ENEC13015 *Steel and Timber Design*
Term 1 - 2022

Profile information current as at 14/12/2025 04:55 am

General Information

Overview
This unit introduces Australian Standards used for steel and timber design. Basic material and section properties and factors affecting the properties of structural members are introduced. You will design steel and timber members subjected to axial loads, bending moments and combined actions, then check whether they comply with both ultimate and serviceability limit states as required in AS4100 and AS1720 respectively. Furthermore, you also will design steel connection and timber joints according to Australian Standards. You also develop skills in the use of computer software in structural design. You are expected to document the process of analysis and design and communicate, work and learn, both individually and in teams in a professional manner.

Details
Career Level: *Undergraduate*
Unit Level: *Level 3*
Credit Points: *6*
Student Contribution Band: *8*
Fraction of Full-Time Student Load: *0.125*

Pre-requisites or Co-requisites
Prerequisites: ENEC12012 Stress Analysis AND MATH11218 Applied Mathematics
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 - 2022

- Bundaberg
- Cairns
- Gladstone
- Mackay
- 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 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. **Written Assessment**
Weighting: 25%
2. **Written Assessment**
Weighting: 25%
3. **Examination**
Weighting: 50%

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 good practice will be continued in the following years.

Feedback from Moodle

Feedback
Good study materials and a very effective way of teaching through writing each step on paper.

Recommendation
This good practice will be continued in the following years.

Feedback from Moodle/email

Feedback
Assignment feedback is late

Recommendation
Due to the additional workload of the staff, the assessment marking took longer than expected. The workload of the staff will be reviewed and appropriate action will be taken to reduce the return time in 2022.

Unit Learning Outcomes

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

1. Explain how the key materials and section properties of steel and timber affect the structural performance
2. Explain the ultimate and serviceability design limit states for steel and timber members
3. Design steel and timber members and connections subjected to various design actions according to relevant Australian Standards
4. Design structures subjected to load combinations according to Australian Standards
5. Demonstrate a professional level of communication.

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:

Introductory

3.5 Orderly management of self, and professional conduct. (LO: 5N)

Intermediate

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

3.1 Ethical conduct and professional accountability. (LO: 3I)

3.2 Effective oral and written communication in professional and lay domains. (LO: 5I)

3.3 Creative, innovative and pro-active demeanour. (LO: 3I)

3.4 Professional use and management of information. (LO: 1I 3I)

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 2I 3A)

1.3 In-depth understanding of specialist bodies of knowledge within the engineering discipline. (LO: 1A 2I 3A)

1.4 Discernment of knowledge development and research directions within the engineering discipline. (LO: 1I 2I 3A)

1.5 Knowledge of engineering design practice and contextual factors impacting the engineering discipline. (LO: 1I 2I 3A 4I)

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

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

2.2 Fluent application of engineering techniques, tools and resources. (LO: 3A 4I)

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

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 Undergraduate Course 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=1511

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	5
1 - Written Assessment - 25%	•	•	•	•	•
2 - Written Assessment - 25%	•	•	•	•	•
3 - Examination - 50%	•	•	•		•

Alignment of Graduate Attributes to Learning Outcomes

Graduate Attributes	Learning Outcomes				
	1	2	3	4	5
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					

Textbooks and Resources

Textbooks

ENEC13015

Prescribed

Steel Designers' Handbook
8th Edition (2012)
Authors: Gorenc, B, Tinyou, R and Syam, A
Australian Steel Institute
Sydney , NSW , Australia
ISBN: 9781742233413
Binding: Hardcover
ENEC13015

Prescribed

Timber Design Handbook (SA HB 108-2013)
(2013)
Authors: Boughton, G. N, Crews, K. and Standards Association of Australia
Standards Australia
Sydney , NSW , Australia
ISBN: 9781743423738
Binding: eBook

Additional Textbook Information
Timber Design Handbook (SA HB 108-2013) is accessible from Standards Australia for free of charge. Students need to follow the instructions given on the CQUni Library website.

