



# CIVL3305

## Structural Design 2

Session 2, In person-scheduled-weekday, North Ryde 2022

*School of Engineering*

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## General Information

Unit convenor and teaching staff

Unit Convenor & Lecturer

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Tuesdays (2 pm - 4 pm) to be set on email requests due to building access requirement.

Teaching assistant

Nour Manafikhi

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Contact via E-mail

44 Waterloo Road, Structural Lab

To be set on email requests

Credit points

10

Prerequisites

130cp at 1000 level or above and CIVL2301

Corequisites

Co-badged status

### Unit description

In this unit, students will be introduced to fundamentals, concepts, and design principles for steel and timber design. Students will learn the properties of steel and timber materials in structural engineering applications. Design requirements will be based on Australian standards for steel design (AS4100) and for timber design (AS1720), as well as design loading standards (AS1170). Students will develop their understanding of the physical performance of structural steel members and structural timber members in a variety of structural systems in Civil Engineering. Students will also gain an understanding of design requirements and section and element designs according to the ultimate limit state and serviceability limit state designs. Specific topics include types and properties of structural steel sections, structural steel component design, design of steel structures, varieties and properties of structural timber, design of timber elements, and design of timber structures.

This unit provides an essential foundation for subsequent structural design project and theses in the fourth year for students who would like to pursue more studies in the structural engineering field.

## Important Academic Dates

Information about important academic dates including deadlines for withdrawing from units are available at <https://www.mq.edu.au/study/calendar-of-dates>

## Learning Outcomes

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

**ULO1:** convey sound knowledge of the theory, concepts and principles for structural steel and timber design

**ULO2:** comprehend the knowledge of the steel and timber design applications to create safe and accurate design outcomes according to the design requirements set out in Australian Standards

**ULO3:** Perform qualitative and quantitative prediction and assessment of design capacities of structural steel and timber members

**ULO4:** communicate effectively and professionally the outcomes of the structural steel and timber designs

**ULO5:** demonstrate transferable skills (team player, time-management, self-management, creative thinking, and compliance with ethical codes of conducts)

## General Assessment Information

### Late Assessment Submission Penalty

From 1 July 2022, Students enrolled in Session-based units with written assessments will have the following university standard late penalty applied. Please see <https://students.mq.edu.au/stud>

[y/assessment-exams/assessments](#) for more information.

Unless a Special Consideration request has been submitted and approved, a 5% penalty (of the total possible mark) will be applied each day a written assessment is not submitted, up until the 7<sup>th</sup> day (including weekends). After the 7<sup>th</sup> day, a grade of '0' will be awarded even if the assessment is submitted. Submission time for all written assessments is set at **11:55 pm**. A 1-hour grace period is provided to students who experience a technical concern.

For any late submission of time-sensitive tasks, such as scheduled tests/exams, performance assessments/presentations, and/or scheduled practical assessments/labs, students need to submit an application for [Special Consideration](#).

| EA Competency Standard               |  | Unit Learning Outcomes |
|--------------------------------------|--|------------------------|
| Knowledge and Skill Base             | 1.1 Comprehensive, theory-based understanding of the underpinning fundamentals applicable to the engineering discipline. | ULO1                   |
|                                      | 1.2 Conceptual understanding of underpinning maths, analysis, statistics, computing.                                     | ULO3                   |
|                                      | 1.3 In-depth understanding of specialist bodies of knowledge   | ULO1,2                 |
|                                      | 1.4 Discernment of knowledge development and research directions   | ULO2,3,5               |
|                                      | 1.5 Knowledge of engineering design practice   | ULO1                   |
|                                      | 1.6 Understanding of scope, principles, norms, accountabilities of sustainable engineering practice.                     | ULO1,3                 |
| Engineering Application Ability      | 2.1 Application of established engineering methods to complex problem solving  | ULO2,3                 |
|                                      | 2.2 Fluent application of engineering techniques, tools and resources.   | ULO2,3                 |
|                                      | 2.3 Application of systematic engineering synthesis and design processes.  | ULO2                   |
|                                      | 2.4 Application of systematic approaches to the conduct and management of engineering projects.                          | ULO2                   |
| Professional and Personal Attributes | 3.1 Ethical conduct and professional accountability.   | ULO4,5                 |
|                                      | 3.2 Effective oral and written communication in professional and lay domains.  | ULO5                   |
|                                      | 3.3 Creative, innovative and pro-active demeanour.   | ULO4                   |
|                                      | 3.4 Professional use and management of information.  | ULO4,5                 |
|                                      | 3.5 Orderly management of self, and professional conduct.  | ULO4                   |

