COURSE OUTLINE

CIV601 Structural Modelling

School: School of Science, Technology and Engineering

2027 | 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 advances your understanding of computer modelling, moving beyond the fundamental principles of engineering mechanics. The emphasis is on helping you develop a deep understanding of the laws and principles of mechanics by applying advanced computer structural modelling. The course covers the analysis of both determinant and indeterminate structures using industry software for structural analysis. By mastering this course, you will acquire advanced skills for structural analysis, modelling, and design of civil engineering structures.

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 – On campus	2hrs	Week 2	5 times
ONLINE			
Learning materials – Asynchronous weekly learning material	1hr	Week 1	12 times
Seminar – Online	1hr	Week 1	3 times
Tutorial/Workshop 1 – Online tutorial/workshop	2hrs	Week 1	10 times
Laboratory 1 – Online laboratory	2hrs	Week 2	5 times

1.3. Course Topics

Topics may include:

- Advanced Computational modelling
- Application of complex loads, load factors, and load combinations using structural analysis software
- Linear and nonlinear analysis of structures
- Analysis of dynamic effects using computer modelling software
- Deflection analysis using computer modelling software
- Advanced structural modelling of 3-dimensional structures

2. What level is this course?

600 Level (Specialised)

Demonstrating a specialised body of knowledge and set of skills for professional practice or further learning. Advanced 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 Utilise appropriate software tools to examine fundamental structural mechanics.	Empowered	1, 1, 1.3.a, 1.3.a, 1.3, 1.3
2 Evaluate structural behaviour using both linear and non-linear analysis.	Creative and critical thinker	2, 2, 2.1.b, 2.1.b, 2.1, 2.1
3 Communicate your understanding and application of advanced structural modelling.	Empowered Engaged	3, 3, 3.2.a, 3.2.a, 3.2.b, 3.2.b, 3.2, 3.2
4 Employ advanced structural modelling techniques to contribute to sustainable engineering design.	Empowered Sustainability-focussed	1, 1, 1.2.a, 1.2.a, 1.6.c, 1.6.c, 1.2, 1.2, 1.6, 1.6

* Competencies by Professional Body

CODE	COMPETENCY
ENGINEERS AUSTRALIA STAGE 1 ENGINEERING TECHNOLOGIST COMPETENCY STANDARDS	
1	Elements of competency: Knowledge and Skill Base
1.3.a	Knowledge and Skill Base - In-depth understanding of specialist bodies of knowledge within the technology domain: Proficiently applies advanced technical knowledge and skills to deliver engineering outcomes in specialist area(s) of the technology domain and associated industry, commercial and community sectors.
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.
1.6.c	Knowledge and Skill Base - Understanding of the scope, principles, norms, accountabilities and bounds of sustainable engineering practice in the technology domain: Appreciates the social, environmental and economic principles of sustainable engineering practice.
1.2	Knowledge and Skill Base: Conceptual understanding of the, mathematics, numerical analysis, statistics, and computer and information sciences which underpin the technology domain.

