Faculty of Engineering

School of Minerals and Energy Resources Engineering

Postgraduate Course Outline

MINE8820

Mineral Processing

A/Prof Seher Ata

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1. INFORMATION ABOUT THE COURSE

Course Code:	MINE8820	Term:	T1, 2020	Level:	PG	Units/Credits	6 UOC
Course Name:	Mineral Processing						

Course Convenor:	A/Prof Seher Ata		
Contact Details	School of Minerals and Energy Resources Engineering Room 159C, Old Main Building	EMAIL:	s.ata@unsw.edu.au
		Phone:	+61 2 9385 7659
Contact times	By appointment		

1.1 Course Description

This is an introductory course in metallurgical processing, designed for students with no prior training in this area. Students are not expected to become expert practitioners in the field, but to learn enough about the concepts and processes to work effectively with metallurgists/mineral processing engineers in the field.

Topics covered include comminution, physical separation, classification, coal preparation, flotation, dewatering, leaching, CIP and solvent extraction. Some basic analytical tools and a wide range of metallurgical terms and concepts are covered.

Key sustainability issues are also examined briefly, including the drive to reduce energy use in crushing and grinding, reduce water usage across all areas of processing, and minimise environmental damage.

1.2 Course Completion

Course completion requires submission of all assessment items; failure to submit all assessment items can result in the award of an Unsatisfactory Failure (UF) grade for the Course.

1.3 Assumed Knowledge

This course assumes a student has knowledge of:

- basic knowledge of mineral processing terms and descriptions;
- some basic understanding of mining operations to follow the course effectively.

2 AIMS, LEARNING OUTCOMES AND GRADUATE ATTRIBUTES

2.1 Course Aims

This course aims to equip the student with knowledge of mineral processing unit operations normally associated with the production of metal ores and coal preparation. Knowledge of hydrometallurgy unit operations normally associated with the production of major metals (i.e copper and gold) is also provided.

2.2 LearningOutcomes

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

1. Describe the work that metallurgists and mineral process engineers do.
2. Describe the major issues in mineral and metallurgical processing

3.2 Other Resources

- UNSW Mining and Petroleum subject guide (including a link to ACARP and how to find the reports in the catalogue). http://subjectguides.library.unsw.edu.au/content.php?pid=7632&sid=52212
- UNSW Library services for Postgraduate students. http://library.unsw.edu.au/servicesfor/PGandH.html
- Report Writing Guide for Mining Engineers, 2011. P Hagan & P Mort (Mining Education Australia (MEA) ISBN 978 0 7334 3032 9.
- Guide to Authors, 2008. (Australasian Institute of Mining and Metallurgy; Melbourne).
- Style Manual for authors, editors and printers. 6th edition, (John Wiley & Sons).
- EndNote, software package available to UNSW students.
- New postgraduate course students are strongly advised to visit the above website, and complete the ELISE and ELISE Plus tutorials. These will help develop skills in finding, using and evaluating scholarly information.

The University and the Faculty provide a wide range of support services for students, including:

- UNSW Learning Centre (http://www.lc.unsw.edu.au)
- Counselling support - http://www.counselling.unsw.edu.au
- Library training and support services - http://www.library.unsw.edu.au/
- OnePetro – (http://www.onepetro.org)

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.

Videos are often provided to students as a web stream within the Moodle learning management system. Videos are not available for download by students, unless approved by the Course Convenor and either the Undergraduate or Postgraduate Coursework Director. Special consideration can be provided for students to access videos off-line (e.g. working remotely). Please contact the Course Convenor for more information. Note that UNSW reserves the right to deliver videos as a web stream rather than off-line and cannot provide videos that are copyright from other providers.

Remember, UNSW librarians are usually happy to help you locate articles or make suggestions regarding possible material to help you in your academic work. You can also access basic online help at http://www.library.unsw.edu.au/

3.4 Report Writing Guide

The School has a report writing guide (RWG) available. A copy of this is available on the course Moodle site.

