

ENGR20003 Engineering Materials

Credit Points:	12.50									
Level:	2 (Undergraduate)									
Dates & Locations:	This subject is not offered in 2011.									
Time Commitment:	Contact Hours: 48 hours (Lectures: 3 hours per week, Tutorials/Labs: 12 hours per semester) Total Time Commitment: 120 hours									
Prerequisites:	None									
Corequisites:	None									
Recommended Background Knowledge:	<p>Learning in this subject will be assisted by completion of EITHER of the following subjects:</p> <table border="1"> <thead> <tr> <th>Subject</th> <th>Study Period Commencement:</th> <th>Credit Points:</th> </tr> </thead> <tbody> <tr> <td>ENGR10003 Engineering Systems Design 2</td> <td>Not offered 2011</td> <td>12.50</td> </tr> <tr> <td>ENVS10003 Constructing Environments</td> <td>Not offered 2011</td> <td>12.50</td> </tr> </tbody> </table>	Subject	Study Period Commencement:	Credit Points:	ENGR10003 Engineering Systems Design 2	Not offered 2011	12.50	ENVS10003 Constructing Environments	Not offered 2011	12.50
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ENGR10003 Engineering Systems Design 2	Not offered 2011	12.50								
ENVS10003 Constructing Environments	Not offered 2011	12.50								
Non Allowed Subjects:	None									
Core Participation Requirements:	For the purposes of considering requests for Reasonable Adjustments under the Disability Standards for Education (Cwth 2005), and Students Experiencing Academic Disadvantage Policy, academic requirements for this subject are articulated in the Subject Description, Subject Objectives, Generic Skills and Assessment Requirements of this entry. The University is dedicated to provide support to those with special requirements. Further details on the disability support scheme can be found at the Disability Liaison Unit website: http://www.services.unimelb.edu.au/disability/									
Contact:	Prof Priyan Mendis pamendis@unimelb.edu.au (mailto:pamendis@unimelb.edu.au)									
Subject Overview:	<p>The subject focuses on constructional materials for structural engineering applications and is divided into three components:</p> <ol style="list-style-type: none"> 1 Materials Science 2 Constructional Materials 3 Mechanics of Materials. <p>In the material science component, basic concepts on inter-atomic bonding, microstructure of solids and generic material properties related to density, deformation, yield, ductility, fracture, toughness, susceptibility to corrosion and fatigue are introduced. In the constructional materials component, the engineering applications of structural and light-gauge steel, concrete, masonry, timber, glass, fibre-glass and composites will be covered. In the mechanics component, the basic concepts of stress-strain compatibility, composite actions, the concept of shear stress flow, basic two-dimensional stress analysis, strength and ductility and arching actions are covered</p>									
Objectives:	<p>On completion of this subject students should be able to:</p> <ul style="list-style-type: none"> # describe atomic and crystalline structures, molecular composition and its influence on the physical properties of materials. # describe and interpret the phenomena of strength, deformation, ductility, failure mechanisms, fast fracture and fatigue as applied generically to all materials and be able to identify the key engineering implications with these phenomena. # describe the key features in the manufacturing/production, quality control, engineering applications, performance and safety issues associated with the commonly used engineering materials including steel, concrete, masonry, timber, polymers and composites, and be able to identify their engineering implications. # apply the concepts of stress-strain compatibility and complimentary shear stresses in achieving composite actions; identify realistic failure mechanisms in structures and make effective use of strength and ductility in engineering applications. 									

	# identify key considerations including those of costs, practicality, sustainability and the environment, health and safety in making engineering decisions on the choice and engineering application of materials
Assessment:	One 2 hour examination, end of semester (60%) One 50 minute test, mid-semester (10%) Two assignments totalling 2400 words, due mid and late semester (30%)
Prescribed Texts:	Materials Science and Engineering: An Introduction (W.D. Callister, Jr) Wiley and Sons Inc. The Science and Engineering of Materials (D.R. Askeland), Chapman & Hall Engineering Materials 1 & 2 (M.F. Ashby & D.R.H. Jones)
Breadth Options:	This subject potentially can be taken as a breadth subject component for the following courses: # Bachelor of Arts (https://handbook.unimelb.edu.au/view/2011/B-ARTS) # Bachelor of Commerce (https://handbook.unimelb.edu.au/view/2011/B-COM) # Bachelor of Environments (https://handbook.unimelb.edu.au/view/2011/B-ENVS) # Bachelor of Music (https://handbook.unimelb.edu.au/view/2011/B-MUS) You should visit learn more about breadth subjects (http://breadth.unimelb.edu.au/breadth/info/index.html) and read the breadth requirements for your degree, and should discuss your choice with your student adviser, before deciding on your subjects.
Fees Information:	Subject EFTSL, Level, Discipline & Census Date, http://enrolment.unimelb.edu.au/fees
Generic Skills:	# Ability to apply knowledge of science and engineering fundamentals # Ability to undertake problem identification, formulation, and solution # Understanding of social, cultural, global, and environmental responsibilities and the need to employ principles of sustainable development
Notes:	This subject is available for science credit to students enrolled in the BSc
Related Course(s):	Bachelor of Science
Related Majors/Minors/Specialisations:	B-ENG Civil Engineering stream Civil (Engineering) Systems Master of Engineering (Civil) Master of Engineering (Environmental) Master of Engineering (Structural) Physical (Environmental Engineering) Systems