

## MCEN30007 Mechanics 3

<b>Credit Points:</b>	12.50
<b>Level:</b>	3 (Undergraduate)
<b>Dates &amp; Locations:</b>	2010, Parkville This subject commences in the following study period/s: Semester 2, Parkville - Taught on campus.
<b>Time Commitment:</b>	Contact Hours: Unit 1: Eighteen hours of lectures and six hours of tutorials and laboratory. Unit 2: Thirteen hours of lectures and 11 hours of tutorials and laboratory Total Time Commitment: 120 hours
<b>Prerequisites:</b>	<b>436-353 Mechanics 2 (/view/2010/436-353)</b> and (200-level mathematics - <b>431-101 Engineering Analysis A</b> and <b>431-102 Engineering Analysis B</b> ; or <b>620-231 Vector Analysis</b> and <b>620-232 Math Methods</b> and <b>620331 Applied PDE's</b> ).
<b>Corequisites:</b>	N/A
<b>Recommended Background Knowledge:</b>	N/A
<b>Non Allowed Subjects:</b>	N/A
<b>Core Participation Requirements:</b>	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: <a href="http://www.services.unimelb.edu.au/disability">http://www.services.unimelb.edu.au/disability</a>
<b>Coordinator:</b>	Assoc Prof Peter Vee Sin Lee
<b>Contact:</b>	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 <b><a href="mailto:eng-info@unimelb.edu.au">eng-info@unimelb.edu.au</a></b> ( <b><a href="mailto:eng-info@unimelb.edu.au">eng-info@unimelb.edu.au</a></b> )
<b>Subject Overview:</b>	<p>Unit 1, Stress Analysis: Upon completion of this unit, students should be able to model a variety of mechanical engineering structures as a number of elementary components and stress analyse each component to determine failure loads and deflections of the complete structure.</p> <p>Topics covered include engineering plasticity, design of pressure vessels and pipes, thick-walled cylinders, shrink fitting, duplex pressure vessels, inelastic deformation, residual stresses, membrane theory of shells of revolution, yielding, rotating shells, local bending stresses, stress analysis of rotating discs with and without holes, shrink fitting, initial and ultimate yielding, fracture mechanics and fatigue, and introduction to the finite element method.</p> <p>Unit 2, Dynamics of Mechanical Systems: Upon completion, students should be able to formulate physical and mathematical models for three-dimensional dynamic analysis of mechanical systems, solve the mathematical models by means of analytical and numerical methods and assess stability of their solutions.</p> <p>Topics covered include constraints, mobility, generalised coordinates, number of degrees of freedom, driving forces, virtual displacement, generalised force, impressed forces and constraint forces, principle of virtual work, Lagrange equations of motion, kinetic energy</p>

	function, potential energy function, collisions of unconstrained and constrained bodies, and analysis of mathematical models.
<b>Objectives:</b>	TBA
<b>Assessment:</b>	One 3-hour examination at the end of semester (80%). Unit 1: assignment of up to 1000 words (10%). Unit 2: assignment of up to 1000 words (5%) and 2 laboratory reports (5%) due throughout the semester.
<b>Prescribed Texts:</b>	TBA
<b>Recommended Texts:</b>	Information Not Available
<b>Breadth Options:</b>	This subject is not available as a breadth subject.
<b>Fees Information:</b>	Subject EFTSL, Level, Discipline & Census Date, <a href="http://enrolment.unimelb.edu.au/fees">http://enrolment.unimelb.edu.au/fees</a>
<b>Generic Skills:</b>	<p>On completion of the subject students should have the following skills:</p> <ul style="list-style-type: none"> <li># ability to apply knowledge of basic science and engineering fundamentals</li> <li># in-depth technical competence in at least one engineering discipline</li> <li># ability to undertake problem identification, formulation and solution</li> <li># ability to function effectively as an individual and in multi-disciplinary and multi-cultural teams, with the capacity to be a leader or manager as well as an effective team member</li> <li># understanding of professional and ethical responsibilities and commitment to them</li> <li># expectation of the need to undertake lifelong learning, capacity to do so</li> <li># capacity for independent critical thought, rational inquiry and self-directed learning</li> <li># intellectual curiosity and creativity, including understanding of the philosophical and methodological bases of research activity</li> <li># profound respect for truth and intellectual integrity, and for the ethics of scholarship</li> </ul>
<b>Related Course(s):</b>	<p>Bachelor of Engineering (Engineering Management) Mechanical &amp; Manufacturing          Bachelor of Engineering (Mechanical &amp; Manufacturing) &amp; Bachelor of Science          Bachelor of Engineering (Mechanical and Manufacturing Engineering)          Bachelor of Engineering (Mechanical &amp; Manufacturing) and Bachelor of Laws</p>