

MINE8130

Technology Management and Innovation in Mining

Term 2, 2023



Course Overview

Staff Contact Details

Convenors

Name	Email	Availability	Location	Phone
Serkan Saydam	s.saydam@unsw.edu.au	During the class session times	159	0406876629

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](#)

Course Details

Units of Credit 6

Summary of the Course

Through this course experience, you will obtain an overview of different mining operations and core technologies involved, historical and recent trends in mining technology developments, the dynamic management needs of changing technologies, especially in different resource and economic environments, and will have the opportunity to identify innovative and potentially technologies and mining systems. The course is designed to extend traditional thinking and provide for some entrepreneurial ideas and “outside the box” thinking.

You will work both individually and in small groups to explore how your chosen innovations and/or new technologies fit within a mining industry application and then evaluate your ideas through structured technology audits, risk assessments, implementation plans, capital justification and possible commercialisation opportunities for the technology – for both the Australian and/or international mining industries.

Course Aims

This course builds on the students' understanding of current needs, systems and practices in mining industry. It seeks to extend their thinking to consider new, innovative, alternative systems and technologies that might find application in the industry for the future, to either replace or extend current industry capabilities and efficiencies. The course will involve identification of such systems and technologies, followed by a comprehensive evaluation of them in terms of their role in the industry, integration with current and other systems and technologies, and development of potential adoption strategies and preliminary entrepreneurial thinking with regard to commercialisation opportunities.

Course Learning Outcomes

After successfully completing this course, you should be able to:




Learning Outcome	EA Stage 1 Competencies
1. Ability to analyse the technology needs of mining systems, within the overall mine performance measures – be they economic, safety, social.	PE1.1, PE1.3, PE1.5, PE2.1, PE2.3, PE3.2, PE3.6
2. Ability to think ‘outside the box’ and create potential innovative solutions to significant challenges facing the mining industry and socially	PE1.3, PE1.5, PE2.1, PE3.1, PE3.3
3. Recognition and evaluation of the management requirements associated with the implementation and ongoing operation of innovative technologies in a mining context.	PE1.5, PE1.6, PE2.2, PE2.3, PE3.1, PE3.3, PE3.4
4. Appraisal and development of commercialisation strategies for the identified innovative solutions, taking account of IP and entrepreneurial opportunities.	PE1.5, PE2.1, PE2.3, PE3.1, PE3.3

Teaching Strategies

The course is intended to be delivered in a combination of synchronous initial delivery of the content, followed by asynchronous modes over a period of either intensive block course mode or fully online. The overall strategy is to encourage students to undertake a project-based self-learning experience, using topics of their own choice. Lateral, innovative and entrepreneurial thinking is encouraged as students are challenged to choose suitable systems of mining or technologies to work on. These would be expected to be quite focused topics or sub-systems that have potential application in any chosen sector of an overall mining operation (for example, innovative rock breakage technologies, or ore/waste rock separation techniques). This course uses a number of different teaching and learning approaches including:

- Lecture notes
- Audio/video podcasts
- Student on-line presentations
- Group discussion forums
- Syndicated workgroups
- Self-directed activities.

Assessment

Assessment task	Weight	Due Date	Course Learning Outcomes Assessed
1. Case Study 1 	10%	31/05/2023 10:30 AM	1, 2, 3, 4
2. Case Study 2 	15%	01/06/2023 09:00 AM	1, 2, 3, 4
3. Syndicated Group Project Work 	25%	02/06/2023	1, 2, 3, 4
4. Major Assignment Report	50%	03/07/2023 11:00 PM	1, 2, 3, 4

Assessment 1: Case Study 1 (Group)

Start date: 30/05/2023 02:00 PM

Due date: 31/05/2023 10:30 AM

This is a group work on a preselected case study on technology evaluation from a mining operation

Assessment 2: Case Study 2 (Group)

Start date: 31/05/2023 03:00 PM

Due date: 01/06/2023 09:00 AM

This is a group work on a preselected case study on technology evaluation from a mining operation

Assessment 3: Syndicated Group Project Work (Group)

Start date: 29/05/2023 04:00 PM

Due date: 02/06/2023

Groups will select a technology idea presented in Assessment 2 and implement this technology to a particular mining system/process

Assessment 4: Major Assignment Report

Start date: 02/06/2023 12:00 AM

Submission notes: you should provide both document (pdf or Word) and financial excel model

Due date: 03/07/2023 11:00 PM

The major report will be completed by individuals on a technology idea/s for a mining operation addressing all the aspects of the course.

This assignment is submitted through Turnitin and students do not see Turnitin similarity reports.

Attendance Requirements

Students are strongly encouraged to attend all classes and review lecture recordings.

Course Schedule

[View class timetable](#)

Timetable

Date/Module	Type	Content
DAY 1	Lecture	9.00 – 9.30 Course Introduction and Outline <i>Serkan Saydam, UNSW</i> 9.30 – 10.30 Introduction to Mining Systems <i>Serkan Saydam, UNSW</i> 10.30 – 11.00 Morning Tea 11.00 – 12.30 Mining Processes <i>Serkan Saydam, UNSW</i> 12.30 – 13.30 Lunch 13.30 – 15.00 Innovation and Technology Change <i>Serkan Saydam, UNSW</i> 15.00 – 15.30 Afternoon Tea 15.30 – 17.00 Challenges of Mining and Technology Gaps <i>Serkan Saydam, UNSW</i>
	Group Work	17.00 – ...

