400-685 Mineral Processing and Waste Management

Credit Points:	12.50
Level:	9 (Graduate/Postgraduate)
Dates & Locations:	2009, This subject commences in the following study period/s: Semester 1, - Taught on campus. On campus only.
Time Commitment:	Contact Hours: 36 Total Time Commitment: 144 hours (including non-contact time).2 X 1 hour lectures weekly.1 X 1 hour practical weekly.
Prerequisites:	400-684 (ENGR0010) Mineral economics (may be taken as a corequisite).
Corequisites:	None
Recommended Background Knowledge:	None
Non Allowed Subjects:	None
Core Participation Requirements:	Students undertaking this subject will be expected to be competent in the use of Microsoft Excel or alternative spreadsheet software.
Coordinator:	Prof Moshe Zukerman
Contact:	Dr Priyan Mendis **http://eng-unimelb.custhelp.com (http://eng-unimelb.custhelp.com/)**
Subject Overview:	This course introduces the scientific and engineering principles involved in the winning of minerals and metals from ores. Unit operations include: comminution, classification, solid-liquid separation and concentration operations. Tailings disposal systems: impoundment on surface, treatment of recycle or decant water, sub-aqueous discharge to fresh and marine waters. Construction, maintenance and stability of embankments, waste piles, dams, and dikes. Prediction, prevention and control of acid rock drainage from exposed faces or waste dumps.
Objectives:	On completion of this subject, the students should have developed the skills and knowledge to understand the the scientific and engineering principles involved in the winning of minerals and metals from ores, and in safe handling and disposal of the resultant residues. Specifically, they should be familiar with : • Formation of minerals. • Occurrence of economically important minerals. • Identification of ores and minerals and their properties. • Various ore-dressing operations: comminution, sizing and sorting, jigging, tabling, flotation, magnetic and electrostatic separations. • Extraction of mineral species. • Various separation processes for beneficiation of minerals, including adsorption, electrolysis, electrowinning, leaching, and solvent extraction by precipitation and by reaction. • Typical examples from the local mineral processing industry • Tailings disposal systems: impoundment on surface, treatment of recycle or decant water, sub-aqueous discharge to fresh and marine waters. • Construction, maintenance and stability of embankments, waste piles, dams, and dikes. • Prediction, prevention and control of acid rock drainage from exposed faces or waste dumps. • Control of dust, noise, and gas emissions. • Reclamation and revegetation. • Government regulations concerning environmental protection in the design, operation and closure of mines and mills.

Assessment:	• Formally supervised written examination - 3 hours 50% (end of semester). This final exam is a hurdle. A student must pass the exam to pass the subject. • Written class test - 1 hour 20% (mid semester);• A project (2000 word limit) 30% (end of semester).
Prescribed Texts:	B. Wills, 1988. Mineral Processing Technology: An Introduction to the Practical Aspects of Ore Treatment and Mineral Recovery, Pergamon; 4th Ed., 785 pages.
Recommended Texts:	J.A. Meech, 1999. ProcES – an Introductory Expert System on Mineral Processing. Available at **http://www.mining.ubc.ca/faculty/meech/MINE290/ (http://www.mining.ubc.ca/faculty/meech/MINE290/)**
Breadth Options:	This subject is not available as a breadth subject.
Fees Information:	Subject EFTSL, Level, Discipline & Census Date, http://enrolment.unimelb.edu.au/fees
Generic Skills:	On completion of this subject, the students should have developed: • analytical, critical and creative thinking, with an aptitude for continued self-directed learning; • sense of intellectual curiosity; • ability to interpret data and research results; • sense of intellectual integrity and ethics of scholarship; • writing, problem-solving and communication skills; • ability to learn in a range of ways, including through information and communication technologies; • capacity to confront unfamiliar problems; • ability to evaluate and synthesise the research and professional literature; • ability to develop models of practical applications and evaluate their performance by rigorous analytical means and by programming computer simulations; • capacity to manage competing demands on time, including self-directed project work.
Notes:	Students will need access to a calculator or preferably a PC/laptop with spreadsheet software to conduct evaluation analyses.
Related Course(s):	Master of Mining Engineering