements that contribute to the *Learning Outcomes* of the course as well as the *Graduate Attributes* of the overall degree program.

Assignments and examination	% MARK
Answers may be numerical, graphical or descriptive.	
Numerical	
<i>Answer is correct and substantiated by complete mathematical working</i>	100%
<i>Deduct for incorrect or unspecified units</i>	20%
<i>Deduct for excessive round off error</i>	10%
<i>Answer is correct but not substantiated by complete, correct working.</i>	up to 30% depending upon how much of the correct working is given
<i>Answer is incorrect but principles of mathematical working are correct</i>	60%
<i>Add if the answer is of reasonable Magnitude</i>	20%
<i>Add if incorrect only because of an error of transcription of numerical data</i>	10%
<i>Mathematical working is incomplete or incorrect</i>	up to 50% depending upon how much of the correct working is given
Graphical answers	
Accuracy with which the data are presented	60%
Layout	20%
Tidiness	20%
Descriptive answers	
Completeness and accuracy of answer	70%
Clarity of expression	30%
Deduct for irrelevant material	up to 40%

6. STUDYING A PG COURSE IN MINING ENGINEERING AT UNSW

7.1. How We Contact You

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 within 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: <http://www.cloudemail.unsw.edu.au/>

7.2. How You Can Contact Us

We are always ready to assist you with your inquiries. To ensure your question is directed to the correct person, please use the email address below for:

Enrolment or other admin questions regarding your program: postgrad.mining@unsw.edu.au

Course inquiries: these should be directed to the Course Convenor.

7.3. Computing Resources and Internet Access Requirements

UNSW Mining Engineering provides blended learning using the on-line Moodle LMS (Learning Management System).

It is essential that you have access to a PC or notebook computer. Mobile devices such as smart phones and tablets may compliment learning, but access to a PC or notebook computer is also required. Note that some specialist engineering software is not available for Mac computers.

You can access the School's computer laboratory in-line with the School laboratory access guidelines and [Class bookings](#).

It is recommended that you have regular internet access to participate in forum discussion and group work. To run Moodle most effectively, you should have:

- broadband connection (256 kbit/sec or faster)
- Firefox browser
- ability to view streaming video (high or low definition UNSW TV options)

More information about system requirements is available at www.student.unsw.edu.au/moodle-system-requirements

7.4. Accessing Course Materials Through Moodle

Course outlines and support materials are uploaded on a Learning Management System (LMS) - Moodle. All enrolled students are automatically included on the Moodle for each course. To access these documents, please visit: www.moodle.telt.unsw.edu.au

7.5. Assessment Criteria for Postgraduate Programs

The assessment criteria provide a framework for you to assess your own work before formally submitting major assignments to your facilitator. Your facilitator will be using this framework to assess you work and as a way to assess whether you have met the listed learning outcomes and the graduate attributes for your program. All students are encouraged to take a closer look at this framework before, during and after completing an assignment.

The descriptions in the framework will help you and your facilitator to identify where your assignment is ranked – from excellent to poor achievement. We ask that you don't use the guidelines as a checklist, but as a tool to assess the quality of your work. Your facilitator will also be looking at the quality, creativity and the presentation of your written assignment as they review the framework.

7.6. Assignment Submissions

The School has developed a guideline to help you when submitting a course assignment. Please take a closer look at all these details on our website: www.engineering.unsw.edu.au/mining-engineering/assignment-submission-policy

We encourage you to retain a copy of every assignment submitted for assessment for your own record either in hardcopy or electronic form. On a rare occasion, assignments may be mislaid and we may contact you to re-submit your assignment.

All your assignments will need to have a completed PG coversheet. To access a copy, please visit: https://www.engineering.unsw.edu.au/mining-engineering/sites/mine/files/uploads/Assignmentcoversheetindividual_PG.pdf

7.7. Late Submission of an Assignment

Full marks for an assignment are only possible when an assignment is received by the due date. In fairness to those students who do meet the assignment due date and time, deductions will apply to submissions made after this time. Details on deductions that are automatically applied to late submissions are available on our webpage: <http://www.engineering.unsw.edu.au/mining-engineering/late-submissions>

We understand that at times you may not be able to submit an assignment on time, and the School will accommodate any fair and reasonable extension. We would recommend you review the UNSW Special Consideration guidelines as soon as possible: <https://student.unsw.edu.au/special-consideration>

7.8. Special Consideration

You can apply for special consideration through [UNSW Student Central](#) when illness or other circumstances interfere with your assessment performance. Sickness, misadventure or other circumstances beyond your control may:

- Prevent you from completing a course requirement,
- Keep you from attending an assessable activity,
- Stop you submitting assessable work for a course,
- Significantly affect your performance in assessable work, be it a formal end-of-semester examination, a class test, a laboratory test, a seminar presentation or any other form of assessment.

We ask that you please contact the Course Convenor immediately once you have completed the special consideration application, no later than one week from submission.

More details on special consideration can be found at: <https://www.student.unsw.edu.au/special-consideration>

7.9. Course Results

For details on UNSW assessment policy, please visit: <https://student.unsw.edu.au/assessment>

In some instances your final course result may be withheld and not released on the UNSW planned date. This is indicated by a course grade result of either:

- WD – which usually indicates you have not completed one or more items of assessment or there is an issue with one or more assignment; or
- WC – which indicates you have applied for Special Consideration due to illness or misadventure and the course results have not been finalised.

In either event it would be your responsibility to contact the Course Convener as soon as practicable but no later than five (5) days after release of the course result. If you don't contact the convener on time, you may be required to re-submit an assignment or re-sit the final exam and may result in you failing the course. You would also have a NC (course not completed) mark on your transcript and would need to re-enroll in the course.

7.10. Students Needing Additional Support

The Student Equity and Disabilities Unit (SEADU) aims to provide all students with support and professional advice when circumstances may prevent students from achieving a successful university education. Take a look at their webpage: www.studentequity.unsw.edu.au/

7.11. Academic Honesty and Plagiarism

Your lecturer and the University will expect your submitted assignments are truly your own work. UNSW has very clear guidelines on what plagiarism is and how to avoid it. Plagiarism is using the words or ideas of others and presenting them 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. The University has adopted an educative approach to plagiarism and has developed a range of resources to support students. All the details on plagiarism, including some useful resources, can be found at <https://student.unsw.edu.au/plagiarism>.

All Mining Engineering students are required to complete a student declaration for academic integrity which is outlined in the assignment cover sheets. By signing this declaration, you agree that your work is your own original work.

If you need some additional support with your writing skills, please contact the Learning Centre or view some of the resources on their website: www.lc.unsw.edu.au/. The Learning Centre is designed to help you improve your academic writing and communication skills. Some students use the Centre services because they are finding their assignments a challenge, others because they want to improve an already successful academic performance.

7.12. Report Writing Guide for Mining Engineers

The School has a report writing guide (RWG) available for all mining engineering students. View this website to download a copy of this guide: https://www.engineering.unsw.edu.au/mining-engineering/sites/mine/files/publications/MEA_ReportWritingGuide_eBook_2018ed.pdf

7.13. Continual Course Improvement

At the end of each course, all students will have the opportunity to complete a course evaluation form. These anonymous surveys help us understand your views of the course, your lecturers and the course materials. We are continuously improving our courses based on student feedback, and your perspective is valuable.

We also encourage all students to share any feedback they have any time during the course – if you have a concern, please contact us immediately.