



UNSW Course Outline

MINE4250 Mine Design and Feasibility Project - 2024

Published on the 04 Feb 2024

General Course Information

Course Code : MINE4250

Year : 2024

Term : Term 1

Teaching Period : T1

Is a multi-term course? : No

Faculty : Faculty of Engineering

Academic Unit : School of Minerals & Energy Resources Engineering

Delivery Mode : In Person

Delivery Format : Standard

Delivery Location : Kensington

Campus : Sydney

Study Level : Undergraduate

Units of Credit : 6

Useful Links

[Handbook Class Timetable](#)

Course Details & Outcomes

Course Description

This course is about development of a pre-feasibility study for a mining project. Students will have an opportunity to learn via different activities, including assessment of reserves, method selection, layout and optimisation of surface and underground operations, geotechnical design,

ventilation design, project risk assessment, mine scheduling, equipment selection, cost estimation, economics/finance, and sustainability, as well as the use of mine design and optimisation software packages.

Students will specifically learn about mine planning software tools, review and preparation of a resource block model, open pit design and optimisation procedures and underground mine layout design. As part of the course, equipment selection, production and equipment scheduling, cost estimation and economic evaluation for mining project will also be covered.

Furthermore, the course will go through ventilation and geotechnical design and project evaluation and sustainable development (Risk, social, environmental, mine closure, legislations, etc.)

Course Aims

The aim of this course is to introduce students to the principles of mine feasibility studies for mine deposit. In this course, students should be able to develop skills for optimal mine design, scheduling and preparation of a pre-feasibility study document.

Relationship to Other Courses

This course is a capstone course which is directly related to most of the courses of our program.

Course Learning Outcomes

Course Learning Outcomes
CLO1 : Design a mine using mine planning and design software for a real dataset
CLO2 : Evaluate the main design outcomes using financial evaluation models to assess the economics viability of the project
CLO3 : Employ team skills and advanced written and oral communication skills
CLO4 : Present a mine pre-feasibility study based on planning and design knowledge with consideration of sustainability criteria

Course Learning Outcomes	Assessment Item
CLO1 : Design a mine using mine planning and design software for a real dataset	<ul style="list-style-type: none">• Progress Interview 1 - Mine Optimisation• Progress Interview 2 - Mine Design• Board Presentation• Final Report
CLO2 : Evaluate the main design outcomes using financial evaluation models to assess the economics viability of the project	<ul style="list-style-type: none">• Progress Interview 1 - Mine Optimisation• Progress Interview 2 - Mine Design• Board Presentation• Final Report
CLO3 : Employ team skills and advanced written and oral communication skills	<ul style="list-style-type: none">• Progress Interview 2 - Mine Design• Board Presentation• Final Report
CLO4 : Present a mine pre-feasibility study based on planning and design knowledge with consideration of sustainability criteria	<ul style="list-style-type: none">• Progress Interview 1 - Mine Optimisation• Progress Interview 2 - Mine Design• Board Presentation• Final Report

Learning and Teaching Technologies

Moodle - Learning Management System | Microsoft Teams

Assessments

Assessment Structure

Assessment Item	Weight	Relevant Dates
Progress Interview 1 - Mine Optimisation Assessment Format: Individual	10%	Due Date: Week 4: 04 March - 10 March
Progress Interview 2 - Mine Design Assessment Format: Individual	20%	Due Date: Week 8: 01 April - 07 April
Board Presentation Assessment Format: Individual	30%	Due Date: Week 11: 22 April - 28 April
Final Report Assessment Format: Individual	40%	Due Date: Week 12: 29 April - 05 May

Assessment Details

Progress Interview 1 - Mine Optimisation

Assessment Overview

Project progress interviews will be conducted on a computer demonstrating the knowledge of the software packages used and the progress of the project. It will be a Q&A session. Marking will be done by the academic and final marks will be given individually with peer assessment.

All members must present their work to the group on weekly basis. A peer review will have to be submitted by each team, indicating the proportion of each individual group member's contribution to the project. Team member marks will be moderated based on individual contributions.

Course Learning Outcomes

- CLO1 : Design a mine using mine planning and design software for a real dataset
- CLO2 : Evaluate the main design outcomes using financial evaluation models to assess the economics viability of the project
- CLO4 : Present a mine pre-feasibility study based on planning and design knowledge with consideration of sustainability criteria

Detailed Assessment Description

A demonstration of Mine Optimisation software use - Whittle and the knowledge of mine optimisation and relevant information including costing, other constraints.

