# ENAC12002 *Steel and Concrete Design*

## Term 1 - 2021

Profile information current as at 12/10/2024 07:01 pm

All details in this unit profile for ENAC12002 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

This unit introduces you to the basic principles and processes of structural design. You will learn how to design simple structural components made of steel and reinforced concrete under the supervision of a professional engineer. The concept of load action will be introduced and you will build on the structural analysis skills developed in Engineering Statics. Properties of common construction materials and structural sections will be reviewed in the context of sustainability. You will also develop your professional communication, problem-solving and ethical practice skills.

### Details

Career Level: *Undergraduate*
Unit Level: *Level 2*
Credit Points: *6*
Student Contribution Band: *8*
Fraction of Full-Time Student Load: *0.125*

### Pre-requisites or Co-requisites

Prerequisite: ENEG11006 Engineering Statics and ENEG11008 Materials for Engineers.
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 - 2021

- Online

### 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 6-credit Undergraduate unit at CQUniversity requires an overall time commitment of an average of 12.5 hours of study per week, making a total of 150 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. **Online Quiz(zes)**
Weighting: 20%
2. **Written Assessment**
Weighting: 40%
3. **Written Assessment**
Weighting: 40%

### 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 evaluation

**Feedback**
Overall well organised and structured unit.

**Recommendation**
This good practice will continue in 2021 with further enhancement in Moodle navigation.

#### Feedback from Moodle evaluation

**Feedback**
Assessment return can be sooner.

**Recommendation**
Every effort will be taken to return the assessments within two weeks of the submission date.

## Unit Learning Outcomes

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

1. Describe the limit state design process
2. Evaluate basic material and section properties for reinforced concrete and structural steel members in the context of sustainability
3. Design appropriate steel and concrete members using design tables and charts that comply with relevant Australian Standards
4. Demonstrate ethical conduct and a professional level of communication.

The learning outcomes are linked to Engineers Australia Stage 1 Competencies for Engineering Associates.

## 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 |
| **1 - Online Quiz(zes) - 20%** | | • | • | |
| **2 - Written Assessment - 40%** | • | • | • | • |
| **3 - Written Assessment - 40%** | • | • | • | • |

### Alignment of Graduate Attributes to Learning Outcomes

| Graduate Attributes | Learning Outcomes | | | |
|---|---|---|---|---|
| | 1 | 2 | 3 | 4 |
| 1 - Communication | • | | | • |
| 2 - Problem Solving | | • | • | |
| 3 - Critical Thinking | | • | • | |
| 4 - Information Literacy | • | | • | |
| 5 - Team Work | | | | |
| 6 - Information Technology Competence | | • | | • |
| 7 - Cross Cultural Competence | | | • | |
| 8 - Ethical practice | | | • | • |
| 9 - Social Innovation | | | | |
| 10 - 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 | 9 | 10 |
| 1 - Online Quiz(zes) - 20% | | • | • | • | | | | | | |
| 2 - Written Assessment - 40% | • | • | • | • | | • | • | • | | |
| 3 - Written Assessment - 40% | • | • | • | • | | • | • | • | | |

## Textbooks and Resources

### Textbooks

ENAC12002

**Prescribed**

**Design Capacity Tables for Structural Steel, Vol. 1: Open Sections**
5th Edition (2016)
Authors: Australian Steel Institute
Australian Steel Institute
Sydney , NSW , Australia
ISBN: 9781921476402
Binding: eBook
ENAC12002

**Prescribed**

**HB71-2011: Reinforced Concrete Design in accordance with AS 3600 - 2009**
(2011)
Authors: BD-002 (Concrete Structures)
Cement Concrete & Aggregates Australia and Standards Australia
Sydney , NSW , Australia
ISBN: 9781877023286
Binding: eBook

**Additional Textbook Information**
**HB71-2011: Reinforced Concrete Design in accordance with AS 3600 - 2009** can be obtained/accessed through the Library website.
**Design Capacity Tables for Structural Steel, Vol. 1: Open Sections** can be purchased through the Australian Steel Institute website through a discounted price for members.

