



CIVL2101

Water and Wastewater Engineering

Session 2, In person-scheduled-weekday, North Ryde 2026

School of Engineering

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Disclaimer

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General Information

Unit convenor and teaching staff

Unit Convener/Lecturer

Bandita Mainali

bandita.mainali@mq.edu.au

Room 309, 9 Wally's Walk

Appointment via email or Wednesdays from 11 am to 1 pm.

Credit points

10

Prerequisites

CIVL1001 or MECH1001

Corequisites

Co-badged status

This unit is co-taught with CIVL6100.

Unit description

The objective of this unit is to introduce students to principles and processes involved in contaminants removal from drinking water and wastewater. Theory and conceptual design of systems for treating drinking water and municipal wastewater are discussed. Specific topics in water engineering include introduction to water resources, pollution in different types of water bodies, different water treatment processes, design and implementation, and drinking water regulations. Specific topics in wastewater engineering include introduction to wastewater treatment and process analysis, wastewater characteristics, wastewater flowrates and constituent loadings, physical, chemical, biological unit processes, disinfection, and wastewater treatment process selection, design and implementation. As a part of this unit, students will complete various design tasks in team projects for developing engineering solutions in designing water and wastewater treatment facilities.

Learning in this unit enhances student understanding of global challenges identified by the United Nations Sustainable Development Goals ([UNSDGs](#)) Clean Water and Sanitation; Sustainable Cities and Communities; Climate Action

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: Use parameters to characterize the constituents of drinking water and municipal wastewater.

ULO2: Explain physical, chemical and biological unit operations in treatment processes.

ULO3: Select and apply appropriate options to design processes for treating drinking water and municipal wastewater based on engineering concepts.

ULO4: Communicate outcomes of analysing and designing different water and wastewater treatment processes in professionally varied ways.

General Assessment Information

Grading and passing requirements for the unit

To pass this unit, a student must obtain a mark of 50 or more for the unit (i.e., get a passing grade P/ CR/ D/ HD).

For more details about grading, please refer to the policies and procedures section.

Late submissions

Online quizzes or scheduled tests or assignments must be undertaken/submitted 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 assessments must be submitted by 11:55 pm on their due date if not an in class activity.

Late assessments are not accepted in this unit unless a short extension or [Special Consideration](#) has been submitted and approved.

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 written assessments in this unit on time, please inform the convenor and submit a Special Consideration request through ask.mq.edu.au.

[Short Extensions](#)

For some assessment types, students are allowed to request an extra 3 calendar days to complete eligible assessments. No reason or evidence is required. This only applies to individual assessments with the Short Extension flag in CMS marked as 'yes'. Please ensure that the unit guide specifies whether short extensions apply to any of the assessments in your unit.

Assessment Tasks

Name	Weighting	Hurdle	Due	Groupwork/Individual	Short Extension	AI Approach
Project Presentation	30%	No	Week 11 and Week 12, During workshops.	Individual and Group	No	Observed
Project Report on Design of Wastewater Treatment Plant	40%	No	06/11/2026	Individual	Yes	Open
Mid-Term Quiz	30%	No	06/10/2026	Individual	No	Observed

Project Presentation

Assessment Type [1](#): Presentation task

Indicative Time on Task [2](#): 10 hours

Due: **Week 11 and Week 12, During workshops.**

Weighting: **30%**

Groupwork/Individual: Individual and Group

Short extension [3](#): No

AI Approach: Observed

The project presentation will assess your ability to analyse and design drinking water and municipal wastewater treatment processes by applying relevant parameters and engineering concepts. You will also be evaluated on your ability to clearly and professionally communicate your project outcomes, demonstrating understanding of treatment operations and the rationale behind your design choices.

On successful completion you will be able to:

- Use parameters to characterize the constituents of drinking water and municipal wastewater.
- Explain physical, chemical and biological unit operations in treatment processes.
- Select and apply appropriate options to design processes for treating drinking water and municipal wastewater based on engineering concepts.
- Communicate outcomes of analysing and designing different water and wastewater treatment processes in professionally varied ways.

