



Faculty of Engineering

School of Minerals and Energy Resources Engineering

Undergraduate Course Outline

MINE1010

Mineral Resources Engineering

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1. INFORMATION ABOUT THE COURSE

Course Code:	MINE1010	Term:	T2, 2020	Level:	UG	Units/Credits	6 UOC
Course Name:	Mineral Resources Engineering						

Course Convenor:	Associate Professor Seher Ata		
Contact Details	School of Minerals and Energy Resources Engineering Old Main Building - Rm 159C	EMAIL:	s.ata@unsw.edu.au
		Phone:	+61 2 9385 7659
Contact times	By appointment		

Course Supervisor	Dr Ghislain Bournival		
Contact Details	School of Minerals and Energy Resources Engineering Old Main Building - Rm 156	EMAIL:	g.bournival@unsw.edu.au
		Phone:	+61 2 9385 5524
Contact times	Tutorial: Monday 3 – 5pm, online By appointment and ad-hoc workshops		

1.1. Course Description

You woke up this morning and most likely looked at your mobile phone. Did you know that this device alone contains about 50 different elements? It must be charged like all of your electronic devices. But how is the electricity produced? Whether it is from renewable energy sources or not, they all rely on metals and minerals to operate or to be built. Wherever you look you see metals and minerals and as remote as it may seem, all these goods started in a pit. In this course you will develop an awareness for the importance of the mining industry in our lives. Together, we will explore how commodities are extracted from the ground and who are involved at various stages of the mining operation. The topics covered in this course are geology, mining, mineral processing, safety, the impact of mining on the environment, and economics. We will also discuss employability in the mining industry, which employs people of various backgrounds (e.g. geologists, mining engineers, civil engineers, mechanical engineers, environmental engineers, process & chemical engineers, lawyers, finance, etc.) and offers competitive salaries. Why not come and learn about one of the pillars of the Australian economy and a potential employer?

1.2. 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.

1.3. Assumed Knowledge

Students are expected to have reasonable writing and communication skills. (The MEA Report Writing Guide, will be made available at the start of the term as a basis for all future assignment/report writing.)

1.4. Attendance

To pass this course, it is expected that you will attend all scheduled tutorials. Participation is an important part of achieving the course outcomes as in-class (or virtual classroom) activities are a part of the course's curriculum.

The timetable for this term is as follows:

Tutorial: Attending the tutorials is necessary to complete team activities.

Time: Monday 3 – 5pm

- Distance: the tutorials will be delivered online through collaborate, which is accessible from the course Moodle website.

2. AIMS, LEARNING OUTCOMES AND GRADUATE ATTRIBUTES

2.1. Course Aims

This course aims to provide a basic introduction to mining and the Australian minerals industry. It is of relevance for students from a wide range of disciplines with an interest in the minerals industry, which employs skilled workers with different technical backgrounds. Students will learn the fundamentals of mining and are invited to think about the challenges and opportunities facing the mining industry.

2.2. Learning Outcomes

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

1. Classify types of geology and distribution of mineral resources
2. Select a mining method and mineral processing equipment to extract an ore and concentrate a mineral
3. Evaluate hazards and their consequences
4. Apply principles of mineral economics and explain economic performance based on mining principles

2.3. Graduate Attributes

This course will contribute to the development of the following Mining Education Australia (MEA) 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. Being able to think and work individually and in teams
5. Listening, influencing, motivating and communication skills
6. Basic business and management skills
7. Awareness of opportunities to add value through engineering and the need for continuous improvement
8. Being able to work and communicate effectively across discipline boundaries
9. Having HSEC consciousness
10. Awareness of sustainability, multi-cultural and global issues
11. Being active life-long learners.

3. REFERENCE RESOURCES

3.1. Reference Materials

Support material for this course including, whenever available, copies of lecture notes, recommended readings, etc., and can be found on Moodle.

The lecture notes may be viewed and downloaded from the course Moodle site <http://moodle.telt.unsw.edu.au/>.

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 (e.g. 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.

3.2. Textbook

The following texts are relevant for many of the courses you will study throughout your mining engineering degree. However, it should be noted that there is no formal textbook for this course.

