



# ENEC20002 *Steel and Masonry Design*

## Term 2 - 2024

Profile information current as at 17/06/2024 11:44 pm

All details in this unit profile for ENEC20002 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

Steel and Masonry Design introduces you to material and section properties of structural steel and masonry, and factors affecting the properties of steel and masonry construction. You will design complex steel and masonry structures subjected to various loads that comply with both ultimate and serviceability limit states as required in Australian Standards. In this unit, you will also use appropriate computer software to analyse and/or design. You will also formulate, plan, manage, and complete projects individually or in teams in an ethical and professional manner considering stakeholders and sustainability requirements. You will also document and communicate engineering information using the appropriate platform at a standard expected for a professional engineer.

### 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

There are no requisites for this unit.

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 - 2024

- Melbourne
- Online
- 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. **Project (applied)**

Weighting: 30%

#### 2. **Project (applied)**

Weighting: 30%

#### 3. **In-class Test(s)**

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 In-class feedback

**Feedback**

Students appreciated the opportunity to learn structural design using Microsoft Excel and SPACEGASS

**Recommendation**

The use of industry-relevant tools such as Microsoft Excel and SPACEGASS in the teaching of structural design should be continued in the subsequent offerings of this unit.

#### Feedback from In-class feedback

**Feedback**

Students expressed their interest in guest lectures in this unit

**Recommendation**

Guest lectures should be organised in the subsequent offerings of this unit.

## Unit Learning Outcomes

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

1. Evaluate structural performance using the material and section properties of structural steel and masonry
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 steel members and connections subjected to various design actions according to the Australian Standards
4. Design masonry members and connections subjected to various design actions according to the Australian Standards
5. Use computer software to analyse and design the structures subjected to different load combinations that comply with relevant standards
6. Demonstrate a professional level of communication and leadership.

The Learning Outcomes for this unit are linked with the Engineers Australia Stage 1 Competency Standards for Professional Engineers in the areas of 1. Knowledge and Skill Base, 2. Engineering Application Ability and 3. Professional and Personal Attributes at the following levels:

#### Intermediate

1.2 Conceptual understanding of the mathematics, numerical analysis, statistics, and computer and information sciences which underpin the engineering discipline. (LO: 1I 3I 4I )

1.5 Knowledge of engineering design practice and contextual factors impacting the engineering discipline. (LO: 3I 4I )

3.1 Ethical conduct and professional accountability. (LO: 2I 6N )

3.2 Effective oral and written communication in professional and lay domains. (LO: 2I 6I )

3.5 Orderly management of self, and professional conduct. (LO: 2I 6I )

#### Advanced

1.1 Comprehensive, theory-based understanding of the underpinning natural and physical sciences and the engineering fundamentals applicable to the engineering discipline. (LO: 1I 3A 4A )

1.3 In-depth understanding of specialist bodies of knowledge within the engineering discipline. (LO: 1A 3A 4A 5I )

1.4 Discernment of knowledge development and research directions within the engineering discipline. (LO: 1A 3A 4A 5I )

1.6 Understanding of the scope, principles, norms, accountabilities and bounds of sustainable engineering practice in the specific discipline. (LO: 1I 3A 4A 5A )

2.1 Application of established engineering methods to complex engineering problem solving. (LO: 1I 2I 3A 4A 5I )

2.2 Fluent application of engineering techniques, tools and resources. (LO: 1I 5A )

2.3 Application of systematic engineering synthesis and design processes. (LO: 1I 3A 4A 5I )

2.4 Application of systematic approaches to the conduct and management of engineering projects. (LO: 1A 2A 3I 4I 5I )

3.4 Professional use and management of information. (LO: 1I 2A 3I 4I 6I )

3.6 Effective team membership and team leadership. (LO: 2A 3I 4I 6I )

*Note: LO refers to the Learning Outcome number(s) which link to the competency and the levels: N - Introductory, I - Intermediate and A - Advanced.*

Refer to the Engineering Postgraduate Units Moodle site for further information on the Engineers Australia's Stage 1 Competency Standard for Professional Engineers and course level mapping information

<https://moodle.cqu.edu.au/course/view.php?id=11382>

## 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
<b>1 - Project (applied) - 30%</b>	•	•	•		•	•
<b>2 - Project (applied) - 30%</b>	•	•		•	•	•

Assessment Tasks	Learning Outcomes					
	1	2	3	4	5	6
3 - In-class Test(s) - 40%			•	•		

