

411-449 Minerals, Materials and Recycling

Credit Points:	12.50
Level:	4 (Undergraduate)
Dates & Locations:	2009, This subject commences in the following study period/s: Semester 2, - Taught on campus.
Time Commitment:	Contact Hours: Forty eight hours Total Time Commitment: Not available
Prerequisites:	411-432 Particle Mechanics and Processing (prior to 2005 411-332), 411-303 Reactor Engineering (prior to 2005 411-433), 411-204 Chemical Engineering Thermodynamics
Corequisites:	-
Recommended Background Knowledge:	-
Non Allowed Subjects:	-
Core Participation Requirements:	-
Coordinator:	Assoc Prof George Vincent Franks
Contact:	-
Subject Overview:	The importance of the minerals industry to the Australian economy. Liberation, size reduction, size separation and concentration separations in minerals processing. Extractive metallurgy, including hydrometallurgy and pyrometallurgy. Aspects of physico-chemical principles of mineral separation processes to produce metals and ceramic products from ores as well as recycled materials and consumer products. The influence of interatomic bonding and material atomic structure on material behaviour. Phase diagrams and equilibria as well as material mechanical, electrical and magnetic properties will be covered. The process of developing material selection criteria and selecting materials for particular applications will be presented. The systems approach to recycling of products, process sustainability and environmental considerations.
Objectives:	On completion of this subject students should be able to understand the complex interaction of processes within the material cycle i.e. starting with primary material production from minerals, material production and properties, consumer products and ending with recycled material, waste and environmental issues. This will be based on material science principles, thermodynamics, system engineering and optimization. The students will understand the relationships between materials composition, processing, microstructure and properties. The students will be able to select materials for particular engineering design applications.
Assessment:	One written 3-hour end-of-semester examination (70%) and a series of regular assignments (30%).
Prescribed Texts:	-
Recommended Texts:	Information Not Available
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:	The subject will enhance the following generic skills: # capacity for independent thought # awareness of advanced technologies in the discipline

	<ul style="list-style-type: none"># ability to apply knowledge of basic science and engineering fundamentals# ability to undertake problem identification, formulation and solution# ability to utilise a systems approach to design and operational performance
Related Course(s):	Bachelor of Engineering (Chemical Engineering) Bachelor of Engineering (Chemical) and Bachelor of Science