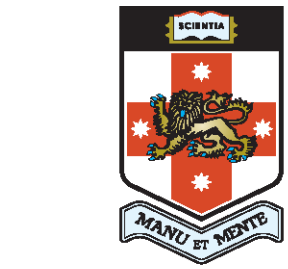

UNSW
SYDNEY

Faculty of Engineering

School of Minerals and Energy Resources Engineering

Undergraduate Course Outline

MINE3630

Rock Breakage

Dr Joung Oh

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1. INFORMATION ABOUT THE COURSE

Course Code:	MINE3630	Term:	T3, 2020	Level:	UG	Units/Credits	6 UOC
Course Name:	**Rock Breakage**						

Course Convenor:	***Dr Joung Oh***		
Contact Details	School of Minerals and Energy Resources Engineering OMB, Rm159k	EMAIL:	joung.oh@unsw.edu.au
		Phone:	+61 2 9385 5002
Contact times	Contact times are scheduled for: • **Tuesday 9:00am – 11:00am, Online** • **Thursday 2:00pm – 4:00pm, Online**		

1.1. Course Description

This course covers the principal methods of rock breakage used in mining including machine mining, drilling and blasting. Machine mining encompasses rock cutting principles, cutting with picks and discs, the design of cutter heads, effect of wear, assessment of rock cuttability, impact breakage and ripping. Drilling encompasses the methods of drilling used in mining and the impact of drilling parameters on performance and selection and costing of drilling equipment. Blasting encompasses the chemistry of explosives and mechanics of explosive-rock interaction, selection of commercial explosives, explosive charging techniques, initiation and delay systems, blast design principles for surface and underground mines, safety, environmental and regulatory management and blast performance assessment and analysis.

1.2. Course Completion

Course completion requires submission of all assessment items; failure to submit all assessment items can result in the award of an Unsatisfactory Failure (UF) grade for the Course.

1.3. Assumed Knowledge

This course assumes that a student:

- is currently enrolled in the Mining Engineering single degree program or a Mining Engineering double degree program at UNSW; and
- has satisfactorily completed all the courses in Stages 1 to 3 of the Mining Engineering single degree program or equivalent in the Mining Engineering double degree program and is in the final Stage/Year of the program; and
- has successfully completed MINE3430 Mining Systems; and
- has a sound knowledge of mining terms and systems and has had previous exposure to mining operations through industry employment and/or field trips.

1.4. Attendance

To pass this course it is expected that you will attend at least 80% of tutorials and lectures. *Failure to meet the specified attendance requirements of the course may result in in the award of an Unsatisfactory Failure (UF) grade for the Course.*

Attendance will be recorded when applicable. Normally, there is no make-up work for poor attendance. If you have misadventure or ill-health, please contact your course coordinator soon as possible. The attendance requirement is not meant to be punitive. It is included because participation is an important part of achieving the course outcomes.

2. AIMS, LEARNING OUTCOMES AND GRADUATE ATTRIBUTES

2.1. Course Aims

This course aims to equip the student with knowledge and skills to design and select appropriate rock breakage techniques for different mining applications.

2.2. Learning Outcomes

At the conclusion of this course, students should be able to:

1. Explain the contribution and influence of rock breakage to the stream of mining processes and in particular the mine-to-mill concept
2. Describe the various methods of rock breakage
3. Select appropriate methods of drilling and rock breakage for given in-situ rock conditions
4. Apply fundamental principles to the design and selection of safe and efficient blasting and machine mining to:
    - design blasts to achieve particular outcomes;
    - manage and control blast damage and environmental impacts;
    - optimise design of cutterheads; and
    - evaluate productivity and economics
5. Identify relevant requirements for the security, storage and handling of explosives

2.3. Graduate Attributes

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

1. appropriate technical knowledge
2. having advanced problem solving, analysis and synthesis skills with the ability to tolerate ambiguity
3. ability for engineering design and creativity
4. awareness of opportunities to add value through engineering and the need for continuous improvement
5. being able to work and communicate effectively across discipline boundaries
6. having HSEC consciousness
7. being active life-long learners.

