1. INFORMATION ABOUT THE COURSE

<table>
<thead>
<tr>
<th>Course Code:</th>
<th>MINE3430</th>
<th>Semester:</th>
<th>S1, 2016</th>
<th>Level:</th>
<th>UG</th>
<th>Units/Credits</th>
<th>6 UOC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course Name:</td>
<td>Mining Systems</td>
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<table>
<thead>
<tr>
<th>Course Convenor:</th>
<th>Dr Rudrajit Mitra</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact Details</td>
<td>School of Mining Engineering</td>
</tr>
<tr>
<td></td>
<td>Old Main Building, Rm 159D</td>
</tr>
<tr>
<td>EMAIL:</td>
<td><a href="mailto:r.mitra@unsw.edu.au">r.mitra@unsw.edu.au</a>,</td>
</tr>
<tr>
<td>Phone:</td>
<td>+61 2 9385 5161</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Contact times</th>
<th>Contact times are scheduled for:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Monday: 12 noon – 2 PM; Tyree LG07</td>
</tr>
<tr>
<td></td>
<td>• Wednesday: 10 AM – 12 noon; Red Centre M032</td>
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</tbody>
</table>

1.1. Course Description

This course presents a systems approach to the principles, design and application of the major surface and underground mining methods together with the associated equipment, services and infrastructure.

1.2. 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.

1.3. Assumed Knowledge

This course assumes that students have a good understanding of mining terms and descriptions, have been exposed to surface and underground mining methods and are familiar with mining development, operations and production.

1.4. Course Content

- Principles of systems engineering
- Mine services and infrastructure
- Surface mining methods
  - Method selection
  - Strip mining
  - Open pit mining
  - Highwall mining
  - Solution mining
  - Surface miners and other mining methods
- Underground mining methods
  - Mine access and development
  - Longwall coal mining
  - Thick seam coal mining
  - Bord and pillar coal mining
  - Underground metalliferous mining method selection
  - Room and pillar mining
  - Cut and fill mining
  - Sublevel stoping
  - Narrow vein mining
  - Caving methods
2. AIMS, LEARNING OUTCOMES AND GRADUATE ATTRIBUTES

2.1. Course Aims

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.

2.2. Learning Outcomes

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

1. Identify, assess and select mining methods appropriate to specific types of deposits;
2. Appraise mining methods with respect to productivity, safety, efficiency, risks, and sustainability;
3. Describe and illustrate major mining methods and their related equipment, supporting infrastructure, key performance drivers, and constraints;
4. Be conversant with the key principles of a systems approach to mining, and be able to describe a mining operation in terms of an array of interrelated processes and systems;
5. Demonstrate awareness of the major technological trends in mining methods and equipment.

2.3. BE (Hons) Program Learning Outcomes

1. Comprehensive, theory based understanding of the underpinning natural and physical sciences and the engineering fundamentals applicable to the engineering discipline.
2. Conceptual understanding of the mathematics, numerical analysis, statistics, and computer and information sciences which underpin the engineering discipline.
3. In-depth understanding of specialist bodies of knowledge within the engineering discipline.
4. Discernment of knowledge development and research directions within the engineering discipline.
5. Knowledge of engineering design practice and contextual factors impacting the engineering discipline.
6. Understanding of the scope, principles, norms, accountabilities and bounds of sustainable engineering practice in the specific discipline.
7. Application of established engineering methods to complex engineering problem solving.
8. Fluent application of engineering techniques, tools and resources.
10. Application of systematic approaches to the conduct and management of engineering projects.
11. Ethical conduct and professional accountability.
12. Effective oral and written communication in professional and lay domains.
13. Creative, innovative and pro-active demeanour.
14. Professional use and management of information.
15. Orderly management of self, and professional conduct.
16. Effective team membership and team leadership.

2.4. Graduate Attributes

This course will contribute to the development of the following 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. Having Health, Safety, Environment and Community (HSEC) consciousness
3. REFERENCE RESOURCES

3.1. Recommended Texts


3.2. Reference Materials

- Gertsch, RE and Bullock, RL (eds.), 1998. Techniques in Underground Mining, SME, Littleton, USA.

3.3. Online Resources

Selected readings as well as other supporting material (e.g. course outline and lecture notes will be made available on LMS.
### 4. Learning Activities Summary

