MCEN40024 Solid Mechanics

Credit Points:	12.50
Level:	4 (Undergraduate)
Dates & Locations:	2010, Parkville This subject commences in the following study period/s: Semester 2, Parkville - Taught on campus.
Time Commitment:	Contact Hours: 36 hours of lectures, 12 hours of tutorials and 6 hours of laboratory classes Total Time Commitment: 120 hours
Prerequisites:	**436-303 Mechanics and Materials (/view/2010/436-303)**
Corequisites:	N/A
Recommended Background Knowledge:	N/A
Non Allowed Subjects:	N/A
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 Unitwebsite: http://www.services.unimelb.edu.au/disability/
Coordinator:	Dr Jason Monty
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 course will build on the fundamental theories defined previously in Mechanics & Materials. Two principal theories in the determination of stress within a structure are Energy Methods and three-dimensional analysis. Topics covered in this course will include, stress equilibrium, Airy's stress function, strain energy, strain energy density, elastic strain energy for normal stress, elastic strain energy for shearing stress, impact loading, virtual work method, Castigliano's Theorem, statically indeterminate structures, three-dimensional principal stresses, failure criterion, homogeneous deformation, principal axes of strain, and rotation. Also, the student will have been provided an introduction to the finite element method for solving problems of stress analysis, including isoparametric elements, linear analysis, modeling of solids, plate and shells elements, and will have developed fundamental laboratory skills in FE analysis and modeling.
Objectives:	At the conclusion of this subject students should be able to: • Determine analytically, the maximum stress in a loaded beam • Design structures with columnar and beam elements • Predict failure of structures due to yielding of components • Utilise FEA software to solve stress analysis problems.
Assessment:	Assessment -3 hour end of semester examination (60%of total mark). 1 Stress analysis laboratory class and report (10% of total subject mark) of approximately 2000 words; 2 Modelling Projects of equal weight (30% total) and approximately 1000 words each to be completed between weeks 7 - 11.

Prescribed Texts:	Gere & Timoshenko, “Mechanics of Materials.”David Hutton, “Fundamentals of Finite Element Analysis”
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 - • 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 • Proficiency in engineering design • Capacity for lifelong learning and professional development
Related Course(s):	Bachelor of Engineering
Related Majors/Minors/ Specialisations:	Master of Engineering (Mechatronics)