## Assessment Tasks

| Name                        | Weighting | Hurdle | Due               |
|-----------------------------|-----------|--------|-------------------|
| <u>A design project</u>     | 30%       | No     | Week 13           |
| <u>Final Examination</u>    | 30%       | No     | 11/11/2022        |
| <u>Regular problem sets</u> | 20%       | No     | Weeks 5, 7, 9, 11 |
| <u>Mid session test</u>     | 20%       | No     | Week 8            |

### A design project

Assessment Type <sup>1</sup>: Project

Indicative Time on Task <sup>2</sup>: 21 hours

Due: **Week 13**

Weighting: **30%**

Students will design an engineering structure incorporating structural steel and timber and submit a report.

On successful completion you will be able to:

- convey sound knowledge of the theory, concepts and principles for structural steel and timber design
- comprehend the knowledge of the steel and timber design applications to create safe and accurate design outcomes according to the design requirements set out in Australian Standards
- Perform qualitative and quantitative prediction and assessment of design capacities of structural steel and timber members
- communicate effectively and professionally the outcomes of the structural steel and timber designs
- demonstrate transferable skills (team player, time-management, self-management, creative thinking, and compliance with ethical codes of conducts)

### Final Examination

Assessment Type <sup>1</sup>: Examination

Indicative Time on Task <sup>2</sup>: 21 hours

Due: **11/11/2022**

Weighting: **30%**

Final examination assessing content throughout the semester

On successful completion you will be able to:

- convey sound knowledge of the theory, concepts and principles for structural steel and timber design
- comprehend the knowledge of the steel and timber design applications to create safe and accurate design outcomes according to the design requirements set out in Australian Standards
- Perform qualitative and quantitative prediction and assessment of design capacities of structural steel and timber members
- communicate effectively and professionally the outcomes of the structural steel and timber designs

## Regular problem sets

Assessment Type <sup>1</sup>: Problem set

Indicative Time on Task <sup>2</sup>: 14 hours

Due: **Weeks 5, 7, 9, 11**

Weighting: **20%**

Students will be provided with regular problem sets to complete. Four in total.

On successful completion you will be able to:

- convey sound knowledge of the theory, concepts and principles for structural steel and timber design
- comprehend the knowledge of the steel and timber design applications to create safe and accurate design outcomes according to the design requirements set out in Australian Standards
- Perform qualitative and quantitative prediction and assessment of design capacities of structural steel and timber members
- communicate effectively and professionally the outcomes of the structural steel and

timber designs

## Mid session test

Assessment Type <sup>1</sup>: Quiz/Test

Indicative Time on Task <sup>2</sup>: 14 hours

Due: **Week 8**

Weighting: **20%**

Students will be provided with some problems to solve in the test, which will be invigilated.

On successful completion you will be able to:

- convey sound knowledge of the theory, concepts and principles for structural steel and timber design
- comprehend the knowledge of the steel and timber design applications to create safe and accurate design outcomes according to the design requirements set out in Australian Standards
- Perform qualitative and quantitative prediction and assessment of design capacities of structural steel and timber members
- communicate effectively and professionally the outcomes of the structural steel and timber designs

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<sup>1</sup> If you need help with your assignment, please contact:

- the academic teaching staff in your unit for guidance in understanding or completing this type of assessment
- the [Writing Centre](#) for academic skills support.

