UNSW Course Outline

MINE8930 Uranium mining fundamentals - 2024

Published on the 21 May 2024

General Course Information

Course Code : MINE8930
Year : 2024
Term : Term 2
Teaching Period : T2
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 : Postgraduate
Units of Credit : 6

Useful Links

Handbook Class Timetable

Course Details & Outcomes

Course Description

Uranium mining fundamentals will cover all stages of mining, from exploration of ore geology to mine feasibility and design and mine operation. Global and Australian uranium potential and leading practices for mining uranium will be evaluated and critiqued. Mining methods considered

for efficient and safe extraction of uranium will include open cut, underground and In Situ Recovery (ISR) leach methods. The fundamentals of mine geomechanics, including slope stability and ground support requirements, will be presented as part of mining method selection, along with consideration of grade control and ventilation for safe underground mining. Fundamentals of milling and chemical processing of uranium ore will be presented, focusing mostly on production to the yellow cake stage (uranium oxide powders). Technical aspects of mining and milling operations are complimented with consideration of health and safety, economic, community, environmental and regulatory issues associated with uranium mining, presented within a risk management framework.

Course Aims

The course aims to provide an introduction to uranium mining for engineers, geologists and other industry professionals.

The uranium mining part of the 'nuclear cycle' is essential to energy production that is safe, efficient and minimises environmental effects.

The course aims to cover the geology of uranium deposits, uranium mining practices, milling and processing, and management of mining wastes from an Australian and international perspective.

Course Learning Outcomes

Course Learning Outcomes
CLO1 : Describe relevant terminologies and concepts related to uranium mining operations, covering from assessing feasibility to the operational stages, including associated exploration and milling practices.
CLO2 : Assess information requirements for designing a uranium mine as an open cut, underground or ISR (in situ recovery), and for safe and efficient mining and milling operations, including consideration of ground support and ventilation.
CLO3 : Analyse the potential risks and hazards associated with uranium mining and evaluate how legislation mitigates these risks.
CLO4 : Develop a plan for a hypothetical mining operation, integrating exploration, mining, processing, safety measures, adherence to regulations, and waste management strategies.

Course Learning Outcomes	Assessment Item
CLO1 : Describe relevant terminologies and concepts related to uranium mining operations, covering from assessing feasibility to the operational stages, including associated exploration and milling practices.	• Glossary Activity • Participation in on-line forum discussions
CLO2 : Assess information requirements for designing a uranium mine as an open cut, underground or ISR (in situ recovery), and for safe and efficient mining and milling operations, including consideration of ground support and ventilation.	• Major Project
CLO3 : Analyse the potential risks and hazards associated with uranium mining and evaluate how legislation mitigates these risks.	• Major Project
CLO4 : Develop a plan for a hypothetical mining operation, integrating exploration, mining, processing, safety measures, adherence to regulations, and waste management strategies.	• Group Presentation • Glossary Activity

Learning and Teaching Technologies

Moodle - Learning Management System | Microsoft Teams

Additional Course Information

Course Completion

Course completion requires submission of all assessment items; failure to submit all

assessment items will result in the award of an Unsatisfactory Failure (UF) grade for the Course.

Assumed Knowledge

This course assumes a student has knowledge of basic technical principles. A background in engineering, chemistry, and physics would be an advantage but is not essential for the course. As a fundamental course, basic concepts in mining engineering and related disciplines will be introduced.

Assessments

Assessment Structure

Assessment Item	Weight	Relevant Dates
Glossary Activity Assessment Format: Group	10%	Start Date: 10/06/2024 12:00 AM Due Date: 10/06/2024 12:00 AM
Group Presentation Assessment Format: Group	30%	Start Date: 27/05/2024 12:00 AM Due Date: 31/05/2024 12:00 AM
Participation in on-line forum discussions Assessment Format: Individual	15%	Start Date: 27/05/2024 12:00 AM Due Date: 05/06/2024 12:00 AM
Major Project Assessment Format: Individual	45%	Start Date: 27/05/2024 12:00 AM Due Date: 24/06/2024 12:00 AM

Assessment Details

Glossary Activity

Assessment Overview

Students will be working in a group on a glossary of terms that are important for uranium mining.

- Definition of glossary terms is limited to 100 words. Students are required to choose terms related to uranium mining with which they are not familiar, or are not certain as to the meaning.
- Minimum of 10 terms per person, and maximum of 60 terms per group – discuss and decide as a group which 60 terms to include, and which to leave aside. No duplication of terms.
- Editing and commenting on entries by others in the group is encouraged

Group glossary is worth 10% of the overall course grade. The grade will be graded for each individual based on participation.

