



# CIVL3301

## Structural Design 1

Session 1, In person-scheduled-weekday, North Ryde 2022

*School of Engineering*

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## General Information

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Friday 1pm - 3pm, or other time by pre appointment

Lecturer, Tutor

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G60, 44 Waterloo Rd

Friday 1pm - 3pm, or other time by pre appointment

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 concrete structural design including material properties of concrete, section properties, design loads, and design requirements based on Australian Standards. This Unit provides the students with the skills to analyse the capacity of concrete sections in bending, shear, torsion, and the combination of these actions. Students will develop their ability to design reinforced concrete members based on their section capacities to sustain external loadings. They will gain an in-depth understanding of the difference between the actual and design loads, design safety, ultimate strength design and serviceability limit state. Specific topics include properties of concrete materials, concrete reinforcements, actions in concrete members, bending theory and stress block, requirements for bending, shear, and torsion capacities of reinforced concrete beams, columns and slabs, and prestressed concrete.

This unit provides an essential foundation for subsequent structural design project unit and research theses in the fourth year for students who would like to pursue more work 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 in concrete structural design

**ULO2:** comprehend the design of reinforced concrete sections under bending, shear and torsion

**ULO3:** perform qualitative and quantitative prediction of the design capacities of reinforced concrete members

**ULO4:** communicate clearly and professionally the design outcomes of reinforced concrete structures

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

## General Assessment Information

The Project report is to be submitted in two parts.

Problem sets are based on the lectures and lab contents.

## Assessment Tasks

Name	Weighting	Hurdle	Due
<a href="#">Reinforced Concrete Design</a>	30%	No	Weeks 7 & 13
<a href="#">Regular problem sets</a>	20%	No	Weeks 3, 6, 9, 12
<a href="#">Final Examination</a>	30%	No	Exam week
<a href="#">Mid session test</a>	20%	No	Week 8

### Reinforced Concrete Design

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

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

Due: **Weeks 7 & 13**

Weighting: **30%**

Students will be provided a project brief to design a reinforced concrete structure.

On successful completion you will be able to:

- convey sound knowledge of the theory, concepts, and principles in concrete structural design
- comprehend the design of reinforced concrete sections under bending, shear and torsion
- perform qualitative and quantitative prediction of the design capacities of reinforced concrete members
- communicate clearly and professionally the design outcomes of reinforced concrete structures
- demonstrate transferable skills (team player, self-management, time-management, professionalism, and compliance with ethical codes of conducts)

### Regular problem sets

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

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

Due: **Weeks 3, 6, 9, 12**

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 in concrete structural design
- comprehend the design of reinforced concrete sections under bending, shear and torsion
- perform qualitative and quantitative prediction of the design capacities of reinforced concrete members
- communicate clearly and professionally the design outcomes of reinforced concrete structures

## Final Examination

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

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

Due: **Exam week**

Weighting: **30%**

Final examination assessing the content throughout the semester

On successful completion you will be able to:

- convey sound knowledge of the theory, concepts, and principles in concrete structural design
- comprehend the design of reinforced concrete sections under bending, shear and torsion
- perform qualitative and quantitative prediction of the design capacities of reinforced concrete members
- communicate clearly and professionally the design outcomes of reinforced concrete structures

## 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 given some problems during the test which will be invigilated.

On successful completion you will be able to:

- comprehend the design of reinforced concrete sections under bending, shear and torsion
- perform qualitative and quantitative prediction of the design capacities of reinforced concrete members
- communicate clearly and professionally the design outcomes of reinforced concrete structures

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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

Lectures 2 hours per week

SGTA 1 hour per week, starting from Week 1

Practical 2 hours per week, starting from Week 1

Lecture notes will be provided in iLearn.

Note: Practicals are a combination of lab work and workshop for Q&A. Students will participate in the lab work in some weeks; the rest of the weeks will be for tutorials and practice problems.

## 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 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.

## Changes from Previous Offering

This is the first time offering this Unit.

## Engineers Australia Competency Mapping

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, ULO2
	1.2 Conceptual understanding of underpinning maths, analysis, statistics, computing.	ULO1, ULO2
	1.3 In-depth understanding of specialist bodies of knowledge	ULO1, ULO2, ULO3
	1.4 Discernment of knowledge development and research directions	ULO1, ULO3
	1.5 Knowledge of engineering design practice	ULO1, ULO3
	1.6 Understanding of scope, principles, norms, accountabilities of sustainable engineering practice.	ULO2, ULO3



Engineering Application Ability	2.1 Application of established engineering methods to complex problem solving	
	2.2 Fluent application of engineering techniques, tools and resources.	ULO2
	2.3 Application of systematic engineering synthesis and design processes.	ULO3
	2.4 Application of systematic approaches to the conduct and management of engineering projects.	
Professional and Personal Attributes	3.1 Ethical conduct and professional accountability.	ULO5
	3.2 Effective oral and written communication in professional and lay domains.	ULO4
	3.3 Creative, innovative and pro-active demeanour.	ULO4, ULO5
	3.4 Professional use and management of information.	ULO4, ULO5
	3.5 Orderly management of self, and professional conduct.	ULO4, ULO5
	3.6 Effective team membership and team leadership	ULO4, ULO5

## Late Submission

Online quizzes, in-class activities, or scheduled tests and exam must be undertaken at the time indicated in the unit guide. Should these activities be missed due to illness or misadventure, students may apply for Special Consideration.

All other assessments must be submitted by 5:00 pm (Sydney Time) on their due date.

Should these assessments be missed due to illness or misadventure, students should apply for Special Consideration.

Assessments not submitted by the due date will receive a mark in accordance with the late submission policy as follows:

A 12-hour grace period will be given after which the following deductions will be applied to the awarded assessment mark: 12 to 24 hours late = 10% deduction; for each day thereafter, an additional 10% per day or part thereof will be applied until five days beyond the due date. After this time, a mark of zero (0) will be given. For example, an assessment worth 20% is due 5 pm on 1 January. Student A submits the assessment at 1 pm, 3 January. The assessment received a mark of 15/20. A 20% deduction is then applied to the mark of 15, resulting in the loss of three (3) marks. Student A is then awarded a final mark of 12/20.

## On-campus Activities

SGTA and Practical sessions are on-campus activities, starting from Week 1. Students who are unable to get back to campus in time please contact the Unit Convenor.