



COURSE OUTLINE

ENG104 Introduction to Engineering Design

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2021 | Semester 2

USC Sunshine Coast
USC Moreton Bay

ON CAMPUS

Most of your course is on campus but you may be able to do some components of this course online.

Please go to the USC website for up to date information on the teaching sessions and campuses where this course is usually offered.

1. What is this course about?

1.1. Description

Engineering design is the practice of turning “dreams” into reality. It involves conceptualising and interpreting ideas and providing a feasible solution. This course introduces you to the whole systems design cycle approach in which you apply basic design concepts, analyse human-centric needs and solve problems to meet these needs. You will also learn how to communicate engineering designs using CAD. Using a design brief from a real-life challenge, you will work together in a group to come up with well-reasoned feasible solution to the identified problems.

1.2. How will this course be delivered?

ACTIVITY	HOURS	BEGINNING WEEK	FREQUENCY
ON CAMPUS			
Tutorial/Workshop 1	2hrs	Week 5	9 times
Laboratory 1 – Computer Lab	2hrs	Week 1	4 times
Lecture – 2 hours Lecture Wks 1 - 6	2hrs	Week 1	5 times
Lecture	1hr	Week 6	7 times

1.3. Course Topics

- Communicating Engineering Design with CAD
- Groupwork in Engineering Design
- Formulating Design problem
- Function and means representation
- Design objectives
- Optimizing alternatives using a decision matrix
- Product design and redesign
- Humanitarian design
- Reporting conceptual design

2. What level is this course?

100 Level (Introductory)

Engaging with discipline knowledge and skills at foundational level, broad application of knowledge and skills in familiar contexts and with support. Limited or no prerequisites. Normally, associated with the first full-time study year of an undergraduate program.

3. What is the unit value of this course?

12 units

4. How does this course contribute to my learning?

COURSE LEARNING OUTCOMES	GRADUATE QUALITIES MAPPING	PROFESSIONAL STANDARD MAPPING
On successful completion of this course, you should be able to...	Completing these tasks successfully will contribute to you becoming...	Engineers Australia
1 Solve human-centric engineering problems to improve life by taking and applying a whole systems design cycle approach	Sustainability-focussed	2.3 - Application of systematic engineering synthesis and design processes. 3.1 - Ethical conduct and professional accountability. 3.5 - Orderly management of self, and professional conduct.
2 Respond to a regional or international engineering brief and create and justify a conceptual design, considering human context, potential outcomes, constraints and risks.	Engaged	3.3 - Creative, innovative and pro-active demeanour. 3.4 - Professional use and management of information.
3 Demonstrate basic skills in engineering drawing methods and techniques	Empowered	1.2 - Conceptual understanding of the mathematics, numerical analysis, statistics, and computer and information sciences which underpin the engineering discipline. 3.2 - Effective oral and written communication in professional and lay domains.
4 Interpret, analyse and evaluate engineering design alternatives.	Empowered	1.4 - Discernment of knowledge development and research directions within the engineering discipline. 1.5 - Knowledge of engineering design practice and contextual factors impacting the engineering discipline. 3.2 - Effective oral and written communication in professional and lay domains.
5 Communicate design solutions using engineering drawings, written reports and a presentation to specialist audiences.	Engaged	3.1 - Ethical conduct and professional accountability. 3.2 - Effective oral and written communication in professional and lay domains. 3.6 - Effective team membership and team leadership.
6 Act professionally by: functioning autonomously and in teams, and adhering to the engineering code of ethics and sustainability practices	Ethical	1.3 - In-depth understanding of specialist bodies of knowledge within the engineering discipline. 3.5 - Orderly management of self, and professional conduct. 3.6 - Effective team membership and team leadership.

5. Am I eligible to enrol in this course?

Refer to the [USC Glossary of terms](#) for definitions of “pre-requisites, co-requisites and anti-requisites”.

5.1. Pre-requisites

Enrolled in Program SC013, SC410, SC411, SC425, SC404, SC405, (SC367 and a Prosthetics and Orthotics Extended Major)

5.2. Co-requisites

Not applicable

5.3. Anti-requisites

ENG202

5.4. Specific assumed prior knowledge and skills (where applicable)

Not applicable

6. How am I going to be assessed?

6.1. Grading Scale

Standard Grading (GRD)

High Distinction (HD), Distinction (DN), Credit (CR), Pass (PS), Fail (FL).

6.2. Details of early feedback on progress

In Week 3 a draft copy of your task 1 (engineering drawing) will be reviewed by your tutor and a feedback will be provided.

