



ENEC20001 *Structural Design I*

Term 1 - 2019

Profile information current as at 14/12/2025 06:34 am

All details in this unit profile for ENEC20001 have been officially approved by CQUniversity and represent a learning partnership between the University and you (our student). The information will not be changed unless absolutely necessary and any change will be clearly indicated by an approved correction included in the profile.

General Information

Overview

Structural Design I is an advanced civil engineering unit that introduces the analysis and design of complex reinforced and prestressed concrete structures. In this unit you will develop knowledge on the state-of-the-art construction materials and design technologies in the context of structural engineering and environmental sustainability. You will be expected to conceptualise the vertical and horizontal load resisting mechanism of concrete structural systems, interpret and apply the relevant Australian Standards and ensure the designed structure/structural components also meet the serviceability and stakeholder requirements. The use of commercial computer software is required to analyse and design these structures. In this unit you will document the processes involved in modelling, analysis, design, and communication; and work and learn, both individually and in teams in a professional manner.

Details

Career Level: *Postgraduate*

Unit Level: *Level 9*

Credit Points: 12

Student Contribution Band: 8

Fraction of Full-Time Student Load: 0.25

Pre-requisites or Co-requisites

Anti-Requisite: ENEC14014 Structural and Geotechnical Design

Important note: Students enrolled in a subsequent unit who failed their pre-requisite unit, should drop the subsequent unit before the census date or within 10 working days of Fail grade notification. Students who do not drop the unit in this timeframe cannot later drop the unit without academic and financial liability. See details in the [Assessment Policy and Procedure \(Higher Education Coursework\)](#).

Offerings For Term 1 - 2019

- Melbourne
- Online
- Perth
- Rockhampton

Attendance Requirements

All on-campus students are expected to attend scheduled classes – in some units, these classes are identified as a mandatory (pass/fail) component and attendance is compulsory. International students, on a student visa, must maintain a full time study load and meet both attendance and academic progress requirements in each study period (satisfactory attendance for International students is defined as maintaining at least an 80% attendance record).

Website

[This unit has a website, within the Moodle system, which is available two weeks before the start of term. It is important that you visit your Moodle site throughout the term. Please visit Moodle for more information.](#)

Class and Assessment Overview

Recommended Student Time Commitment

Each 12-credit Postgraduate unit at CQUniversity requires an overall time commitment of an average of 25 hours of study per week, making a total of 300 hours for the unit.

Class Timetable

[Regional Campuses](#)

Bundaberg, Cairns, Emerald, Gladstone, Mackay, Rockhampton, Townsville

[Metropolitan Campuses](#)

Adelaide, Brisbane, Melbourne, Perth, Sydney

Assessment Overview

1. **Written Assessment**

Weighting: 35%

2. **Written Assessment**

Weighting: 35%

3. **Examination**

Weighting: 30%

Assessment Grading

This is a graded unit: your overall grade will be calculated from the marks or grades for each assessment task, based on the relative weightings shown in the table above. You must obtain an overall mark for the unit of at least 50%, or an overall grade of 'pass' in order to pass the unit. If any 'pass/fail' tasks are shown in the table above they must also be completed successfully ('pass' grade). You must also meet any minimum mark requirements specified for a particular assessment task, as detailed in the 'assessment task' section (note that in some instances, the minimum mark for a task may be greater than 50%). Consult the [University's Grades and Results Policy](#) for more details of interim results and final grades.

CQUniversity Policies

All University policies are available on the [CQUniversity Policy site](#).

You may wish to view these policies:

- Grades and Results Policy
- Assessment Policy and Procedure (Higher Education Coursework)
- Review of Grade Procedure
- Student Academic Integrity Policy and Procedure
- Monitoring Academic Progress (MAP) Policy and Procedure – Domestic Students
- Monitoring Academic Progress (MAP) Policy and Procedure – International Students
- Student Refund and Credit Balance Policy and Procedure
- Student Feedback – Compliments and Complaints Policy and Procedure
- Information and Communications Technology Acceptable Use Policy and Procedure

This list is not an exhaustive list of all University policies. The full list of University policies are available on the [CQUniversity Policy site](#).

