Program Information for Postgraduate Coursework in Resource Development

Acknowledgement of Country

The University of Queensland (UQ) acknowledges the Traditional Owners and their custodianship of the lands on which we meet.

We pay our respects to their Ancestors and their descendants, who continue cultural and spiritual connections to Country.

We recognise their valuable contributions to Australian and global society.

The Brisbane River pattern from A Guidance Through Time by Casey Coolwell and Kyra Mancktelow.





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General Information





In your own time, watch this video

A faculty specific, carefully considered general information introduction. If you do just one thing to help prepare you for studies in this faculty, watch this video.





https://youtu.be/Vkw-8EAvLAQ



Timetables, Changing & Dropping Courses

Class Allocation is via MyTimetable system via your my.UQ Dashboard: http://my.uq.edu.au/

- 1. Go to 'mySI-net' to enrol in chosen course(s)
- Go to 'My Timetable' to use the Allocate+ system to preference class times (Closed 07/07/2025)
- Classes are then allocated automatically with personal timetable released 12pm 14/07/2025

Class Adjustment (14/07/2025):

Didn't get the time you wanted, or now need to change times?

- 4. Use 'My Timetable' to:
 - Swap to other classes if there is space.
 - Add your name to a waitlist to swap to preferred class
 - Contact <u>eait.mytimetable@uq.edu.au</u> if you still have unavoidable clashes



Timetables, Changing & Dropping Courses, Student Email Addresses

Need to add or change courses?

Go to step (1) then (2) or (4) on the previous slide [depending on when you change].
 Adding courses is available till Friday 11 August 2025.

Need to **drop** a course?

- International students MUST discuss with EAIT faculty office before reducing below #8.
- Census date (last day to drop a course without financial liability): Monday 31st August 2025
- Last day to withdraw from a course without academic penalty: Wednesday 30th
 September 2025

All communication.

- Student email to be checked regularly this is how UQ communicates with you.
- Your student email account will be used to access Microsoft 365, and you can set it up on your



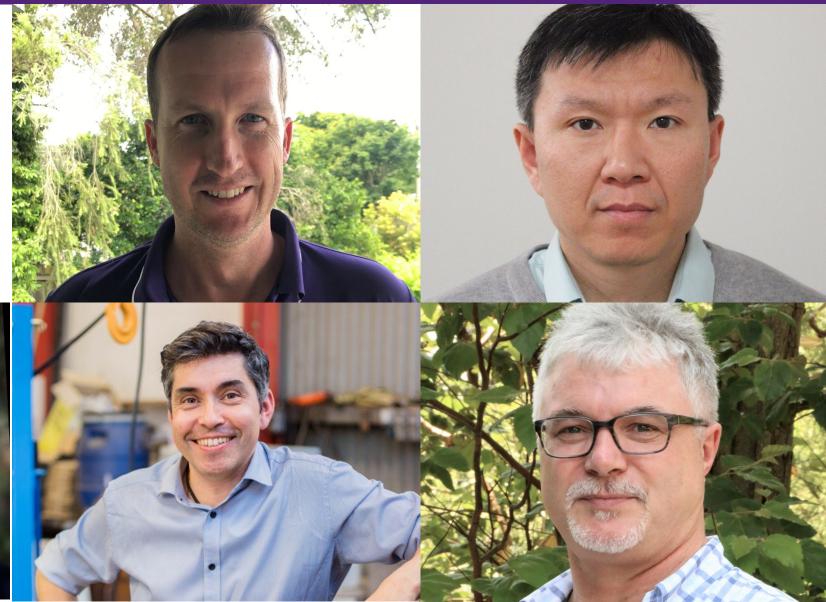
Introduction to Course Coordinators

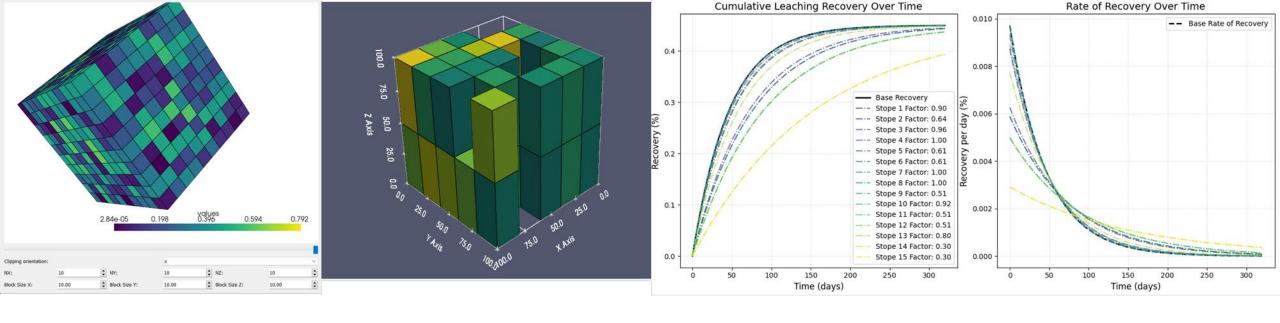


Course Coordinators

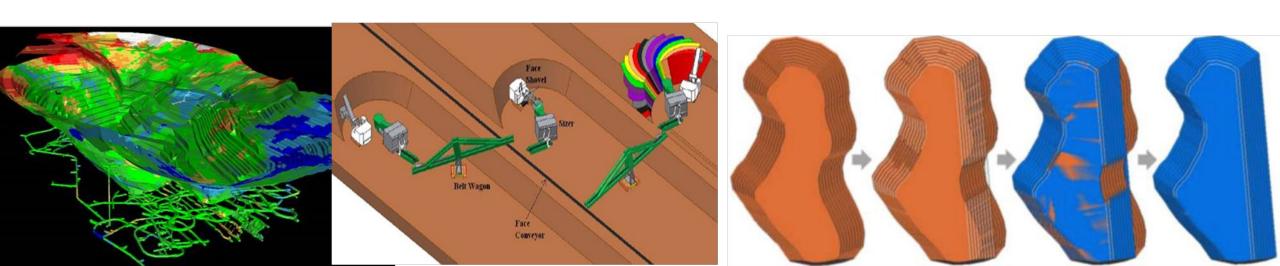
- Dr Micah Nehring
- A/Prof Zhongwei Chen
- A/Prof Mehmet Kizil
- A/Prof Italo Onederra
- Prof Peter Knights







Micah Nehring Planning & Scheduling Optimisation



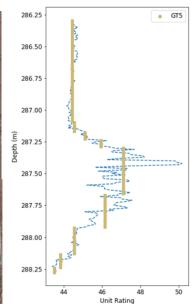
A/Prof Zhongwei Chen

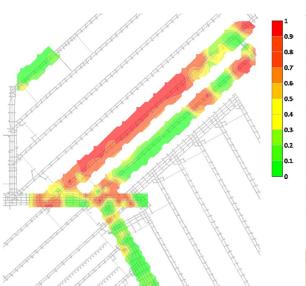


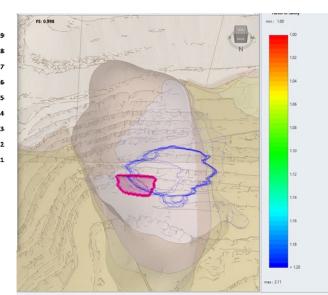
Research focusses on areas of applied geomechanics in mining and gas industry and application of machine learning to underground mining, CO₂ sequestration, and hydrogen underground storage. He serves as the associate editor of two international journals, an editorial member for four international journals, and the president of ISRM Rock Weathering and Erosion Commission.

