



ENEC20001 *Structural Design I*

Term 2 - 2020

Profile information current as at 20/09/2024 12:38 pm

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 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 - 2020

- 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. **Take Home Exam**

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

Feedback

Well organised and delivered unit.

Recommendation

This practice will be continued in the future offering as well.

Feedback from Moodle

Feedback

Lecturers are supportive and available for consultation when required.

Recommendation

This practice will be continued in the future offering as well.

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 - Take Home Exam - 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 - Take Home Exam - 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

If you prefer to study with a paper copy, they are available at the CQUni Bookshop here: <http://bookshop.cqu.edu.au> (search on the Unit code). eBooks are available at the publisher's website.

IT Resources

You will need access to the following IT resources:

- CQUniversity Student Email
- Internet
- Unit Website (Moodle)

Referencing Style

No referencing style set.

Teaching Contacts

Kumaran Suntharavadivel Unit Coordinator

t.suntharavadivel@cqu.edu.au

Schedule

Week 1 - 13 Jul 2020

Module/Topic	Chapter	Events and Submissions/Topic
Introduction of RC Design Limit State Design and Load Combinations Design Properties of Concrete and Reinforcement Durability and Fire Resistance Structural Analysis		

Week 2 - 20 Jul 2020

Module/Topic	Chapter	Events and Submissions/Topic
Design of Rectangular Beam • Ultimate Limit State requirements • Serviceability Limit State requirements		

Week 3 - 27 Jul 2020

Module/Topic	Chapter	Events and Submissions/Topic
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Design of T-Beams and irregular shapes

Week 4 - 03 Aug 2020

Module/Topic	Chapter	Events and Submissions/Topic
Design of Slab <ul style="list-style-type: none">• One-way and two-way slabs• Suspended Slabs		

Week 5 - 10 Aug 2020

Module/Topic	Chapter	Events and Submissions/Topic
Design of Columns		

Vacation Week - 17 Aug 2020

Module/Topic	Chapter	Events and Submissions/Topic
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Week 6 - 24 Aug 2020

Module/Topic	Chapter	Events and Submissions/Topic
Design of Walls and Footings Strut-and-tie Modelling		

Week 7 - 31 Aug 2020

Module/Topic	Chapter	Events and Submissions/Topic
Introduction to PC Design <ul style="list-style-type: none">• Principle of prestressing• Type of prestress		Project: Reinforced Concrete Design Due: Week 7 Monday (31 Aug 2020) 5:00 pm AEST

Week 8 - 07 Sep 2020

Module/Topic	Chapter	Events and Submissions/Topic
Analysis and Design of PC (Magnet Diagram)		

Week 9 - 14 Sep 2020

Module/Topic	Chapter	Events and Submissions/Topic
Determine the Tendon Details		

Week 10 - 21 Sep 2020

Module/Topic	Chapter	Events and Submissions/Topic
Ultimate Moment Checks and Losses		

Week 11 - 28 Sep 2020

Module/Topic	Chapter	Events and Submissions/Topic
End-block Design		

Week 12 - 05 Oct 2020

Module/Topic	Chapter	Events and Submissions/Topic
Revision		Project: Prestressed Concrete Beam Design Due: Week 12 Monday (5 Oct 2020) 5:00 pm AEST

Review/Exam Week - 12 Oct 2020

Module/Topic	Chapter	Events and Submissions/Topic
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Exam Week - 19 Oct 2020

Module/Topic	Chapter	Events and Submissions/Topic
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Term Specific Information

Read **ENEC20001: General Information** available from the unit website.

Assessment Tasks

1 Project: Reinforced Concrete Design

Assessment Type

Written Assessment

Task Description

You will be asked to design a low-rise RC building as per a client's requirements. The project briefing will be released on Friday, Week 2.

Assessment Due Date

Week 7 Monday (31 Aug 2020) 5:00 pm AEST

Submit a single PDF/Word file. Late submission penalty is 5% per day of the allotted marks. Extension requests greater than 14 days will be denied except under exceptional circumstances.

Return Date to Students

Week 9 Tuesday (15 Sept 2020)

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

In addition, the following criteria also will be considered:

Evidence of correct procedures

- All necessary steps in the analysis are followed in the correct order
- Clear presentation of mathematical working

Evidence of an understanding of the topic

- Use of correct principles and theories
- Interpretation of results as necessary

Professional presentation

- Appropriate use of diagrams, clear diagrams
- Correct use of terminology, conventions
- Clear English in the explanation of procedure and interpretation of results

Submission

Online

Graduate Attributes

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

- Leadership

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.

2 Project: Prestressed Concrete Beam Design

Assessment Type

Written Assessment

Task Description

You will be asked to design a PC beam as per a client's requirements. The project briefing will be released on Friday, Week 6.

Assessment Due Date

Week 12 Monday (5 Oct 2020) 5:00 pm AEST

Submit a single PDF/Word file. Late submission penalty is 5% per day of the allotted marks. Extension requests greater than 14 days will be denied except under exceptional circumstances.

Return Date to Students

Exam Week Tuesday (20 Oct 2020)

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

In addition, the following criteria also will be considered:

Evidence of correct procedures

- All necessary steps in the analysis are followed in the correct order
- Clear presentation of mathematical working

Evidence of an understanding of the topic

- Use of correct principles and theories
- Interpretation of results as necessary

Professional presentation

- Appropriate use of diagrams, clear diagrams
- Correct use of terminology, conventions
- Clear English in the explanation of procedure and interpretation of results

Submission

Online

Graduate Attributes

- Knowledge
- Communication
- Cognitive, technical and creative skills

- Research
- Self-management
- Ethical and Professional Responsibility
- Leadership

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.

3 End-of-Term Examination (Online)

Assessment Type

Take Home Exam

Task Description

End-of-Term Examination will be conducted in the form of an online test during the examination week.

Duration of the Test: 3 hours

Important: Students need to complete this online test at the prescribed time (notified via unit Moodle site). It is expected the student should on their web-camera for invigilation during the test.

Students may require to submit their workings on the conclusion of the examination (Scanned copy).

Assessment Due Date

Exam day and time will be informed via Moodle site

Return Date to Students

Weighting

30%

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

In addition, the following criteria also will be considered:

Evidence of correct procedures

- All necessary steps in the analysis are followed in the correct order
- Clear presentation of mathematical working

Evidence of an understanding of the topic

- Use of correct principles and theories
- Interpretation of results as necessary

Professional presentation

- Appropriate use of diagrams, clear diagrams
- Correct use of terminology, conventions
- Clear English in the explanation of procedure and interpretation of results

Submission

Online

Graduate Attributes

- Knowledge

- Communication
- Cognitive, technical and creative skills
- Self-management

Learning Outcomes Assessed

- Design complex reinforced concrete structural components using appropriate Australian Standards
- Design prestressed concrete structural components using appropriate Australian Standards

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