

MCEN30017 Mechanics & Materials

Credit Points:	12.50									
Level:	3 (Undergraduate)									
Dates & Locations:	2010, Parkville This subject commences in the following study period/s: Semester 1, Parkville - Taught on campus.									
Time Commitment:	Contact Hours: 36 hours of lectures, 15 hours of tutorials and laboratory work Total Time Commitment: 120 hours									
Prerequisites:	Postgraduate - # Enrolment in Master of Engineering (Mechanical) or Master of Engineering (Mechatronics) Undergraduate - # 436-291 Engineering Mechanics (/view/2010/436-291)									
Corequisites:	N/A									
Recommended Background Knowledge:	<table border="1"> <thead> <tr> <th>Subject</th> <th>Study Period Commencement:</th> <th>Credit Points:</th> </tr> </thead> <tbody> <tr> <td>PHYC10003 Physics 1</td> <td>Semester 1</td> <td>12.50</td> </tr> <tr> <td>PHYC10004 Physics 2: Physical Science & Technology</td> <td>Semester 2</td> <td>12.50</td> </tr> </tbody> </table>	Subject	Study Period Commencement:	Credit Points:	PHYC10003 Physics 1	Semester 1	12.50	PHYC10004 Physics 2: Physical Science & Technology	Semester 2	12.50
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Non Allowed Subjects:	<table border="1"> <thead> <tr> <th>Subject</th> <th>Study Period Commencement:</th> <th>Credit Points:</th> </tr> </thead> <tbody> <tr> <td>436-285 Engineering Design and Materials 1</td> <td>Not offered 2010</td> <td></td> </tr> </tbody> </table>	Subject	Study Period Commencement:	Credit Points:	436-285 Engineering Design and Materials 1	Not offered 2010				
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Core Participation Requirements:	For the purposes of considering request 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									
Coordinator:	Assoc Prof Kenong Xia									
Contact:	Melbourne School of Engineering Office Building 173, Grattan Street The University of Melbourne VIC 3010 Australia General telephone enquiries + 61 3 8344 6703 + 61 3 8344 6507 Facsimiles + 61 3 9349 2182 + 61 3 8344 7707 Email eng-info@unimelb.edu.au									
Subject Overview:	This subject consists of two distinct and fundamentally related topics. An Introduction to the fundamentals of materials science will be given, detailing the classification of materials, atomic structure, types of atomic bonding, materials structures, defects, overview of characterisation techniques, modes of failure (ductile, brittle, fatigue, creep), strengthening, and mechanical properties.									

	<p>The Mechanics of Materials section will extend the concepts of material mechanical behaviour by detailing elastic/inelastic behaviour and introducing the concepts of stress and strain analysis. Topics covered may include the definition of principal stresses, plane stress, plane strain, two-dimensional stress and strain analysis, torsion, pure bending, transverse loading, Mohr's circle, failure criteria, inelastic behaviour, residual stress.</p> <p>Particular emphasis will be placed on the fundamental mechanisms by which materials fail under loading.</p>
Objectives:	<p>At the conclusion of this subject students should be able to:</p> <ul style="list-style-type: none"> • Perform basic stress and strain analysis. • Analyse mechanical behaviour of materials. • Obtain simple mathematical and physical relationships between mechanics and materials. • Describe various testing techniques for characterisation of mechanical behaviour of materials.
Assessment:	<p>One three-hour end of semester written examination (60%) Two laboratory sessions (30% total) during the semester with 1500 word reports due throughout of the semester One assignment of not more than 2000 words (10% total) due in week 8 of the semester. Attendance at the labs and submission of written lab reports are compulsory to pass the subject.</p>
Prescribed Texts:	Materials Science and Engineering – an Introduction by W. D. Callister, Jr.
Breadth Options:	<p>This subject potentially can be taken as a breadth subject component for the following courses:</p> <ul style="list-style-type: none"> # Bachelor of Arts (https://handbook.unimelb.edu.au/view/2010/B-ARTS) # Bachelor of Commerce (https://handbook.unimelb.edu.au/view/2010/B-COM) # Bachelor of Music (https://handbook.unimelb.edu.au/view/2010/B-MUS) <p>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.</p>
Fees Information:	Subject EFTSL, Level, Discipline & Census Date, http://enrolment.unimelb.edu.au/fees
Generic Skills:	<p>On completion of this subject, students should have developed the following generic skills -</p> <ul style="list-style-type: none"> • Ability to apply knowledge of science and engineering fundamentals • Ability to undertake problem identification, formulation, and solution • Ability to utilise a systems approach to complex problems and to design and operational performance • Ability to communicate effectively, with the engineering team and with the community at large
Related Course(s):	<p>Bachelor of Engineering Bachelor of Science</p>
Related Majors/Minors/Specialisations:	<p>Master of Engineering (Mechanical) Master of Engineering (Mechatronics) Mechanical Systems</p>