Research impact has been recognised through numerous awards, such as 2023 Gas Science and Engineering (GSE) Distinguished Scientists, 2022 Global Rising Stars in Energy and Fuels, and American Rock Mechanics Association (ARMA) Research Award 2011. He has been recognized as a World Top 2% scientist in Energy since 2020.







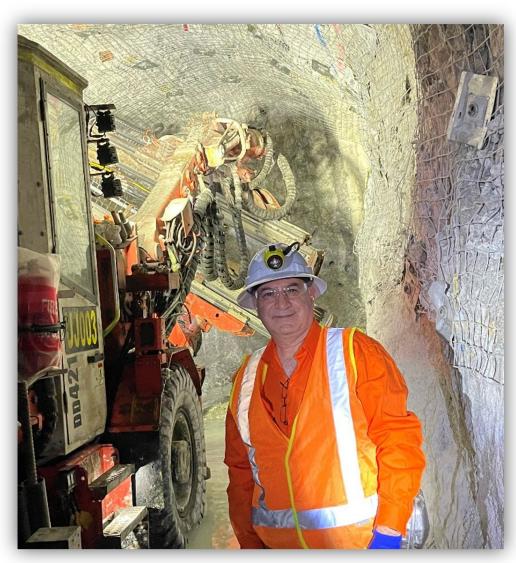






A/Prof Mehmet Kizil

- Associate Professor, The University of Queensland
- 36 years experience in mining, research and academia.
- Specialist in:
- Mining systems and automation, mine feasibility and design, mine ventilation, computer application in mining and virtual reality.
- Educational background
- BEng (Mining) Dokuz Eylul University, Turkey
- PhD (Mining), Nottingham University, England
- Assistant Prof with Dokuz Eylul University of Turkey
- Mining Engineer at Anglo American and BHP
- With UQ since 1996.



A/Prof Italo Onederra



BE (Civil) with honours - University of Melbourne MEngSc - University of Queensland PhD - University of Queensland

127

Publications

Peer reviewed journals and conferences, 4 book sections and technical reports

Patents

Novel NOx free explosive formulations

Borehole condition device

+35

Consulting

Projects in Australia. South America, Africa and Europe. ~10 in South America

+\$6.7m

Completed **Research Projects**

As chief investigator & principal researcher since 2014

Current Research Projects

Current project funding as Chief investigator 2023-2026

Industry impact

- Developer of blast fragmentation models implemented by industry in mine process optimisation projects applicable to surface and underground operations
- Co-inventor of hydrogen peroxide-based explosives designed to eliminate NOx fumes.
- Pioneered the use of physics engines in blast movement modelling techniques. Concepts and algorithms have been implemented in commercial software JKVBOC used by industry in ore control to maximise metal recovery
- Member of the team that developed JKSimBlast a blast design and analysis software used in over 60 countries





Prof Peter Knights

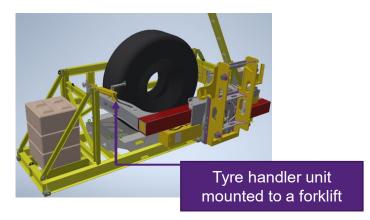
Background

- 30 years experience in mining, construction, defence and academia. Specialist in maintenance, systems modelling, data driven decisions.
- · Multi-disciplinary engineering background
 - B.Eng. (Mech) U. Melbourne
 - M.Eng. (Systems Engineering) RMIT
 - PhD (Mining), McGill, Canada.
- Worked 6 years for BHP Research (mining).
- 9 years as Associate Prof with Catholic University of Chile.
- Graduate planning engineer, project management (John Holland Construction – Northwest Shelf onshore gas processing plant).

Vacation work experience in manufacturing (automotive component industry)

Real Life experience

- Design and commissioning of "Off-the-Road Tyre Handler Friction Test Rig" designed to quantify the Factor of Safety (FoS) involved in lifting and handling large tyres for mining trucks
- Project team: Prof Peter Knights, Dr Michael Heitzmann, Lenny McInnes, Stephen Joseph
- Funded by ACARP in 2020. Tyre handling is 2nd most hazardous activity at surface mines following vehicle collisions.
- Working with Bridgestone Mining Solutions Australia to conduct a range of tests in 2nd half of 2022.
- An example of how EAIT is working to make the mining industry safer!

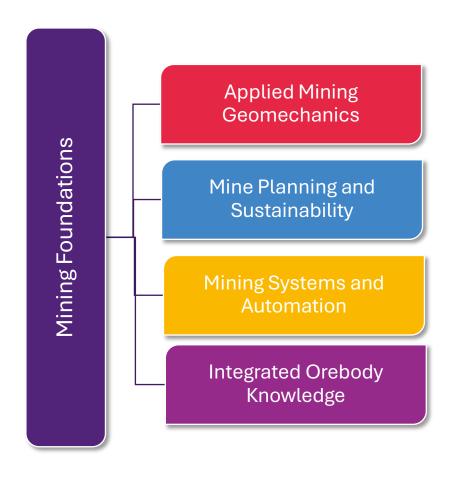






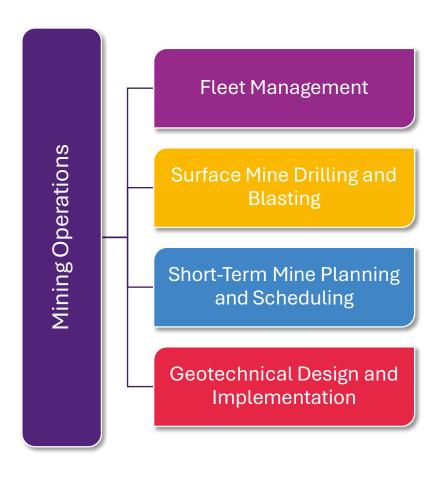
Overview of Programs

Graduate Certificate in Resource Development Mining Foundations)



Program duration
1 year part-time (2 semesters)

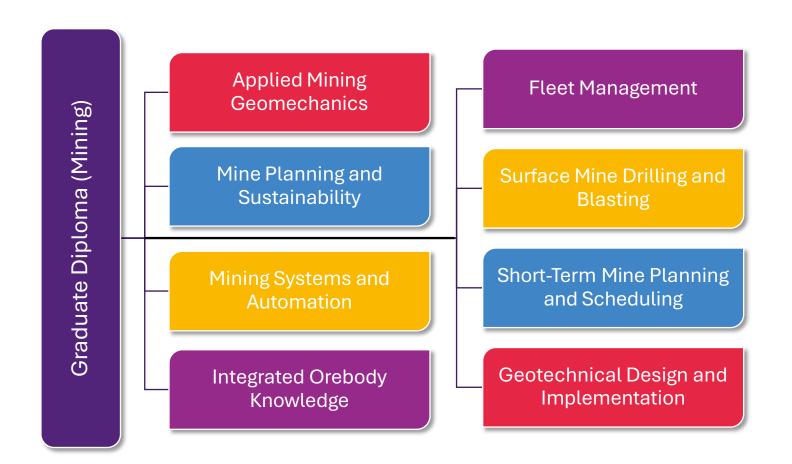
Graduate Certificate in Resource Development (Mining Operations)



Program duration

1 year part-time (2 semesters)

Graduate Diploma in Resource Development (Mining)



The Graduate Diploma in Resource Development (Mining) combines the courses within the Mining Foundations and Mining Operations fields of study.