### IT Resources

**You will need access to the following IT resources:**

- CQUniversity Student Email
- Internet
- Unit Website (Moodle)
- Microphone and headset

## Referencing Style

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

## Teaching Contacts

**Kumaran Suntharavadivel** Unit Coordinator
t.suntharavadivel@cqu.edu.au

## Schedule

**Week 1 - 08 Mar 2021**

| Module/Topic | Chapter | Events and Submissions/Topic |
|---|---|---|
| Introduction to Structural Design, Limit State Design, Estimation of Loads on the Structure | | |

**Week 2 - 15 Mar 2021**

| Module/Topic | Chapter | Events and Submissions/Topic |
|---|---|---|
| Reinforced Concrete Design: Beam Design I | | |

**Week 3 - 22 Mar 2021**

| Module/Topic | Chapter | Events and Submissions/Topic |
|---|---|---|
| Reinforced Concrete Design: Beam Design II | | |

**Week 4 - 29 Mar 2021**

| Module/Topic | Chapter | Events and Submissions/Topic |
|---|---|---|
| Reinforced Concrete Design: One way Slab Design | | **Progressive Assessment (Quiz) 1** opens at 09:00 AM on Monday |

**Week 5 - 05 Apr 2021**

| Module/Topic | Chapter | Events and Submissions/Topic |
|---|---|---|
| Reinforced Concrete Design: Two-way Slab Design | | **Progressive Assessment (Quiz) 1** closes at 09:00 AM on Monday |

**Vacation Week - 12 Apr 2021**

| Module/Topic | Chapter | Events and Submissions/Topic |
|---|---|---|
| Vacation week | | |

**Week 6 - 19 Apr 2021**

| Module/Topic | Chapter | Events and Submissions/Topic |
|---|---|---|
| Reinforced Concrete Design: Column Design | | |

**Week 7 - 26 Apr 2021**

| Module/Topic | Chapter | Events and Submissions/Topic |
|---|---|---|
| Steel Design: Introduction to the Steel Design | | **Assignment 1** Due: Week 7 Tuesday (27 Apr 2021) 11:55 pm AEST |

**Week 8 - 03 May 2021**

| Module/Topic | Chapter | Events and Submissions/Topic |
|---|---|---|
| Steel Design: Design of Tension Members | | |

**Week 9 - 10 May 2021**

| Module/Topic | Chapter | Events and Submissions/Topic |
|---|---|---|
| Steel Design: Design of Compression Members | | |

**Week 10 - 17 May 2021**

| Module/Topic | Chapter | Events and Submissions/Topic |
|---|---|---|
| Steel Design: Design of Bending Members | | **Progressive Assessment (Quiz) 2** opens at 09:00 AM on Monday |

**Week 11 - 24 May 2021**

| Module/Topic | Chapter | Events and Submissions/Topic |
|---|---|---|
| Steel Design: Design of Webs in Shear and Bearing | | **Progressive Assessment (Quiz) 2** closes at 09:00 AM on Monday |

**Week 12 - 31 May 2021**

| Module/Topic | Chapter | Events and Submissions/Topic |
|---|---|---|
| Steel Design: Design of connections | | |

**Review/Exam Week - 07 Jun 2021**

| Module/Topic | Chapter | Events and Submissions/Topic |
|---|---|---|

**Assignment 2** Due: Review/Exam Week Tuesday (8 June 2021) 11:55 pm AEST

**Exam Week - 14 Jun 2021**

| Module/Topic | Chapter | Events and Submissions/Topic |
|---|---|---|

## Term Specific Information

In addition to the study materials available on the Moodle site, a weekly one-hour drop-in session will be conducted through Zoom.

## Assessment Tasks

### 1 Progress Assessments

**Assessment Type**
Online Quiz(zes)

**Task Description**
This assessment task consists of Two Progressive assessments (tests) in the form of online quizzes. Each test consists of a combination of numerical and multiple-choice questions.
Important Notes:

- Each test is set for 60 minutes. You have 60 minutes from when you start your attempt to submit your answers. If you start but leave a test and come back to it later, your 60 min time may have lapsed and you will be scored - zero for that attempt.
- You can attempt the quiz up to 3 times within the given time frame (generally 1 week) as specified in the Schedule. The test will be automatically closed after the end of the given time frame.
- The final mark will be the Highest of all the attempts.
- Tests cannot be deferred.

