



CIVL3301

Design of Concrete Structures

Session 1, In person-scheduled-weekday, North Ryde 2024

School of Engineering

Contents

<u>General Information</u>	2
<u>Learning Outcomes</u>	3
<u>General Assessment Information</u>	3
<u>Assessment Tasks</u>	4
<u>Delivery and Resources</u>	6
<u>Policies and Procedures</u>	6
<u>Changes from Previous Offering</u>	8
<u>Engineers Australia Competency Mapping</u>	8

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General Information

Unit convenor and teaching staff

Convenor and Lecturer

Sorn Vimonsatit

sorn.vimonsatit@mq.edu.au

Contact via email

44WTR-103

Thursday 2pm - 4pm, 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

Project task includes a group project assignment, weekly progress, and some problem sets that are based on the lectures and lab contents.

To pass this Unit you must: • Attempt all assessments, and • Achieve a total mark equal to or greater than 50% of the total Unit's mark, and • Participate in, and undertake all hurdle activities for, a minimum of 9 of the 12 weekly workshops, and • Achieve at least 50% in the final examination

Hurdle Assessments

Practice-based task (40% including Lab and Project-based activities)

Development of knowledge and skills requires continual practice at authentic problems in a laboratory-based setting. This unit has weekly laboratory/workshop classes and you must demonstrate your progress in developing and communicating knowledge and skills in a minimum of 9 of the 12 classes. This is a hurdle assessment meaning that failure to meet this requirement may result in a fail grade for the unit. Students are permitted up to three absences: additional absences will require a Special Consideration to be applied for (see below).

Special Consideration:

The Special Consideration Policy aims to support students who have been impacted by short-term circumstances or events that are serious, unavoidable and significantly disruptive, and which may affect their performance in assessment. If you experience circumstances or events that affect your ability to complete the assessments in this unit on time, please inform the convenor and submit a Special Consideration request through ask.mq.edu.au.

If you receive special consideration for the final exam, a supplementary exam will be scheduled by the faculty during a supplementary exam period, typically about 3 to 4 weeks after the normal exam period. By making a special consideration application for the final exam you are declaring

yourself available for a resit during the supplementary examination period and will not be eligible for a second special consideration approval based on pre-existing commitments. Please ensure you are familiar with the policy prior to submitting an application. Approved applicants will receive an individual notification one week prior to the exam with the exact date and time of their supplementary examination.

Special Consideration for Practical-based Tasks

The [Special Consideration Policy](#) aims to support students who have been impacted by short-term circumstances or events that are serious, unavoidable and significantly disruptive, and which may affect their performance in assessment.

Written Assessments: If you experience circumstances or events that affect your ability to complete the written assessments in this unit on time, please inform the convenor and submit a Special Consideration request through ask.mq.edu.au.

Weekly practice-based tasks: To pass the unit you need to demonstrate ongoing development of skills and application of knowledge in 9 out of 12 of the weekly practical classes. If you miss a weekly practical class due to a serious, unavoidable and significant disruption, contact your convenor ASAP as you may be able to attend another class that week.

If it is not possible to attend another class, you should still contact your convenor for access to class material to review in your own time.

Note that a Special Consideration should only be applied if you miss more than three of the weekly practical classes.

Assessment Tasks

Name	Weighting	Hurdle	Due
Reinforced Concrete Design	40%	No	Week 7 & Week 13
Mid-Session Exam	20%	No	Week 5
Final Examination	40%	No	Exam Week

Reinforced Concrete Design

Assessment Type ¹: Project

Indicative Time on Task ²: 21 hours

Due: **Week 7 & Week 13**

Weighting: **40%**

Project task includes a reinforced concrete design project and lab-based activities during practical classes.

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)

Mid-Session Exam

Assessment Type ¹: Examination

Indicative Time on Task ²: 14 hours

Due: **Week 5**

Weighting: **20%**

Students will be given some problems during the exam, 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

Final Examination

Assessment Type ¹: Examination

Indicative Time on Task ²: 21 hours

Due: **Exam Week**

Weighting: **40%**

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
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¹ 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.

² 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, on-line, pre-recorded

Practicals 2 hours per week, starting from Week 1

SGTA 1 hour per week, starting from Week 1

Lecture notes will be provided in iLearn.

Note: Practical s are a combination of lab work and workshops for Q&A. Students will participate in the lab work for some weeks; the rest of the weeks will be for SGTA-small group teaching activities 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 connect.mq.edu.au or if you are a Global MBA student contact 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 the [Service Connect Portal](#), 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/.

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

There is no change from the previous offering.

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 the scope, principles, norms, and 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 proactive 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

Unit information based on version 2024.04 of the [Handbook](#)