Description: Mining Technology

<table>
<thead>
<tr>
<th>Subject</th>
<th>Cat-nbr</th>
<th>Class</th>
<th>Term</th>
<th>Mode</th>
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<tr>
<td>CIV</td>
<td>4604</td>
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<td>1, 2005</td>
<td>EXT</td>
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<td>Toowoomba</td>
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Academic group: FOENS
Academic org: FOES03
Student contribution band: 2
ASCED code: 030303

STAFFING
Moderator: Jo Devine

RATIONALE
Mining engineering a broad discipline. One of the main differences is that in most engineering disciplines, such as mechanical, electrical or civil, the materials used are selected from materials of specific strength and other properties. For example steel for manufacturing, concrete for building, wire for power transmission and many more. In mining, the problem is to extract minerals from the earth and the mining engineer cannot select his materials which are the natural material or rocks of the earth in which a mineral deposit is found. These materials have numerous different properties and the mining engineer must vary his mining methods to suit, since the minerals must be recovered safely as well as economically. The significance of mining to Australia cannot be understated. Mining to Australia is very significant, in fact our largest export earner is mineral products. These include base metals such as lead, zinc, copper and iron ore, precious metals such as gold and silver, and fossil fuels such as coal, oil and natural gas. Since the early days of mining, many changes have taken place, in the recent past the three most important being environmental protection mining of lower grade ore deposits and mechanisation. Most people are now environmentalists to some extent and this has required a new approach to mining techniques so that the environment is protected as much as possible. Most high grade ore bodies have already been discovered or mined out and so new methods must be designed to extract the minerals more economically. Another problem in Australia is its duty to protect Aboriginal lands and sacred sites. Mining methods are split into two broad categories: underground mining, surface mining. These broad categories are further split into many varied methods of mining. This course introduces both surface and underground mining to the student and covers a very diverse range of subject material.

SYNOPSIS
The aim of the course is to provide a basis for further studies in mining engineering. The student is led step by step into the mining process which eventually leads into development including sinking of shafts, driving of tunnels etc and stoping, or ore extraction. The main method of breaking rock is still by drilling and blasting; this subject is covered in some detail. All of this together with safety and environmental protection aims to give the student a very broad but
basic understanding of mining engineering which is essential in order to study more specialised courses later in this course.

OBJECTIVES

On completion of this course, students should be able to:

1. explain the significance of mining in the Australian economy and the need for mining, explain the history of mining in Australia and briefly describe early mining in the ancient world;
2. describe the different types of drills used in mining and how blastholes are placed to effectively and economically break rock. Explain also why holes, other than for blasting, are drilled;
3. recall the significant events in the history of explosives development, describe the characteristics of modern explosives and their use in breaking rock, and discuss the differences in composition of the various explosives in use today and in the past;
4. relate the problems involved in establishing a mine;
5. describe the various methods of developing a mine including shaft sinking, tunnelling, raising, etc;
6. describe production methods, both surface and underground;
7. describe potential hazards associated with mining, especially within the environment of an underground mine;
8. debate the political, environmental, social, cultural and heritage issues associated with mining, environmental protection and the need to maintain Aboriginal land rights and sacred sites.

TOPICS

<table>
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<tr>
<th>Description</th>
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<tr>
<td>1. Introduction to the Mining Industry</td>
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<td>2. Establishing a Mine Site</td>
<td>16.00</td>
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<td>3. Drills and Drilling</td>
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<td>4. Explosives and Blasting</td>
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<td>5. Mine Development</td>
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<td>6. Underground Mining Methods</td>
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<tr>
<td>7. Surface Mining Techniques</td>
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<tr>
<td>8. The Environment and Safety of Mines</td>
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<tr>
<td>9. Environmental, Social and Political Issues</td>
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TEXT and MATERIALS required to be PURCHASED or ACCESSED

ALL textbooks and materials are available for purchase from USQ BOOKSHOP (unless otherwise stated). Orders may be placed via secure internet, free fax 1800642453, phone 07 46312742 (within Australia), or mail. Overseas students should fax +61 7 46311743, or phone +61 7 46312742. For costs, further details, and internet ordering, use the 'Textbook Search' facility at http://bookshop.usq.edu.au click 'Semester', then enter your 'Course Code' (no spaces).
REFERENCE MATERIALS

Reference materials are materials that, if accessed by students, may improve their knowledge and understanding of the material in the course and enrich their learning experience.

Mining and Exploration Australia and New Guinea:
Chamber of Mines of South Africa:
http://www.bullion.org.za
Western Australian School of Mines:
Australian Virtual Engineering Library:
http://avel.library.uq.edu.au/


Sweet, K. A 1984, Mining 1, Technical Publications Trust, Perth, Western Australia.

Sweet, K. A 1984, Quarrying 1, Technical Publications Trust, Perth, Western Australia.


