Faculty of Engineering

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x [illegible] 2011, [illegible] [illegible], [illegible] 978 0 87335 264 2
x [illegible]
x [illegible] – [illegible]

Other material that should be referred to in conjunction with this Course Outline include:

x [illegible]
x [illegible]
x [illegible]
x [illegible]

This course involves the following topics:

x [illegible]
  - o machine mining
  - o blasting
x [illegible]
  - o types of mining machines
  - o design variables and performance of pick and disc cutting tools
  - o cutting tool materials and effect of tool metallurgy on wear and fracture resistance
  - o cutterhead design for mining machines
  - o methods of assessment of rock cuttability
  - o ripping and impact breaking
x [illegible]
  - o types of drilling machines and drilling methods
  - o selection, performance and costing of different drilling machines
  - o safety and logistics of drilling machines
x [illegible]
  - o detonation and explosive performance
  - o types, properties and selection of commercial explosives
  - o charging techniques, initiation systems, blasting accessories and their applications
  - o rock mass characterisation for blasting
  - o blast design principles and practices
    - o bench blasting
    - o open pit coal blasting
    - o underground blasting

- special blasting techniques
  - management of blast damage
  - cast blasting
  - secondary blasting
- blast fragmentation and analysis
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		x Rock drillability and the factors that affect drillab x Rock drilling methods (rotary, percussive, rotary-crushing, rotary cutting and rotary abrasive) x Mechanisms of rock breakage associated with drag bits, rotary bits and percussion bits. x Identify the range of drilling systems for exploration and production applications x Applications and operating characteristics (torque/rotation, feed/pull-down, flushing/bailing velocity, blow energy and frequency, etc) for rotary and percussion blasthole drills for different mining objectives and rock mass conditions x Drill pattern design for various mining methods (underground and surface) x Choosing appropriate drilling machine(s) for different mining methods x The role of rock blasting in mining	
		x Outline of learning outcomes for blasting. x Explosives and rock breakage x Commercial mining explosives x Explosive performance x Logistics and Safety x Delivery and charging systems x Open pit blast patterns and explosive distributio	
		x Blast patterns and explosive distribution (open pit) x Charge and pattern selection x Rock mass charactisation and explosive selecti	
		x Initiation timing x Blast damage x Wall control	
		x Blasting in underground coal mines x Explosives legislation and security x Managing the environmental impacts from blasting – 1 x Managing the environmental impacts from blast – 2	

			Quiz: Machine Mining A quiz assessing all aspects detailed in the Machine Mining Learning Guide	
			Seminar presentation[1] (Group Work[2])	
			Major Design Project (Group work) A group assignment which is subject to a Peer Review to prepare blast designs, costing and other analyses for a given surface mining operation or underground operation	
			Exam (Covers Drill and Blast)	

Note: 1. Each team should select a topic for the seminar presentation and inform the Course Convenor by email before close of business on Friday by Week 2.
2. Refer to details on Group Work

Quiz

- The in-semester quiz for the machine mining module may be either paper-based or conducted on-line using Moodle in the School of Mining Engineering Computer Laboratory, OMB Rm 48.
- The **quiz will be scheduled during the normal lecture period or either on a Thursday or Friday** in the nominated week between 10am and 2pm.
- The duration of the quiz will be approximately 60 minutes. Students should make provision in the diary to be available during these periods in the nominated weeks.
- Non-attendance at the Quiz will result in a zero mark. No supplementary quiz will be scheduled.
- The Quiz will cover the various learning outcomes as defined in the *Cd* and the material outlined in the *g* .
- The Quiz will include a combination of multiple answer, short answer and calculation style questions selected at random from a bank of questions.
- Normal university regulations for examinations will apply to the Quiz.
- Students must also bring to the Quiz a *g* QSS*)*. Preparation of the QSS is regarded as a key part of the learning process and so students are strongly encouraged to prepare their own QSS. Requirements of the QSS are:
  - it must be the student's own work;

- it must be a single A4 sheet of paper with notes placed on both sides of the sheet;
- the sheet must contain only **handwritten** notes and diagrams. It must NOT contain any typed, photocopied or computer generated information;
- it must be the individual student's own work written in pencil and/or pen. A photocopy is NOT allowed;
- there are no constraints on the size or amount of information that can be included; and
- the student's name and signature must be placed in the top right hand corner of the QSS with the statement "I declare this QSS is all my own work.".

x If a QSS does not comply with all of these requirements then it may be confiscated and the student will not have recourse to the QSS during the Quiz. Academic Misconduct procedures may also be applied.

x The QSS must be surrendered at the end of the Quiz. The QSS will be checked but will not be assessed, so students can elect to submit a blank QSS. Students who do not submit a QSS will get zero marks for the Quiz.

x

TABLE 1: Assessment Criteria – *Project*

Criteria	Excellent	Good	Satisfactory	Unsatisfactory	Poor	nil
Summary	x summary clearly defines all aspects of the objectives of project and methodology used x includes a well-written and comprehensive statement of the findings and outcomes of study based on a correct interpretation of data and correct analysis	x summary defines the objectives of the assignment and methodology used x includes a statement of the findings and outcomes based on a correct interpretation of data and correct analysis				

Criteria	Excellent	Good	Satisfactory	Unsatisfactory	Poor	nil
	cost structure xall costs fully justified and all reference sources cited xprovided an appropriately structured SOP and performance monitoring plan	xmost costs are fi justified and most reference sources cited xprovided a reasonable SOP and performan monitoring plan	cost structure xsome costs are fully justified and some reference sour a Tw 0 - 0 -1.135.0.72 0.72 re f 7D [(an)15vid a Tw 0 - 0 -1.135.1 Tf 8.0 h-10.9 (t)1l6.76 some refer (r226 ((c)-0.9 (e)]TJ -0.008 Tc 0.004 Tw 0 -1.134 TD [(s)-15.9 (ou)-14.7 (r)-3 (			

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