CODE	COMPETENCY
1.3	Knowledge and Skill Base: In-depth understanding of specialist bodies of knowledge within the technology domain.
1.6	Knowledge and Skill Base: Understanding of the scope, principles, norms, accountabilities and bounds of sustainable engineering practice in the technology domain.
2	Elements of competency: Engineering Application Ability
2.1.b	Engineering Application Ability - Application of established engineering methods to broadly-defined problem solving within the technology domain: Ensures that the application of specialist technologies are soundly based on fundamental principles by diagnosing, and taking appropriate action with data, calculations, results, proposals, processes, practices, and documented information that may be ill-founded, illogical, erroneous, unreliable or unrealistic.
2.1	Engineering Application Ability: Application of established engineering methods to broadly-defined problem solving 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.
3.2.b	Professional and Personal Attributes - Effective oral and written communication in professional and lay domains: Prepares high quality engineering documents such as progress and project reports, reports of investigations and feasibility studies, proposals, specifications, design records, drawings, technical descriptions and presentations pertinent to the technology domain.
3.2	Professional and Personal Attributes: Effective oral and written communication in professional and lay domains.
ENGINEERS AUSTRALIA STAGE 1 PROFESSIONAL ENGINEER COMPETENCY STANDARDS	
1	Elements of competency: Knowledge and Skill Base
1.3.a	Knowledge and Skill Base - In-depth understanding of specialist bodies of knowledge within the engineering discipline: Proficiently applies advanced technical knowledge and skills in at least one specialist practice domain of the engineering discipline.
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.
1.6.c	Knowledge and Skill Base - Understanding of the scope, principles, norms, accountabilities and bounds of sustainable engineering practice in the specific discipline: Appreciates the social, environmental and economic principles of sustainable engineering practice.
1.2	Knowledge and Skill Base: Conceptual understanding of the mathematics, numerical analysis, statistics, and computer and information sciences which underpin the engineering discipline.
1.3	Knowledge and Skill Base: In-depth understanding of specialist bodies of knowledge within the engineering discipline.
1.6	Knowledge and Skill Base: Understanding of the scope, principles, norms, accountabilities and bounds of sustainable engineering practice in the specific discipline.
2	Elements of competency: Engineering Application Ability
2.1.b	Engineering Application Ability - Application of established engineering methods to complex engineering problem solving: Ensures that all aspects of an engineering activity are soundly based on fundamental principles - by diagnosing, and taking appropriate action with data, calculations, results, proposals, processes, practices, and documented information that may be ill-founded, illogical, erroneous, unreliable or unrealistic.
2.1	Engineering Application Ability: Application of established engineering methods to complex engineering problem solving.
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.
3.2.b	Professional and Personal Attributes - Effective oral and written communication in professional and lay domains: Prepares high quality engineering documents such as progress and project reports, reports of investigations and feasibility studies, proposals, specifications, design records, drawings, technical descriptions and presentations pertinent to the engineering discipline.

CODE	COMPETENCY
3.2	Professional and Personal Attributes: Effective oral and written communication in professional and lay domains.

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 Program GC002 or GD002 or (MC010 in Civil specialisation)

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

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	50%	2500 words	Week 7	Online Assignment Submission with plagiarism check
All	2	Oral and Written Piece	Group	50%	10 minutes plus 1500 words	Week 12	Online Assignment Submission with plagiarism check

All - Assessment Task 1: Problem set

GOAL:	Formulate and solve advanced mechanics problems based on the problem descriptions provided.
PRODUCT:	Written Piece
ASSURED LEARNING:	Yes
PROGRAM ASSESSMENT:	Assessment Task
FORMAT:	Formulate and solve advanced mechanics problems based on the problem descriptions provided.
CRITERIA:	**No.** / **Learning Outcome assessed** 1 Utilisation of appropriate software tools to examine fundamental structural mechanics. — 1 2 Evaluation of structural behaviour using both linear and non-linear analysis. — 2 3 Communication of your understanding and application of advanced structural modelling. — 3 4 Employment of advanced structural modelling techniques to contribute to sustainable engineering design. — 4
GENERIC SKILLS:	Communication, Problem solving, Applying technologies

All - Assessment Task 2: Group project/presentation

GOAL:	You will undertake a group project to further skills and understanding of advanced structural analysis and modelling terchniques.
PRODUCT:	Oral and Written Piece
ASSURED LEARNING:	Yes
PROGRAM ASSESSMENT:	Assessment Task
FORMAT:	You will undertake a group project to further skills and understanding of advanced structural analysis and modelling terchniques. You will convery your findings via a written report and an oral presentation.
CRITERIA:	**No.** / **Learning Outcome assessed** 1 Utilisation of appropriate software tools to examine fundamental structural mechanics. — 1 2 Evaluation of structural behaviour using both linear and non-linear analysis. — 2 3 Communication of your understanding and application of advanced structural modelling. — 3 4 Employment of advanced structural modelling techniques to contribute to sustainable engineering design. — 4
GENERIC SKILLS:	Communication, Collaboration, Problem solving, Applying technologies

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

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