Program duration 2 years part-time (4 semesters)



Graduate Certificate in Resource Development (Mining Foundations)

Courses – Semester 1





Aim

This course aims to develop an understanding of the principles and practical methodologies of mine planning and mine valuation.

Content

- Introduction to Mine Planning & Financial Concepts
- ESG in Mining
- The Circular Economy
- Mining Economics
- Mining Method Selection
- Process Route selection
- Assessment

- Scale of Operation, Equivalent Grade. Basic Cut-off Grade
- Open Pit Sequencing & Scheduling
- Underground Mine Production Scheduling
- Cut-off Grade Policy
- · Pit optimisation algorithms
- Financial Modelling
- Mine Closure







Aim

This course equips students with fundamental knowledge of intact rock and rockmass properties, along with practical understanding of the applications of geotechnical engineering principles in mining from the perspective of planning, design, and operations. This course enables students to comprehend and apply fundamental concepts and design methodologies to proficiently design safe excavations in both surface and underground mining environments.

Content

- Introduction & rock characteristics
- Geotechnical data collection techniques
- Mechanical properties of Intact Rock
- Rock mass classification systems and applications
- Strength of Rock Discontinuities and Rock Mass Strength & Deformability
- Rock Slope Stability

- Slope monitoring and remediation
- Rock reinforcement and support- soft and hard rock
- Excavation stability and spans
- Dynamic events: seismicity, rock burst, airblasts
- · Caving mechanics- hard rock
- Longwall Geomechanics and Subsidence
- Pillar mechanics and design

Assessment

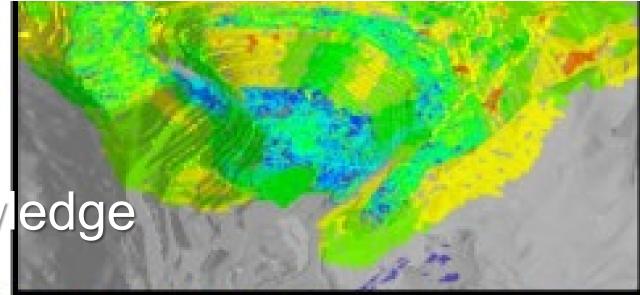


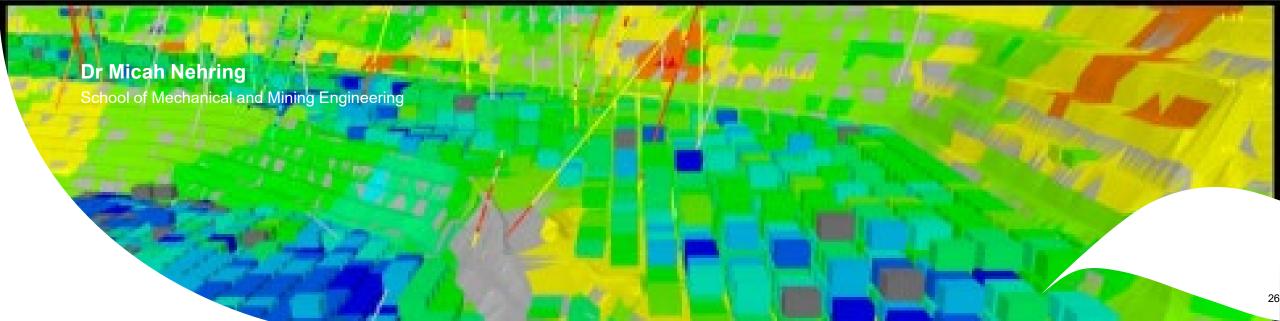


Graduate Certificate in Resource Development (Mining Foundations)

Courses – Semester 2









Aim

The aim of this course is to introduce students to the principles of geology, deposit types and resource and reserve estimation for metalliferous and coal deposits as the basis from which to commence the mine planning process.

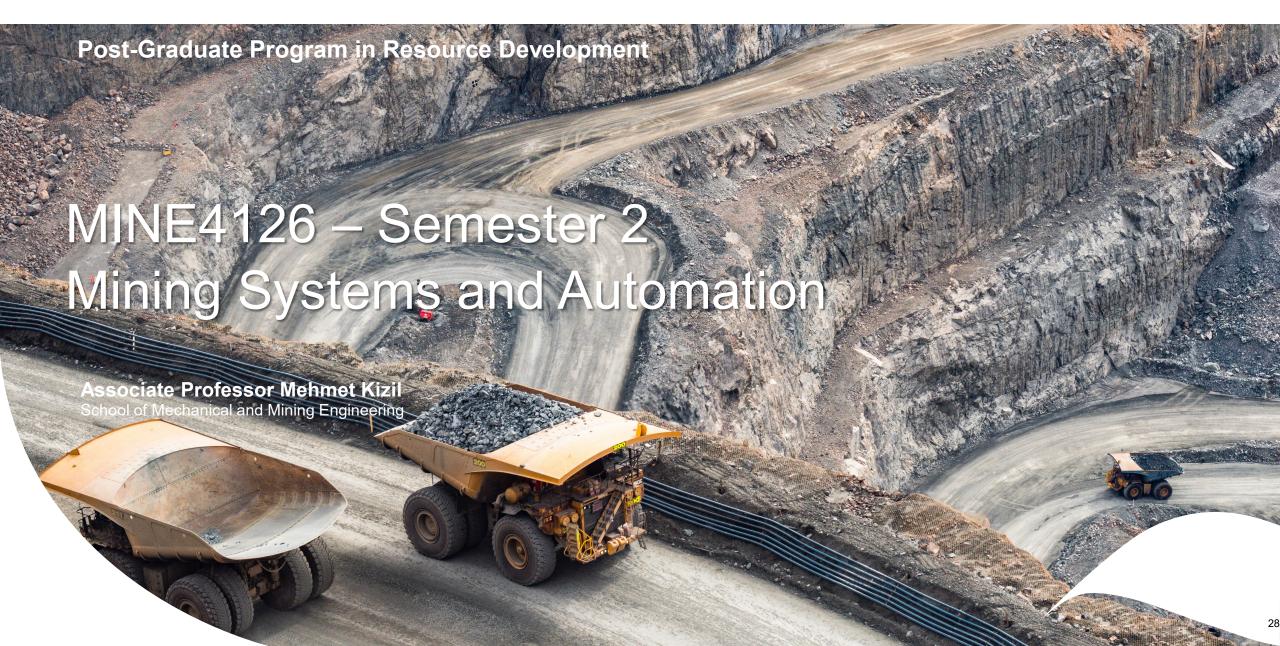
Content

- · Introduction & Key aspects of mineral-rock relationships
- Earth processes: understanding the planet. The concept of an ore deposit
- Rock fabrics and orientations: geometric relations play a crucial role in the mining process
- Exploration geology regional and 'near-mine' exploration; geophysics and remote sensing
- · Carbonaceous systems: coal, oil and gas
- The mine planning process. Mineral resources their distribution and strategic importance

- Data Compositing
- Traditional Estimation Methods
- Introduction to Geostatistics
- JORC
- Ordinary Kriging Equations
- Orebody Modelling

Assessment







Aim

The aim of this course is to provide students with the capability to select the appropriate mining method, together with its associated equipment, services and infrastructure, for a given deposit as well as comprehend the technological developments in mine automation.

