

#### Profile information current as at 08/05/2024 03:51 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 <u>Assessment Policy and</u> <u>Procedure (Higher Education Coursework)</u>.

## Offerings For Term 1 - 2018

- Melbourne
- 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

<u>Metropolitan Campuses</u> Adelaide, Brisbane, Melbourne, Perth, Sydney

#### Assessment Overview

 Written Assessment Weighting: 35%
Written Assessment Weighting: 35%
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 <u>University's Grades and Results Policy</u> for more details of interim results and final grades.

# **CQUniversity Policies**

#### All University policies are available on the <u>CQUniversity Policy site</u>.

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 <u>CQUniversity Policy site</u>.

# 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



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	o	o	o	o	o	o
2 - Communication	o	o	o	0	o	o
3 - Cognitive, technical and creative skills	o	o	o	o	o	
4 - Research	0	o	0	0	o	
5 - Self-management	0	o	0	0	o	
6 - Ethical and Professional Responsibility	0	o	o	0	o	0
7 - Leadership		o				0

Graduate Attributes	Learning Outcomes					
	1	2	3	4	5	6
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%	o	o	o	o	o	o	0	
2 - Written Assessment - 35%	o	o	o	o	o	o		
3 - Examination - 30%	0	o	0		0	0		

# Textbooks and Resources

### Textbooks

ENEC20001

#### Prescribed

#### **Design of Prestressed Concrete to AS3600-2009**

Edition: 2nd (2015) Authors: Raymond Ian Gilbert, Neil Colin Mickleborough and Gianluca Ranzi CRC Press ISBN: 978-1-4665-7269-0 Binding: Other ENEC20001

#### Prescribed

#### **Reinforced and Prestressed Concrete**

Edition: 2nd (2013) Authors: Yew-Chaye Loo and Sanaul Huq Chowdhury Cambridge University Press ISBN: 978-1-107-63786-3 Binding: Other

## 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: <u>Harvard (author-date)</u> For further information, see the Assessment Tasks.

# Teaching Contacts

Faris Albermani Unit Coordinator f.albermani@cqu.edu.au

# Schedule

Week 1 - 05 Mar 2018		
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 - 12 Mar 2018		
Module/Topic	Chapter	<b>Events and Submissions/Topic</b>
Design of RC beams and columns		
Week 3 - 19 Mar 2018		
Module/Topic	Chapter	<b>Events and Submissions/Topic</b>
Design of RC one-way slabs		
Week 4 - 26 Mar 2018		
Module/Topic	Chapter	<b>Events and Submissions/Topic</b>
Design of RC two-way slabs		
Week 5 - 02 Apr 2018		
Module/Topic	Chapter	<b>Events and Submissions/Topic</b>
Design of RC flat plates		
Vacation Week - 09 Apr 2018		
Module/Topic	Chapter	<b>Events and Submissions/Topic</b>
Week 6 - 16 Apr 2018		
Module/Topic	Chapter	<b>Events and Submissions/Topic</b>
continue Design of RC flat plates		Design Project 1: Design of RC structures Due: Week 6 Monday (16 Apr 2018) 11:45 pm AEST
Week 7 - 23 Apr 2018		
Module/Topic	Chapter	<b>Events and Submissions/Topic</b>
Design of RC non-flexural elements, strut-and-tie modelling		
Week 8 - 30 Apr 2018		
Module/Topic	Chapter	<b>Events and Submissions/Topic</b>
Introduction to prestressed concrete (PC) and load balance		
Week 9 - 07 May 2018		
Module/Topic	Chapter	<b>Events and Submissions/Topic</b>
Design of uncracked PC members		
Week 10 - 14 May 2018		
Module/Topic	Chapter	<b>Events and Submissions/Topic</b>

Flexural design of PC members		
Week 11 - 21 May 2018		
Module/Topic	Chapter	<b>Events and Submissions/Topic</b>
Anchorage and losses in PC members		Design Project 2: Design of PC structures Due: Week 11 Monday (21 May 2018) 11:45 pm AEST
Week 12 - 28 May 2018		
Module/Topic	Chapter	<b>Events and Submissions/Topic</b>
Shear design of PC members		
Review/Exam Week - 04 Jun 2018		
Module/Topic	Chapter	<b>Events and Submissions/Topic</b>
Revision		
Exam Week - 11 Jun 2018		
Module/Topic	Chapter	<b>Events and Submissions/Topic</b>

# Assessment Tasks

# 1 Design Project 1: Design of RC structures

#### Assessment Type

Written Assessment

#### **Task Description**

Design project based on the material covered in Week 1 to Week 4 of the unit

## Assessment Due Date

Week 6 Monday (16 Apr 2018) 11:45 pm AEST

#### **Return Date to Students**

Week 8 Monday (30 Apr 2018)

Weighting 35%

#### **Assessment Criteria**

Your submission must be neatly presented and easy to follow. Present your results and working on clearly annotated diagrams. Include all the necessary calculations and assumptions made in your solution. Use consistent units.

#### **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 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**

Design project based on the material covered in Week 5 to Week 9 of the unit

#### Assessment Due Date

Week 11 Monday (21 May 2018) 11:45 pm AEST

#### **Return Date to Students**

Week 12 Monday (28 May 2018)

#### Weighting

35%

#### **Assessment Criteria**

Your submission must be neatly presented and easy to follow. Present your results and working on clearly annotated diagrams. Include all the necessary calculations and assumptions made in your solution. Use consistent units.

#### **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 120 minutes

Minimum mark or grade

50

Exam Conditions Open Book. 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 <u>Student Academic</u> <u>Integrity Policy and Procedure</u>. 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 <u>Academic Learning Centre (ALC)</u> 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