6.3. Assessment tasks

DELIVERY MODE	TASK NO.	ASSESSMENT PRODUCT	INDIVIDUAL OR GROUP	WEIGHTING %	WHAT IS THE DURATION / LENGTH?	WHEN SHOULD I SUBMIT?	WHERE SHOULD I SUBMIT IT?
All	1	Portfolio	Individual	25%	(i) Multi views(ii) Isometric drawing	Week 6	Online Assignment Submission
All	2	Written Piece	Individual	25%	1500 words	Week 8	Online Assignment Submission with plagiarism check
All	3	Report	Group	50%	Final report- 2000 words per student.10 minutes, 5 slides, 200 words equivalent including diagrams	Refer to Format	Online Assignment Submission with plagiarism check

All - Assessment Task 1: Engineering Drawing

GOAL:	You will develop skills for drafting to communicate design using specialised software
PRODUCT:	Portfolio
FORMAT:	You individually produce CAD and freehand drawings based on pictorial views of engineering components related to design problems. CAD drawings include orthographic projections, auxiliary views and isometric drawings. Week 3 - Formative feedback given on multi-view projections to assist in Task 1 submission.

CRITERIA:	No.	Learning Outcome assessed
	1 Application of software	3
	2 Evidence of Engineering design principles	5
	3 Relevance to given problem	4
	4 Accuracy of multi –views application	4
	5 2.1 Application of established engineering methods to complex engineering problem solving.	5

All - Assessment Task 2: Product design analysis and redesign

GOAL:	You will apply your understanding of the process of product redesign for continuous improvement and communicate it to a specific audience.	
PRODUCT:	Written Piece	
FORMAT:	This individual task requires you to write a report by following the steps below: Choose an engineering product from a given list and state the need for the product Explain how the product evolved by referring to research, e.g.from literature, product websites Evaluate the functions/subfunctions and the means used in the product Propose what will be the next iteration of this product following the essential design steps. You may wish to sketch this object, but detailed engineering drawings are not necessary.	
CRITERIA:	No.	Learning Outcome assessed
	1 Interpretation of engineering design to explain how the product evolved	1 4
	2 Application of a whole system design cycle approach to engineering problems to: evaluate the role engineering design played in the evolution of the product:	1 4 5
	3 propose and justify the next iteration (conceptual design) of the product taking into account human needs and outcomes	4 5
	4 Communication of your evaluation in a written report to specialist audiences: adhere to report template and word limit	1 5
	5 English expression	5
	6 1.4 Discernment of knowledge development and research directions within the engineering discipline.	6

All - Assessment Task 3: Case study design brief and oral presentation

GOAL:	You will work in a group to solve a human-centric engineering problem to improve life by applying the whole system design cycle approach. Further, you will develop the important and complex skills of collaboration and communication that are invaluable professional engineering competencies.		
PRODUCT:	Report		
FORMAT:	<p>Submit: Draft report Monday Week 10 Oral presentation Week 12 Final report Friday Week 13. You are given a brief describing the lifestyle of real human community. Your group of 3-4 will analyse the brief and come to identify a need in this community. You will apply basic concepts of design to propose a solution to meet that need. You are encouraged to be creative in responding to this real-life challenge to improve human living conditions. Ensure your design would be sustainable in the community and that you behaved ethically as a group in developing your design. Your group will be given assistance during tutorials to help clarify any concerns about choosing and defining a design problem from the brief. You will be given feedback on the preliminary draft of your design and your justification so that you can revise it and develop into your final report. 10% of your mark: One member of your group presents the group's conceptual design response to the brief and a completed collaboration log outlining where report elements and project benchmarks were planned, met and evidenced by your group members. The presentation is to be 10 minutes using no more than 5 PowerPoint slides. 40% of your mark: The final report is a revision of the preliminary report and an update to the collaboration log. It takes into account your tutor's feedback on the preliminary report and peer feedback from the oral presentation and shows further development of the design and justification.</p> <p>Draft report due Monday Week 10 Oral presentation due Week 12 Final report Friday due Week 13</p>		
CRITERIA:	No.		Learning Outcome assessed
	1	Application of whole systems design cycle approach	1 4
	2	Communication for specialist audiences: adhere to word limit English expression use of terminology follow referencing conventions	2 6
	3	Adherence to professional and ethical behaviour during collaboration. This will have elements of peer and tutor assessment of effective group dynamics and participation.	1 5 6
	4	2.3 Application of systematic engineering synthesis and design processes.	1 2 3
	5	3.2 Effective oral and written communication in professional and lay domains	1 5 6
	6	3.6 Effective team membership and team leadership.	2 4 6

7. Directed study hours

A 12-unit course will have total of 150 learning hours which will include directed study hours (including online if required), self-directed learning and completion of assessable tasks. Directed study hours may vary by location. Student workload is calculated at 12.5 learning hours per one unit.

8. What resources do I need to undertake this course?

Please note: Course information, including specific information of recommended readings, learning activities, resources, weekly readings, etc. are available on the course Blackboard site– Please log in as soon as possible.

