

# ENGR10004 Engineering Systems Design 1

<b>Credit Points:</b>	12.50
<b>Level:</b>	1 (Undergraduate)
<b>Dates &amp; Locations:</b>	2014, Parkville This subject commences in the following study period/s: Semester 1, Parkville - Taught on campus.
<b>Time Commitment:</b>	Contact Hours: 3 x one hour lectures + 1 x three hour workshop per week Total Time Commitment: Estimated 170 hours
<b>Prerequisites:</b>	A mark of at least 25 in VCE Math Methods or equivalent OR Admission into the B-SCI Bachelor of Science
<b>Corequisites:</b>	None
<b>Recommended Background Knowledge:</b>	None
<b>Non Allowed Subjects:</b>	None
<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 Gavin Buskes
<b>Contact:</b>	Email: <a href="mailto:buskesgj@unimelb.edu.au">buskesgj@unimelb.edu.au</a> ( <a href="mailto:buskesgj@unimelb.edu.au">mailto:buskesgj@unimelb.edu.au</a> )
<b>Subject Overview:</b>	<p><b>AIMS</b></p> <p>Engineering Systems Design 1 introduces students to the world of engineering through a mix of design projects, interactive workshops and lectures. This subject centres on the engineering method, the approach to problem solving and engineering design that makes engineers unique. The subject will prepare students for an exciting and rigorous engineering education that will allow them to serve an increasingly complex society. This subject features designing a solution to a real-world challenge using skills from disciplines such as fluid mechanics, chemical engineering, water treatment, aerospace engineering, mathematical modelling and computer simulation.</p> <p><b>INDICATIVE CONTENT</b></p> <p>The engineering profession, engineering disciplines, problem solving, engineering method, mathematical modelling using appropriate software tools, data gathering, data analysis, fluid mechanics, conservation of material and energy in engineering processes, mass transport in two phase flow, report writing, communication skills.</p>
<b>Learning Outcomes:</b>	<p><b>INTENDED LEARNING OUTCOMES (ILO)</b></p> <p>On completion of this subject the student is expected to:</p> <ol style="list-style-type: none"> <li>1 Explain the importance of engineers and the place of engineering in society.</li> <li>2 Apply basic knowledge of fluid mechanics, chemical engineering and aerospace systems to solve design problems across multiple engineering disciplines</li> <li>3 Identify the nature of a technical problem and make appropriate simplifying assumptions, in order to achieve a solution</li> </ol>

	<p>4 Develop and construct mathematical, physical and conceptual models of situations, systems and devices, and utilise such models for purposes of analysis and design</p> <p>5 Analyse possible alternative engineering approaches and evaluate their advantages and disadvantages in terms of functionality, cost, sustainability and all other factors</p> <p>6 Demonstrate competency in current tools for analysis, simulation, visualisation, synthesis and design, particularly computer-based tools and packages</p>
<b>Assessment:</b>	<p>Weekly subject reflective journal (10% in total, Hurdle requirement*) Short quizzes, held during semester (5% in total, Hurdle requirement*) Team online blog, requiring 10 hours of work (10% in total**) In-class team-based project assessments due throughout semester (15% in total**) Two hour written examination held in exam period (25%, Hurdle requirement*) A written end of semester group report, 40 pages in length (including diagrams and calculations), due in the exam period (35%**) * The indicated individual assessment items (totalling 40%) are a combined hurdle requirement. ** Students work in teams of 5-6 on these indicated assessments and thus the workload is expected to be divided equally within the team.</p>
<b>Prescribed Texts:</b>	None
<b>Recommended Texts:</b>	Brockman, Jay B., <i>Introduction to Engineering: Modeling and Problem Solving</i> , 2009, Wiley.
<b>Breadth Options:</b>	<p>This subject potentially can be taken as a breadth subject component for the following courses:</p> <ul style="list-style-type: none"> <li># <b>Bachelor of Arts</b> (<a href="https://handbook.unimelb.edu.au/view/2014/B-ARTS">https://handbook.unimelb.edu.au/view/2014/B-ARTS</a>)</li> <li># <b>Bachelor of Commerce</b> (<a href="https://handbook.unimelb.edu.au/view/2014/B-COM">https://handbook.unimelb.edu.au/view/2014/B-COM</a>)</li> <li># <b>Bachelor of Music</b> (<a href="https://handbook.unimelb.edu.au/view/2014/B-MUS">https://handbook.unimelb.edu.au/view/2014/B-MUS</a>)</li> </ul> <p>You should visit <b>learn more about breadth subjects</b> (<a href="http://breadth.unimelb.edu.au/breadth/info/index.html">http://breadth.unimelb.edu.au/breadth/info/index.html</a>) and read the breadth requirements for your degree, and should discuss your choice with your student adviser, before deciding on your subjects.</p>
<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>	<ul style="list-style-type: none"> <li># Ability to interact with people in other engineering disciplines and professions to broaden their knowledge and achieve successful outcomes in an engineering design project</li> <li># Ability to realistically assess the scope and dimensions of a project or task, and employ appropriate planning and time management skills to achieve a substantial outcome</li> <li># Communication skills in order to make effective oral and written presentations to technical and non-technical audiences and with other team members</li> <li># Ability to apply creative approaches to identify and develop alternative concepts and problem solving procedures</li> <li># Perception of their own learning and development; understanding the need to critically review and reflect on capability and undertake appropriate learning programs</li> </ul>
<b>Notes:</b>	<p><b>LEARNING AND TEACHING METHODS</b></p> <p>The key element of the subject is the series of workshops that take place throughout the semester. Students work in teams to complete a series of projects, gathering and analysing data, and designing, building and testing a solution to an engineering challenge. The lectures support the workshop activities.</p> <p><b>INDICATIVE KEY LEARNING RESOURCES</b></p> <p>Students will have access to lecture notes and lecture slides. The subject LMS site also additional resources included readings.</p> <p><b>CAREERS / INDUSTRY LINKS</b></p> <p>This is the first engineering subject that most students will normally undertake. It starts building some of the key skills that employers look for when recruiting graduates.</p>
<b>Related Majors/Minors/ Specialisations:</b>	<p>B-ENG Chemical Engineering stream</p> <p>B-ENG Chemical and Biomolecular Engineering stream</p> <p>B-ENG Civil Engineering stream</p> <p>B-ENG Electrical Engineering stream</p>

	B-ENG Mechanical Engineering stream B-ENG Software Engineering stream Science-credited subjects - new generation B-SCI and B-ENG. Selective subjects for B-BMED
<b>Related Breadth Track(s):</b>	Chemical Engineering