MCEN90037 Advanced Dynamics

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, up to 12 hours of tutorials and up to 4 hours of laboratory sessions. Total Time Commitment: 200 hours
Prerequisites:	MCEN90009 Dynamics of Machines
Corequisites:	None
Recommended Background Knowledge:	NA
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:	Email: **simon.illingworth@unimelb.edu.au (mailto:simon.illingworth@unimelb.edu.au)**
Subject Overview:	This course provides a general introduction to vibration modelling, analysis and control. The topics covered are: # Single degree of freedom systems (mass-spring-damper systems): free vibration, response to harmonic forcing, response to general forcing # Multiple degree of freedom systems: free vibration of 2 DoF systems, natural frequencies and modeshapes, response to forcing, matrix methods for multi DoF systems # Continuous systems: free vibration of strings, bars, beams and shafts, equations of motion, boundary conditions, natural frequencies and modeshapes, forced vibration # Modelling methods: Rayleigh’s method and Lagrange’s method # Vibration control: damping, vibration isolation, vibration absorbers # Experimental methods: modal analysis # Nonlinear vibrations
Objectives:	Upon completion, students should be able to: # Formulate mathematical models for vibration analysis for single degree of freedom systems; multiple degree of freedom systems; and continuous systems # Analyse these systems using a variety of analysis tools both in the time domain and in the frequency domain # Apply methods for the control of vibrations # Apply some more advanced topics in vibrations, including experimental methods and nonlinear vibrations
Assessment:	One end of semester examination not exceeding three hours (students need to score at least 30 out of 60 in the final exam to pass the subject (60%) One mid-semester written test, not exceeding two hours (10%) Two assignments each worth 15%, due in weeks 6 and week 10 (30%)

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
Related Majors/Minors/ Specialisations:	Master of Engineering (Mechanical) Master of Engineering (Mechatronics)