3. REFERENCE RESOURCES

3.1. Reference Materials

- *ISEE Blasters Handbook. Society of Explosives Engineers Inc. 18th edition, 2011 (International Society of Explosives Engineers: Cleveland, USA).*
- *Blasting principles for open pit mining and theoretical foundations. William Hustrulid. Rotterdam: A.A. Balkema, 1999.*
- *Practical Blasting Fundamentals, International Society of Explosives Engineers*
- *Drilling and blasting of rocks. Carlos Lopez Jimeno, Emilio Lopez Jimeno, Francisco Javier Ayala Carcedo. , Rotterdam, Ne.: A.A. Balkema, c1995.*
- *Open Pit Blast Design – analysis and optimisation, JKMRC Monograph 1, University of Queensland, 1996.*
- *Rock Excavation Handbook, Sandvik Tamrock Corporation, 1999*
- *Rock Blasting and Explosives Engineering. Per-Anders Persson, Roger Holmberg, Jaimin Lee., Boca Raton, Fla.: CRC Press, 1994.*
- *Underground Mining Methods: Engineering Fundamentals and International Case Studies. Hustrulid, WA, Bullock, R. (ed.), 2001. (Society for Mining Metallurgy & Exploration: Littleton), 728p.*

- *SME Mining Engineering Handbook, 2011, Peter Darling (ed.), ISBN 978 0 87335 264 2*
- *Cost Estimation Handbook for the Australian Mining Industry, AusIMM*
- *www.austlii.edu.au – for all Acts & Regulations for all states and territories*

3.2. Other Resources

Other material that should be referred to in conjunction with this Course Outline include:

- *Learning Guide: Machine Mining*
- *Learning Guide: Drilling*
- *Learning Guide: Blasting*
- *Module Reader – Machine Mining: Elements of Machine Mining*

3.3. Online Resources

There are numerous articles / information sources on reservoir engineering on the web. Many of them are sound, but many are either very lightweight or contain errors. Be very careful in your choice of web sources. Remember, UNSW librarians are usually happy to help you locate articles or make suggestions regarding possible material to help you in your academic work. You can also access basic online help at http://www.library.unsw.edu.au/

3.4. Report Writing Guide

The School has a Report Writing Guide (RWG) available. A copy of this is available on the course Moodle site.

4. COURSE CONTENT AND LEARNING ACTIVITIES

4.1. Course content

This course involves the following topics:

- *Mechanics of rock breakage and fragmentation*
  - machine mining
  - blasting
- *Machine mining*
  - types of mining machines
  - design variables and performance of pick and disc cutting tools
  - cutting tool materials and effect of tool metallurgy on wear and fracture resistance
  - cutterhead design for mining machines
  - methods of assessment of rock cuttability
  - ripping and impact breaking
- *Drilling techniques for blasting*
  - types of drilling machines and drilling methods
  - selection, performance and costing of different drilling machines
  - safety and logistics of drilling machines
- *Explosive breakage*
  - detonation and explosive performance
  - types, properties and selection of commercial explosives
  - charging techniques, initiation systems, blasting accessories and their applications
  - rock mass characterisation for blasting
  - blast design principles and practices
    - bench blasting
    - open pit coal blasting
    - underground blasting

- special blasting techniques
  - management of blast damage
  - cast blasting
  - secondary blasting
- blast fragmentation and analysis
- environmental management
- relevant legislation and standards

4.2. Learning Activities Summary

UNSW Wk	Activity	Content	Presenter
1	Lecture + In class activity	Course outline and course orientation. Content, course profile, learning objectives, orientation to teaching and learning, activity based learning, outline of resources, how to utilise the resources, methods of assessment, graduate attribute, how to get help, nature of feedback session, what students are expected to learn. Rationale (why we are going to this approach), • Outline of learning outcomes for machine mining. • Types of rock cutting tools and machines. The mechanics of rock breakage with a mechanical indenter.	JO
2	Lecture + In class activity	*Design Objective 1*: To analyse the effectiveness of the design of a cutterhead on a pick cutting machine for a continuous miner, longwall shearer and roadheader. • Impact of design variables and rock mass properties on rock cutting performance. • Concept of specific energy & cutting efficiency. • Tool interaction; spacing-to-depth ratio • Impact of wear on cutting performance with consideration of the quartz content of rock and cutting tool metallurgy	JO
3	Lecture + In class activity	*Design Objective 2*: To design the cutterhead on disc cutting machine for a tunnel boring machine and raiseborer. • Models and empirical results linking major design variables and machine cutting performance for disc cutting tools. • Tool interaction; spacing-to-depth ratio • Assessing cuttability • Rippability, impact breakage of rock	JO

