COURSE OUTLINE

ENG502 Engineering System Design

School: School of Science, Technology and Engineering

2026 | Trimester 1

UniSC Moreton Bay	BLENDED LEARNING	Most of your course is on campus but you may be able to do some components of this course online.
Online	ONLINE	You can do this course without coming onto campus, unless your program has specified a mandatory onsite requirement.

Please go to unisc.edu.au 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

This course will develop advanced principles of engineering design. The design process includes consideration of safety and compliance with standards and assessment of failure. For an engineering technologist, this course will develop core skills in detailing the design process and develop clear understanding of the levels of responsibility.

1.2. How will this course be delivered?

ACTIVITY	HOURS	BEGINNING WEEK	FREQUENCY
BLENDED LEARNING			
Learning materials – Asynchronous weekly learning material	1hr	Week 1	12 times
Seminar – On campus	1hr	Week 1	3 times
Tutorial/Workshop 1 – On campus	2hrs	Week 1	10 times
Laboratory 1 – Mandatory on campus intensive	10hrs	Break week	Once Only
ONLINE			
Learning materials – Asynchronous weekly learning material	1hr	Week 1	12 times
Seminar – Online	1hr	Week 1	3 times
Tutorial/Workshop 1 – Online	2hrs	Week 1	10 times
Laboratory 1 – Mandatory on campus intensive	10hrs	Break week	Once Only

1.3. Course Topics

Topics may include:

- Higher level design theory e.g. design specifications, concept selection methods, standards, patents, design of components & human factors.
- Introduction to the application of digital design tools appropriate to the engineering discipline.
- Topics relevant to the individual engineering discipline

2. What level is this course?

500 Level (Advanced)

Engaging with new discipline knowledge and skills at an advanced level or deepening existing knowledge and skills within a discipline. Independent application of knowledge and skills in unfamiliar contexts.

3. What is the unit value of this course?

12 units

4. How does this course contribute to my learning?

COURSE LEARNING OUTCOMES On successful completion of this course, you should be able to...	GRADUATE QUALITIES MAPPING Completing these tasks successfully will contribute to you becoming...	PROFESSIONAL STANDARD MAPPING * Competencies from multiple Professional Bodies (see below) *
1 Explain the principles and practices of engineering design required to successfully implement complex engineering solutions.	Knowledgeable	1, 1, 1.5.a, 1.5.a, 1.5, 1.5
2 Investigate and assess scientific material to effectively synthesise relevant information to develop innovative design solutions	Creative and critical thinker	2, 2, 2.1.d, 2.1.d, 2.1, 2.1
3 Analyse potential failure modes in engineering systems and evaluate their impact to develop strategies to mitigate and prevent failures.	Creative and critical thinker	2, 2, 2.2.c, 2.2.c, 2.2, 2.2
4 Apply appropriate design concepts to deliver a desired engineering outcome.	Empowered	2, 2, 2.3.a, 2.3.a, 2.3, 2.3
5 Manage time and resources (independently and/or as a member of a team).	Empowered Engaged	3, 3, 3.2.a, 3.2.a, 3.5.d, 3.5.d, 3.2, 3.2, 3.5, 3.5
6 Develop Workplace, Health and Safety risk management knowledge and skills, including WHS frameworks, legislation, standards, procedures and guidance.	Ethical	3, 3, 3.1.a, 3.1.a, 3.1.b, 3.1.b, 3.1.c, 3.1.c, 3.1, 3.1

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...	Competencies from multiple Professional Bodies (see below) *
7 Synthesise and critically evaluate core course concepts and their interrelationships and effectively communicate a comprehensive understanding of the course's main ideas and their broader implications.	Knowledgeable Creative and critical thinker Empowered Communication Problem solving Applying technologies	