- Australasian Coal Mining Practice. Monograph 12, AusIMM, 3rd edition. (Student discounts available for members)
- Hartman, H.L. & Mutmanský, J.M. "Introductory Mining Engineering", 2nd Edition. John Wiley & Sons.
- Mining Engineers Handbook. 3rd edition. SME (American Society of Mining Engineers – see Web page for student discount details, www.smenet.org/store)

Textbooks relevant to the topic being reviewed are also suggested in the course Moodle site and made available online or as a hardcopy through the library.

3.3. Other resources

The University and the Faculty provide a wide range of support services for students, including:

- UNSW Learning Centre (<http://www.lc.unsw.edu.au>)
- Counselling support - <http://www.counselling.unsw.edu.au>
- Library training and support services - <http://www.library.unsw.edu.au/>

3.4. Online resources

There is a considerable amount of information to be found on the internet. Much of that is sound, but there are also either very lightweight or contain errors. Be very careful in your choice of web sources. Students are directed to the UNSW Library and to publications of the Mineral Resources Division of the Department of Primary Industries. 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/>. In addition, the following addresses provide some useful starting points for sourcing books and other information:

- <http://www.longwalls.com> (We have a subscription service to this)
- <http://www.minerals.nsw.gov.au/index.htm>
- <http://www.minerals.org.au>
- <http://www.nswmin.com.au>
- <http://books.smenet.org/store>
- <http://www.miningnews.net>
- <http://www.minebox.com.au/>

- <https://www.bhp.com/>
- <https://www.rocktechnology.sandvik/en/>
- <http://www.riotinto.com/>

3.5. Report writing guide

The School has a report writing guide (RWG) available for all students taking mining engineering courses. View this website to download a copy of the guide:

https://www.engineering.unsw.edu.au/minerals-energy-resources/sites/mine/files/publications/MEA_ReportWritingGuide_eBook_2018ed.pdf

The RWG is also available through the Moodle website of this course.

4. COURSE CONTENT AND LEARNING ACTIVITIES

4.1. Course contents

Over a period of 10 weeks, this course covers the following topics:

- Importance of the mineral resources for Australia and society
- The Australian minerals industry
- Geology
- Surface mining methods
- Underground mining methods
- Geomechanics
- Mine ventilation
- Health and safety
- Extractive metallurgy
- Sustainable mining
- Social license
- Use of technologies in mining
- Mineral economics
- Employability

4.2. Learning Activities Summary

This online course is divided into 10 weeks.

UNSW Week	Week starts	Content / Activities	Important dates
0	26/05	Getting started <i>Survey the Moodle environment for the course; Get familiar with the resources available (e.g. MEA report writing guide)</i>	<ul style="list-style-type: none"> • Mining around you (A0) (in W1) <i>Complete the pre-lecture activity and submit by Monday 01/06 12.05pm.</i>
1	01/06	Complete week 1 (online lectures) <i>A general introduction on the minerals industry and its importance</i>	<ul style="list-style-type: none"> • Tutorial (collaborate) <i>Discussion about the course and meeting your teammates.</i> • Team project starts (A1) <i>Look at the requirements; develop a strategy; entry point for prices</i>
2	08/06	Complete week 2 (online lectures) <i>Learn about the earth and formation of mineral deposits, which we can exploit</i>	<ul style="list-style-type: none"> • Team project (A1.1) <i>Submit preliminary report</i> • Quiz (A2.1) <i>Group Aluminium: write questions</i> <i>Group Brass: answer questions</i>
3	15/06	Complete week 3 (online lectures) <i>In this week's subject we will look at different surface mining methods</i>	<ul style="list-style-type: none"> • Workshop (collaborate) • Quiz (A2.2) <i>Group Aluminium: answer questions</i> <i>Group Brass: write questions</i>
4	22/06	Complete week 4 (online lecture) <i>In this week's subject we will look at different underground mining methods</i>	<ul style="list-style-type: none"> • Quiz (A2.3) <i>Group Aluminium: write questions</i> <i>Group Brass: answer questions</i>
5	29/06	Complete week 5 (online lecture) <i>Mining can be hazardous. Have a close look at safety in mining. Also included is mine ventilation.</i>	<ul style="list-style-type: none"> • Tutorial (collaborate) • Application Exercise (A3.1) <i>A3.1 report (MINING)</i> • Quiz (A2.4)