4	Lecture + In class activity	• Rock drillability and the factors that affect drillability • Rock drilling methods (rotary-percussive, rotary-crushing, rotary cutting and rotary abrasive) • Mechanisms of rock breakage associated with drag bits, rotary bits and percussion bits. • Identify the range of drilling systems for exploration and production applications • Applications and operating characteristics (torque/rotation, feed/pull-down, flushing/bailing velocity, blow energy and frequency, etc) for rotary and percussion blasthole drills for different mining objectives and rock mass conditions • Drill pattern design for various mining methods (underground and surface) • Choosing appropriate drilling machine(s) for different mining methods • The role of rock blasting in mining	MFH
5	Lecture + In class activity	• Outline of learning outcomes for blasting. • Explosives and rock breakage • Commercial mining explosives • Explosive performance • Logistics and Safety • Delivery and charging systems • Open pit blast patterns and explosive distribution	MFH
6	Flexibility week	N/A	N/A
7	Lecture + In class activity	• Blast patterns and explosive distribution (open pit) • Charge and pattern selection • Rock mass charactisation and explosive selection	MFH
8	Lecture + In class activity	• Initiation timing • Blast damage • Wall control	MFH
9	Lecture + In class activity	• Blasting in underground coal mines • Explosives legislation and security • Managing the environmental impacts from blasting – 1 • Managing the environmental impacts from blasting – 2	DC
10	Lecture + In class activity	• Underground blasting concepts • Horizontal development blasts • Production ring blasts • Confined production blasts • Secondary breakage • Review of blasting	MFH

Total student effort hours: Approx. 150

(Note: The above indication of "student effort hours" is indicative only – It reflects the anticipated level of total student involvement with the course – either through accessing or participating in online materials and activities; private research; preparation of assignments. Individual students may find their level of involvement differs from this schedule.

UNSW Key dates: https://student.unsw.edu.au/calendar

5. COURSE ASSESSMENT

5.1. Assessment Summary

Assessment task	Due date / week	Weight	Assessment	Learning outcomes assessed
1	W4	30%	**Quiz: Machine Mining** A quiz assessing all aspects detailed in the Machine Mining Learning Guide	1, 2, 3, 4
2	TBA	10%	**Seminar presentation**[1] (Group Work[2])	1, 2, 3, 4, 5
3	W9	25%	**Major Design Project** (Group work) A group assignment which is subject to a Peer Review to prepare blast designs, costing and other analyses for a given surface mining operation or underground operation	1, 2, 3, 4, 5
4	Formal Exam period	35%	**Exam** (Covers Drill and Blast)	1, 2, 3, 4, 5

Note: 1. Each team should select a topic for the seminar presentation and inform the Course Convenor by email before close of business on Friday by Week 2.
2. Refer to details on Group Work

Assignments related details/submission-box will be available online through Moodle. Access to the Moodle site is via the Moodle icon on the MyUNSW homepage.

6. ASSESSMENT CRITERIA

Quiz

- The in-semester quiz for the machine mining module may be either paper-based or conducted on-line using Moodle in the School of Mining Engineering Computer Laboratory, OMB Rm 48.
- The **quiz will be scheduled during the normal lecture period or either on a Thursday or Friday** in the nominated week between 10am and 2pm.
- The duration of the quiz will be approximately 60 minutes. Students should make provision in the diary to be available during these periods in the nominated weeks.
- Non-attendance at the Quiz will result in a zero mark. No supplementary quiz will be scheduled.
- The Quiz will cover the various learning outcomes as defined in the *Course Outline* and the material outlined in the *Learning Guides*.
- The Quiz will include a combination of multiple answer, short answer and calculation style questions selected at random from a bank of questions.
- Normal university regulations for examinations will apply to the Quiz.
- Students must also bring to the Quiz a *Quiz Summary Sheet (**QSS**)*. Preparation of the QSS is regarded as a key part of the learning process and so students are strongly encouraged to prepare their own QSS. Requirements of the QSS are:
    - it must be the student's own work;