STUDENT WORKLOAD REQUIREMENTS

<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th>HOURS</th>
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<tr>
<td>Assessment</td>
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<tr>
<td>Directed Study</td>
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<tr>
<td>Examinations</td>
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<td>Private Study</td>
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## ASSESSMENT DETAILS

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<thead>
<tr>
<th>Description</th>
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<th>Wtg(%)</th>
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<tbody>
<tr>
<td>ASSIGNMENT 1</td>
<td>120.00</td>
<td>12.00</td>
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<td>ASSIGNMENT 2</td>
<td>120.00</td>
<td>12.00</td>
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<td>ASSIGNMENT 3</td>
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<td>12.00</td>
<td>13 May 2005</td>
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<td>ASSIGNMENT 4</td>
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<td>3 HOUR RESTRICTED EXAMINATION</td>
<td>520.00</td>
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### NOTES

1. Student Administration will advise students of the dates of their examinations during the semester.

### IMPORTANT ASSESSMENT INFORMATION

1. **Attendance requirements:**
   There are no attendance requirements for this course. However, it is the students' responsibility to study all material provided to them or required to be accessed by them to maximise their chance of meeting the objectives of the course and to be informed of course-related activities and administration.

2. **Requirements for students to complete each assessment item satisfactorily:**
   To complete each of the assessment items satisfactorily, students must obtain at least 50% of the marks available (or at least a grade of C-) for each assessment item.

3. **Penalties for late submission of required work:**
   If students submit assignments after the due date without prior approval then a penalty of 5% of the total marks available for the assignment will apply for each working day late.

4. **Requirements for student to be awarded a passing grade in the course:**
   To be assured of a passing grade, students must demonstrate, via the summative assessment items, that they have achieved the required minimum standards in relation to the objectives of the course by satisfactorily completing all summative assessment items (the examination and assignments), as stated in 2 above.

5. **Method used to combine assessment results to attain final grade:**
   The final grades for students will be assigned on the basis of the weighted aggregate of the marks (or grades) obtained for each of the summative assessment items in the course.

6. **Examination information:**
   In a Restricted Examination, candidates are allowed access to specific materials during the examination. The only materials that candidates may use in the restricted examination for this course are: writing materials (non-electronic and free from material which could give the student an unfair advantage in the examination); calculators which cannot hold textual information (students must indicate on their examination paper the make and model of any calculator(s) they use during the examination).

7. **Examination period when Deferred/Supplementary examinations will be held:**
   Any Deferred or Supplementary examinations for this course will be held during the examination period at the end of the semester of the next offering of this course.

8. **University Regulations:**

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Students should read USQ Regulations 5.1 Definitions, 5.6. Assessment, and 5.10 Academic Misconduct for further information and to avoid actions which might contravene University Regulations. These regulations can be found at the URL http://www.usq.edu.au/corporateservices/calendar/part5.htm or in the current USQ Handbook.

**ASSESSMENT NOTES**

1. The due date for an assignment is the date by which a student must despatch the assignment to the USQ. The onus is on the student to provide proof of the despatch date, if requested by the Examiner.

2. Students must retain a copy of each item submitted for assessment. This must be produced within five days if required by the Examiner.

3. In accordance with University's Assignment Extension Policy (Regulation 5.6.1), the examiner of a course may grant an extension of the due date of an assignment in extenuating circumstances.

4. The Faculty will normally only accept assessments that have been written, typed or printed on paper-based media.

5. The Faculty will NOT accept submission of assignments by facsimile.

6. Students who do not have regular access to postal services or who are otherwise disadvantaged by these regulations may be given special consideration. They should contact the examiner of the course to negotiate such special arrangements.

7. In the event that a due date for an assignment falls on a local public holiday in their area, such as a Show holiday, the due date for the assignment will be the next day. Students are to note on the assignment cover the date of the public holiday for the Examiner's convenience.

8. Students who have undertaken all of the required assessments in a course but who have failed to meet some of the specified objectives of a course within the normally prescribed time may be awarded one of the temporary grades: IM (Incomplete - Make up), IS (Incomplete - Supplementary Examination) or ISM (Incomplete - Supplementary Examination and Make up). A temporary grade will only be awarded when, in the opinion of the examiner, a student will be able to achieve the remaining objectives of the course after a period of non directed personal study.

9. Students who, for medical, family/personal, or employment-related reasons, are unable to complete an assignment or to sit for an examination at the scheduled time may apply to defer an assessment in a course. Such a request must be accompanied by appropriate supporting documentation. One of the following temporary grades may be awarded IDS (Incomplete - Deferred Examination; IDM (Incomplete Deferred Make-up); IDB (Incomplete - Both Deferred Examination and Deferred Make-up).

**OTHER REQUIREMENTS**

1. Students will require access to e-mail and the internet for this course.