Content

- Introduction & Mine services and infrastructure. Surface vs underground mining method selection.
- Open Pit Mining Introduction and Principles, Loading & Hauling Equipment
- Strip Mining Introduction and Principles, Draglines, BWEs & Dozers
- Haul Roads, Waste Dumps and Highwall Mining
- Surface Miners and Other Methods
- Underground Mine Method Selection, Access and Development

- Longwall Coal Mining
- Thick Seam Coal Mining
- Board & Pillar and Room & Pillar
- Cut and Fill Mining and Sublevel Stoping
- Caving Mining Methods
- Mine Automation Introduction, Surface and Underground Applications

Assessment





Graduate Certificate in Resource Development (Mining Operations)

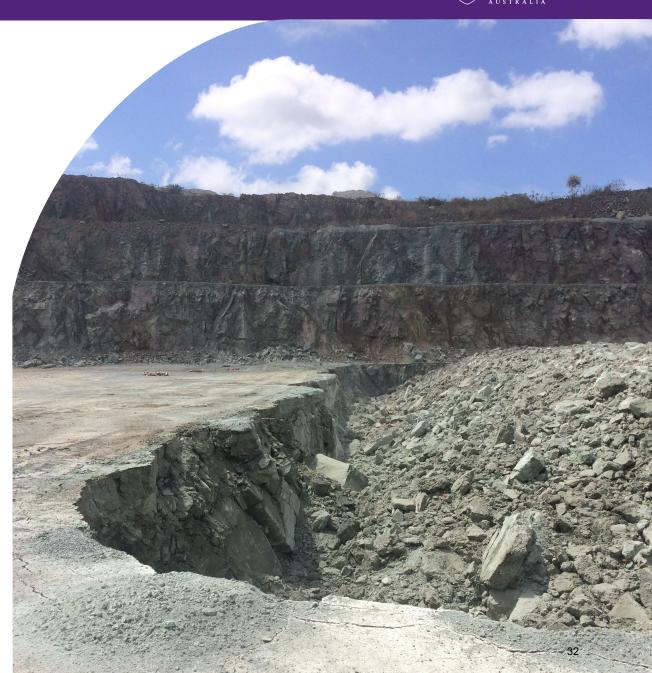
Courses – Semester 1





Aim

The aim of this course is to provide the knowledge and skills to evaluate drilling and blasting (D&B) practices in surface mining, identify vulnerabilities in design and implementation; and support the development of continuous improvement strategies. Through work integrated learning and project-based assessment, this course will cover important fundamentals and practical tools to support the implementation of leading D&B practices in surface mining operations



Hybrid Delivery Mode





On-line

- Self-paced modules that include written materials, videos, formative activities, and quizzes.
- Live online sessions to support the learning process.



Face to face

- 2-day face-to-face workshop to review course content, but primarily serve as a platform for idea exchange, experience sharing, and general discussion.
- Guest speakers from the industry will share case studies and experiences, offering students valuable practical insights and a broader perspective on Surface Drill and Blast industry challenges.



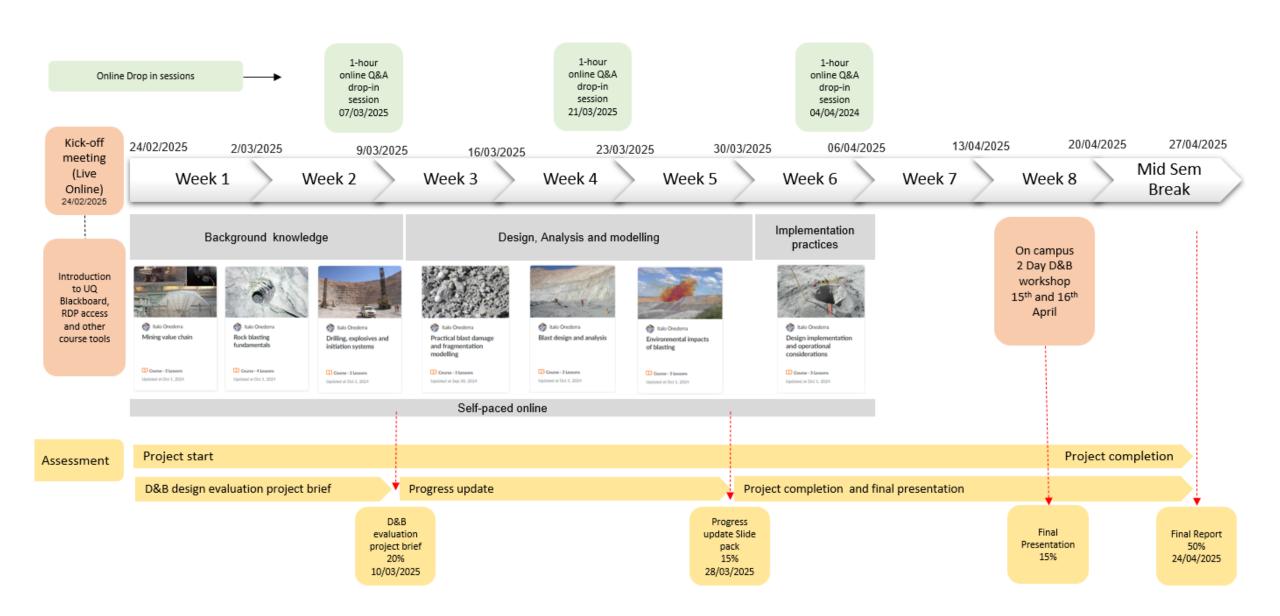
Hands-on

 Project based assessment that also integrates the use of blast design and analysis software.



Course structure (2025)





Assessment



The course assessment involves an individual project that focuses on the evaluation and optimisation of a selected D&B design at your respective operation, or from a list of available case studies.

Assessment Task	Weighting	Description*
Project Brief	20%	Review and selection of a D&B design under implementation, or previously implemented at your operation. If you are not in an operational setting, a real case study will be made available. You will be required to submit a two-page project brief using the available fillable PDF template.
Progress update slide pack	15%	Report project progress through a brief slide pack. In this update you will highlighting the milestones reached so far and identify any challenges or hurdles encountered and strategies to address them.
Final workshop presentation	15%	Deliver a 10-minute project presentation during the workshop. This presentation will provide an opportunity to share the project experience and generate discussion between the course participants.
Final Project Report	50%	A final report of no more than 10 pages summarising your design evaluation, improvement recommendations and an implementation plan.



