MCEN90009 Dynamics of Machines

Credit Points:	12.50
Level:	9 (Graduate/Postgraduate)
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 lectures, 12 hours tutorials, 4 hours laboratory Total Time Commitment: 120 hours
Prerequisites:	**436302 Mechanical Dynamics (/view/2010/436-302)** **Subject** / **Study Period Commencement:** / **Credit Points:** MCEN30016 Mechanical Dynamics / Semester 1 / 12.50
Corequisites:	NA
Recommended Background Knowledge:	NA
Non Allowed Subjects:	436353 – Mechanics 2 436354 – Mechanics 3
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:	Dr Denny Oetomo
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 (eng-info@unimelb.edu.au)**
Subject Overview:	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. 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.
Objectives:	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.

	• Formulate physical and mathematical models of mechanical systems for vibration analysis • Obtain solutions using analytical and/or numerical methods and have an increased understanding of vibration analysis of complex structures
Assessment:	Two written class tests (10%) in weeks 5 and 10 of the semesterTwo computational or laboratory assignments of equal weight totalling no more than 3000 words (30% total)One 3-hour end-of-semester examination (60%)
Prescribed Texts:	TBA
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 the 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 • Ability to communicate effectively, with the engineering team and with the community at large • Capacity for lifelong learning and professional development
Related Course(s):	Bachelor of Engineering