UNSW Week	Week starts	Content / Activities	Important dates
			Group Aluminium: write questions Group Brass: answer questions
6	06/07	Non-teaching week	
7	13/07	Complete week 7 (online lecture) <i>Mine geomechanics is closely associated with rock competency and thus mining methods</i>	<ul style="list-style-type: none"> • Tutorial (collabotate) • Application Exercise (A3.2) A3.2 report (<i>RISK ASSESSMENT</i>) • Quiz (A2.5) Group Aluminium: write questions Group Brass: answer questions
8	20/07	Complete week 8 (online lecture) <i>See what happens once the ore is out of the mine in these lessons on extractive metallurgy.</i>	<ul style="list-style-type: none"> • Quiz (A2.6) Group Aluminium: write questions Group Brass: answer questions
9	27/07	Complete week 9 (online lecture) <i>Mining does affect the environment. Look who are the stakeholders and how to mine responsibly as well as the use of technologies to improve the performance of mining companies in complying with regulations.</i>	<ul style="list-style-type: none"> • Tutorial (collabotate) • Application Exercise (A3.3) A3.3 report (<i>MIN PRO</i>) • Quiz (A2.7) Group Aluminium: write questions Group Brass: answer questions
10	03/08	Complete week 10 (online lecture) <i>Mining is a business. Look at the financial side of mining. As well, see how you can work in the mining industry.</i>	<ul style="list-style-type: none"> • Workshop (collabotate) A1.2 & A4 • Quiz (A2.8) Group Aluminium: answer questions Group Brass: write questions • Individual project (A4) Submit report • Team project (A1.2) Exit point and submit final report • Complete MyExperience
11	10/08		
UNSW Exams Period			

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.

5. COURSE ASSESSMENT

5.1. Assessment Summary

The assessment tasks will be based on the components outlined below:

- Mining around you (A0.0)
- Team project (A1.1 – A1.2)
- Quiz (A2.1 – A2.8)
- Application exercise (A3.1 – A3.3)
- Individual project (A4)

Specific times are available on Moodle.

Assessment task	Due date	Release date	Weight (%)	Assessment	Type	Learning outcomes assessed
A0	01/06	25/05	0	Mining around you	Individual	NA (learning objective and team building)
A1.1 A1.2	Part 1: 08/06 Part 2: 07/08	01/06	0 15	Stock exchange	Group*	4
A2.1 – A2.8	Q: Monday of following week A: Wednesday of following week	Q: Monday of current week A: Monday of following week	Q: 8x3 A: 8x2	Quiz	Individual and group	1 – 4
A3.1 A3.2 A3.3	29/06 13/07 27/07	29/06 13/07 27/07	1x10 (R) 1x10 (R) 1x10 (R)	Application exercises	Group*	2 - 3
A4	10/8	01/06	15	Mining project	Individual	1 - 4

* After the group grade has been released, you will be required to complete a *Team Evaluation*. The Team Evaluation requires you to assess your contribution and that of your team mates to the group work. It then scales the group grade (up or down) for each member based on their individual level of contribution. You will then be awarded this individual mark.

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>

For the face-to-face delivery of the course, you will need to bring an internet-enabled to participate to the in-class activities.

6. ASSESSMENT CRITERIA

The assessment criteria provide a framework for you to assess your own work before formally submitting major assignments to your course convenor. Your course convenor will be using this framework to assess your work and as a way to assess whether you have met the listed learning outcomes and the graduate attributes for your program. We ask that you do not use the assessment criteria guidelines as a checklist, but as a tool to assess the quality of your work. Your course convenor will also be looking at the quality, creativity and the presentation of your written assignment as they review the framework.

