Undergraduate Course Outline

MINE1010
Mineral Resources Engineering
Session One, 2016

Dr Rudrajit Mitra
E: r.mitra@unsw.edu.au
1. INFORMATION ABOUT THE COURSE .................................................................2
2. AIMS, LEARNING OUTCOMES AND GRADUATE ATTRIBUTES .........................3
3. REFERENCE RESOURCES ..................................................................................4
4. COURSE CONTENT AND LEARNING ACTIVITIES ............................................5
5. COURSE ASSESSMENT ....................................................................................6
6. STUDYING A UG COURSE IN MINING ENGINEERING AT UNSW ......................7

Document Management:
Filename: CourseOutline_MINE1010_S1_2016
Date last update: 17 Feb 2016
Changes made by: Rudra Mitra
Revision number: V1.1
1. INFORMATION ABOUT THE COURSE

<table>
<thead>
<tr>
<th>Course Code:</th>
<th>MINE1010</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>Mineral Resources Engineering</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Course Convenor:</td>
<td>Dr Rudrajit Mitra</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contact Details</td>
<td>School of Mining Engineering</td>
<td>Old Main Building, Rm 159D</td>
<td>EMAIL:</td>
<td><a href="mailto:r.mitra@unsw.edu.au">r.mitra@unsw.edu.au</a>,</td>
<td></td>
<td></td>
<td>Phone:</td>
</tr>
<tr>
<td>Contact times</td>
<td>Contact times are scheduled for:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Tuesday: 10 AM – 12 noon; Elec Eng 418</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Wednesday: 1 PM – 2 PM; Chem Sc M10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1.1. Course Description

This course includes an overview of the Australian minerals industry and the presence and development of mineral resources in Australia; the role of the mining engineer and career path options; awareness of major mineral types and distribution in Australia; basic mining concepts and systems, operations, equipment & services; an introduction to risk management and general issues of safety, health and well-being, including important issues for the safety of persons visiting or working at mining operations in remote or bushland areas.

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. Course Content

The course includes the following specific topics:

- Report Writing Skills
- Careers’ Job Applications/Interviews
- OHS Induction
- Risk Management
- Geology
- Coal Mining Systems
- Mining Systems (hard rock)
- Mine Economics
- Mine Geomechanics
- Mine Ventilation
- BushSmart
- Mine Water
- Mineral Processing
- Sustainability & Environment
2. AIMS, LEARNING OUTCOMES AND GRADUATE ATTRIBUTES

2.1. Course Aims

This course aims to provide a basic introduction to the profession of mining engineering and the Australian minerals industry for all new students.

2.2. Learning Outcomes

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

1. Be familiar with the magnitude and diversity of the Australian minerals industry and mineral resources
2. Appreciate the priority importance of safety and proactive safety management practices within the Australian mining industry.
3. Understand different types of generic mine plans and conceptual mining systems.
4. Understand basic mining methods/terminology/mine layouts.
5. Recognise types and functions of major mining equipment.
6. Appreciate the importance of mining geomechanics.
7. Recognise an understanding of mine economics.
8. Appreciate how effective mine ventilation is achieved.
9. Understand the principles and importance of sustainable mine development and operational practice, including environment, safety, and community issues.
10. Be able to undertake a basic risk assessment.
11. Be able to write reports, assignments and other documents in a format and style consistent with the School’s report writing guidelines.

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. An appreciation of the Australian minerals industry, the role of a mining engineer and career path options
2. An overview of mining systems
3. An opportunity to apply their studies in fundamental engineering and physical principles to mining engineering.
4. An introduction to engineering risk management.
5. An understanding and working knowledge of safety and health issues associated with working and travelling in remote areas.
6. Ability for engineering design and creativity
7. Being able to think and work individually and in teams
8. Awareness of opportunities to add value through engineering and the need for continuous improvement
9. Being able to work and communicate effectively across discipline boundaries

3. REFERENCE RESOURCES

3.1. Recommended Texts

- Australasian Coal Mining Practice. Monograph 12, AusIMM, 3rd edition. (Student discounts available for members)
- Mining Engineers Handbook. 3rd edition. SME (American Society of Mining Engineers – see Web page for student discount details, www.smenet.org/store

These texts are relevant for many of the courses you will study throughout your degree program. In addition, a number of mining magazines and periodicals published during the last 12 months will be distributed to the class.

