COURSE OUTLINE

ENG105 Engineering Statics

School: School of Science, Technology and Engineering

2026 | Trimester 2

UniSC Sunshine Coast
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.

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

Within all engineering disciplines core concepts form the foundation of our knowledge as practicing engineers. Statics allows us to understand and advance in the engineering field. It provides the framework to analyse structural components found in various mechanical and civil engineering structures, including buildings, bridges, machinery, and hydraulics. In this course, you will gain an understanding of fundamental principles and concepts related to rigid and deformable bodies. You will then apply these principles to analyse structures under different load conditions to ensure their safety.

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	Once Only
Tutorial/Workshop 1 – On campus	2hrs	Week 1	12 times
Laboratory 1 – On campus Week 2, Week 4 and Week 6	2hrs	Week 2	3 times

1.3. Course Topics

Topics may include:

- External forces on 2D rigid bodies, moment, couples
- 2D free body diagrams and equilibrium of rigid bodies
- Trusses including method of joints, method of sections
- Centre of Gravity & Centroid
- Moments of Inertia
- Internal Forces of Structural Members
- Shear force & Bending Moment Diagrams

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 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 Describe and utilise concepts of centre of gravity and second moment of areas.	Knowledgeable	1, 1, 1.2, 1.2
2 Explain and justify the effects of deviations from ideal behaviour in systems of interacting bodies/structures in equilibrium	Knowledgeable	1, 1, 1.2.a, 1.2.a, 1.2, 1.2
3 Analyse simple static and dynamic physical systems using appropriate engineering and mathematical techniques.	Creative and critical thinker	2, 2, 2.1.a, 2.1.a, 2.1, 2.1
4 Critically evaluate various engineering mechanics problems and synthesise solutions for specific applications.	Creative and critical thinker	2, 2, 2.1.a, 2.1.a, 2.1, 2.1
5 Construct free-body diagrams of objects subjected to forces, moments and distributed loads	Empowered	2, 2, 2.2.d, 2.2.d, 2.2, 2.2
6 Perform laboratory experiment to observe the behaviour of structural members under given conditions, conduct theoretical and comparative analyses, and write an experiment report.	Empowered	2, 2, 2.2.f, 2.2.f, 2.2, 2.2

* Competencies by Professional Body

CODE	COMPETENCY
ENGINEERS AUSTRALIA STAGE 1 PROFESSIONAL ENGINEER COMPETENCY STANDARDS	
1	Elements of competency: Knowledge and Skill Base
1.2.a	Knowledge and Skill Base - Conceptual understanding of the mathematics, numerical analysis, statistics, and computer and information sciences which underpin the engineering discipline: Develops and fluently applies relevant investigation analysis, interpretation, assessment, characterisation, prediction, evaluation, modelling, decision making, measurement, evaluation, knowledge management and communication tools and techniques pertinent to the engineering discipline.
1.2	Knowledge and Skill Base: Conceptual understanding of the mathematics, numerical analysis, statistics, and computer and information sciences which underpin the engineering discipline.
2	Elements of competency: Engineering Application Ability
2.1.a	Engineering Application Ability - Application of established engineering methods to complex engineering problem solving: Identifies, discerns and characterises salient issues, determines and analyses causes and effects, justifies and applies appropriate simplifying assumptions, predicts performance and behaviour, synthesises solution strategies and develops substantiated conclusions.
2.2.d	Engineering Application Ability - Fluent application of engineering techniques, tools and resources: Applies a wide range of engineering tools for analysis, simulation, visualisation, synthesis and design, including assessing the accuracy and limitations of such tools, and validation of their results.
2.2.f	Engineering Application Ability - Fluent application of engineering techniques, tools and resources: Designs and conducts experiments, analyses and interprets result data and formulates reliable conclusions.