^{*} More details provided in the course guide document





Aim

Principles of Fleet Management. Truck/shovel systems are the most common means of extraction of mineral resources in surface mines. The optimal performance of truck/shovel fleets involves a knowledge of mine design, equipment safety, sustainability and performance characteristics, stochastic systems performance and management theory. This course aims to impart the fundamentals of successful fleet management to professionals charged with the management and control of such operations.



Hybrid Delivery Mode





On-line

- Self-paced modules that include written materials, videos, formative activities, and quizzes.
- Live online sessions to support the learning process.



Face to face

- 2-day face-to-face workshop to review course content, but primarily serve as a platform for idea exchange, experience sharing, and general discussion.
- Guest speakers from the industry will share case studies and experiences, offering students valuable practical insights and a broader perspective on Fleet Management challenges.



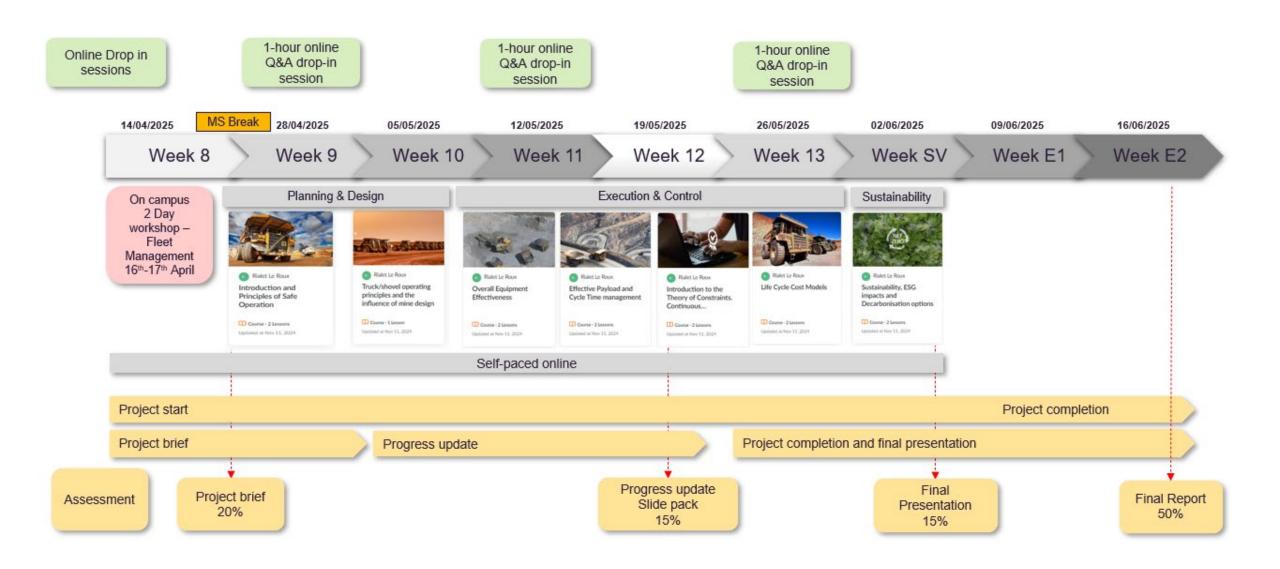
Hands-on

• Project based assessment that also uses data analytics tools.



Course structure (2025)





Assessment



The course assessment involves an individual project that focuses on the identification, quantification and exploration of improvement alternatives for a selected fleet at your respective operation, or from a list of available case studies.

Assessment Task	Weighting	Description*
Project Brief	20%	This component involves the review and selection of operating data from a Truck/Shovel fleet at your operation. If you are not in an operational setting, a real case study will be made available. You will be required to submit a two-page project brief using the available fillable PDF template.
Progress update presentation	15%	This component involves the reporting of progress via a PowerPoint presentation of no more than 10 minutes covering the following elements: Background description of evaluation case Progress vs Plan Results to date Conclusions and Way forward
Final report presentation	15%	For this component you will be required to prepare a 10-minute presentation to be delivered during the workshop on campus. This final presentation will provide an opportunity to share experiences and generate discussion between the course participants.
Final Report	50%	A final report of no more than 10 pages summarising the operation and fleet activities implemented, evaluation of selected fleet, methodology and assumptions, results of data evaluation and improvement recommendations and an implementation plan.



^{*} More details provided in the course guide document



Graduate Certificate in Resource Development (Mining Operations)

Courses – Semester 2





Aim

This course integrates technical mining knowledge relating geology, equipment capabilities, dig and dump designs, customer specifications, environmental requirements with project management theory to deliver robust short-term mine plans. This course focuses on minimising deviation to the targets set out in the long-term strategic planning and scheduling process.

Note: While limited training in the use of a mine planning and scheduling package may be provided, students are encouraged to use a package they are most familiar with.

