Faculty of Engineering

School of Minerals and Energy Resources Engineering

Undergraduate Course Outline

MINE2810

Minerals & Processing

Part B

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T3 2021

2. AIMS, LEARNING OUTCOMES AND GRADUATE ATTRIBUTES

2.1 Course Aims

2.3. Graduate Attributes

1. This course will contribute to the development of the following Graduate Attributes:
2. appropriate technical knowledge
3. having advanced problem solving, analysis and synthesis skills with the ability to tolerate ambiguity
4. ability for engineering design and creativity
5. awareness of opportunities to add value through engineering and the need for continuous improvement
6. being able to work and communicate effectively across discipline boundaries
7. having HSEC consciousness
8. being active life-long learners.

3. REFERENCE RESOURCES

3.1. Reference Materials

- Wills BA &Napier-Munn T J, 2006. Mineral Processing Technology, Butterworth-Heinemann, Oxford.
- Morrell S, Morrison R D & Kojovic T, 1996. Mineral Comminution Circuits: Their Operation and Optimisation. (Series: JKMRC Monograph Series in Mining and Mineral Processing No. 2). Series Editor, T J Napier-Munn, published by Julius Kruttschnitt Mineral Research Centre, University of Queensland.
- Hayes P C, 2003. Process Principles In Minerals & Materials Production, Hayes Publishing Co.
- Noakes M & Lanz T (Ed). Cost estimation handbook for the Australian mining industry Published Parkville, Vic.: Australasian Institute of Mining and Metallurgy, 1993 Monograph 20.
- Robert W Bartlett,1998. Solution Mining: Leaching and Recovery of Materials.
- Sutherland K L & Wark I W, 1955. Principles of Flotation, Australasian Institute of Mining and Metallurgy, 489 pages.
- Publications from Suppliers and Original Equipment Manufacturers.
- Gupta A &Yan DS, 2006. Mineral Processing Design and Operations, An Introduction, Amsterdam: Elsevier.
- Rhodes M,1998. Introduction to Particle Technology, Wiley, West Sussex.
- Ritcey GM, 2006. Solvent Extraction – Principles and Applications to Process Metallurgy, (2nd ed.). Ottawa, Canada: Gordon M.
- Habashi F, 1969. Principles of Extractive Metallurgy, Volume 1. General Principles, Gordon & Breach, New York – London – Paris 1969 (reprinted 1980), 413 pages.
- Weiss N L, 1985. SME Mineral Processing Handbook, SME American Institute of Mining, metallurgy, and Pc

4. COURSE CONTENT AND LEARNING ACTIVITIES

6. ASSESSMENT CRITERIA

6.1 Laboratory Practical Session

The laboratory schedule is deliberately designed to provide practical, hands-on exposure to the concepts conveyed in lectures. You are required to maintain one lab session: Flotation. Students will be required to work in a group but submit the lab report individually. All students are expected to familiarise themselves with the practical session activities before they come to the lab. Laboratory manual and a booklet containing Laboratory Practice are available in Moodle.

The assessment criteria and relative weighting that will be used in assessing the laboratory reports is summarised in the following tables.

Assessment Criteria – Flotation Laboratory Report

Title page
- Course title and course number
- Title of the experiment
- Student name & student number
- Email address
- Group number
- Date of submission
- Signed declaration of academic integrity

Abstract
- Summarise the aim of the work
- Summarise the procedure including key materials
- Summarise the results
- Summarise the key findings
- Concise (maximum of ½ page)
- Single paragraph
- Past tense
- No figure/table

Total: /5

Introduction
- Description of the flotation process
  - What is it used for?
  - How does it work?
  - What are the roles of the different reagents
- Present the aims of the study

Total: /10

Theory
- Present the different (3) adsorption mechanisms of DDA onto quartz and how they are affected by DDA concentration and pH
- Discuss the effect of particle size on flotation
- Discuss the effect of froth depth on flotation
- Discuss the effect of frother concentration on flotation
- Explain the concept of recovery and maximum recovery (include equations)
- Explain flotation kinetics (include eqw 17.03(o)1 (f)-DC /C2 P -195 (r)2.7 esent t78.6 (h)43 (e)6.5

Flotation kinetics

Kinetics calculations are presented in the table of results (see above)
Graph the disappearance plot (one figure with four series)
- x Include proper figure caption (no 'graph title')
- x Label the axes (including the units)
- x Use markers (not plain lines)

Show the linear regressions with the equations
Describe the figure and what is being done
Present the flotation rate constants
State any trend
State possible source of error
Discuss results in relation to the Theory section (How can you explain the results? Were the results as expected?)

Total: /20

Modelling recovery data

Present modelled recovery values in the table of results (see above)
- x Include a caption
- x Include all units

Plot the recovery curves along with the modelled data (one figure)
- x Include proper figure caption (no 'graph title')
- x Label axes (include units)
- x Use markers (not plain lines) for experimental data
- x Use lines for modelled data (matching colours)

Describe the figure in the text
Discuss the validity of the model (were the assumptions valid?)

Total: /10

Conclusions

Summarise your findings with respect to the objectives
State how your findings may affect flotation practices

Total: /5

Recommendations

Give suggestions for future experiments

Total: /2.5

References

Cite all sources in the text wherever required
Provide full bibliographic information
Use the ACS style referencing (name, date)
- x http://www.lib.unimelb.edu.au/cite/acs/print.pdf

Total: /5

Appendix

7 STUDYING A UG COURSE IN MINING ENGINEERING AT UNSW

7.1 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 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://student.unsw.edu.au/email-rules

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: mining@unsw.edu.au

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

7.3 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)
- Firefox browser
- ability to view streaming video (high or low definition UNSW TV options)

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

7.4 Accessing Course Materials Through Moodle

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.

7.6 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 wo1 (ons)]/2datem.

3. SCHOOL ASSESSMENT COVER SHEET