400-686 Soil Rock and Tailings Mechanics

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 (ENGR00010) Mineral economics (can be taken concurrently). 400-685 (ENGR00011) Mineral processing and waste management (can be taken concurrently).
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:	The subject is an introduction to the principles of soil and rock mechanics for materials involved in mining, particularly including: soil & weathered rock, rock masses, backfill materials, and waste rock & tailings. Principles included: • Nature and mechanics of granular materials with pore water pressure • Nature and mechanics of fractured rock masses, particularly covering force-displacement relationships, stress and pore water. • Flow of water through granular and fractured rock. • Mechanics of stress and seismicity in rock • Methods of laboratory & field measurements of the properties of soil & rock materials. • Methods of analysis of masses of soil & rock, particularly including limit equilibrium, numerical modelling, and expert systems.
Objectives:	On completion of this subject, the students should have developed the skills and knowledge to understand the theoretical and procedural basis for the application of geomechanics for mining. They will then master the knowledge required to take the subject 'Mining geomechanics and mine design'. Specifically, they should have a solid understanding of the principles of the following: • Nature and mechanics of granular materials with pore water pressure • Nature and mechanics of fractured rock masses, particularly covering force-displacement relationships, stress and pore water. • Flow of water through granular and fractured rock. • Mechanics of stress and seismicity in rock • Methods of laboratory & field measurements of the properties of soil & rock materials. • Methods of analysis of masses of soil & rock, particularly including limit equilibrium, numerical modelling, and expert systems.
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 (3000 word limit) 30% (end of semester).

Prescribed Texts:	• J. Jaeger, N. G. Cook and R. Zimmerman –"Fundamentals of Rock Mechanics", Blackwell, 2007.• Braja M. Das, "Principles of Geotechnical Engineering", Thompson, 2006.• Australian Centre for Geomechanics (ACG), "Tailings from concept to closure".
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