		Syndicated work group projects
DAY 2	Lecture	9.00 – 10.30 Mine IoT <i>Binghao Li, UNSW</i> 10.30 – 11.00 Morning Tea 11.00 – 12.30 Mine Economics and Technology Management <i>Serkan Saydam, UNSW</i> 12.30 – 13.30 Lunch 13.30 – 14.30 Capital Justification / Cost Benefit Analysis <i>Jeff Coulton, UNSW</i> 15.30 – 16.00 Afternoon Tea 15.30 – 17.00 Lost Opportunities in Technology Management <i>Peter Johnson, Maptek</i>
	Group Work	14:30 - 15:30 Technology Evaluation: Case Study 1 (Group Work) 17:00 - ... Technology Evaluation: Case Study 1 (Group Work)
DAY 3	Lecture	9.00 – 10.30 Introduction to Entrepreneurial Engineering <i>François Ladouceur, UNSW</i>
	Assessment	10.30 – 12.00 Technology Evaluation: Case Study 1
	Lecture	13:00 - 14:30 Risk Management & Technology Audits / Performance Monitoring

		<i>Bruce Hebblewhite, UNSW</i>
	Group Work	Group Work 15:00 - ... Technology Evaluation: Case Study 2 (Group Work)
DAY 4	Assessment	9.00 – 10.30 Technology Evaluation: Case Study 2 Presentations
	Lecture	11.00 – 12.30 Technology Development & Commercialisation – The Needs and Expected Outcomes <i>Adrian Beer, METS Ignited</i> 12.30 –13.30 Lunch 13.30 – 15.30 Intellectual Property (IP) Management & Protection <i>Derek Baigent, Griffith Hack</i>
	Group Work	15.30 - ... Syndicated Work Groups
DAY 5	Lecture	9:00 - 10:30 AM Zero Copper Mine of The Future <i>Clare Sykes, LarkinSykes</i>
	Group Work	10:30 - 13:00 Syndicated Work Groups
	Presentation	13:00 - ... Work Group Presentations & Discussions

Resources

Prescribed Resources

Lecture Presentations and additional readings in Moodle

Submission of Assessment Tasks

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.

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.

Late Submission of an Assignment

Full marks for an assessment are only possible when an assessment is received by the due date. 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. 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 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, or
- Online quizzes where answers are released to students on completion, or Professional assessment tasks, where the intention is to create an authentic assessment that has an absolute submission date, or Pass/Fail assessment tasks.

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 section below.

Special Consideration

You may be eligible for special consideration, when an illness or other short-term events beyond your control (exceptional circumstances) affect your assessment performance. More details on special consideration can be found at: www.student.unsw.edu.au/special-consideration

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.

Student Support

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

- Library training and support services - www.library.unsw.edu.au
- Academic Skills Support - <https://www.student.unsw.edu.au/skills>
- Psychology and Wellness - www.counselling.unsw.edu.au

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>

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 MERE 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 academic skills, please contact the Academic Skills Support or view some of the resources on their website: <https://www.student.unsw.edu.au/skills>. The Academic Skills Team can provide resources, support and assistance to help you improve your academic 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.

Academic Information

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:

- LE – indicates you have not completed one or more items of assessment; or
- WD – indicates 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.

Studying a course in the School of Minerals and Energy Resources Engineering at UNSW

Student Resources

This engineering [student resources](#) section collates 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 on-line Moodle LMS (Learning Management System). Also see - Transitioning to Online Learning: www.covid19studyonline.unsw.edu.au

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

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

This course outline sets out 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 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 (as updated in Moodle), the description in the Course Outline/Moodle applies.

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 instructions on how to redirect your UNSW emails: "[How can I forward my emails to another account?](#)"

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.microsoftcrmpartals.com/web-forms/>
- Course inquiries should be directed to the Course Convenor

Image Credit

Synergies in Sound 2016

CRICOS

CRICOS Provider Code: 00098G

Acknowledgement of Country

We acknowledge the Bedegal people who are the traditional custodians of the lands on which UNSW Kensington campus is located.

Appendix: Engineers Australia (EA) Professional Engineer Competency Standard

Program Intended Learning Outcomes	
Knowledge and skill base	
PE1.1 Comprehensive, theory based understanding of the underpinning natural and physical sciences and the engineering fundamentals applicable to the engineering discipline	✓
PE1.2 Conceptual understanding of the mathematics, numerical analysis, statistics, and computer and information sciences which underpin the engineering discipline	
PE1.3 In-depth understanding of specialist bodies of knowledge within the engineering discipline	✓
PE1.4 Discernment of knowledge development and research directions within the engineering discipline	
PE1.5 Knowledge of engineering design practice and contextual factors impacting the engineering discipline	✓
PE1.6 Understanding of the scope, principles, norms, accountabilities and bounds of sustainable engineering practice in the specific discipline	✓
Engineering application ability	
PE2.1 Application of established engineering methods to complex engineering problem solving	✓
PE2.2 Fluent application of engineering techniques, tools and resources	✓
PE2.3 Application of systematic engineering synthesis and design processes	✓
PE2.4 Application of systematic approaches to the conduct and management of engineering projects	
Professional and personal attributes	
PE3.1 Ethical conduct and professional accountability	✓
PE3.2 Effective oral and written communication in professional and lay domains	✓
PE3.3 Creative, innovative and pro-active demeanour	✓
PE3.4 Professional use and management of information	✓
PE3.5 Orderly management of self, and professional conduct	
PE3.6 Effective team membership and team leadership	✓