- it must be a single A4 sheet of paper with notes placed on both sides of the sheet;
- the sheet must contain only **handwritten** notes and diagrams. It must NOT contain any typed, photocopied or computer generated information;
- it must be the individual student's own work written in pencil and/or pen. A photocopy is NOT allowed;
- there are no constraints on the size or amount of information that can be included; and
- the student's name and signature must be placed in the top right hand corner of the QSS with the statement "I declare this QSS is all my own work.".

- If a QSS does not comply with all of these requirements then it may be confiscated and the student will not have recourse to the QSS during the Quiz. Academic Misconduct procedures may also be applied.
- The QSS must be surrendered at the end of the Quiz. The QSS will be checked but will not be assessed, so students can elect to submit a blank QSS. Students who do not submit a QSS will get zero marks for the Quiz.
- The QSS will not returned to students. Students are advised to make a copy for their own use.
- Students should bring to the Quiz a
  - calculator,
  - pen and pencil,
  - the Quiz Summary Sheet and
  - their Student ID card.

  A blank sheet of paper for workings will be provided.

Group Work

Students should form teams of three (3) students per team and advise the Course Convenor of the Team Name and student members of the team by no later than Friday in Week 2. Any student who is not in a team after this time will be assigned to a team by the Course Convenor.

See the section on *Group Work - Peer Assessment* in the section on University Policies for further details on the requirements and process of peer assessment in the group project assignment.

Formal Exam

An exam in the formal examination period at the end of semester will be held on material covered in the Drilling and Blasting modules of the course. The examination will be closed book, all necessary formulae will be provided on the exam paper.

Full marks for an assignment or examination question can be obtained where:

- The numerical **'result'** is substantiated by an **'answer'** comprising a complete mathematical working with appropriate definitions, assumptions, explanations and sketch diagrams at each stage.
- The result is numerically correct, with the correct units, magnitude and sign.
- The appropriate number of significant figures have been reported in the result and the accuracy of the result has not been compromised by rounding errors.
- Where appropriate, there is some **discussion** of the reliability and applicability of the result in the relevant engineering context.
- The answers to purely descriptive questions, which do not require any calculation and do not have a numerical result, should clearly and comprehensively address the specific question, supported by appropriate diagrams, graphs, formulae, examples and cited references.

A key ability of an engineer is to recognise when a numerical result 'looks wrong' and then go back over the work to check the input data, assumptions, and calculations.

These typical maximum marks apply where the following errors occur:

- There is a minor calculation or transcription error, but otherwise the answer is satisfactory and the result is consistent and apparently reasonable: 70 to 90%

- The answer is satisfactory but the result is compromised by one of more of the following: is inaccurate due to rounding errors, has incorrect or no units, has the wrong magnitude, has the wrong sign: 60 to 80%
- There is a minor calculation or transcription error but, although the answer is satisfactory, the result is clearly unreasonable: 40 to 60%
- The result is correct but there is little or no mathematical working with appropriate definitions, assumptions, explanations and sketch diagrams at each stage: 30 to 50%
- The question has been misunderstood, an inappropriate mathematical working has been applied but the result is consistent and apparently reasonable: 20 to 40%
- The question has been misunderstood, an inappropriate mathematical working has been applied and the result is clearly unreasonable: 0 to 30%
- The input data have been transcribed correctly, but there has been no serious attempt to answer the question 0 to 10%
- A descriptive answer, although substantially correct, is padded with waffle and irrelevant material: 60 to 80%
- A descriptive answer is very brief and clearly deficient: 30 to 60%
- A descriptive answer merely comprises a re-statement of the question with something like "… is very important" added at the end: 0 to 10%

The following assessment criteria provide both a framework for students when preparing major assignments in the course as well as a guideline for assessors when marking an assignment. The student is advised to review the relevant framework before undertaking their assignment.