Project Report on Design of Wastewater Treatment Plant

Assessment Type [1](#): Written Submission

Indicative Time on Task [2](#): 46 hours

Due: **06/11/2026**

Weighting: **40%**

Groupwork/Individual: Individual

Short extension ³: Yes

AI Approach: Open

The project report will assess your ability to characterize the constituents of drinking water and municipal wastewater, design key treatment processes, and apply appropriate engineering concepts to design suitable treatment options. You will also be expected to communicate your analysis and design outcomes effectively through a professionally structured report, demonstrating both technical understanding and clear, purpose-driven communication.

On successful completion you will be able to:

- Use parameters to characterize the constituents of drinking water and municipal wastewater.
- Explain physical, chemical and biological unit operations in treatment processes.
- Select and apply appropriate options to design processes for treating drinking water and municipal wastewater based on engineering concepts.
- Communicate outcomes of analysing and designing different water and wastewater treatment processes in professionally varied ways.

Mid-Term Quiz

Assessment Type ¹: Examination

Indicative Time on Task ²: 26 hours

Due: **06/10/2026**

Weighting: **30%**

Groupwork/Individual: Individual

Short extension ³: No

AI Approach: Observed

This quiz will assess your ability to characterize the constituents of drinking water and municipal wastewater using relevant parameters, explain key physical, chemical, and biological treatment processes, and apply appropriate engineering concepts to design suitable treatment options. It will consist of multiple-choice, short-answer, and problem-solving questions, testing both conceptual understanding and the application of knowledge in practical scenarios.

On successful completion you will be able to:

- Use parameters to characterize the constituents of drinking water and municipal wastewater.
- Explain physical, chemical and biological unit operations in treatment processes.
- Select and apply appropriate options to design processes for treating drinking water and municipal wastewater based on engineering concepts.

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
- [Academic Success](#) 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.

³ An automatic short extension is available for some assessments. Apply through the [Service Connect Portal](#).

Delivery and Resources

WEEK 1 Classes:

There will be no SGTA in WEEK 1 only a 2 hr online lecture.

Lectures: Tuesday 10 am- 12 pm (Online via ZOOM)

Check the unit Schedule for more information.

Methods of Communication

We will communicate with you via your university email and through announcements on iLearn. Queries to convenors can either be placed on the iLearn discussion board or sent to the unit convenor via the contact email on iLearn.

Textbook(s):

Wastewater Engineering Fifth Edition

Treatment and Resource Recovery

By: Inc. Metcalf & Eddy, George Tchobanoglous, H. David Stensel, Ryujiro Tsuchihashi, Franklin L. Burton

Online Platform:

The iLearn Page will provide all necessary information related to the subject.

Equipment Required:

1. **Scientific Calculator:** A high-quality scientific calculator is essential for this course. You are also expected to familiarise yourself with its various functions and operations.
2. **Personal Device (Laptop/Tablet/Mobile Phone):** A personal device, such as a laptop, tablet, or mobile phone, is necessary for accessing the iLearn resources.

Ensure you procure these resources and familiarise yourself with the online platform before our first class for an optimal learning experience.

Unit Schedule

Teaching Schedule for Semester 2, 2026 (subject to minor changes)

Lectures: Tuesday 10 am- 12 pm (Online Via ZOOM)

Workshops/Practicals: Tuesday 1 pm - 3 pm (Venue- 01 Central Courtyard 205);

Tuesday 3 pm – 5 pm (Venue- 01 Central Courtyard 205)