6.1. Individual project – Mining project (distance only)

Assessment criteria for this activity is explained at the start of the term. Students choose a site and perform an analysis of the mine (e.g. geology, mining method selected, impact of the mine on the local community, etc.). In week 5, students will have the opportunity to receive formative feedback on their progress if they desire so. The final report is to be submitted at the end of the term.

6.2. Team project – ASX

Each group will prepare one report based on a mining financial portfolio. Details of the assessment criteria are available in the description of the task. Briefly, students select shares of mining companies from the Australian Securities Exchange (ASX). They track the shares over the course of the term and discuss the changes in the valuation of their mining companies. The final mark is determined from a report submitted at the end of the term. A group mark is assigned and individual marks are scaled from the group mark based on the contribution of each group member. In addition to the report, students enrolled in the face-to-face course will present their investment strategy, portfolio and portfolio performance in a short class presentation.

6.3. Application exercises

Assessment criteria for each in-class activities (either face-to-face or in a virtual classroom) will be explained at the start of the activity and is described with the task in the task description. Generally students will need to explore and analyse given topics and, in a team, provide a written response to the given query at the end of the activity for evaluation. There is no substitute for these in-class activities. Students need to make sure they attend class to be able to secure the marks associated with this assessment. Application exercises will be assessed based on a report (R), which may include a discussion (D) or a presentation (P).

6.4. Readiness assurance test (i-RAT and t-RAT) (face-to-face only)

In-class quizzes to be taken individually and in teams to test your understanding of the material presented since the last lecture. They consist of multiple-choice questions.

6.5. Quiz (distance only)

Write questions on the material contents.

- Writing questions: Quiz will open at 8:00am on the Monday of an academic week and close the following Monday at 8:00am.
- Answer questions: Quiz will open at 8:00am on the Monday of the academic week following a subject and will close the following Wednesday at 5:00pm.
- An exception is made on week 10 to finish before week 11.

6.6. Report

When writing reports, you are required to follow the school's report writing guide (see section 3.5).

7. STUDYING A UG COURSE IN THE SCHOOL OF MINERALS AND ENERGY RESOURCES 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: <https://student.unsw.edu.au/email-rules>

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: mere.admin@unsw.edu.au

Course inquiries: these should be directed to the Course Convenor. It is important to note that your course convenor and lecturers will NOT open any emails, which are not from UNSW. Therefore we ask you to use your UNSW email address. It is advised to include MINE1010 is the subject line. You can also use the email function within Moodle to contact your course convenor/lecturer.

7.3. Computing Resources and Internet Access Requirements

UNSW Minerals and Energy Resources Engineering provides blended learning and distance 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 [Class bookings](#).

Mining engineering students: OMB G48/49

Petroleum engineering students: TETB

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, 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. Please take a closer look at all these details on our website: <https://www.engineering.unsw.edu.au/minerals-energy-resources/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 assessable materials must have a 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. 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: <https://www.engineering.unsw.edu.au/minerals-energy-resources/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 – see following section.

In the case of late submission of a report (if applicable – check specific assessment tasks), penalty marks will be applied at the following rate if submitted after the due date: five (5) percentile points of the maximum possible mark for each day or part thereof that the assessment is overdue. For example if a student submitted a report five days after the due date and the unadjusted mark was 68% then the final adjustment mark for the assignment would be 43%; that is the raw mark of 68% less 25 percentile points (5 days at 5 percentile points per day).

Where material is submitted more than seven (7) days but less than fourteen (14) days after the deadline then the final mark will be reduced by thirty (30) percentile points. For example if an assignment, which was submitted 8 days following the deadline, would have been awarded a mark of 80% then following late submission deduction, the final adjusted mark would be 50%.

Assignments submitted more than 14 days after the due date or after the return of marked submissions to students will not be marked but will be retained and held for consideration by the School Examination Committee after the final examinations.

7.7. 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: 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 the release of the course result. If you don't contact the convenor 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

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/

7.10. 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 <https://student.unsw.edu.au/plagiarism>.

All 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.

Students are also encouraged to enrol and do the online module *Working with academic integrity*: <https://student.unsw.edu.au/aim>.

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.