The criteria listed for each item of assessment and the descriptions contained therein are not intended to be prescriptive nor is it an exhaustive list. Rather it should be viewed as a framework to guide the student as to the type of information and depth of coverage that is expected to be evident in an assignment; the framework illustrates for example what would distinguish an excellent achievement from a poor achievement.

The student should be cognisant that a range of factors are 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.

The student is cautioned against merely using the assessment criteria as a checklist. When assessing an assignment, elements in the framework will be examined in terms of quality and creativity. Hence ensuring all elements are merely covered in an assignment is often not sufficient in itself and will not automatically lead to full marks being awarded. Other factors such as how the student went about presenting information, how an argument was structured and/or the elements supporting a particular recommendation or outcome are also important.

Finally the framework can also be used to provide feedback to a student on their performance in an assignment. Periodically the criteria are reviewed and updated, consequently changes may be made to the framework to improve their effectiveness in achieving both these objectives.

Note: Reference to *RWG* in the assessment criteria refers to the *MEA Report Writing Guide*.

6.1 Major Design Project

The assessment criteria and weighting that will be use in assessing the assignment are summarised in Table 3. Note: student submissions must be consistent with the requirements detailed in the earlier section on *Requirements on Submission of Major Assignment.*

TABLE 1: Assessment Criteria – *Major Design Project*

Criteria	*Excellent*	*Good*	*Satisfactory*	*Unsatisfactory*	*Poor*	*nil*
Summary	• summary clearly defines all aspects of the objectives of project and methodology used • includes a well-written and comprehensive statement of the findings and outcomes of study based on a correct interpretation of data and correct analysis	• summary defines the objectives of the assignment and methodology used • includes a statement of the findings and outcomes based on a correct interpretation of data and correct analysis	• summary lists most of the important elements of the objectives of the assignment and methodology used • statement of findings includes a satisfactory description of findings. Some errors found in the interpretation of data and analysis	• summary lists some of the objectives of the assignment and aspects of the methodology used. • statement of findings was incomplete and/or contains errors	• summary was inadequate or poorly written • lacks statement on objectives and methodology. • missing a statement on finding and outcomes	• no summary provided
	5	4	3	2	1	0
Background review, interpretation of information and method of analysis	• background review was provided • data provided was correctly interpreted • all assumptions were clearly stated and appropriately justified • method of analysis was clearly stated, was correct and was easy to follow	• background review was provided • data was adequately interpreted •most assumptions were clearly stated and justified to some extent •method of calculation was clearly stated and mostly correct	• background review was limited • some minor problems with interpretation of the data •some assumptions stated and/or not clearly stated and/or not fully justified • method of calculation was clearly stated and generally correct	• background review was limited • some data was slightly misinterpreted • assumptions were not stated and/or inadequately justified and/or unsubstantiated • method of calculation was incorrect and/or missing important elements and/or difficult to understand	• no background review provided • data was misinterpreted • no assumptions stated and/or justified • method of calculation not provided • no explanatory notes for calculations were provided	• no background review provided • no calculations provided and/or incorrect method applied
	10 9	8 7	6 5	4 3	2 1	0
Drill and blast design designs	• drill and blast design(s) were correct and consistent with industry practice •all design details were provided and were clearly justified by the analyses • all assumptions documented and justified in the report.	• drill and blast designs were acceptable and consistent with industry practice • most design details were provided and justified by the analyses •most assumptions documented and justified in the report.	• drill and blast designs were reasonable and consistent with industry practice • not all design details provided and justified by the analyses •some assumptions documented in the report	• drill and blast designs were not reasonable and/or not consistent with industry practice • few design details provided few assumptions documented though not justified in the report	• inappropriate drill and blast designs and/or not consistent with industry practice no design details provided • no statement of assumptions	• did not provide any details on drill and blast design(s)
	25 20	19 15	14 10	9 5	4 1	0
Design evaluations and analysis	• all analysis has been conducted as specified by the scope of work • all results are numerically correct • all results stated reflect appropriate level of understanding •all units of • measurements were stated and are correct	• all analysis has been conducted as specified by the scope of work • most results are numerically correct • most results reflect appropriate level of understanding •most units were stated and correct	• all analysis has been conducted as specified by the scope of work • some results are numerically correct • most results reflect satisfactory level of understanding •some units are stated and generally correct	• some analysis missing • many results are incorrect • though some results are generally close to being numerically correct • results reflect unsatisfactory level of understanding • some units are correct and some are missing	• some analysis missing • most results are incorrect • results reflect no understanding • units missing and/or are incorrect	• no results provided
	25 20	19 15	14 10	9 5	4 1	0
Costs analysis	• provided comprehensive cost estimates • costs reflect current industry	• provided most cost estimates • costs reasonably reflect current cost structure	• provided some cost estimates • costs are reasonable but do not reflect current	• provided some cost estimates with some errors • costs do not reflect current cost	• provided limited cost estimates • unrealistic costings • no justification of costs and no	• no cost estimates provided • no SOP and performance monitoring plan