Previous Student Feedback

Feedback, Recommendations and Responses

Every unit is reviewed for enhancement each year. At the most recent review, the following staff and student feedback items were identified and recommendations were made.

Feedback from Unit evaluation

Feedback

The unit received very positive evaluation and students commented that the unit developed their understanding of the structural design of concrete.

Recommendation

Will maintain the teaching quality.

Unit Learning Outcomes

On successful completion of this unit, you will be able to:

1. Determine various types of loads acting on a structural system, provide a rationale for load combinations applied and conceptualise the load resisting concrete structural systems
2. Formulate, plan, manage and complete projects individually or in teams in an ethical and professional manner considering stakeholder requirements and principals of sustainable development
3. Design complex reinforced concrete structural components using appropriate Australian Standards
4. Design prestressed concrete structural components using appropriate Australian Standards
5. Use appropriate software to analyse and/or design the structural components subjected to different load combinations
6. Demonstrate a professional level of communication and leadership.

The Learning Outcomes for this unit are linked with **Engineers Australia's Stage 1 Competency Standard for Professional Engineers**.

Alignment of Learning Outcomes, Assessment and Graduate Attributes



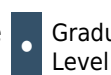
N/A
Level



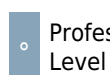
Introductory
Level



Intermediate
Level



Graduate
Level



Professional
Level



Advanced
Level

Alignment of Assessment Tasks to Learning Outcomes

Assessment Tasks	Learning Outcomes					
	1	2	3	4	5	6
1 - Written Assessment - 35%	•	•	•		•	•
2 - Written Assessment - 35%	•	•		•	•	•
3 - Examination - 30%			•	•		

Alignment of Graduate Attributes to Learning Outcomes

Graduate Attributes	Learning Outcomes					
	1	2	3	4	5	6

Graduate Attributes	Learning Outcomes					
	1	2	3	4	5	6
1 - Knowledge	○	○	○	○	○	○
2 - Communication	○	○	○	○	○	○
3 - Cognitive, technical and creative skills	○	○	○	○	○	
4 - Research	○	○	○	○	○	
5 - Self-management	○	○	○	○	○	
6 - Ethical and Professional Responsibility	○	○	○	○	○	○
7 - Leadership		○				○
8 - Aboriginal and Torres Strait Islander Cultures						

Alignment of Assessment Tasks to Graduate Attributes

Assessment Tasks	Graduate Attributes							
	1	2	3	4	5	6	7	8
1 - Written Assessment - 35%	○	○	○	○	○	○	○	
2 - Written Assessment - 35%	○	○	○	○	○	○		
3 - Examination - 30%	○	○	○		○	○		

Textbooks and Resources

Textbooks

There are no required textbooks.

IT Resources

You will need access to the following IT resources:

- CQUniversity Student Email
- Internet
- Unit Website (Moodle)
- Steel Design Software - SPACEGASS or similar

Referencing Style

All submissions for this unit must use the referencing style: [Harvard \(author-date\)](#)
For further information, see the Assessment Tasks.

Teaching Contacts

Remadevi Dhanasekar Unit Coordinator

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Kumaran Suntharavadivel Unit Coordinator

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Schedule

Week 1 - 11 Mar 2019

Module/Topic

Chapter

Events and Submissions/Topic

Introduction, general analysis and design requirements for reinforced concrete (RC) structures, behavior of RC structural elements under axial, flexural and shear loading