**Number of Quizzes**
2

**Frequency of Quizzes**
Other

**Assessment Due Date**

See the Schedule

**Return Date to Students**

Immediately after the submission

**Weighting**
20%

**Assessment Criteria**
Due to the nature of the assessment, only the final answer will be considered. Full marks will be given for each correct answers, but there will be no partial marks.

**Referencing Style**

- Harvard (author-date)

**Submission**
Online

**assessmentOutcome**

- Evaluate basic material and section properties for reinforced concrete and structural steel members in the context of sustainability
- Design appropriate steel and concrete members using design tables and charts that comply with relevant

Australian Standards

**assessmentGradAttribute**

- Problem Solving
- Critical Thinking
- Information Literacy

## 2 Assignment 1

**Assessment Type**
Written Assessment

**Task Description**
This assessment to cover the content from weeks 1 to 6 (Reinforced Concrete Design). Assessment questions include theory, analysis and design of structural elements. Questions will be available via Moodle unit web site at the beginning of the term.

**Assessment Due Date**
Week 7 Tuesday (27 Apr 2021) 11:55 pm AEST

**Return Date to Students**
Week 9 Wednesday (12 May 2021)

**Weighting**
40%

**Minimum mark or grade**
40%

**Assessment Criteria**
**Each question in this assignment will be assessed separately for the criterion *accuracy and correct results*.**

- Correct application of mathematics and arithmetic
- Answers clearly identified
- Correct results

**In addition, the assignment as a whole will be assessed against the following criteria:**
**Evidence of correct procedures**

- All necessary steps in the analysis are present in the correct order
- Clear presentation of mathematical and arithmetical working linking given details of the problem to the results obtained
- Evidence of checking results (mathematical, graphical, logic-common sense)

**Evidence of the understanding of the topic**

- Explanation of choices made in the analysis (why is the procedure required, why this particular procedure)
- Interpretation of results, eg limitations, the direction of vectors

**Professional presentation**

- The work (job) is clearly identified (problem, date, analyst)
- A clear statement of each problem and its details and requirements
- The logical layout of the analysis
- Appropriate use of diagrams, clear diagrams
- Correct use of terminology, conventions
- Clear English in the explanation of procedure and interpretation of results.

**Referencing Style**

- Harvard (author-date)

**Submission**
Online

**assessmentOutcome**

- Describe the limit state design process
- Evaluate basic material and section properties for reinforced concrete and structural steel members in the context of sustainability

- Design appropriate steel and concrete members using design tables and charts that comply with relevant Australian Standards
- Demonstrate ethical conduct and a professional level of communication.

**assessmentGradAttribute**

- Communication
- Problem Solving
- Critical Thinking
- Information Literacy
- Information Technology Competence
- Cross Cultural Competence
- Ethical practice

# 3 Assignment 2

**Assessment Type**
Written Assessment

**Task Description**
This assessment to cover the content from weeks 7 to 12 (Steel Design). Assessment questions include theory, analysis and design of structural elements. Questions will be available via Moodle unit web site at the beginning of Week 7.

**Assessment Due Date**
Review/Exam Week Tuesday (8 June 2021) 11:55 pm AEST

**Return Date to Students**
Exam Week Friday (18 June 2021)

**Weighting**
40%

**Minimum mark or grade**
40%

**Assessment Criteria**
**Each question in this assignment will be assessed separately for the criterion *accuracy and correct results*.**

- Correct application of mathematics and arithmetic
- Answers clearly identified
- Correct results

**In addition, the assignment as a whole will be assessed against the following criteria:**
**Evidence of correct procedures**

- All necessary steps in the analysis are present in the correct order
- Clear presentation of mathematical and arithmetical working linking given details of the problem to the results obtained
- Evidence of checking results (mathematical, graphical, logic-common sense)

**Evidence of the understanding of the topic**

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

**Referencing Style**

- Harvard (author-date)

**Submission**
Online

**assessmentOutcome**

- Describe the limit state design process
- Evaluate basic material and section properties for reinforced concrete and structural steel members in the context of sustainability
- Design appropriate steel and concrete members using design tables and charts that comply with relevant Australian Standards
- Demonstrate ethical conduct and a professional level of communication.

**assessmentGradAttribute**

- Communication
- Problem Solving
- Critical Thinking
- Information Literacy
- Information Technology Competence
- Cross Cultural Competence
- Ethical practice

## 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