



# CIVL2301

## Structural Analysis

Session 2, In person-scheduled-weekday, North Ryde 2024

*School of Engineering*

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## General Information

Unit convenor and teaching staff

Unit Convenor & Lecturer

Tohid Ghanbari-Ghazijahani

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Contact via E-mail

To be set on email requests

Credit points

10

Prerequisites

CIVL1001 or MECH1001

Corequisites

Co-badged status

Unit description

In this unit, students will be introduced to different aspects of mechanics of solids and structural analysis of trusses, beams and frames. This provides the students with the skills to analyse structures as a foundation skill for different structural designs. Students will develop their understanding of the physical performance of structural members, which are associated with a variety of structural systems in Civil Engineering. They also gain an understanding of the theory and application of structural analysis as it applies to trusses, beams and frames. Specific topics include basic concepts of deformation compatibility; stresses and strains in structural elements, states of stress such as shear, bending, and torsion, displacements and deformations, energy methods for bar and beam structures; simple buckling; deformation of simple frames and beams, the response of linear elastic structures under different mechanical and environmental effects, and structural behaviour considering the distribution of internal forces.

This unit provides an essential foundation for subsequent structural design subjects such as the design of steel, timber and concrete structures in the third year.

## 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 a sound knowledge of the theory, concepts, and principles in solid mechanics

**ULO2:** Analyse reactions, axial forces, bending moments, shear forces, deflection, and stresses in structural elements and systems

**ULO3:** Perform qualitative and quantitative structural analysis and structural behaviour of different vertical and lateral loads

**ULO4:** Report the structural analysis process and outcomes to a professional standard in both oral and written forms

## Assessment Tasks

Name	Weighting	Hurdle	Due
<a href="#">Final Examination</a>	40%	No	TBA
<a href="#">Mid session quiz</a>	20%	No	TBA
<a href="#">Final Project</a>	20%	No	TBA
<a href="#">Regular problem sets</a>	20%	No	TBA

### Final Examination

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

Indicative Time on Task <sup>2</sup>: 20 hours

Due: **TBA**

Weighting: **40%**

The final examination will assess the students' performance on the content delivered throughout the session.

On successful completion you will be able to:

- Convey a sound knowledge of the theory, concepts, and principles in solid mechanics
- Analyse reactions, axial forces, bending moments, shear forces, deflection, and stresses in structural elements and systems
- Perform qualitative and quantitative structural analysis and structural behaviour of different vertical and lateral loads

### Mid session quiz

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

Indicative Time on Task <sup>2</sup>: 15 hours

Due: **TBA**

Weighting: **20%**

Mid-session quiz will be run.

On successful completion you will be able to:

- Convey a sound knowledge of the theory, concepts, and principles in solid mechanics
- Analyse reactions, axial forces, bending moments, shear forces, deflection, and stresses in structural elements and systems
- Perform qualitative and quantitative structural analysis and structural behaviour of different vertical and lateral loads

## Final Project

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

Indicative Time on Task <sup>2</sup>: 20 hours

Due: **TBA**

Weighting: **20%**

A structure to be analysed based on dedicated chapters of the unit.

On successful completion you will be able to:

- Convey a sound knowledge of the theory, concepts, and principles in solid mechanics
- Analyse reactions, axial forces, bending moments, shear forces, deflection, and stresses in structural elements and systems
- Perform qualitative and quantitative structural analysis and structural behaviour of different vertical and lateral loads
- Report the structural analysis process and outcomes to a professional standard in both oral and written forms

## Regular problem sets

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

Indicative Time on Task <sup>2</sup>: 15 hours

Due: **TBA**

Weighting: **20%**

Students will be provided with regular questions to complete (minimum of five in total).

On successful completion you will be able to:

- Convey a sound knowledge of the theory, concepts, and principles in solid mechanics
- Analyse reactions, axial forces, bending moments, shear forces, deflection, and stresses in structural elements and systems
- Perform qualitative and quantitative structural analysis and structural behaviour of different vertical and lateral loads

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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

**Delivery consists of in-person lectures and SGTA sessions.**

**The resources are:**

- The lecturer's complete note for the year of delivery (main resource) + iLearn materials.
- Structural Analysis: understanding behavior, Nielson, Bryant G., McCormac, Jack C., Hoboken, NJ: Wiley 2017

## 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](http://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 Advocacy](#) provides independent advice on MQ policies, procedures, and processes

## 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.

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Unit information based on version 2024.03 of the [Handbook](#)