Week 2 - 18 Mar 2019

Module/Topic

Chapter

Events and Submissions/Topic

Flexural Design of RC Beam

Week 3 - 25 Mar 2019

Module/Topic

Chapter

Events and Submissions/Topic

Flexural Design of RC Beam

Week 4 - 01 Apr 2019

Module/Topic

Chapter

Events and Submissions/Topic

Shear Design of RC Beam

Week 5 - 08 Apr 2019

Module/Topic

Chapter

Events and Submissions/Topic

Serviceability of RC Beam.
Introduction to PC design

Vacation Week - 15 Apr 2019

Module/Topic

Chapter

Events and Submissions/Topic

Week 6 - 22 Apr 2019

Module/Topic

Chapter

Events and Submissions/Topic

Design of RC slab
PC design (Magnet diagram)

Design Project 1: Design of RC structures Due: Week 6 Wednesday (24 Apr 2019) 11:55 pm AEST

Week 7 - 29 Apr 2019

Module/Topic

Chapter

Events and Submissions/Topic

Design of RC Column
PC design (tendon details)

Week 8 - 06 May 2019

Module/Topic

Chapter

Events and Submissions/Topic

Design of RC Shallow Foundations
PC design (ULS check)

Week 9 - 13 May 2019

Module/Topic

Chapter

Events and Submissions/Topic

PC design (losses)

Week 10 - 20 May 2019

Module/Topic	Chapter	Events and Submissions/Topic
PC design (end block)		Design Project 2: Design of PC structures Due: Week 10 Wednesday (22 May 2019) 11:55 pm AEST

Week 11 - 27 May 2019

Module/Topic	Chapter	Events and Submissions/Topic
PC design (other topics)		

Week 12 - 03 Jun 2019

Module/Topic	Chapter	Events and Submissions/Topic
Content Review		

Review/Exam Week - 10 Jun 2019

Module/Topic	Chapter	Events and Submissions/Topic
Revision		

Exam Week - 17 Jun 2019

Module/Topic	Chapter	Events and Submissions/Topic
Exam timetable will be released during the term.		

Term Specific Information

Assessment Tasks

1 Design Project 1: Design of RC structures

Assessment Type

Written Assessment

Task Description

This assessment has questions from weeks 1 to 5 content and include theory and design questions. Question will be available via the unit web site on or before week 2, Friday of the term.

Assessment Due Date

Week 6 Wednesday (24 Apr 2019) 11:55 pm AEST

Return Date to Students

Week 8 Wednesday (8 May 2019)

Feedback and mark will be available via moodle unit site

Weighting

35%

Minimum mark or grade

50% of the allotted marks

Assessment Criteria

Assessment Criteria

(5 %) Presentation and layout—includes the selection of typeface, written and general appearance, detail and quality of the assessment item submission

(95%) Content—includes the accuracy and relevance of information, application of knowledge, language and grammar used in answering questions, and proper referencing of sources of information, equations, images, data and tables used in the assessment submission. When referencing, use of the Harvard Referencing System

Referencing Style

- [Harvard \(author-date\)](#)

Submission

Online

Submission Instructions

Required format is a single word or pdf file. Mathematical calculations in hand-written format is allowed; students should scan the hand-written calculation and insert/paste it within the word/pdf file at the appropriate location.

Learning Outcomes Assessed

- Determine various types of loads acting on a structural system, provide a rationale for load combinations applied and conceptualise the load resisting concrete structural systems
- Formulate, plan, manage and complete projects individually or in teams in an ethical and professional manner considering stakeholder requirements and principals of sustainable development
- Design complex reinforced concrete structural components using appropriate Australian Standards
- Use appropriate software to analyse and/or design the structural components subjected to different load combinations
- Demonstrate a professional level of communication and leadership.

Graduate Attributes

- Knowledge
- Communication
- Cognitive, technical and creative skills
- Research
- Self-management
- Ethical and Professional Responsibility
- Leadership

2 Design Project 2: Design of PC structures

Assessment Type

Written Assessment

Task Description

This assessment has questions from prestressed concrete content and include theory and design. Question will be available via the unit web site on or before week-5, Friday of the term.

