MCEN90012 Design and Manufacturing 1

Credit Points:	12.50
Level:	9 (Graduate/Postgraduate)
Dates & Locations:	This subject is not offered in 2013.
Time Commitment:	Contact Hours: up to 48 hours of lectures, 4 hours of tutorials, 12 hours practical workshops Total Time Commitment: 120 hours
Prerequisites:	<table><tr><th>Subject</th><th>Study Period Commencement:</th><th>Credit Points:</th></tr><tr><td>MCEN30016 Mechanical Dynamics</td><td>Not offered 2013</td><td>12.50</td></tr><tr><td>MCEN30014 Mechanical Design</td><td>Not offered 2013</td><td>12.50</td></tr></table> MCEN30016 Mechanical Dynamics can be taken concurrently
Corequisites:	N/A
Recommended Background Knowledge:	N/A
Non Allowed Subjects:	Students cannot obtain credit for this subject and the subjects listed below - MCEN30009 Engineering Design & Processes 1 or MCEN30001 Engineering Design & Processes 2
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/
Contact:	**ajrs@unimelb.edu.au (mailto:ajrs@unimelb.edu.au)**
Subject Overview:	This subject includes two units which together aim to equip students with the skills to undertake abstract and concrete design tasks at an intermediate level, taking into account the wider engineering environment and the ability to select suitable manufacturing processes to realise their designs. As a result, students will also be able to modify products and processes to improve their performance. This subject will consider the design of machine elements and the manufacturing processes to produce these elements. It will present concurrent design of systems and products; computer-based techniques for geometric modelling, materials selection, service simulations and representation of manufacturing knowledge. The impact of variability in manufacturing will be accounted for in approaches to uncertainty in design, including tolerance technology. It will provide project-based experience in the use of conceptual design techniques and in the management of larger open-ended, team-based design tasks.
Objectives:	On completion of this subject students should be able to - # Synthesize solutions to open-ended design problems # Explain the concepts and methods of designing for quality, of managing variability and of integrating design with downstream manufacturing operations # Explain the effect of the relevant variables on the performance of various processes and their process capabilities # Perform basic analyses of for 'classical' and practical turning operations; forming, casting and welding

	# Design simple engineering components for structural integrity # Formulate a path for engineering solution of well-delineated problems to dealing with complex and/or vaguely defined design tasks
Assessment:	Two 2-hour end-of-semester examinations (55%) Four team-based projects, not exceeding 3,000 words (excluding computations, tables, graphs, diagrams) per student (25%) due in weeks 4, 7, 10 and 12 of the semester. Three laboratory assignments throughout semester, not exceeding 2,000 words (excluding computations, tables, graphs, diagrams) per student (20%). Students must obtain a mark of at least 40% for all continuing assessment tasks in order to pass the subject.
Prescribed Texts:	Budynas, R.G. and Nisbett, J.K, Shigley's Mechanical Engineering Design, McGraw-Hill, 2009/2011.Groover, M.K, Fundamentals of Modern Manufacturing - materials, processes and systems, 4th edition, Wiley, 2010.
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:	# 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 creativity and innovation
Related Majors/Minors/ Specialisations:	B-ENG Mechanical Engineering stream Master of Engineering (Mechanical)