3.2. Reference Materials

Students are directed to the UNSW Library and to the library and publications of the Mineral Resources Division of the Department of Primary Industries. There is a considerable amount of information to be found on the internet. The following addresses provide some useful starting points for sourcing books and other information:

- http://www.longwalls.com (We have a subscription service to this)
- http://www.minerals.org.au
- http://books.smenet.org/store
- http://www.miningnews.net
- http://www.bhpbilliton.com/bb/home/home.jsp
- http://www.miningandconstruction.sandvik.com/
- http://www.riotinto.com/

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. COURSE CONTENT AND LEARNING ACTIVITIES

4.1. Learning Activities Summary

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Topic</th>
<th>Staff</th>
<th>Delivery</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>01/03</td>
<td>Welcome to School</td>
<td>PH</td>
<td>Lecture</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Course Introduction</td>
<td>RM</td>
<td>Lecture</td>
</tr>
<tr>
<td></td>
<td></td>
<td>OHS Induction</td>
<td>RM</td>
<td>Lecture</td>
</tr>
<tr>
<td></td>
<td>02/03</td>
<td>Industry overview &amp; safety focus</td>
<td>BH</td>
<td>Lecture</td>
</tr>
<tr>
<td>2</td>
<td>08/03</td>
<td>Risk Management methods</td>
<td>BH</td>
<td>Lecture</td>
</tr>
<tr>
<td></td>
<td>09/03</td>
<td>School Report Writing Skills</td>
<td>PH</td>
<td>Lecture/Workshop</td>
</tr>
<tr>
<td>3</td>
<td>15/03</td>
<td>BushSmart</td>
<td>WT</td>
<td>Lecture</td>
</tr>
<tr>
<td></td>
<td>16/03</td>
<td>AVIE Visit</td>
<td>RM/JT</td>
<td>Lecture</td>
</tr>
<tr>
<td>4</td>
<td>22/03</td>
<td>Coal mining systems overview</td>
<td>BH</td>
<td>Lecture</td>
</tr>
<tr>
<td></td>
<td>23/03</td>
<td>Coal mining systems (underground &amp; opencut)</td>
<td>BH</td>
<td>Lecture</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MID-SESSION BREAK (Field Trip)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>05/04</td>
<td>Mining systems (hard rock)</td>
<td>FS</td>
<td>Lecture</td>
</tr>
<tr>
<td></td>
<td>06/04</td>
<td>Mine economics</td>
<td>SS</td>
<td>Lecture</td>
</tr>
<tr>
<td>6</td>
<td>12/04</td>
<td>AutoCAD Workshop</td>
<td>CD</td>
<td>Workshop</td>
</tr>
<tr>
<td></td>
<td>13/04</td>
<td>Mine Ventilation</td>
<td>DC</td>
<td>Lecture</td>
</tr>
<tr>
<td>7</td>
<td>19/04</td>
<td>Mine Geology &amp; Water</td>
<td>WT</td>
<td>Lecture</td>
</tr>
<tr>
<td></td>
<td>20/04</td>
<td>AVIE Visit</td>
<td>RM/JT</td>
<td>Lecture</td>
</tr>
<tr>
<td>8</td>
<td>26/04</td>
<td>BushSmart - Presentations</td>
<td>WT</td>
<td>Presentations</td>
</tr>
<tr>
<td></td>
<td>27/04</td>
<td>Mine Geomechanics</td>
<td>HM</td>
<td>Lecture</td>
</tr>
<tr>
<td>9</td>
<td>03/05</td>
<td>Risk assessment – Presentations</td>
<td>BH/RM</td>
<td>Presentations</td>
</tr>
<tr>
<td></td>
<td>04/05</td>
<td>Mineral Processing</td>
<td>SA</td>
<td>Lecture</td>
</tr>
<tr>
<td>10</td>
<td>10/05</td>