### 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 - Project (applied) - 30%	○	○	○	○	○	○	○	
2 - Project (applied) - 30%	○	○	○	○	○	○		
3 - In-class Test(s) - 40%	○	○	○		○	○		

## Textbooks and Resources

### Textbooks

ENEC20002

#### Prescribed

##### Steel Designers' Handbook

Eighth edition (2012)

Authors: Gorenc, B, Tinyou, R and Syam, A

Australian Steel Institute Sydney

Sydney , NSW , Australia

ISBN: 9781742233413

[View textbooks at the CQUniversity Bookshop](#)

### IT Resources

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

- CQUniversity Student Email
- Internet
- Unit Website (Moodle)
- Finite Element Software for Structural Analysis: SPACE GASS

## Referencing Style

All submissions for this unit must use the referencing style: [Harvard \(author-date\)](#)

For further information, see the Assessment Tasks.

## Teaching Contacts

**Sarkar Noor E Khuda** Unit Coordinator

[s.noorekhuda@cqu.edu.au](mailto:s.noorekhuda@cqu.edu.au)

## Schedule

### Week 1 - 08 Jul 2024

Module/Topic	Chapter	Events and Submissions/Topic
Lecture 1: Introduction to ENEC20002, Unit Overview, Assessments, Masonry		
Lecture 2: Control Joints, Material Properties		
Tutorial 1: Team Formation/Project Discussion		
Tutorial 2: Project Discussion/Control Joints		

### Week 2 - 15 Jul 2024

Module/Topic	Chapter	Events and Submissions/Topic
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Lecture 1: Load Distribution Mechanism  
 Lecture 2: Design of URM for Shear  
 Tutorial 1: Team Formation/Project Discussion  
 Tutorial 2: Project Discussion/Shear Design

**Week 3 - 22 Jul 2024**

Module/Topic	Chapter	Events and Submissions/Topic
Lecture 1: Design of URM for Out-of-plane Bending Lecture 2: Design of URM for Compression Tutorial 1: Project Discussion/Bending Design Tutorial 2: Project Discussion/Compression Design		

**Week 4 - 29 Jul 2024**

Module/Topic	Chapter	Events and Submissions/Topic
Lecture 1: Design of RM for Out-of-plane Bending Lecture 2: Design of RM for Shear Tutorial 1: Project Discussion/Bending Design Tutorial 2: Project Discussion/Shear Design		

**Week 5 - 05 Aug 2024**

Module/Topic	Chapter	Events and Submissions/Topic
Lecture 1: Design of RM for Compression Lecture 2: Fire Design of Masonry Tutorial 1: Project Discussion/Compression Design Tutorial 2: Project Discussion/Fire Design		

**Vacation Week - 12 Aug 2024**

Module/Topic	Chapter	Events and Submissions/Topic

**Week 6 - 19 Aug 2024**

Module/Topic	Chapter	Events and Submissions/Topic
Lecture 1: Introduction to Steel Design Lecture 2: Material and Section Properties Tutorial 1: Project Discussion/Steel Design Tutorial 2: Project Discussion/Steel Sections and Material Properties		<b>INDIVIDUAL PROJECT (MASONRY DESIGN)</b> Due: Week 6 Monday (19 Aug 2024) 10:00 pm AEST

**Week 7 - 26 Aug 2024**

Module/Topic	Chapter	Events and Submissions/Topic

Lecture 1: Wind Loading I  
 Lecture 2: Wind Loading II  
 Tutorial 1: Project  
 Discussion/Wind Loading  
 Tutorial 2: Project  
 Discussion/Wind Loading

**Week 8 - 02 Sep 2024**

Module/Topic	Chapter	Events and Submissions/Topic
Lecture 1: Design for Tension Lecture 2: Design for Compression Tutorial 1: Project Discussion/Tension Design Tutorial 2: Project Discussion/Compression Design		

**Week 9 - 09 Sep 2024**

Module/Topic	Chapter	Events and Submissions/Topic
Lecture 1: Design for Bending I Lecture 2: Design Bending II Tutorial 1: Project Discussion/Bending Design Tutorial 2: Project Discussion/Bending Design		

**Week 10 - 16 Sep 2024**

Module/Topic	Chapter	Events and Submissions/Topic
Lecture 1: Combined Action Lecture 2: Connection Design Tutorial 1: Project Discussion/Combined Action Tutorial 2: Project Discussion/Connection Design		

**Week 11 - 23 Sep 2024**

Module/Topic	Chapter	Events and Submissions/Topic
Lecture 1: Revision Week Lecture 2: Revision Week Tutorial 1: Revision Week Tutorial 2: Revision Week		<b>TEAM PROJECT (STEEL DESIGN)</b> Due: Week 11 Monday (23 Sept 2024) 10:00 pm AEST