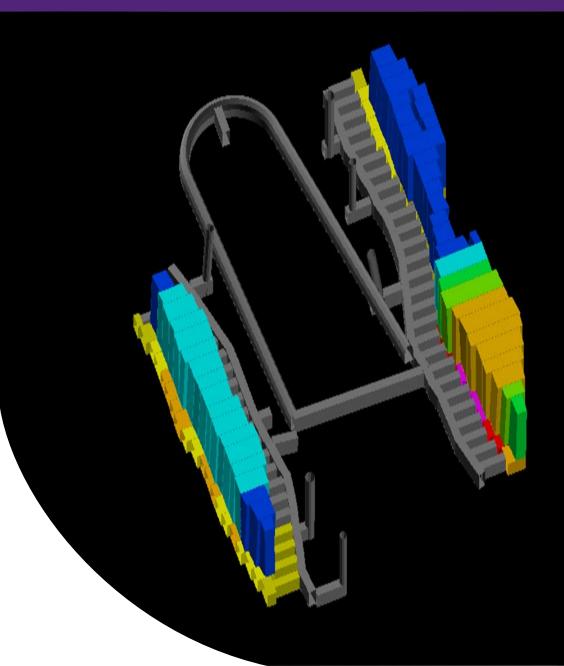




Learning outcomes

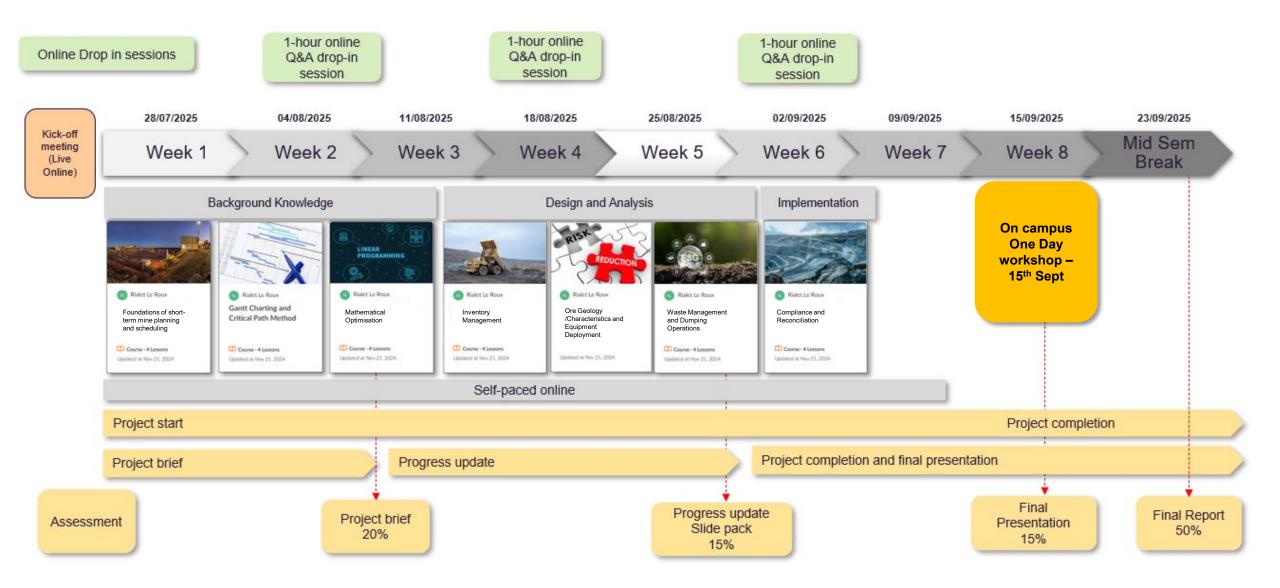
This course aims to equip students to develop robust short/medium term mine plans that seek to execute on the targets set out in the strategic plan:

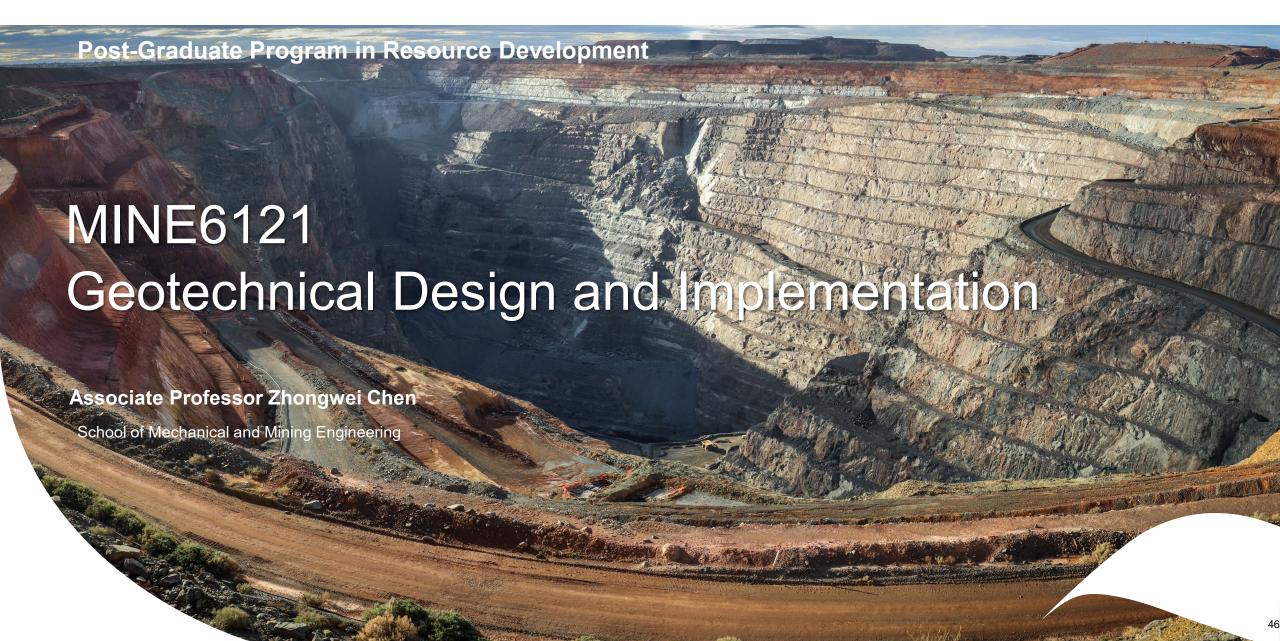
- Undertake short term mine planning and scheduling within the broader mine planning process and mining value chain.
- Apply the objectives of short-term mine planning within the time horizons involved and general resource and sequencing constraints.
- Apply fundamental project management tools including, Gantt Charts, Network Diagrams and Critical Path Method (CPM) to develop short term mine plans and schedules.
- Apply and develop basic mathematical optimisation tools and programs to aid the mine planning decision making process.
- Apply Inventory Management theories as it applies to short-term mine planning and scheduling.
- Use higher level/strategic planning outputs as the basis from which to commence the short-term planning and scheduling process.
- Examine and incorporate ore geology/characteristics and its relation to producing a product type/blend to specification as well as the role of equipment deployment and its impact on bench design.
- Examine and incorporate short-term planning and scheduling aspects unique to waste materials (overburden) and the fundamentals of waste dump operations to ensure a sustainable post mine land use.
- Incorporate operational compliance (including Health & Safety and ESG) and reconciliation aspects as it applies to short-term mine planning and scheduling.
- Effectively communicate short-term mine plans and schedules to key stakeholders.



Course structure (2025)









Aim

The course aims to equip students with technical expertise and practical skills required across the open pit mine lifecycle from data collection and analysis, slope design and assessment, and monitoring, to post-failure remediation and mine closure. Key topics covered in this course include:

- (i) geotechnical model development
- (ii) slope design and optimisation
- (iii) slope monitoring and instrumentation
- (iv) slope stability management dewatering, rockfall, and large instability
- (v) geotechnical risk management, and
- (vi) final pit closure geotechnical perspective.





Learning outcomes

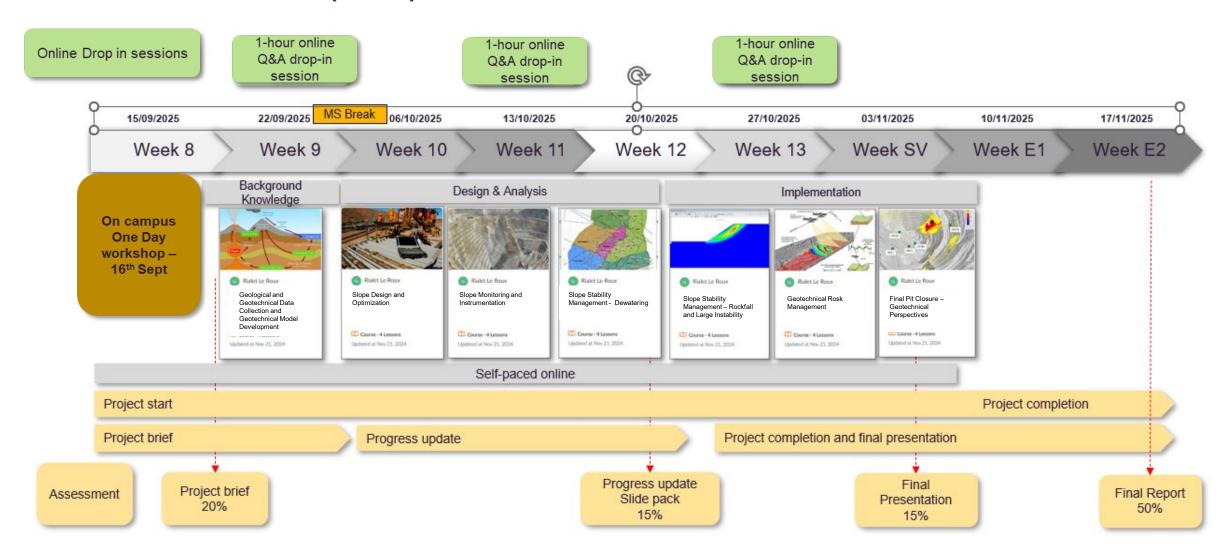
After successfully completing this course students should be able to:

- Critically evaluate geological, structural, and geotechnical data collection techniques and interpret results to inform rock mass characterisation.
- Develop and apply advanced geotechnical models and software tools to inform slope stability assessments and design decisions.
- Design and optimize open pit slope and waste dump geometries by integrating geotechnical parameters, stability criteria, and economic constraints.
- Assess and interpret data from advanced slope monitoring systems and instrumentation to detect instability indicators and inform proactive geotechnical decision-making.
- Evaluate the impact of groundwater and surface water on slope stability and design effective dewatering systems.
- Analyse mechanisms of rockfalls and structure dominant slope instabilities, apply predictive and mitigation techniques, and formulate remediation strategies.
- Critically review existing geotechnical risk assessment frameworks used by Australian mining companies and develop risk management plans to address slope instability through case studies.
- Design geotechnically stable open pit and water dump closure plans that meet regulatory standards.





Course structure (2025)

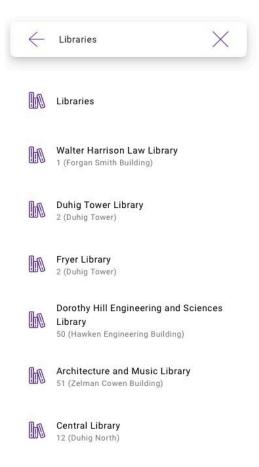




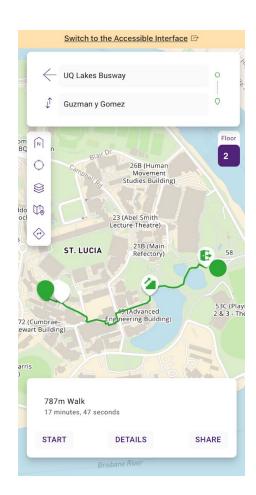
Welcome to the Library

Tracey Powell - Outreach Librarian — EAIT Faculty

Find Library locations on <u>UQ Maps</u>







Library spaces

Your place to study, meet and relax

- 6 locations at St Lucia campus:
 - Architecture and Music Library
 - Biological Sciences Library
 - Central Library
 - Dorothy Hill Engineering and Sciences Library
 - Duhig Tower

JD Fryer Memorial Library of Australian Literature

- Walter Harrison Law Library
- Dutton Park Health Sciences Library
- Herston Health Sciences Library
- JK Murray Library (Gatton)



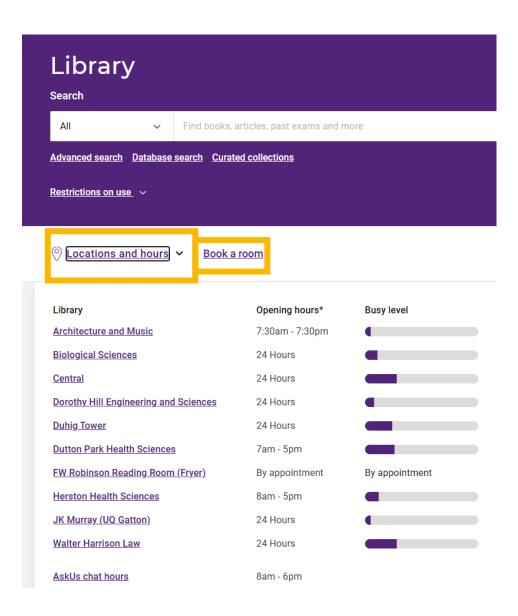
Opening hours

You can find out when Library spaces and certain services are available on our website.

Many libraries have spaces that you can access 24/7.

To access 24/7 spaces, you'll need your UQ student card – this will allow you access outside of staffed hours.

You can even book library study rooms for group study.



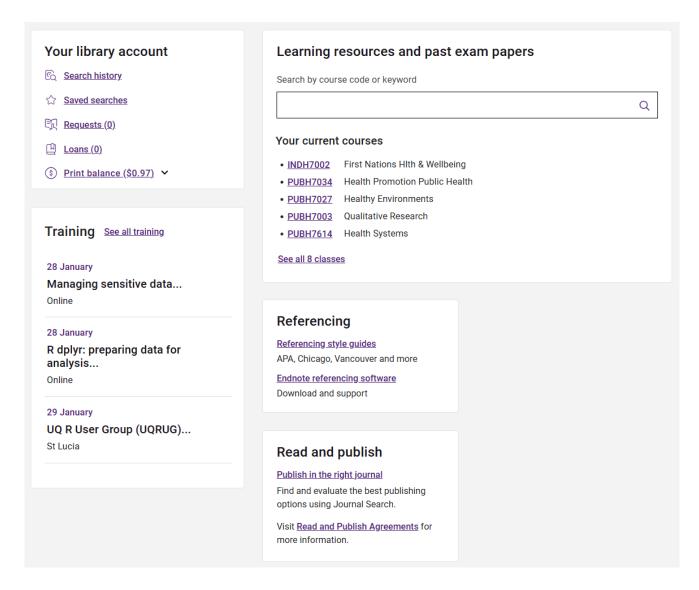


Course reading lists

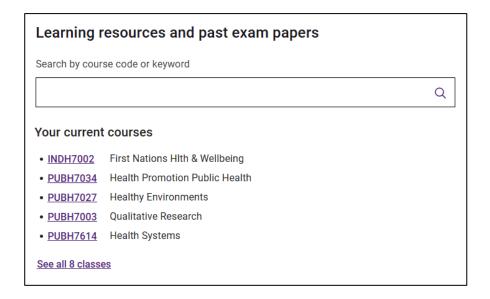
2 Log in UQ home > Library The Library is custodian of culturally sensitive Aboriginal and Torres Strait Islander materials. Library Search Find books, articles, past exams and more All Q V Library Advanced search <u>Database search</u> <u>Curated collections</u> Search All Restrictions on use ~ AII Books Journal articles Video and audio Journals Physical items Databases Past exam papers

