MCEN90029 Advanced Solid Mechanics

Credit Points:	12.50
Level:	9 (Graduate/Postgraduate)
Dates & Locations:	This subject is not offered in 2013.
Time Commitment:	Contact Hours: 36 hours of lectures, 6 hours of tutorials and lab classes. Total Time Commitment: 120 hours
Prerequisites:	

Subject	Study Period Commencement:	Credit Points:
MCEN90026 Solid Mechanics	Not offered 2013	12.50

Corequisites:	None
Recommended Background Knowledge:	None
Non Allowed Subjects:	None
Core Participation Requirements:	For the purposes of considering request for Reasonable Adjustments under the Disability Standards for Education (Cwth 2005), and Student Support and Engagement Policy, academic requirements for this subject are articulated in the Subject Overview, Learning Outcomes, Assessment and Generic Skills sections of this entry. It is University policy to take all reasonable steps to minimise the impact of disability upon academic study, and reasonable adjustments will be made to enhance a student's participation in the University's programs. Students who feel their disability may impact on meeting the requirements of this subject are encouraged to discuss this matter with a Faculty Student Adviser and Student Equity and Disability Support: http://services.unimelb.edu.au/disability
Contact:	dackland@unimelb.edu.au
Subject Overview:	This course will expand on the basic principals established previously in Solid Mechanics. Methods of three-dimensional stress and strain analysis will be extended to allow the student to obtain solutions using analytical and/or numerical methods. These will include the analyses of principal stresses and strains, three dimensional Mohr's circles, strain gauge experimentation and failure criteria. In addition, this unit will focus on plastic deformation of solids, including the analysis of residual stresses and the collapse load of structures. The responses of materials to fatigue and fracture, as well as their creep and viscoelastic behaviour, will also be explored. Finally, this unit will provide a number of examples of experimental applications of solid mechanics analysis based on modern research techniques.
Objectives:	At the completion of this subject students should be able to – # Understand advanced stress/strain correlations # Obtain simple mathematical and physical relationships between mechanics and materials # Model the plastic behaviour, as well as the fatigue, fracture and creep response, of common engineering materials # Model an engineering structure without detailed instruction # Establish links between theoretical and practical applications; identify problems and formulate solution strategies
Assessment:	Three hour written exam at the end of semester (60%) and two assignments of equal weight totalling no more than 3000 words in weeks 4 and 8 (40% total).
Prescribed Texts:	None
Recommended Texts:	*Advanced Mechanics of Materials and Applied Elasticity*; Ugural & Fenster, 5th edition *Mechanics of Engineering Materials; Benham,* Crawford and Armstrong, 2nd edition

	Fundamentals of Machine Component Design; Juvinall and Marshek, 5th edition *Advanced Strength and Applied Stress Analysis; Budynas*, 2nd edition *Advanced Mechanics of Materials; Boresi and Schmidt,* 6th edition *Fracture Mechanics*; Anderson, 3rd edition
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 students should have the following skills – # Critical thinking and critical judgement of assumptions adopted # Interpretation and analysis of data # Ability to undertake problem identification, formulation, and solution # Ability to apply knowledge of science and engineering fundamentals
Related Course(s):	Bachelor of Engineering (Mechanical and Manufacturing Engineering) Bachelor of Engineering(Mechanical & Manufacturing) and Bachelor of Laws Master of Philosophy - Engineering Ph.D.- Engineering
Related Majors/Minors/ Specialisations:	B-ENG Mechanical Engineering stream Master of Engineering (Mechanical)