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Activity</th>
<th>Hours</th>
<th>Area</th>
<th>Content</th>
<th>Presenter</th>
</tr>
</thead>
</table>
| 1    | 29/02      | Lecture  | 2     | Generic     | Course Introduction
Introduction to Systems Engineering                                  | RM        |
|      | 02/03      | Lecture  | 2     | Generic     | Mine Services & Infrastructure
Surface vs Underground Mining - Method Selection                            | RM        |
| 2    | 07/03      | Lecture  | 2     | Surface     | Strip Mining – Introduction and Principles
Strip Mining – Draglines, Bucket Wheel Excavators & Dozers                 | RM        |
|      | 09/03      | Tutorial | 2     |             | Tutorial 1 – Dragline Selection & Productivity                          | RM        |
| 3    | 14/03      | Lecture  | 2     | Surface     | Open Pit Mining – Introduction and Principles
Open Pit Mining – Loading Equipment                                         | RM        |
|      | 16/03      | Tutorial | 2     |             | Tutorial 2 – Open Pit Mining – Bench and Pit Slope Geometry              | RM        |
| 4    | 21/03      | Lecture  | 2     | Surface     | Open Pit Mining – Truck Haulage
Highwall Mining                                                              | RM        |
|      | 23/03      | Tutorial | 2     |             | Tutorial 3 – Truck & Shovel Selection including Haul Road Design         | RM        |
|      | 25/03 – 03/04 |       |       |             | MID-SESSION BREAK                                                        |           |
| 5    | 04/04 – 10/04 |       |       |             | NON-TEACHING WEEK                                                        |           |
| 6    | 11/04      | Lecture  | 2     | Surface     | Surface Miners
Solution Mining & Other Mining Methods                                     | RM        |
|      | 13/04      | Tutorial | 2     |             | Tutorial 4 – Truck Fleet Dispatch and TALPAC                              | RM        |
| 7    | 18/04      | Tutorial | 2     | Surface     | Tutorial 5 – Systems Engineering                                         | RM        |
|      | 20/04      | Lecture  | 1     | Surface     | Quiz 1
Guest Lecturer (TBC)                                                       | RM        |
| 8    | 25/04      | Lecture  | 1     | Underground | Underground Mine Access & Development
UG Coal – Introduction & Longwall Mining                                    | RM        |
|      | 27/04      | Tutorial | 2     | Underground | UG Coal – Thick Seam Mining                                              | BH        |
| 9    | 02/05      | Lecture  | 2     | Underground | UG Metal – Introduction
UG Metal – Method Selection                                                  | RM        |
|      | 04/05      | Tutorial |       |             | Tutorial 6 – Shaft vs Decline                                             | RM        |
| 10   | 09/05      | Lecture  | 2     | Underground | Bord & Pillar Coal Mining and Room & Pillar Metal
UG Metal – Cut & Fill                                                        | RM        |
|      | 11/05      | Tutorial |       | Underground | Tutorial 7 – Longwall Mining                                             | RM        |
| 11   | 16/05      | Lecture  | 4     | Underground | UG Metal – Sublevel Stopping
UG Metal – Narrow Vein Mining                                               | RM        |
|      | 18/05      | Tutorial |       |             | Tutorial 8 – UG Metal Mining Method Selection & Stopping                 | RM        |
| 12   | 23/05      | Lecture  | 4     | Underground | UG Metal – Caving Methods                                                | RM        |
|      | 25/05      | Tutorial |       |             | Tutorial 9 – Room & Pillar                                                | RM        |
| 13   | 30/05      | Lecture  | 2     | Underground | Tutorial 10 – Caving Methods                                             | RM        |
|      | 01/06      | Quiz     | 1     | Underground | A2, Quiz 2
Guest Lecturer (TBC)                                                       | RM        |
5. COURSE ASSESSMENT

5.1. Assessment Summary

All assessments are due 12 noon Sydney time on Monday of the week, unless otherwise indicated in the table below.

<table>
<thead>
<tr>
<th>Assessment task</th>
<th>Due date</th>
<th>Weight (%)</th>
<th>Method of Assessment</th>
<th>Learning outcomes assessed</th>
</tr>
</thead>
<tbody>
<tr>
<td>A01. Quiz 1</td>
<td>Wk 7 (Apr 20)</td>
<td>20</td>
<td>Quiz on Surface Mining Systems</td>
<td>1, 2, 3, 4, 5</td>
</tr>
<tr>
<td>A02. Quiz 2</td>
<td>Wk 13 (Jun 1)</td>
<td>20</td>
<td>Quiz on Underground Mining Systems</td>
<td>1, 2, 3, 4, 5</td>
</tr>
<tr>
<td>A03. Tutorials</td>
<td>On the same day of each session</td>
<td>20</td>
<td>10 tutorials for the complete portfolio</td>
<td>1, 2, 3, 4, 5</td>
</tr>
<tr>
<td>A04. Final Exam</td>
<td>Jun 20, 2016 (2 PM)</td>
<td>40</td>
<td>End of semester exam covering the whole course</td>
<td>1, 2, 3, 4, 5</td>
</tr>
</tbody>
</table>

In addition to achieving an overall pass in the course, a student is required to achieve a minimum mark of 40% in the final exam.

Please bring smartphone, tablet or notebook computer with wi-fi connection to all classes for random on-line quizzes.

5.2. Tutorial Portfolio

Students need to submit their worked tutorials at the end of each session. Each submission will be added to their individual portfolio. Marking of the tutorials will be based on the completeness of the portfolio. The first 15 minutes of each tutorial will be used to discuss the previous tutorial’s solution. Solutions of each tutorial will be given to students a week later and not on the same day.

The portfolio will be worth 20% of the total course marks.
6. STUDYING A UG COURSE IN MINING ENGINEERING AT UNSW

6.1. 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 through 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: www.it.unsw.edu.au/students/zmail/redirect_external.html

6.2. 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: mining@unsw.edu.au
- Course inquiries: these should be directed to the course convenor.

6.3. Computing Resources and Internet Access Requirements

UNSW Mining Engineering provides blended 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 and Class bookings.

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)
- Chrome browser or FireFox
- ability to view streaming video (high or low definition UNSW The Box options)

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

6.4. Accessing Course Materials through Moodle

Course outlines and support materials are uploaded on a Learning Management System (LMS) - Moodle. All enrolled students are automatically included on the Moodle for each course. To access these documents, please visit: www.moodle.telt.unsw.edu.au

6.5. 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: www.engineering.unsw.edu.au/mining-engineering/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.

6.6. Late Submission of an Assignment

Full marks for an assignment are only possible when an assignment is received by the due date.
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: http://www.engineering.unsw.edu.au/mining-engineering/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 as soon as possible: https://student.unsw.edu.au/special-consideration

6.7. Course Results

For details on UNSW assessment policy, please visit: https://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 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.

6.8. 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: https://www.student.unsw.edu.au/special-consideration

6.9. 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: http://www.studentequity.unsw.edu.au/

6.10. 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://www.student.unsw.edu.au/plagiarism.

All Mining Engineering 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: http://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.

6.11. Report Writing Guide for Mining Engineers


6.12. 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.

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.