View textbooks at the CQUniversity Bookshop

IT Resources

You will need access to the following IT resources:

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

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 - 07 Mar 2022

Module/Topic	Chapter	Events and Submissions/Topic
Structural Design Process & Limit State Approaches		

Week 2 - 14 Mar 2022

Module/Topic	Chapter	Events and Submissions/Topic

Estimation of Design Actions on Structures		

Week 3 - 21 Mar 2022

Module/Topic	Chapter	Events and Submissions/Topic
Design of steel members subjected Tension and Compression	Study Guide: Tension Member Study Guide: Compression Member	

Week 4 - 28 Mar 2022

Module/Topic	Chapter	Events and Submissions/Topic
Design of Steel Members Subjected to Bending	Study Guide: Bending Study Guide: Shear & Bearing	

Week 5 - 04 Apr 2022

Module/Topic	Chapter	Events and Submissions/Topic
Design of Steel Members Subjected to Combined Actions		

Vacation Week - 11 Apr 2022

Module/Topic	Chapter	Events and Submissions/Topic
Mid-term Break		

Week 6 - 18 Apr 2022

Module/Topic	Chapter	Events and Submissions/Topic
Application of Design Software in Steel Design	Guide to use Spacegass	

Week 7 - 25 Apr 2022

Module/Topic	Chapter	Events and Submissions/Topic
Design of Steel Connections Fire & Corrosion Protection	Study Guide: Connections	

Week 8 - 02 May 2022

Module/Topic	Chapter	Events and Submissions/Topic
Introduction to Timber Design	Study Resources	**Assignment 1** Due: Week 8 Monday (2 May 2022) 5:00 pm AEST

Week 9 - 09 May 2022

Module/Topic	Chapter	Events and Submissions/Topic
Design timber members subjected to tension and compression	Study Resources	

Week 10 - 16 May 2022

Module/Topic	Chapter	Events and Submissions/Topic
Design timber members subjected to bending and combined actions	Study Resources	

Week 11 - 23 May 2022

Module/Topic	Chapter	Events and Submissions/Topic
Design of timber connections	Study Resources	

Week 12 - 30 May 2022

Module/Topic	Chapter	Events and Submissions/Topic
Review		**Assignment 2** Due: Week 12 Monday (30 May 2022) 5:00 pm AEST

Review/Exam Week - 06 Jun 2022

Module/Topic	Chapter	Events and Submissions/Topic
		Examination - Please check the exam timetable

Exam Week - 13 Jun 2022

Module/Topic	Chapter	Events and Submissions/Topic

Assessment Tasks

1 Assignment 1

Assessment Type
Written Assessment

Task Description
The aim of this assignment is to allow the students to demonstrate their understanding of various concepts, theories and processes studied/developed in steel design.
Assignment 1 will be available by end of week 1 through the unit website.

Assessment Due Date
Week 8 Monday (2 May 2022) 5:00 pm AEST

Return Date to Students
Week 10 Tuesday (17 May 2022)

Weighting
25%

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

Learning Outcomes Assessed

- Explain how the key materials and section properties of steel and timber affect the structural performance
- Explain the ultimate and serviceability design limit states for steel and timber members
- Design steel and timber members and connections subjected to various design actions according to relevant Australian Standards

- Design structures subjected to load combinations according to Australian Standards
- Demonstrate a professional level of communication.

Graduate Attributes

- Communication
- Problem Solving
- Critical Thinking
- Information Literacy
- Team Work
- Information Technology Competence
- Cross Cultural Competence

2 Assignment 2

Assessment Type
Written Assessment

Task Description
The aim of this assignment is to allow the students to demonstrate their understanding of various concepts, theories and processes studied/developed in timber design.
Assignment 2 will be available by end of week 7 through the unit website.

Assessment Due Date
Week 12 Monday (30 May 2022) 5:00 pm AEST

Return Date to Students

Exam Week Tuesday (14/06/2022)

Weighting
25%

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

Learning Outcomes Assessed

- Explain how the key materials and section properties of steel and timber affect the structural performance
- Explain the ultimate and serviceability design limit states for steel and timber members
- Design steel and timber members and connections subjected to various design actions according to relevant Australian Standards
- Design structures subjected to load combinations according to Australian Standards
- Demonstrate a professional level of communication.

Graduate Attributes

- Communication
- Problem Solving
- Critical Thinking
- Information Literacy
- Information Technology Competence

Examination

Outline
Complete an invigilated examination.

Date
During the examination period at a CQUniversity examination centre.

Weighting
50%

Length
180 minutes

Minimum mark or grade
50%

Exam Conditions
Closed 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