* Competencies by Professional Body

CODE	COMPETENCY
ENGINEERS AUSTRALIA STAGE 1 ENGINEERING TECHNOLOGIST COMPETENCY STANDARDS	
1	Elements of competency: Knowledge and Skill Base
1.5.a	Knowledge and Skill Base - Knowledge of engineering design practice and contextual factors impacting the technology domain: Identifies and applies systematic principles of engineering design relevant to the technology domain.
1.5	Knowledge and Skill Base: Knowledge of engineering design practice and contextual factors impacting the technology domain.
2	Elements of competency: Engineering Application Ability
2.1.d	Engineering Application Ability - Application of established engineering methods to broadly-defined problem solving within the technology domain: Recognises problems which have component elements and/or implications beyond the engineering technologist's personal expertise and correctly identifies the need for supplementary professional input.
2.2.c	Engineering Application Ability - Application of engineering techniques, tools and resources within the technology domain: Selects and applies such models in the representation of phenomenon, processes, systems, components or devices.
2.3.a	Engineering Application Ability - Application of systematic synthesis and design processes within the technology domain: Proficiently applies technological knowledge and problem solving skills as well as established tools and procedures to design components, system elements, plant, facilities and/or processes to meet technical specifications and performance criteria.
2.1	Engineering Application Ability: Application of established engineering methods to broadly-defined problem solving within the technology domain.
2.2	Engineering Application Ability: Application of engineering techniques, tools and resources within the technology domain.
2.3	Engineering Application Ability: Application of systematic synthesis and design processes within the technology domain.
3	Elements of competency: Professional and Personal Attributes
3.2.a	Professional and Personal Attributes - Effective oral and written communication in professional and lay domains: Is proficient in listening, speaking, reading and writing English.
3.5.d	Professional and Personal Attributes - Orderly management of self, and professional conduct: Manages time and processes effectively, prioritises competing demands to achieve personal, career and organisational goals and objectives.
3.1.a	Professional and Personal Attributes - Ethical conduct and professional accountability: Demonstrates commitment to uphold the Engineers Australia - Code of Ethics, and established norms of professional conduct pertinent to the technology domain.
3.1.b	Professional and Personal Attributes - Ethical conduct and professional accountability: Understands the need for 'due-diligence' in certification, compliance and risk management processes.
3.1.c	Professional and Personal Attributes - Ethical conduct and professional accountability: Understands the accountabilities of the engineering technologist and the broader engineering team for the safety of other people and for protection of the environment.
3.1	Professional and Personal Attributes: Ethical conduct and professional accountability.
3.2	Professional and Personal Attributes: Effective oral and written communication in professional and lay domains.
3.5	Professional and Personal Attributes: Orderly management of self, and professional conduct.
ENGINEERS AUSTRALIA STAGE 1 PROFESSIONAL ENGINEER COMPETENCY STANDARDS	

CODE	COMPETENCY
1	Elements of competency: Knowledge and Skill Base
1.5.a	Knowledge and Skill Base - Knowledge of engineering design practice and contextual factors impacting the engineering discipline: Identifies and applies systematic principles of engineering design relevant to the engineering discipline.
1.5	Knowledge and Skill Base: Knowledge of engineering design practice and contextual factors impacting the engineering discipline.
2	Elements of competency: Engineering Application Ability
2.1.d	Engineering Application Ability - Application of established engineering methods to complex engineering problem solving: Investigates complex problems using research-based knowledge and research methods.
2.2.c	Engineering Application Ability - Fluent application of engineering techniques, tools and resources: Determines properties, performance, safe working limits, failure modes, and other inherent parameters of materials, components and systems relevant to the engineering discipline.
2.3.a	Engineering Application Ability - Application of systematic engineering synthesis and design processes: Proficiently applies technical knowledge and open ended problem solving skills as well as appropriate tools and resources to design components, elements, systems, plant, facilities and/or processes to satisfy user requirements.
2.1	Engineering Application Ability: Application of established engineering methods to complex engineering problem solving.
2.2	Engineering Application Ability: Fluent application of engineering techniques, tools and resources.
2.3	Engineering Application Ability: Application of systematic engineering synthesis and design processes.
3	Elements of competency: Professional and Personal Attributes
3.2.a	Professional and Personal Attributes - Effective oral and written communication in professional and lay domains: Is proficient in listening, speaking, reading and writing English.
3.5.d	Professional and Personal Attributes - Orderly management of self, and professional conduct: Manages time and processes effectively, prioritises competing demands to achieve personal, career and organisational goals and objectives.
3.1.a	Professional and Personal Attributes - Ethical conduct and professional accountability: Demonstrates commitment to uphold the Engineers Australia - Code of Ethics, and established norms of professional conduct pertinent to the engineering discipline.
3.1.b	Professional and Personal Attributes - Ethical conduct and professional accountability: Understands the need for 'due-diligence' in certification, compliance and risk management processes.
3.1.c	Professional and Personal Attributes - Ethical conduct and professional accountability: Understands the accountabilities of the professional engineer and the broader engineering team for the safety of other people and for protection of the environment.
3.1	Professional and Personal Attributes: Ethical conduct and professional accountability.
3.2	Professional and Personal Attributes: Effective oral and written communication in professional and lay domains.
3.5	Professional and Personal Attributes: Orderly management of self, and professional conduct.

5. Am I eligible to enrol in this course?

Refer to the UniSC Glossary of terms for definitions of "pre-requisites, co-requisites and anti-requisites".

5.1. Pre-requisites

Enrolled in MC006

5.2. Co-requisites

Not applicable

5.3. Anti-requisites

Not applicable

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

Not applicable

5.5. Microcredential Information

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

The delivery and facilitation of the tutorials and workshop projects will provide regular feedback throughout the trimester.