Criteria	*Excellent*	*Good*	*Satisfactory*	*Unsatisfactory*	*Poor*	*nil*
	cost structure • all costs fully justified and all reference sources cited • provided an appropriately structured SOP and performance monitoring plan	• most costs are fully justified and most reference sources cited • provided a reasonable SOP and performance monitoring plan	cost structure • some costs are fully justified and some reference sources cited • provided a reasonable but incomplete SOP and performance monitoring plan	structure • little justification of costs and many reference sources not cited • provided an incomplete SOP and performance monitoring plan	sources cited • provided an incomplete SOP and performance monitoring plan	provided
	20 19	18 15	14 10	9 5	4 1	0
Discussion and conclusions	• analysis presented demonstrates good comprehension of issues and insight into the significance of the results • report concludes with a clear concise • summary of the outcomes and includes qualifications • excellent evidence of research and use made of a variety of sources	• analysis presented demonstrates reasonable comprehension of issues and some insight into the significance of the results •report concludes with • a summary of the outcomes and includes qualifications • good evidence of research and use made of a variety of sources	• analysis presented demonstrates comprehension • report concludes with brief summary of outcomes •some • reference to other sources of information	• analysis presented demonstrates some comprehension of issues • some evidence of reading though poorly integrated in report •inadequate • conclusion and summary of outcomes.	• analysis demonstrates limited • comprehension of issues report missing final summary of findings and outcomes • no evidence of further reading	• little or no discussion and conclusion
	5	4	3	2	1	0
Report standard	• report **structure** contains all sections required in a formal technical report and is in accord with *RWG* standards • includes all elements of a report structure and follows a logical progression • **format** of report is completely in accord with the *RWG* with appropriate heading and sub-headings • use of tables, figures and equations is fully compliant with R*WG* and has no errors • writing **style** is completely in accord with and appropriate for a formal technical report • report contains no spelling or grammatical errors, etc.	• report structure is complete and mostly follows a logical progression though it has a few minor errors with *RWG* • format is largely in accord with *RWG* with only a few minor errors • use of tables, figures and equations is largely correct with only a few minor errors • style is largely appropriate for a technical report with a few minor exceptions • largely free of spelling and grammatical errors	• report structure is mostly correct and/or has some minor errors • format of report mostly in accord with the *RWG* though it has some minor errors • use of tables, figures and equations is mostly correct though there are several minor errors • style is appropriate in most instances with some minor errors • several minor spelling and grammatical errors	• several issues with report structure and/or many minor errors • many issues with format of report as it deviates from *RWG* • some issues with use of tables, figures and/or equations • writing style is inappropriate in many instances • many instances of spelling and/or grammatical errors	• significant issues with report structure and/or many major errors • report incomplete in sections with missing/gaps in information • large number of significant major issues in format of report • use of tables, figures and/or equations is largely inconsistent with *RWG* • inappropriate report writing style • unacceptable number of spelling and/or grammatical errors	• not presented as a formal technical report and/or not compliant with *RWG* • significant amount of information missing from report • most essential elements of report structure are missing and/or report has no logical structure • format of report not in accord with the *RWG* standards • use of tables, figures and/or equations is incorrect • major issues with spelling and/or grammar
	10 9	8 7	6 5	4 3	2 1	0