Assessment Due Date

Week 10 Wednesday (22 May 2019) 11:55 pm AEST

Required format is a single word or pdf file. Mathematical calculations in hand-written format is allowed; students should scan the hand-written calculation and insert/paste it within the word/pdf file at the appropriate location. One submission per group.

Return Date to Students

Week 12 Wednesday (5 June 2019)

Feedback and mark will be available via moodle unit site

Weighting

35%

Minimum mark or grade

50% of the allotted marks

Assessment Criteria

Assessment Criteria

(5 %) Presentation and layout—includes the selection of typeface, written and general appearance, detail and quality of the assessment item submission

(95%) Content—includes the accuracy and relevance of information, application of knowledge, language and grammar used in answering questions, and proper referencing of sources of information, equations, images, data and tables used in the assessment submission. When referencing, use of the Harvard Referencing System

Referencing Style

- [Harvard \(author-date\)](#)

Submission

Online Group

Learning Outcomes Assessed

- Determine various types of loads acting on a structural system, provide a rationale for load combinations applied and conceptualise the load resisting concrete structural systems
- Formulate, plan, manage and complete projects individually or in teams in an ethical and professional manner considering stakeholder requirements and principals of sustainable development
- Design prestressed concrete structural components using appropriate Australian Standards
- Use appropriate software to analyse and/or design the structural components subjected to different load combinations
- Demonstrate a professional level of communication and leadership.

Graduate Attributes

- Knowledge
- Communication
- Cognitive, technical and creative skills
- Research
- Self-management
- Ethical and Professional Responsibility

Examination

Outline

Complete an invigilated examination.

Date

During the examination period at a CQUniversity examination centre.

Weighting

30%

Length

180 minutes

Minimum mark or grade

50% of the allotted marks

Exam Conditions

Open Book.

Materials

Dictionary - non-electronic, concise, direct translation only (dictionary must not contain any notes or comments).

Calculator - non-programmable, no text retrieval, silent only

Academic Integrity Statement

As a CQUniversity student you are expected to act honestly in all aspects of your academic work.

Any assessable work undertaken or submitted for review or assessment must be your own work. Assessable work is any type of work you do to meet the assessment requirements in the unit, including draft work submitted for review and feedback and final work to be assessed.

When you use the ideas, words or data of others in your assessment, you must thoroughly and clearly acknowledge the source of this information by using the correct referencing style for your unit. Using others' work without proper acknowledgement may be considered a form of intellectual dishonesty.

Participating honestly, respectfully, responsibly, and fairly in your university study ensures the CQUniversity qualification you earn will be valued as a true indication of your individual academic achievement and will continue to receive the respect and recognition it deserves.

As a student, you are responsible for reading and following CQUniversity's policies, including the [Student Academic Integrity Policy and Procedure](#). This policy sets out CQUniversity's expectations of you to act with integrity, examples of academic integrity breaches to avoid, the processes used to address alleged breaches of academic integrity, and potential penalties.

What is a breach of academic integrity?

A breach of academic integrity includes but is not limited to plagiarism, self-plagiarism, collusion, cheating, contract cheating, and academic misconduct. The Student Academic Integrity Policy and Procedure defines what these terms mean and gives examples.

Why is academic integrity important?

A breach of academic integrity may result in one or more penalties, including suspension or even expulsion from the University. It can also have negative implications for student visas and future enrolment at CQUniversity or elsewhere. Students who engage in contract cheating also risk being blackmailed by contract cheating services.

Where can I get assistance?

For academic advice and guidance, the [Academic Learning Centre \(ALC\)](#) can support you in becoming confident in completing assessments with integrity and of high standard.

What can you do to act with integrity?



Be Honest

If your assessment task is done by someone else, it would be dishonest of you to claim it as your own



Seek Help

If you are not sure about how to cite or reference in essays, reports etc, then seek help from your lecturer, the library or the Academic Learning Centre (ALC)



Produce Original Work

Originality comes from your ability to read widely, think critically, and apply your gained knowledge to address a question or problem