CODE	COMPETENCY
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.
ENGINEERS AUSTRALIA STAGE 1 ENGINEERING TECHNOLOGIST COMPETENCY STANDARDS	
1	Elements of competency: Knowledge and Skill Base
1.2.a	Knowledge and Skill Base - Conceptual understanding of the, mathematics, numerical analysis, statistics, and computer and information sciences which underpin the technology domain: Fluently applies relevant investigation, analysis, interpretation, assessment, characterisation, prediction, evaluation, modelling, decision making, measurement, evaluation, knowledge management and communication tools and techniques pertinent to the technology domain.
1.2	Knowledge and Skill Base: Conceptual understanding of the, mathematics, numerical analysis, statistics, and computer and information sciences which underpin the technology domain.
2	Elements of competency: Engineering Application Ability
2.1.a	Engineering Application Ability - Application of established engineering methods to broadly-defined problem solving within the technology domain: Identifies, discerns and characterises salient issues, determines and analyses causes and effects, justifies and applies appropriate simplifying assumptions, predicts performance and behaviour, synthesises solution strategies and develops substantiated conclusions.
2.2.d	Engineering Application Ability - Application of engineering techniques, tools and resources within the technology domain: Determines properties, performance, safe working limits, failure modes, and other inherent parameters of materials, components and systems relevant to specialist area(s) of the technology domain.
2.2.f	Engineering Application Ability - Application of engineering techniques, tools and resources within the technology domain: Designs and conducts experiments, analyses and interprets result data and formulates reliable conclusions.
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.

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

Not applicable

5.2. Co-requisites

Not applicable

5.3. Anti-requisites

ENG102

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

Early feedback will be provided through completion of weekly activities in workshops. Furthermore, feedback on each assessment will be provided which will be used to help with the following assessment.

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	Written Piece	Individual	30%	1500 words	Week 4	Online Assignment Submission with plagiarism check
All	2	Report	Individual	30%	1500 words	Week 7	Online Assignment Submission with plagiarism check
All	3	Examination - Centrally Scheduled	Individual	40%	2 hours	Exam Period	Online Assignment Submission with plagiarism check

All - Assessment Task 1: Written Piece

GOAL:	Formulate and solve mechanics problems based on the problem descriptions provided.
PRODUCT:	Written Piece
AUTHORSHIP STATEMENT:	
FORMAT:	Formulate and solve mechanics problems based on the problem descriptions provided.
CRITERIA:	

No.		Learning Outcome assessed
1	Description and utilisation of concepts of centre of gravity and second moment of areas.	1
2	Analysis of simple static and dynamic physical systems using appropriate engineering and mathematical techniques.	3
3	Critical evaluation of various engineering mechanics problems and synthesis of solutions for specific applications.	4
4	Construction of free-body diagrams of objects subjected to forces, moments and distributed load	5

GENERIC SKILLS:	Problem solving

All - Assessment Task 2: Report

GOAL:	Validate theoretical engineering concepts.
PRODUCT:	Report
AUTHORSHIP STATEMENT:	
FORMAT:	A report that discusses a laboratory experiment undertaken to validate theoretical engineering concepts.

CRITERIA:

No.		Learning Outcome assessed
1	Description and utilisation of concepts of centre of gravity and second moment of areas.	1
2	Explanation and justification of the effects of deviations from ideal behaviour in systems of interacting bodies/structures in equilibrium	2
3	Analysis of simple static and dynamic physical systems using appropriate engineering and mathematical techniques.	3
4	Critical evaluation of various engineering mechanics problems and synthesis of solutions for specific applications.	4
5	Construction of free-body diagrams of objects subjected to forces, moments and distributed load	5
6	Perform laboratory experiment to observe the behaviour of structural members under given conditions, conduct theoretical and comparative analyses, and write an experiment report.	6

GENERIC SKILLS:	Organisation, Information literacy

All - Assessment Task 3: Examination

GOAL:	Demonstrate understanding of any or all of the material covered in the course.
PRODUCT:	Examination - Centrally Scheduled
AUTHORSHIP STATEMENT:	
FORMAT:	An examination on any or all of the material covered in the course.

CRITERIA:

No.		Learning Outcome assessed
1	Description and utilisation of concepts of centre of gravity and second moment of areas.	1
2	Explanation and justification of the effects of deviations from ideal behaviour in systems of interacting bodies/structures in equilibrium	2
3	Analysis of simple static and dynamic physical systems using appropriate engineering and mathematical techniques.	3
4	Critical evaluation of various engineering mechanics problems and synthesis of solutions for specific applications.	4
5	Construction of free-body diagrams of objects subjected to forces, moments and distributed load	5

GENERIC SKILLS:	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

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 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

Eligibility for Supplementary Assessment 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