<td>Sustainability &amp; Environment</td>
<td>SR</td>
<td>Lecture</td>
</tr>
<tr>
<td></td>
<td>11/05</td>
<td>Off-Earth Mining</td>
<td>SS</td>
<td>Lecture</td>
</tr>
<tr>
<td>11</td>
<td>17/05</td>
<td>Careers’ Job Applications/Interviews (1)</td>
<td>DV</td>
<td>Lecture</td>
</tr>
<tr>
<td></td>
<td>18/05</td>
<td>Careers’ Job Applications/Interviews (2)</td>
<td>DV</td>
<td>Lecture</td>
</tr>
<tr>
<td></td>
<td>19/05</td>
<td>MITSUBISHI LECTURE (Venue – TBA)</td>
<td></td>
<td>Public Lecture</td>
</tr>
<tr>
<td>12</td>
<td>24/05</td>
<td>Mining systems presentations</td>
<td>BH/RM</td>
<td>Presentations</td>
</tr>
<tr>
<td></td>
<td>25/05</td>
<td>Stock Exchange presentations</td>
<td>BH/RM</td>
<td>Presentations</td>
</tr>
<tr>
<td>13</td>
<td>31/05</td>
<td>FINAL EXAM</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>01/06</td>
<td>Student Exchange Opportunities</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Staff Names:
SA – Dr Seher Ata, School of Mining Engineering
DC – Mr Duncan Chalmers, School of Mining Engineering
CD – Dr Chris Daly, School of Mining Engineering
BH – Prof Bruce Hebblewhite, School of Mining Engineering
PH – A/Prof. Paul Hagan, School of Mining Engineering
HM – Dr Hossein Masoumi, School of Mining Engineering
RM – Dr. Rudra Mitra, School of Mining Engineering
SR – Dr Simit Raval, School of Mining Engineering
SS – A/Prof. Serkan Saydam, School of Mining Engineering
JT – Dr James Tibbett, School of Mining Engineering
WT – Dr Wendy Timms, School of Mining Engineering
DV – Ms Debbie Vadasz, Careers Consultant, Careers and Employment, UNSW
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>Release date</th>
<th>Weight (%)</th>
<th>Assessment</th>
<th>Method</th>
<th>Learning outcomes assessed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3 May</td>
<td>8 Mar</td>
<td>10</td>
<td>Risk Assessment</td>
<td>Group presentations (Peer reviewed)</td>
<td>2, 10, 11</td>
</tr>
<tr>
<td>2</td>
<td>26 Apr</td>
<td>15 Mar</td>
<td>10</td>
<td>Bush Smart</td>
<td>Group presentations (Peer reviewed)</td>
<td>2, 9, 10, 11</td>
</tr>
<tr>
<td>3</td>
<td>24 May</td>
<td>23 Mar</td>
<td>15</td>
<td>Mining Systems</td>
<td>Group presentations (Peer reviewed)</td>
<td>1, 2, 3, 4, 5, 9, 11</td>
</tr>
<tr>
<td>4</td>
<td>25 May</td>
<td>8 Mar</td>
<td>10</td>
<td>Stock Exchange</td>
<td>Individual Presentation</td>
<td>7, 11</td>
</tr>
<tr>
<td>5</td>
<td>27 May</td>
<td>19 May</td>
<td>10</td>
<td>Mitsubishi Lecture</td>
<td>Assignment</td>
<td>2, 11</td>
</tr>
<tr>
<td>6</td>
<td>25 Apr</td>
<td>29 Mar</td>
<td>25</td>
<td>Field Trip</td>
<td>Assignment</td>
<td>1, 2, 4, 9, 11</td>
</tr>
<tr>
<td>7</td>
<td>25 Apr</td>
<td>11 Apr</td>
<td>25</td>
<td>Mining Project (Alternate to Field Trip)</td>
<td>Assignment</td>
<td>1, 2, 4, 9, 11</td>
</tr>
<tr>
<td>8</td>
<td>31 May</td>
<td>20</td>
<td>20</td>
<td>Course Final Exam</td>
<td>Exam</td>
<td>1, 2, 3, 4, 5, 6, 7, 8, 9, 11</td>
</tr>
</tbody>
</table>

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