7. STUDYING A UG/PG COURSE IN UNSW MINERALS AND ENERGY RESOURCES ENGINEERING

7.1. How We Contact You

At times, the School or your course convenors may need to contact you about your course or your enrolment. Your course convenors 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: https://www.it.unsw.edu.au/students/email/index.html

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: https://unswinsight.microsoftcrmportals.com/web-forms/

Course inquiries should be directed to the Course Convenor.

7.3. Computing Resources and Internet Access Requirements

UNSW Minerals and Energy Resources 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.

Mining Engineering Students: OMB G48
Petroleum Engineering Students: TETB LG34 & LG 35

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)
- 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, 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

7.5. Assignment Submissions

The School has developed a guideline to help you when submitting a course assignment.

We encourage you to retain a copy of every assignment submitted for assessment for your own record either in hardcopy or electronic form.

All assessments must have an assessment cover sheet attached.

7.6. Late Submission of an Assignment

Full marks for an assignment are only possible when an assignment is received by the due date.

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 – see following section.

Late submission will not be accepted and will be considered as no submission.

7.7. Special Consideration

You can apply for special consideration through The Nucleus Student Hub 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: www.student.unsw.edu.au/special-consideration

7.8. Course Results

For details on UNSW assessment policy, please visit: www.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.

7.9. Students Needing Additional Support

Equitable Learning Services aims to provide all students with a free and confidential service that provides practical support to ensure that your health condition doesn't adversely affect your studies. https://student.unsw.edu.au/els

7.10. 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 www.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.

7.11. 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.

Feedback is given via https://student.unsw.edu.au/myexperience and you will be notified when this is available for you to complete.

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.

8. SCHOOL ASSESSMENT COVER SHEET

School of Minerals and Energy Resources Engineering

Assessment Cover Sheet

Course Convenor: _____

Course Code: _____ Course Title: _____

Assignment: _____

Due Date: _____

Student Name: _____ Student ID: _____

ACADEMIC REQUIREMENTS

Before submitting this assignment, the student is advised to review:

- the assessment requirements contained in the briefing document for the assignment;
- the various matters related to assessment in the relevant Course Outline; and
- the *Plagiarism and Academic Integrity* website at < http:/www.lc.unsw.edu.au/plagiarism/pintro.html > to ensure they are familiar with the requirements to provide appropriate acknowledgement of source materials.

If after reviewing this material there is any doubt about assessment requirements, then in the first instance the student should consult with the Course Convenor and then if necessary with the Director – Undergraduate Studies.

While students are generally encouraged to work with other students to enhance learning, all assignments submitted for assessment must be their entire own work and duly acknowledge the use of other person's work or material. The student may be required to explain any or all parts of the assignment to the Course Convenor or other authorised persons. *Plagiarism* is using the work of others in whole or part without appropriate acknowledgement within the assignment in the required form. *Collusion* is where another person(s) assists in the preparation of a student's assignment without the consent or knowledge of the Course Convenor.

Plagiarism and *Collusion* are considered as Academic Misconduct and will be dealt with according to University Policy.

STUDENT DECLARATION OF ACADEMIC INTEGRITY

I declare that:

- This assessment item is entirely my own original work, except where I have acknowledged use of source material [such as books, journal articles, other published material, the Internet, and the work of other student/s or any other person/s].
- This assessment item has not been submitted for assessment for academic credit in this, or any other course, at UNSW or elsewhere.

I understand that:

- The assessor of this assessment item may, for the purpose of assessing this item, reproduce this assessment item and provide a copy to another member of the University.
- The assessor may communicate a copy of this assessment item to a plagiarism checking service (which may then retain a copy of the assessment item on its database for the purpose of future plagiarism checking).

Student Signature: Date:

Students are advised to retain a copy of this assessment for their records and submission should be made in accordance to the assessment details available on the course Moodle site.