Week	Lecture topics (Online Delivery)	SGTA/Workshops Workshops /Practicals	Assessment
1	Unit General Information: Introduction to Water and Wastewater Engineering; Week 1 Quiz (Weekly Resources_Online)	NO SGTA	
2	Week 1 Review; Wastewater Engineering Continue	Week 2 SGTA Week 2 Quiz (Weekly Resources_online) The Project Brief will be issued in Week 2.	
3	Former Weeks Review; Wastewater Characteristics	Week 3 SGTA (ESCAPE ROOM ACTIVITY 1) Week 3 Quiz (Weekly Resources_ online) Project Groups will also be assigned in Week 3.	
4	Former Weeks Review; Wastewater treatment process selection and design, including -Physical Unit processes	Week 4 SGTA Week 4 Quiz (Weekly Resources_ online) (Week 4 Formative Quiz 1)	(Ungraded formative Quiz 1) During the workshop
5	Former Weeks Review; Fundamentals of biological treatment, Part 1	Week 5 SGTA Week 5 Quiz (Weekly Resources_ online)	
6	Former Weeks Review; Wastewater treatment process selection and design, including: Biological treatment part 2	Week 6 SGTA Week 6 Quiz (Weekly Resources_ online) Group updates on their project +SGTA (Week 6 Formative Quiz 2)	(Ungraded Formative Quiz 2)
7	Former Weeks Review; Wastewater treatment process selection and design, including: Biological treatment part 3	Week 7 SGTA (ESCAPE ROOM ACTIVITY 2) + Revision and Consultation	
8	Former Weeks Review; Wastewater treatment process selection and design, including: Chemical Treatment	Week 8 SGTA + Wastewater Treatment Plant Site Visit (Virtual Tour)	

	SEMESTER BREAK	SEMESTER BREAK	SEMESTER BREAK
9	Mid-Term Quiz (During Lecture)	Week 9 SGTA	Mid-Term Quiz (30%) _During Week 9 Lecture
10	Former Weeks Review; Disinfection processes and treatment of sludges, Sludge Treatment	SGTA (ESCAPE ROOM ACTIVITY 3) + Project Updates (Consultation with TAs and Feedback)	
11	Advanced water treatment process Part 1	Group Presentation from 1 st 8 groups including individual Q&A (During workshop)	Project Presentation 30% (During workshop)
12	Advanced water treatment process Part 2	Presentation from remaining groups including individual Q&A (During workshop)	Project Presentation 30% (During workshop)
13	Revision and consultation	Project Report wrap up help from TAs (During workshop)	Project Report 40%_Submission on Friday 5 pm of Week 13

Policies and Procedures

Macquarie University policies and procedures are accessible from [Policy Central](https://policies.s.mq.edu.au) (<https://policies.s.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/>

Academic Success

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

- [Ask a Study Coach](#)
- [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 <https://students.mq.edu.au/support/technology/service-desk>.

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

We value student feedback to be able to continually improve the way we offer our units. As such we encourage students to provide constructive feedback via student surveys, to the teaching staff directly, or via the FSE Student Experience & Feedback link in the iLearn page.

Student feedback from the previous offering of this unit was very positive overall, with students pleased with the clarity around assessment requirements and the level of support from teaching staff. As such, no change to the delivery of the unit is planned, however we will continue to strive to improve the level of support and the level of student engagement.

Engineers Australia Stage 1 Competencies Mapping

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.	ULO2, ULO3		
	1.3 In-depth understanding of specialist bodies of knowledge	ULO2, ULO3		
	1.4 Discernment of knowledge development and research directions	ULO3		
	1.5 Knowledge of engineering design practice	ULO2, ULO3		
	1.6 Understanding of scope, principles, norms, accountabilities of sustainable engineering practice.			
Engineering Application Ability	2.1 Application of established engineering methods to complex problem solving	ULO1, ULO2, ULO3		

	2.2 Fluent application of engineering techniques, tools and resources.	ULO1, ULO2, ULO3		
	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.			
	3.2 Effective oral and written communication in professional and lay domains.	ULO4		
	3.3 Creative, innovative and pro-active demeanour.	ULO3		
	3.4 Professional use and management of information.			
	3.5 Orderly management of self, and professional conduct.			
	3.6 Effective team membership and team leadership	ULO3, ULO4		

Changes since First Published

Date	Description
21/07/2026	Communication Methods is a new addition to this version.

Unit information based on version 2026.02 of the [Handbook](#)