8.1. Prescribed text(s) or course reader

Please note that you need to have regular access to the resource(s) listed below. Resources may be required or recommended.

REQUIRED?	AUTHOR	YEAR	TITLE	PUBLISHER
Required	Haik, Y et al	2016	Engineering Design Process	Cengage Learning

8.2. Specific requirements

Not applicable

9. How are risks managed in this course?

Health and safety risks for this course have been assessed as low. It is your responsibility to review course material, search online, discuss with lecturers and peers and understand the health and safety risks associated with your specific course of study and to familiarise yourself with the University's general health and safety principles by reviewing the [online induction training for students](#), and following the instructions of the University staff.

10. What administrative information is relevant to this course?

10.1. Assessment: Academic Integrity

Academic integrity is the ethical standard of university participation. It ensures that students graduate as a result of proving they are competent in their discipline. This is integral in maintaining the value of academic qualifications. Each industry has expectations and standards of the skills and knowledge within that discipline and these are reflected in assessment.

Academic integrity means that you do not engage in any activity that is considered to be academic fraud; including plagiarism, collusion or outsourcing any part of any assessment item to any other person. You are expected to be honest and ethical by completing all work yourself and indicating in your work which ideas and information were developed by you and which were taken from others. You cannot provide your assessment work to others. You are also expected to provide evidence of wide and critical reading, usually by using appropriate academic references.

In order to minimise incidents of academic fraud, this course may require that some of its assessment tasks, when submitted to Blackboard, are electronically checked through SafeAssign. This software allows for text comparisons to be made between your submitted assessment item and all other work that SafeAssign has access to.

10.2. Assessment: Additional Requirements

Your eligibility for supplementary assessment in a course is dependent of the following conditions applying:

The final mark is in the percentage range 47% to 49.4%

The course is graded using the Standard Grading scale

You have not failed an assessment task in the course due to academic misconduct

10.3. Assessment: Submission penalties

Late submission of assessment tasks may be penalised at the following maximum rate:

- 5% (of the assessment task's identified value) per day for the first two days from the date identified as the due date for the assessment task.

- 10% (of the assessment task's identified value) for the third day - 20% (of the assessment task's identified value) for the fourth day and subsequent days up to and including seven days from the date identified as the due date for the assessment task.

- A result of zero is awarded for an assessment task submitted after seven days from the date identified as the due date for the assessment task. Weekdays and weekends are included in the calculation of days late. To request an extension you must contact your course coordinator to negotiate an outcome.

10.4. Study help

For help with course-specific advice, for example what information to include in your assessment, you should first contact your tutor, then your course coordinator, if needed.

If you require additional assistance, the Learning Advisers are trained professionals who are ready to help you develop a wide range of academic skills. Visit the [Learning Advisers](#) web page for more information, or contact Student Central for further assistance: +61 7 5430 2890 or studentcentral@usc.edu.au.

10.5. Wellbeing Services

Student Wellbeing provide free and confidential counselling on a wide range of personal, academic, social and psychological matters, to foster positive mental health and wellbeing for your academic success.

To book a confidential appointment go to [Student Hub](#), email studentwellbeing@usc.edu.au or call 07 5430 1226.

10.6. AccessAbility Services

Ability Advisers ensure equal access to all aspects of university life. If your studies are affected by a disability, learning disorder mental health issue, , injury or illness, or you are a primary carer for someone with a disability or who is considered frail and aged, [AccessAbility Services](#) can provide access to appropriate reasonable adjustments and practical advice about the support and facilities available to you throughout the University.

To book a confidential appointment go to [Student Hub](#), email AccessAbility@usc.edu.au or call 07 5430 2890.

10.7. Links to relevant University policy and procedures

For more information on Academic Learning & Teaching categories including:

- Assessment: Courses and Coursework Programs
- Review of Assessment and Final Grades
- Supplementary Assessment
- Administration of Central Examinations
- Deferred Examinations
- Student Academic Misconduct
- Students with a Disability

Visit the USC website: <http://www.usc.edu.au/explore/policies-and-procedures#academic-learning-and-teaching>

10.8. General Enquiries

In person:

- **USC Sunshine Coast** - Student Central, Ground Floor, Building C, 90 Sippy Downs Drive, Sippy Downs
- **USC Moreton Bay** - Service Centre, Ground Floor, Foundation Building, Gympie Road, Petrie
- **USC SouthBank** - Student Central, Building A4 (SW1), 52 Merivale Street, South Brisbane
- **USC Gympie** - Student Central, 71 Cartwright Road, Gympie
- **USC Fraser Coast** - Student Central, Student Central, Building A, 161 Old Maryborough Rd, Hervey Bay
- **USC Caboolture** - Student Central, Level 1 Building J, Cnr Manley and Tallon Street, Caboolture

Tel: +61 7 5430 2890

Email: studentcentral@usc.edu.au