**Week 12 - 30 Sep 2024**

Module/Topic	Chapter	Events and Submissions/Topic
Lecture 1: Revision Week Lecture 2: Revision Week Tutorial 1: Revision Week Tutorial 2: Revision Week		

**Review/Exam Week - 07 Oct 2024**

Module/Topic	Chapter	Events and Submissions/Topic

**Exam Week - 14 Oct 2024**

Module/Topic	Chapter	Events and Submissions/Topic



## Term Specific Information

All teaching resources and assessment details are available on the unit Moodle website.

## Assessment Tasks

### 1 INDIVIDUAL PROJECT (MASONRY DESIGN)

#### Assessment Type

Project (applied)

#### Task Description

The aim of this assessment is to allow the students to demonstrate their understanding of various concepts, theories and processes developed in the Structural Engineering topics covered in this unit. This may include, but is not limited to structural analysis, calculation of design actions and design of masonry walls against gravitational and lateral loading.

#### Assessment Due Date

Week 6 Monday (19 Aug 2024) 10:00 pm AEST

Submit the assessment item on or before the due date and time. Late submission penalty is 5% per day of the allotted marks. Extension requests greater than 14 days will be denied except under exceptional circumstances. All extension request should be submitted through Moodle.

#### Return Date to Students

Within two weeks after assignment submission

#### Weighting

30%

#### Minimum mark or grade

50% of the total marks for the assignment are required to pass this course

#### 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 project report, a short interview (viva) will 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 they produced. The interview may also be used as an assessment tool and unsatisfactory performance during interview may affect the grade\*. Omission of any of the required items as specified in the Project Brief will automatically result in a Fail grade.

*\* If the performance in the viva is not at the satisfactory level, the marks obtained from the submission will be multiplied by 0.5 and awarded as final marks for this assessment.*

#### Referencing Style

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

#### Submission

Online

#### Learning Outcomes Assessed

- Evaluate structural performance using the material and section properties of structural steel and masonry
- 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 steel members and connections subjected to various design actions according to the Australian Standards
- Use computer software to analyse and design the structures subjected to different load combinations that comply with relevant standards
- 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 (STEEL DESIGN)

### Assessment Type

Project (applied)

### Task Description

The aim of this assessment is to allow the students to demonstrate their understanding of various concepts, theories and processes developed in this unit. This may include but is not limited to structural analysis, calculation of design actions, the design of steel structures, the use of structural analysis and design software and the final drawing of the designed structures.

Students are required to submit their project report and present it orally.

### Assessment Due Date

Week 11 Monday (23 Sept 2024) 10:00 pm AEST

Submit the assessment item on or before the due date and time. Late submission penalty is 5% per day of the allotted marks. Extension requests greater than 14 days will be denied except under exceptional circumstances. All extension request should be submitted through Moodle.

### Return Date to Students

Within 2 weeks after assignment submission

### Weighting

30%

### Minimum mark or grade

50% of the total marks for the assignment are required to pass this course

### 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 36 marks (out of 40) for their project report.*

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

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

*$M1 = 36 \times (30/33.3) = 32.4$  (out of 40)*

*$M2 = 36 \times (33/33.3) = 35.6$  (out of 40)*

*$M3 = 36 \times (37/33.3) = 40.0$  (out of 40)*

*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**

- Evaluate structural performance using the material and section properties of structural steel and masonry
- 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 masonry members and connections subjected to various design actions according to the Australian Standards
- Use computer software to analyse and design the structures subjected to different load combinations that comply with relevant standards
- Demonstrate a professional level of communication and leadership.

### **Graduate Attributes**

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

## **3 In-class Test**

### **Assessment Type**

In-class Test(s)

### **Task Description**

The in-class test will be conducted in the form of an online test during the examination week.

Duration of the Test: 2 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 at the conclusion of the examination (Scanned copy).

### **Assessment Due Date**

In-class test date and time will be informed via Moodle site

### **Return Date to Students**

Within two weeks after the exam

### **Weighting**

40%

### **Minimum mark or grade**

50%

### **Assessment Criteria**

Each question will be assessed for 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

#### Referencing Style

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

#### Submission

Online

#### Learning Outcomes Assessed

- Design steel members and connections subjected to various design actions according to the Australian Standards
- Design masonry members and connections subjected to various design actions according to the Australian Standards

#### Graduate Attributes

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

## 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