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	Report	Individual	40%	2500 words	Week 6	Online Assignment Submission with plagiarism check
All	2	Report	Individual	40%	2500 words	Week 10	Online Assignment Submission with plagiarism check
All	3	Oral	Individual	20%	A 10-12 minute presentation which may be followed by approximately 5-10 minutes of questions.	Week 12	Online Submission

All - Assessment Task 1: Report

GOAL:	Demonstrate an understanding of the appropriate analytical principles to describe, design and predict the behaviour of standard engineering systems.
PRODUCT:	Report
AUTHORSHIP STATEMENT:	
FORMAT:	Report
CRITERIA:	

No.		Learning Outcome assessed
1	Critical appraisal of the principles and practices of engineering design required to successfully implement complex engineering solutions.	1
2	Investigation and assessment of scientific material to effectively synthesise relevant information to develop innovative design solutions	2
3	Application of appropriate design concepts to deliver a desired engineering outcome.	4
4	Management of time and resources (independently and/or as a member of a team).	5

GENERIC SKILLS:	Problem solving, Applying technologies

All - Assessment Task 2: Report

GOAL:	Final report detailing the engineering design and its analysis.
PRODUCT:	Report
AUTHORSHIP STATEMENT:	
FORMAT:	Report
CRITERIA:	

No.		Learning Outcome assessed
1	Critical appraisal of the principles and practices of engineering design required to successfully implement complex engineering solutions.	1
2	Investigation and assessment of scientific material to effectively synthesise relevant information to develop innovative design solutions	2
3	Application of appropriate design concepts to deliver a desired engineering outcome.	4
4	Analysis of potential failure modes in engineering systems and evaluation of their impact to develop strategies to mitigate and prevent failures.	3
5	Management of time and resources (independently and/or as a member of a team).	5
6	Development of Workplace, Health and Safety risk management knowledge and skills, including WHS frameworks, legislation, standards, procedures and guidance.	6

GENERIC SKILLS:	Organisation, Information literacy

All - Assessment Task 3: Course summary and critical evaluation

GOAL:	To assess your ability to synthesise and critically evaluate the course's core concepts, demonstrating a sophisticated and integrated understanding of its main ideas, their interrelationships, and broader implications.
PRODUCT:	Oral
AUTHORSHIP STATEMENT:	
FORMAT:	Presentation
CRITERIA:	

No.		Learning Outcome assessed
1	Synthesis & Critical Evaluation: Integrated and insightful critiques of core course concepts and their interrelationships.	7
2	Clarity & Communication: Well-organised, engaging, and clear presentation, effectively using visuals to enhance understanding.	7
3	Engagement & Understanding: Accurate and thoughtful responses to questions, demonstrating deep understanding and critical thinking.	7

GENERIC SKILLS:	Communication, Problem solving

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. 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 Canvas site– Please log in as soon as possible.

8.1. Prescribed text(s) or course reader

> There are no required/recommended resources for this course.

8.2. Specific requirements

Fully enclosed shoes (preferably safety shoes/boots) must be worn in the engineering laboratory. If you do not have the correct shoes you will not be allowed to do the workshop practical. You must also undertake the laboratory induction before you can undertake any practical. It is advisable to use a dust-coat (or overall) when in the laboratory.

9. How are risks managed in this course?

Risk assessments have been performed for all studio and laboratory classes and a low level of health and safety risk exists. Some risk concerns may include equipment, instruments, and tools; as well as manual handling items within the laboratory. It is your responsibility to review course material, search online, discuss with lecturers and peers and understand the 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 Canvas, are electronically checked through Turnitin. This software allows for text comparisons to be made between your submitted assessment item and all other work to which Turnitin has access.

10.2. Assessment: Additional Requirements

Eligibility for Supplementary Assessment

Your eligibility for supplementary assessment in a course is dependent of the following conditions applying:
(a) The final mark is in the percentage range 47% to 49.4%; and
(b) The course is graded using the Standard Grading scale

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 submissions may be penalised up to and including the following maximum percentage of the assessment task's identified value, with weekdays and weekends included in the calculation of days late:
(a) One day: deduct 5%;
(b) Two days: deduct 10%;
(c) Three days: deduct 20%;
(d) Four days: deduct 40%;
(e) Five days: deduct 60%;
(f) Six days: deduct 80%;
(g) Seven days: A result of zero is awarded for the assessment task.

The following penalties will apply for a late submission for an online examination:
Less than 15 minutes: No penalty
From 15 minutes to 30 minutes: 20% penalty
More than 30 minutes: 100% penalty

10.4. 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
- Central Examinations
- Deferred Examinations
- Student Conduct
- Students with a Disability

For more information, visit https://www.usc.edu.au/explore/policies-and-procedures#academic-learning-and-teaching

10.5. Student Charter

UniSC is committed to excellence in teaching, research and engagement in an environment that is inclusive, inspiring, safe and respectful. The Student Charter sets out what students can expect from the University, and what in turn is expected of students, to achieve these outcomes.

10.6. General Enquiries

For course-specific questions, contact your teaching staff or Course Coordinator.

For other enquiries or to access support, please contact Student Central:

- UniSC Student Central
- UniSC Adelaide Student Central