

# MCEN90009 Dynamics of Machines

<b>Credit Points:</b>	12.50								
<b>Level:</b>	9 (Graduate/Postgraduate)								
<b>Dates &amp; Locations:</b>	2011, Parkville This subject commences in the following study period/s: Semester 2, Parkville - Taught on campus.								
<b>Time Commitment:</b>	Contact Hours: 36 hours lectures, 12 hours tutorials, 4 hours laboratory Total Time Commitment: 120 hours								
<b>Prerequisites:</b>	Prerequisite for this subject is -								
	<table border="1"> <thead> <tr> <th>Subject</th> <th>Study Period Commencement:</th> <th>Credit Points:</th> </tr> </thead> <tbody> <tr> <td>MCEN30016 Mechanical Dynamics</td> <td>Semester 1</td> <td>12.50</td> </tr> </tbody> </table>			Subject	Study Period Commencement:	Credit Points:	MCEN30016 Mechanical Dynamics	Semester 1	12.50
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MCEN30016 Mechanical Dynamics	Semester 1	12.50							
<b>Corequisites:</b>	NA								
<b>Recommended Background Knowledge:</b>	NA								
<b>Non Allowed Subjects:</b>	436353 – Mechanics 2 436354 – Mechanics 3								
<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>	Dr Denny Oetomo								
<b>Contact:</b>	doetomo@unimelb.edu.au								
<b>Subject Overview:</b>	<p>Multi-body dynamics (18 lectures and 12 hours of tutorial/project work): Constraints, mobility, generalised coordinates, degrees of freedom, driving forces, virtual displacement, generalised force, impressed forces and constraint forces, principle of virtual work, Lagrange equations of motion, kinetic energy function, potential energy function, collisions of unconstrained and constrained bodies, solution of mathematical models and their stability in the sense of Lyapunov.</p> <p>Vibrations (18 lectures and 12 hours of tutorial/project work): Vibration of discrete and continuous systems, modal analysis, vibration isolation, torsional and bending vibrations, vibration absorbers, and system identification. Vibrations of rotors, critical speeds, balancing.</p>								
<b>Objectives:</b>	<p>Upon completion, students should be able to -</p> <ul style="list-style-type: none"> <li>• Formulate physical and mathematical models for three-dimensional dynamic analysis of mechanical systems</li> <li>• Solve the mathematical models by means of analytical and numerical methods and assess stability of their solutions.</li> <li>• Formulate physical and mathematical models of mechanical systems for vibration analysis</li> <li>• Obtain solutions using analytical and/or numerical methods and have an increased understanding of vibration analysis of complex structures</li> </ul>								
<b>Assessment:</b>	Three written assignments (10%) each in weeks 6, 8 and 9 of semesterOne laboratory assignment (10% total)One 3-hour end-of-semester examination (60%)								
<b>Prescribed Texts:</b>	TBA								

<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 science and engineering fundamentals</li> <li>• Ability to undertake problem identification, formulation, and solution</li> <li>• Ability to utilise a systems approach to complex problems and to design and operational performance</li> <li>• Ability to communicate effectively, with the engineering team and with the community at large</li> <li>• Capacity for lifelong learning and professional development</li> </ul>
<b>Related Course(s):</b>	Bachelor of Engineering (Mechatronics) and Bachelor of Computer Science
<b>Related Majors/Minors/ Specialisations:</b>	<p>B-ENG Mechanical Engineering stream  Master of Engineering (Mechanical)  Master of Engineering (Mechatronics)</p>