Library

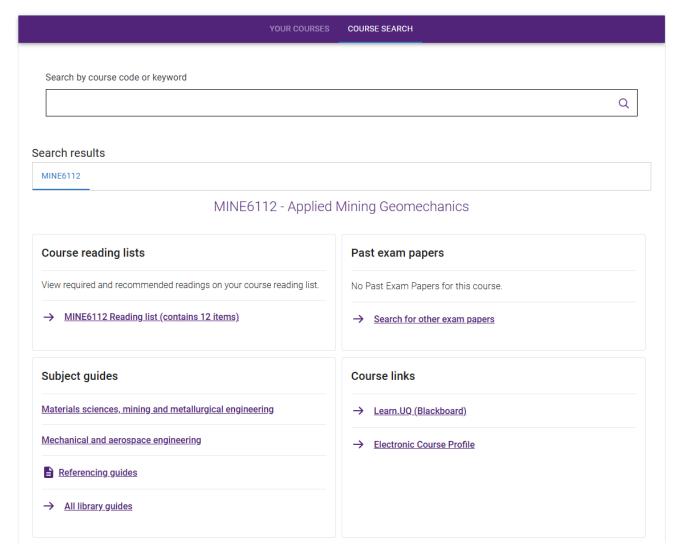
Your Library home page



Learning resources



Learning resources



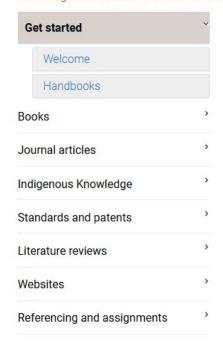
Library guides

Find your <u>subject</u>
 <u>guide</u> to get started
 with your research

 Learn advanced search and data analysis tools and techniques

Materials sciences, mining and metallurgical engineering

Use this guide to find and access information on materials sciences, mining and metallurgical engineering



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Welcome



Photo by Ant Rozetsky on Unsplash

Welcome

Your search is over. Here we have collected the most up to date and relevant books, journals, databases and websites you will need for all your research and assignments. With specialist pages like Standards and Patents, you can be confident this guide has been created specifically for Materials Science and Mechanical and Mining Engineering students. Bookmark this guide, and return often.

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- Available during 'Virtual Service' hours, which you can find on the Library website
- You can also contact other UQ support services





Thank you

Faculty Services Librarian Team

librarians@library.uq.edu.au











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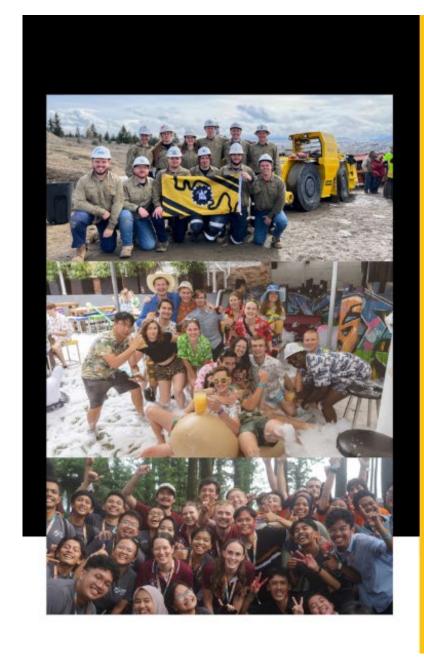
School Information

Kristin Crear - Supervisor, Student and Academic Administration and Services

studentenquiries@mechmining.uq.edu.au



The UQ Mining and Metallurgy Association - #MAMA



Presentation by Tahnee Dilger - President

The UQ Mining And Metallurgy Association

UQ Mining and Metallurgy Association | 2025

Postgraduate Information Session | 2025

Our Executive Team



Tahnee Presiden



EmmaAcademic Officer



Aliesha Secretaty



LachieVice President



Hamish Treasurer



Media Officer

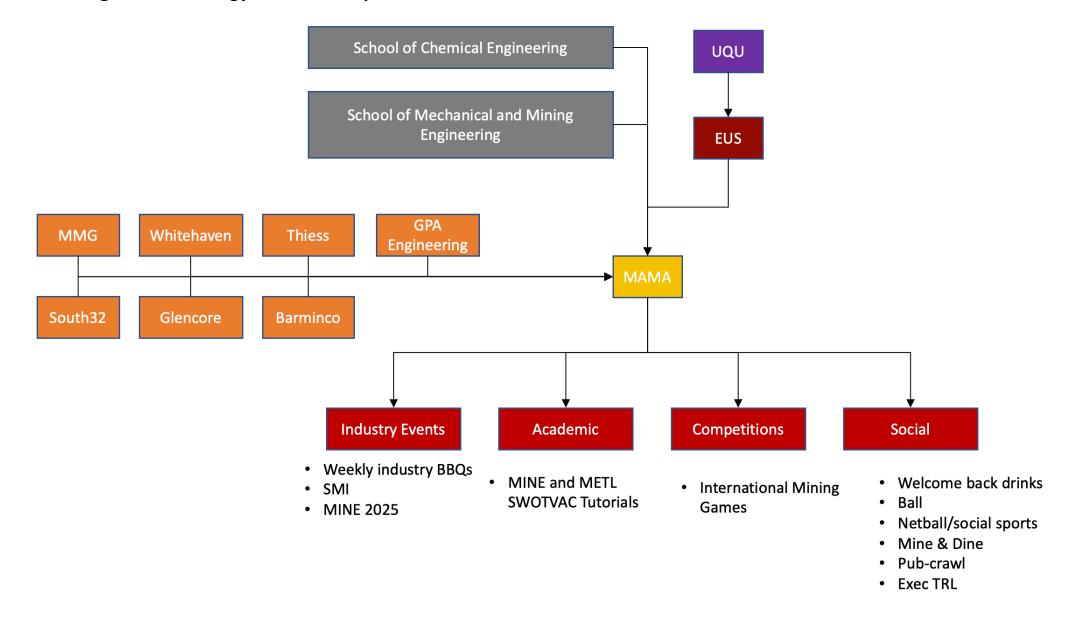


Adam Social



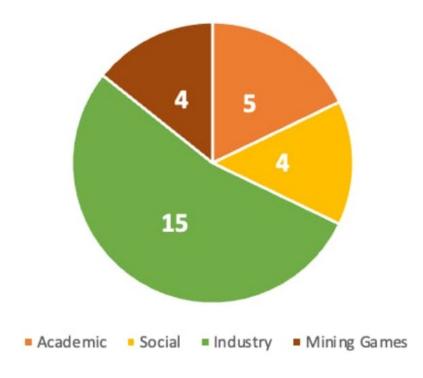
AlexGeneral Executive

UQ Mining and Metallurgy Association | 2025

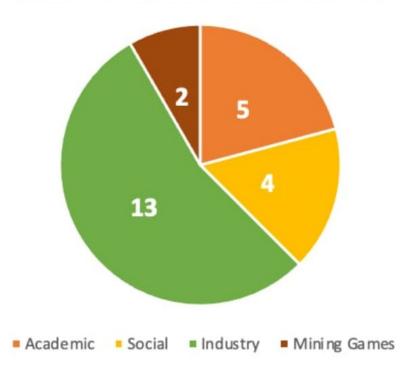


Event Snapshots

Semester 1 Breakdown of Events



Semester 2 Breakdown of Events



Totals: 52

• Industry: 28

• Academic: 10

• Social: 8

Mining Games: 6

~1.6 events per academic week



