

ENGR20003 Engineering Materials

Credit Points:	12.50		
Level:	2 (Undergraduate)		
Dates & Locations:	2010, Parkville This subject commences in the following study period/s: Semester 2, Parkville - Taught on campus.		
Time Commitment:	Contact Hours: 3 hours lectures/week. 12 hours/semester tutorials/labs. Total 48 hours. Total Time Commitment: 120 hours		
Prerequisites:	None		
Corequisites:	None		
Recommended Background Knowledge:	Completion of either 800-102 or 880-103 will assist with learning in this subject		
	Subject	Study Period Commencement:	Credit Points:
	ENGR10003 Engineering Systems Design 2	Summer Term, Semester 2	12.50
	OR		
	Subject	Study Period Commencement:	Credit Points:
	ENVS10003 Constructing Environments	Semester 1, Semester 2	12.50
Non Allowed Subjects:	Subject cannot be taken if 421-122 Materials 2 has been completed		
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/		
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Subject Overview:	The subject focuses on constructional materials for structural engineering applications and is divided into three components: <ol style="list-style-type: none">1 Materials Science2 Constructional Materials3 Mechanics of Materials. 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.
Objectives:	At the conclusion of this subject students should be able to: <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 2hour end of semester exam (60%)One 40minute mid-semester test (10%)Two group assignments totaling 2400 words due weeks 7 and 12 (30%)
Prescribed Texts:	W.D. Callister, Jr Materials Science and Engineering an Introduction Wiley and Sons Inc. D.R. Askeland, The Science and Engineering of Materials, Chapman & Hall. M.F. Ashby & D.R.H. Jones, Engineering Materials 1 & 2.
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:	<ul style="list-style-type: none"> # 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:	<ul style="list-style-type: none"> # 421-122 Materials 2 was offered for the last time in 2008 # This subject is available for science credit to students enrolled in the BSc
Related Course(s):	Bachelor of Engineering Bachelor of Science
Related Majors/Minors/Specialisations:	Civil (Engineering) Systems Master of Engineering (Civil) Master of Engineering (Environmental) Master of Engineering (Structural) Physical (Environmental Engineering) Systems