



ENEC20001 Structural Design I

Term 2 - 2019

Profile information current as at 26/04/2024 04:03 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 2 - 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 Moodle unit evaluation

Feedback

Concrete and prestress are the best part of this unit.

Recommendation

Glad to note that students enjoyed the content.

Feedback from Moodle unit evaluation

Feedback

More slides with solved tutorial would be good.

Recommendation

Tutorials were discussed in the class and gave guidance to solve the problems. Lecturers were available to assist if any issue with solving the problems.

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



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
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

ENEC20001

Prescribed

Reinforced and Prestressed Concrete

3rd Edition (2018)

Authors: Yew-Chaye Loo and Sanaul Huq Chowdhury
Cambridge University Press
Melbourne , VIC , Australia
ISBN: 9781108405645
Binding: Paperback

Additional Textbook Information

Please ensure you will buy updated version (released after 2019 January)

[View textbooks at the CQUniversity Bookshop](#)

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

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Schedule

Week 1 - 15 Jul 2019

Module/Topic	Chapter	Events and Submissions/Topic
Reinforced Concrete Design Introduction, general analysis and design requirements for reinforced concrete (RC) structures, the behaviour of RC structural elements under axial, flexural and shear loading		
Prestressed Concrete Design Introduction to PC design - Basic Concepts		

Week 2 - 22 Jul 2019

Module/Topic	Chapter	Events and Submissions/Topic

Reinforced Concrete Design

Flexural Design of RC Beam

Prestressed Concrete Design

Introduction to PC design -

Prestressing System

Week 3 - 29 Jul 2019

Module/Topic	Chapter	Events and Submissions/Topic
Reinforced Concrete Design Flexural Design of RC Beam		
Prestressed Concrete Design Design for SLS (Magneil diagram)		

Week 4 - 05 Aug 2019

Module/Topic	Chapter	Events and Submissions/Topic
Reinforced Concrete Design Shear Design of RC Beam		
Prestressed Concrete Design PC Design - Tendon Details		

Week 5 - 12 Aug 2019

Module/Topic	Chapter	Events and Submissions/Topic
Reinforced Concrete Design Serviceability of RC Beam.		
Prestressed Concrete Design Design for ULS (Moment & Shear)		

Vacation Week - 19 Aug 2019

Module/Topic	Chapter	Events and Submissions/Topic

Week 6 - 26 Aug 2019

Module/Topic	Chapter	Events and Submissions/Topic
Reinforced Concrete Design Design of RC slab		
Prestressed Concrete Design Losses		

Week 7 - 02 Sep 2019

Module/Topic	Chapter	Events and Submissions/Topic
Reinforced Concrete Design Design of RC slab		
Prestressed Concrete Design PC design (Deflection and other checks)		

Week 8 - 09 Sep 2019

Module/Topic	Chapter	Events and Submissions/Topic
Reinforced Concrete Design Design of RC Column		
Prestressed Concrete Design PC design - End block Design		

Week 9 - 16 Sep 2019

Module/Topic	Chapter	Events and Submissions/Topic
Reinforced Concrete Design Design of RC Shallow Foundations		
Prestressed Concrete Design PC design - Other considerations		

Week 10 - 23 Sep 2019

Module/Topic	Chapter	Events and Submissions/Topic

Reinforced Concrete Design
Concrete Technology
Prestressed Concrete Design
PC design - External Post-tensioning

Team project: PC Design Due: Week 10 Wednesday (25 Sept 2019) 5:00 pm AEST

Week 11 - 30 Sep 2019

Module/Topic	Chapter	Events and Submissions/Topic
Content Review		

Week 12 - 07 Oct 2019

Module/Topic	Chapter	Events and Submissions/Topic
Content Review		

Review/Exam Week - 14 Oct 2019

Module/Topic	Chapter	Events and Submissions/Topic

Exam Week - 21 Oct 2019

Module/Topic	Chapter	Events and Submissions/Topic

Term Specific Information

Please read ENEC20001: General Information available on the unit website.

Due to the multi-campus delivery of the unit, Workshop timetable will be available from the unit website separately.

Assessment Tasks

1 Progressive Assessment: RC Design

Assessment Type

Written Assessment

Task Description

This assessment task consists of four **Progressive Assessments** in the form of in-class assessment. Each Assessment consists of a number of numerical/explanation-type questions.

Important Notes:

- Each Assessment is set for 60-120 minutes, depends on the content. You will get the information about the date and duration of the assessment from the Moodle site in Week 1.
- Assessment should be completed during the allocated time (usually during the tutorial time).
- Assessments cannot be deferred.

Assessment Due Date

Please see the Moodle Site

Return Date to Students

In 2 weeks

Weighting

35%

Minimum mark or grade

50%

Assessment Criteria

Each question will be assessed for the criterion accuracy and correct answers.

- Correct application of mathematics and arithmetic
- Answers clearly identified and explained
- Correct results/explanation

Referencing Style

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

Submission

Offline Online

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 principles 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 Team project: PC Design

Assessment Type

Written Assessment

Task Description

This assessment is a **Team project** and students will work in a small team to solve a complex design task.

Important Notes:

- Each team must submit a separate report.
- Students also will be invited for a viva at the end of the term.
- Viva cannot be deferred/declined. Failure to attend the viva will be considered as Fail in this assessment.

Assessment Due Date

Week 10 Wednesday (25 Sept 2019) 5:00 pm AEST

Return Date to Students

Week 12 Thursday (10 Oct 2019)

Weighting

35%

Minimum mark or grade

50%

Assessment Criteria

Grades for the assessment will be determined based on the evidence and substantiation of attainment of the Learning Outcomes.

After submission of the team project report, a short interview (viva) may be scheduled for each student. Students must be prepared to answer any questions raised by the facilitator/lecturer. The questions will be based on their individual achievement/work and the work the team has produced. The interview may also be used as an assessment tool and unsatisfactory performance during the interview may affect the grade.

The omission of any of the required items as specified in the Project Brief will automatically result in a Fail grade.

Students will receive feedback after two weeks of the interview.

Individual Student's Grade:

Initially, team submission will be assessed and a grade will be given for each team. Then individual grade will be determined based on their contribution and performance during the viva. Each student's contribution will be determined by peer assessment. It is possible that individual grade can be higher than team marks, but capped at maximum marks for the assessment.

Example: Individual contributions of 3 students in Team A are given below. This Team A received 32 marks (out of 35) for their project report.

M1 - 30%; M2 - 33%; M3 - 37% (Total 100%)

Based on the contribution, Individual marks are given as follow.

M1 = 32x (30/33.3) = 28.8 (out of 35)

M2 = 32 x (33/33.3) = 31.7 (out of 35)

M3 = 32 x (37/33.3) = 35.0 (out of 35)

If the performance in the viva is not at the satisfactory level, the above individual marks will be multiplied by 0.5 and given as final marks for this assessment item.

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%

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