MCEN90012 Design for Manufacture

Credit Points:	12.5
Level:	9 (Graduate/Postgraduate)
Dates & Locations:	2016, Parkville This subject commences in the following study period/s: Semester 1, Parkville - Taught on campus.
Time Commitment:	Contact Hours: 36 hours of lectures, up to 30 hours of tutorials and practical workshops Total Time Commitment: 200 hours
Prerequisites:	<table><tr><th>Subject</th><th>Study Period Commencement:</th><th>Credit Points:</th></tr><tr><td>MCEN30014 Mechanical Design</td><td>Semester 2</td><td>12.50</td></tr><tr><td>MCEN30016 Mechanical Dynamics</td><td>Not offered 2016</td><td>12.5</td></tr></table> MCEN30016 Mechanical Dynamics may be offered to some students who need to complete mid 2016. From 2016 onwards, MCEN30020 Systems Modelling and Analysis will be a prereq for this subject, along with MCEN30014 Mechanical Design.
Corequisites:	N/A
Recommended Background Knowledge:	N/A
Non Allowed Subjects:	Students cannot obtain credit for this subject and MCEN90012 Design & Manufacturing 1
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 Colin Burvill
Contact:	Colin Burvill **colb@unimelb.edu.au (mailto:colb@unimelb.edu.au)**
Subject Overview:	**AIMS** This subject aims 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 introduce the manufacturing processes to produce these elements. It will present concurrent design of systems and products; computer-based techniques for geometric modelling and materials selection. 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. **INDICATIVE CONTENT** # Fundamentals of materials selection, shape efficient structures and Cambridge Materials Selector

	# Design of springs, columns, pressure vessels, contact loading, bolted joints and pinned and welded joints # Nature of quality in design, Quality Function Deployment (QFD), Failure Modes and Effects Analysis (FMEA), tolerance technology, and design for manufacturing, assembly and disassembly.
Learning Outcomes:	**INTENDED LEARNING OUTCOMES (ILOs)** On completion of this subject the student is expected to be able to: 1 Design simple engineering components for structural integrity 2 Synthesize solutions to open-ended design problems 3 Formulate a path for engineering solution of well-delineated problems to dealing with complex and/or vaguely defined design tasks 4 Explain the concepts and methods of designing for quality, of managing variability and of integrating design with downstream manufacturing operations 5 Have a fundamental awareness of practical manufacturing operations; turning, forming, casting and welding.
Assessment:	One 2-hour written open book examination at the end of semester (40%). Four team-based projects, not exceeding 3,000 words (excluding computations, tables, graphs, diagrams) per student (60%) due in weeks 4, 7, 10 and 12 of the semester, each requiring 25 to 30 hours of work for each student. Intended Learning Outcomes (ILOs) 1, 2, 5 and 6 will be assessed 25% by coursework and 25% by examination. ILO3 will be assessed 5% by coursework and 20% by examination. ILO4 will be assessed 10% by coursework and 15% by examination Hurdle requirement: Students must pass all assignments and the end of semester exam in order to pass the subject.
Prescribed Texts:	Budynas, R.G. and Nisbett, J.K, (2011) Shigley's Mechanical Engineering Design, McGraw-Hill, 9th SI Edition.
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:	After completing this unit, students should have: # The ability to apply knowledge of science and engineering fundamentals # The ability to undertake problem identification, formulation, and solution # The ability to utilise a systems approach to complex problems and to design and operational performance # Proficiency in engineering design # The capacity for creativity and innovation.
Notes:	**INDICATIVE KEY LEARNING RESOURCES** Budynas, R.G. and Nisbett, J.K, (2011) *Shigley's Mechanical Engineering Design*, McGraw-Hill, 9th SI Edition Additional notes on LMS MatWeb – a searchable database of material properties Lecture slides Tutorial sheets **CAREERS / INDUSTRY LINKS** Successful design in the manufacturing sector When available, industry-based engineering practitioners will provide seminars on issues associated with the current state of the engineering and manufacturing, with particular reference to: # Design and product quality # Successful design innovation

Related Majors/Minors/ Specialisations:	B-ENG Mechanical Engineering stream Master of Engineering (Mechanical with Business) Master of Engineering (Mechanical) Master of Engineering (Mechatronics)