<sup>2</sup> Indicative time-on-task is an estimate of the time required for completion of the assessment task and is subject to individual variation

## Delivery and Resources

### Steel Design

1. Australian Standard AS 4100 (2020), access through [here](#).
2. Steel Designers' Handbook, 8th edition (Branko E. Gorenc, Ron Tinyou, Arun A Syam), access through [here](#).
3. The Behaviour and Design of Steel Structures to AS 4100 (NS Trahair, MA

Bradford), access through [here](#).

4. Analysis and Design of Steel and Composite Structures (Liang, Qing Quan), Taylor & Francis Group, 2014, access through [here](#).

## Timber Design

1. Australian Standards AS 1720, access through [here](#).
2. Timber Design Handbook (SA HB 108-2013), in accordance with the Australian Limit State Timber Design Standard AS 1720.1, 2010 (Geoffrey N. Boughton, Keith I. Crews), access through [here](#).

## Unit Schedule

Please note that there will be no SGTA (practical/tutes) in Week 1 (Friday 29 July 2022).

## Policies and Procedures

Macquarie University policies and procedures are accessible from [Policy Central](https://policies.mq.edu.au) (<https://policies.mq.edu.au>). Students should be aware of the following policies in particular with regard to Learning and Teaching:

- [Academic Appeals Policy](#)
- [Academic Integrity Policy](#)
- [Academic Progression Policy](#)
- [Assessment Policy](#)
- [Fitness to Practice Procedure](#)
- [Assessment Procedure](#)
- [Complaints Resolution Procedure for Students and Members of the Public](#)
- [Special Consideration Policy](#)

Students seeking more policy resources can visit [Student Policies](https://students.mq.edu.au/support/study/policies) (<https://students.mq.edu.au/support/study/policies>). It is your one-stop-shop for the key policies you need to know about throughout your undergraduate student journey.

To find other policies relating to Teaching and Learning, visit [Policy Central](https://policies.mq.edu.au) (<https://policies.mq.edu.au>) and use the [search tool](#).

## Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: <https://students.mq.edu.au/admin/other-resources/student-conduct>

## Results

Results published on platform other than [eStudent](#), (eg. iLearn, Coursera etc.) or released directly by your Unit Convenor, are not confirmed as they are subject to final approval by the

University. Once approved, final results will be sent to your student email address and will be made available in [eStudent](#). For more information visit [ask.mq.edu.au](mailto:ask.mq.edu.au) or if you are a Global MBA student contact [globalmba.support@mq.edu.au](mailto:globalmba.support@mq.edu.au)

## Academic Integrity

At Macquarie, we believe [academic integrity](#) – honesty, respect, trust, responsibility, fairness and courage – is at the core of learning, teaching and research. We recognise that meeting the expectations required to complete your assessments can be challenging. So, we offer you a range of resources and services to help you reach your potential, including free [online writing and maths support](#), [academic skills development](#) and [wellbeing consultations](#).

## Student Support

Macquarie University provides a range of support services for students. For details, visit <http://students.mq.edu.au/support/>

### The Writing Centre

[The Writing Centre](#) provides resources to develop your English language proficiency, academic writing, and communication skills.

- [Workshops](#)
- [Chat with a WriteWISE peer writing leader](#)
- [Access StudyWISE](#)
- [Upload an assignment to Studiosity](#)
- [Complete the Academic Integrity Module](#)

The Library provides online and face to face support to help you find and use relevant information resources.

- [Subject and Research Guides](#)
- [Ask a Librarian](#)

## Student Services and Support

Macquarie University offers a range of [Student Support Services](#) including:

- [IT Support](#)
- [Accessibility and disability support](#) with study
- Mental health [support](#)
- [Safety support](#) to respond to bullying, harassment, sexual harassment and sexual assault
- [Social support](#) including information about finances, tenancy and legal issues

## Student Enquiries

Got a question? Ask us via [AskMQ](#), or contact [Service Connect](#).

## IT Help

For help with University computer systems and technology, visit [http://www.mq.edu.au/about\\_us/offices\\_and\\_units/information\\_technology/help/](http://www.mq.edu.au/about_us/offices_and_units/information_technology/help/).

When using the University's IT, you must adhere to the [Acceptable Use of IT Resources Policy](#). The policy applies to all who connect to the MQ network including students.