Students could score 10/10, no matter what their group members did according to the following:

- 5 points for contributing 10 unique terms to the glossary which meet the criteria and are

defined in a satisfactory manner (no obvious incorrect responses).
- 3 points for actively participating in discussing which glossary entries to include in your group forum
- 2 points for adding reasonable and constructive comments on your group members entries in the glossary

Course Learning Outcomes

- CLO1 : Describe relevant terminologies and concepts related to uranium mining operations, covering from assessing feasibility to the operational stages, including associated exploration and milling practices.
- CLO4 : Develop a plan for a hypothetical mining operation, integrating exploration, mining, processing, safety measures, adherence to regulations, and waste management strategies.

Assignment submission Turnitin type

Not Applicable

Group Presentation

Assessment Overview

Each team is assigned a uranium ore deposit. Students are required to develop a mining operation plan for extracting the ore from the deposit and present this to the class. The presentation should cover various aspects, including geological classification, mineralogy, mining methods, ventilation requirements (if applicable), processing techniques, management of hazardous materials and waste, health, safety, and environmental protection measures, compliance with legislation, and social responsibility considerations. Peer assessment will be applied to determine each individual's contribution to the team project. Evaluation will be based on a detailed rubric, and constructive feedback will be provided following the oral presentation.

Course Learning Outcomes

- CLO4 : Develop a plan for a hypothetical mining operation, integrating exploration, mining, processing, safety measures, adherence to regulations, and waste management strategies.

Assignment submission Turnitin type

Not Applicable

Participation in on-line forum discussions

Assessment Overview

After attending lecture each student is required to post one discussion topic based on their key learning from the lecture. Topic posted must be between 150 - 200 words max. Each student must then also post one significant, meaningful response to another posted topic - up to 100 words max.

Course Learning Outcomes

- CLO1 : Describe relevant terminologies and concepts related to uranium mining operations, covering from assessing feasibility to the operational stages, including associated exploration and milling practices.

Assignment submission Turnitin type

This is not a Turnitin assignment

Major Project

Assessment Overview

Students are required to conduct a comprehensive critical review of current and leading practices in uranium mining operations. This should encompass a detailed examination of at least three case study examples. The primary focus should be on the operational stage of mining. Students are expected to present a compelling case for enhancing risk management within these operations, specifically addressing productivity, safety, and environmental concerns.

Additionally, students are to compile a glossary of terms tailored explicitly for this project and provide it as an attachment. This glossary should encompass terms pertinent to uranium mining and its operational aspects, enriching the understanding of the subject matter. Written feedback will be provided for the submitted report.

Course Learning Outcomes

- CLO2 : Assess information requirements for designing a uranium mine as an open cut, underground or ISR (in situ recovery), and for safe and efficient mining and milling operations, including consideration of ground support and ventilation.
- CLO3 : Analyse the potential risks and hazards associated with uranium mining and evaluate how legislation mitigates these risks.

Assignment submission Turnitin type

This assignment is submitted through Turnitin and students can see Turnitin similarity reports.

General Assessment Information

Grading Basis

Standard

Course Schedule

Attendance Requirements

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

Course Resources

Prescribed Resources

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

Recommended Resources

- OECD, 2020. Uranium 2020: Resources, Production and Demand. Nuclear Energy Agency, OECD, International Atomic Energy Agency (IAEA). PDF available free on-line through UNSW library.
- Hore-Lacy, I., The World Nuclear University Primer. Nuclear Energy in the 21st Century, 3rd Edition, World Nuclear University Press, ISBN: 978-0-9550784-5-3. Order online (currently GBP25)
- hhttps://world-nuclear.org/
- Australia (MEA) ISBN 978 0 7334 3032 9. Available on-line: https://www.unsw.edu.au/engineering/sites/default/files/documents/ReportWritingGuideforEngineers2018ed.pdf
- Guide to Authors, 2008. (Australasian Institute of Mining and Metallurgy; Melbourne).

Course Evaluation and Development

MyExperience will be used to get feedback from students.

Staff Details

Position	Name	Email	Location	Phone	Availability	Equitable Learning Services Contact	Primary Contact
Convenor	Seher Ata			478492034		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 Plagarism

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 (if required).

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 Engineering
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