Submission notes

No submission is required, Teams meeting is required

Progress Interview 2 - Mine Design

Assessment Overview

Project progress interviews will be conducted on a computer demonstrating the knowledge of the software packages used and the progress of the project. It will be a Q&A session. Marking will be done by the academic and final marks will be given individually with peer assessment.

All members must present their work to the group on a weekly basis. A peer review will have to be submitted by each team, indicating the proportion of each individual group member's contribution to the project. Team member marks will be moderated based on individual contributions.

Course Learning Outcomes

- CLO1 : Design a mine using mine planning and design software for a real dataset
- CLO2 : Evaluate the main design outcomes using financial evaluation models to assess the economics viability of the project
- CLO3 : Employ team skills and advanced written and oral communication skills
- CLO4 : Present a mine pre-feasibility study based on planning and design knowledge with consideration of sustainability criteria

Detailed Assessment Description

Vulcan or equivalent software demonstration; completed open pit and underground mine design, with surface infrastructure.

Submission notes

Students need to present to the Board (30 min presentation by each group followed by Q&A).

Board Presentation

Assessment Overview

All members must present the final project outcomes to the external board members. The board will be comprised by the industry represents (A Q&A session with a panel formed by industry experts). An individual mark of 10% will be given to the each student. Industry board members will mark and an average mark will be given.

A comprehensive final report will be submitted comprising the elements of a typical pre-feasibility project. Students must demonstrate the section they contributed to the report. An individual mark of 20% will be given to the each student. The academic will mark the report.

A peer review will have to be submitted by each team, indicating the proportion of each individual

group member's contribution to the project. Team member marks will be moderated based on individual contributions.

Course Learning Outcomes

- CLO1 : Design a mine using mine planning and design software for a real dataset
- CLO2 : Evaluate the main design outcomes using financial evaluation models to assess the economics viability of the project
- CLO3 : Employ team skills and advanced written and oral communication skills
- CLO4 : Present a mine pre-feasibility study based on planning and design knowledge with consideration of sustainability criteria

Final Report

Assessment Overview

The Final Report, as in Pre-Feasibility Project Report Format, will be submitted as Group. Individual Mark will be given by the course coordinator / academic individually based on the contribution of each group member using the peer assessment tool. Each student will clearly indicate in the report the section they have written.

Course Learning Outcomes

- CLO1 : Design a mine using mine planning and design software for a real dataset
- CLO2 : Evaluate the main design outcomes using financial evaluation models to assess the economics viability of the project
- CLO3 : Employ team skills and advanced written and oral communication skills
- CLO4 : Present a mine pre-feasibility study based on planning and design knowledge with consideration of sustainability criteria

Assessment information

Word or PDF documents are required to be submitted through Moodle. If one group member submits the final report, it is sufficient; however, submitting students must send an email indicating the submission outcome to the course coordinator by cc'ing all other group members.

Assignment submission Turnitin type

This is not a Turnitin assignment

General Assessment Information

All students must attend the assessments (1-) in person unless there is a health problem such as COVID-19. Online attendance might be organised in this situation. Students can also apply for special consideration.

Grading Basis

Standard

Course Schedule

Teaching Week/Module	Activity Type	Content
Week 1 : 12 February - 18 February	Presentation	Course Introduction
	Group Work	Review of resource model and data manipulation. Conduct pit optimisation and scenario development - results analysis (ultimate pit limit, reserve estimation, pushback, and production schedule).
	Seminar	Industry Presentation on the expectations from a pre-feasibility study - RPM Global
Week 2 : 19 February - 25 February	Laboratory	Vulcan Training 1
	Group Work	Pit Optimisation and Pit Design Work
Week 3 : 26 February - 3 March	Group Work	Completion of Pit Optimisation Pit Design Work continues Underground Design work commences
	Laboratory	Vulcan Training 2
	Workshop	Industry Workshop - RPM Global to review Whittle outcomes
Week 4 : 4 March - 10 March	Assessment	Assessment 1 - Pit Optimisation
Week 5 : 11 March - 17 March	Group Work	Open Pit and Underground Mine Design - Work on the design and layout of open pit & underground design and layout
Week 6 : 18 March - 24 March	Group Work	Open Pit and Underground Mine Design - Work on the design and layout of open pit & underground design and layout
	Workshop	Industry Workshop - RPM Global to review Surface Mine Design
Week 7 : 25 March - 31 March	Group Work	Equipment selection for both open pit and underground mine (Fleet size, capacity, type, etc.). Ventsim simulation, ground support design, etc. Finalising the design and layout of open pit & underground design and Layout.
	Workshop	Industry Workshop - RPM Global to review UG Mine Design
Week 8 : 1 April - 7 April	Assessment	Assessment 2 - Mine Design
Week 9 : 8 April - 14 April	Group Work	Cost estimation and economic evaluation Sustainable development Capital and operating costs, production costs, sensitivity analysis, NPV, etc. Risk analysis, environmental and social impacts, mine closure, etc.
	Presentation	Dry Run
Week 10 : 15 April - 21 April	Group Work	Finalise the project
Week 11 : 22 April - 28 April	Assessment	Final Board Presentation