4 COURSE CONTENT AND LEARNING ACTIVITIES

4.1 Learning Activities Summary

UNSW Week	Date	Hrs	Topic	Content/Activities
6	23 March	8.0	Introduction Liberation & comminution	1.1 Course Introduction – Structure, Assessment, Lab Experiments, Moodle, etc. 1.2 Mineral liberation 1.3 Energy and size reduction theories 1.4 Size reduction equipment & comminution circuits
6	24 March	8.0	Classification & Physical separation Dewatering	2.1 Classification & equipment; representing sizing data 2.2 Physical separation (gravity, magnetic, electrostatic separation) 2.3 Physical separation equipment 2.4 Dewatering methods, equipment and flocculation
6	25 March	8.0	Flotation Coal preparation Mass balance	3.1 Froth flotation: introduction 3.2 Froth flotation: fundamentals; equipment; circuits; reagents; flotation kinetics 3.3 Coal formation and ranking Coal preparation: Crushing; screening; dense media regen/TTan; f680.4249 298 2560.48epapaM366.942.5 32>BDCch.859 scn25

5 COURSE ASSESSMENT

5.1 Assessment Summary

The assessment will be based on the three components as outlined in the below table.

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

Assessment task	Due date	Release date	Weight (%)	Assessment	Learning outcomes assessed
A1.0	27 March	25 March	20		

be awarded for that assessment item. In any case a minimum 5% of the total marks will be forfeited for that assignment.

6 ASSESSMENT CRITERIA

The assessment criteria provide

6.2 Lab Practical Sessions

The laboratory schedule is deliberately designed to provide practical, hands-on exposure to the concepts conveyed in lectures after they are covered in class. You are required to maintain two lab sessions: Grinding & Sieving and Flotation. For both experiments, students will be required to work in group

Equipment used in processing	xProvided comprehensive information on the operation and type/size of the equipment used in the processing flow sheet. Equipment selection is well-justified		xProvided good information on the operation and type/size of the equipment used in the processing flow sheet. Equipment selection is justified		xProvided reasonable information on the operation and type/size of the equipment used in the processing flow sheet. Equipment selection is not fully justified		xProvided only limited xinformation on the operation and type/size of the equipment used in the processing flow sheet. Equipment selection is partially justified.		xProvided limited and confusing information on the operation and type/size of the equipment used in the processing flow sheet. Equipment selection is hardly justified		xProvided no information on the equipment selection and operation
	15	14	13	11	10	8	7	4	3	1	0	
Location (water, transportion, energy)	xExcellent justification of the selected location. Water, energy and transportation requirement are all considered		xJustification of the selected location is sound. Water, energy and transportation requirement are considered		xJustification of the selected location is reasonable. Water, energy and transportation requirement are partly considered		xL					

Conclusion	xClear, concise and comprehensive statement of project objectivesthat reflects state of understanding of topic xAll project management issues relevant have been identified		xGood statement of project objectives that reflect current state of understanding of topic xMost of the major project management issues have been considered		xReasonable statement of project objectives that reflect to some degree current state of understanding of topic xMany of project management issues have been considered with some minor omissions		xPoorly revised project objectives that does not account for current state of understanding of topic xInadequate outline of the project management issues		xProject objective is ambiguous and/or does not account for current state of understanding of topic xPoorly outlined project management issues		xPoor concluding remarks about the project objectives and project plan were provided
	10	9	8	7	6	5	4	3	2	1	0	

7 STUDYING A POSTGRADUATE COURSE IN UNSW MINERALS AND ENERGY RESOURCES ENGINEERING

7.1 How We Contact You

At times, the School or your course convenors may need to contact you about your course or your enrolment. Your course convenors will use the email function within 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: https://www.it.unsw.edu.au/students/email/index.html

7.2 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: https://unswinsight.microsoftcrmportals.com/web-forms/

Course inquiries: these should be directed to the Course Convenor.

7.3 Computing Resources and Internet Access Requirements

UNSW Minerals and Energy Resources Engineering provides blended learning using the on-line Moodle

date. This is indicated by a course grade result of either:

- WD – which