Attendance Requirements

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

General Schedule Information

There will be no specific lectures for this course. However, there will be group meetings, software training sessions and industry workshops.

Course Resources

Recommended Resources

Support material for this course including, whenever available, copies of lecture notes, recommended readings, assignments and results for assignments etc can be found on Moodle.
All correspondence with students and any information regarding changes in the lecture schedule and assignment dates will be done through Moodle. All assignments must be submitted through Moodle. It is important that students regularly check Moodle for changes in calendar events and for messages.

- Darling, P (ed.), 2011. Mining Engineers Handbook, 3rd edition, SME, Littleton, USA
- Hartman, HL, 2002. Introductory Mining Engineering, 2nd edition. Wiley, New York.
- Hustrulid, W and Kuchta, M, 2006. Open Pit Mine Planning & Design, Balkema, Rotterdam.
- Kennedy, BA (ed.), 1990. Surface Mining, 2nd edition, SME, Littleton, Colorado, USA. ISBN 0–87335–102–9.
- Noakes, M and Lanz, T. 1993. Cost Estimation Handbook for the Australian Mining Industry, Monograph No: 20/ Australasian Institute of Mining and Metallurgy.
- Hustrulid, WA, and Bullock, R. (eds.), 2001. Underground Mining Methods: Engineering Fundamentals and International Case Studies, SME, Littleton, USA.
- Gertsch, RE and Bullock, RL (eds.), 1998. Techniques in Underground Mining, SME, Littleton, USA.
- Malone, E. 2011 The Cadia Valley Mines – A Mining Success Story. The AusIMM Spectrum Series 19.
- Kennedy, BA., Editor, 1990. Surface Mining, 2nd edition, Society for Mining, Metallurgy, and Exploration, Littleton, Colorado. ISBN 0–87335–102–9
- MEA Report Writing Guide for Mining Engineers. P Hagan and P Mort (Mining Education Australia (MEA)). (Latest edition available for download from the School website or a hardcopy version is available from the UNSW Bookshop)
- Guide to Authors. (Australasian Institute of Mining and Metallurgy: Melbourne) (Available for download from the AusIMM website)

Course Evaluation and Development

Weekly meetings will be organised for each group during the course time

Each assessment will have peer review

Staff Details

Position	Name	Email	Location	Phone	Availability	Equitable Learning Services Contact	Primary Contact
Convenor	Serkan Saydam		Kensington	93854525	Doing the class session times	No	Yes

Other Useful Information

Academic Information

I. Special consideration and supplementary assessment

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

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

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

II. Administrative matters and links

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

- [Attendance](#)
- [UNSW Email Address](#)
- [Special Consideration](#)
- [Exams](#)
- [Approved Calculators](#)
- [Academic Honesty and Plagiarism](#)
- [Equitable Learning Services](#)

III. Equity and diversity

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

IV. Professional Outcomes and Program Design

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

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

Academic Honesty and Plagiarism

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

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

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

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

www.gs.unsw.edu.au/policy/documents/studentmisconductprocedures.pdf

Submission of Assessment Tasks

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

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

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

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

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

Faculty-specific Information

[Engineering Student Support Services](#) – The Nucleus - enrolment, progression checks, clash requests, course issues or program-related queries

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

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

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

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

Phone

(+61 2) 9385 8500 – Nucleus Student Hub

(+61 2) 9385 7661 – Engineering Industrial Training

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

School-specific Information

Course completion

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

Submission of Assessment Tasks

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

Student Resources

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

Computing Resources and Internet Access Requirements

UNSW Minerals and Energy Resources Engineering provides blended learning using the online Moodle LMS (Learning Management System). Also see - Transitioning to Online Learning: www.covid19studyonline.unsw.edu.au

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

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

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

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

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](#)