



# CIVL3101

## Hydraulics and Hydrology

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

*School of Engineering*

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#### **Disclaimer**

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## General Information

Unit convenor and teaching staff

Unit Convenor and Lecturer

Bandita Mainali

[bandita.mainali@mq.edu.au](mailto:bandita.mainali@mq.edu.au)

Contact via Email

50 Wayerloo Road, Room 112

By appointment via email

Credit points

10

Prerequisites

130cp at 1000 level or above including MECH2002 or MECH202

Corequisites

Co-badged status

Unit description

The objective of this unit is to provide students with the scientific foundations and basic principles of hydraulic and hydrological methods in engineering applications. This unit requires the fundamental knowledge gained through successful completion of Fluid Mechanics in the second year. Specific topics in open channel hydraulics include uniform flow, gradually varied flow, changes in channel cross section, hydraulic structures, and rapidly varied flow. Specific topics in hydrology include fundamentals of hydrology and water resources, Hydrologic cycle, hietograph and hydrograph analysis, rainfall-runoff relationships and flood routing, hydrologic statistics, and flood frequency analysis.

## 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:** Demonstrate an in-depth understanding of the basic principles of hydraulics and hydrology used in civil engineering.

**ULO2:** Analyse and design open channels including estimating water surface profiles, and hydraulic structures such as weirs and culverts.

**ULO3:** Carry out hydrological investigations of natural and urban catchments.

**ULO4:** Analyse and estimate floods for engineering design and forecasting.

## General Assessment Information

### Grading and passing requirement for unit

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

For further details about grading, please refer below in the policies and procedures section.

### Final Examinations

Final examinations will typically take place at the end of the semester. 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.

### Late submissions

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 on their due date.

Late assessments are not accepted in this unit unless a [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](http://ask.mq.edu.au).

### Assessment Tasks

Name	Weighting	Hurdle	Due
<a href="#">Final Exam</a>	40%	No	TBA
<a href="#">Assignment</a>	50%	No	See iLearn
<a href="#">Midterm Exam</a>	10%	No	Week 7

## Final Exam

Assessment Type <sup>1</sup>: Examination Indicative Time on Task <sup>2</sup>: 35 hours Due: (Exam period) **TBA**  
Weighting: **40%**

Final Examination assessing all material delivered throughout the unit. On successful completion you will be able to:

- Demonstrate an in-depth understanding of the basic principles of hydraulics and hydrology used in civil engineering.
- Analyse and design open channels including estimating water surface profiles, and hydraulic structures such as weirs and culverts.
- Carry out hydrological investigations of natural and urban catchments.
- Analyse and estimate floods for engineering design and forecasting.

## Assignment

Assessment Type <sup>1</sup>: Quantitative analysis task Indicative Time on Task <sup>2</sup>: 50 hours Due: **See iLearn** Weighting: **50%**

Four assignments (*Hydraulics Assignment - 10%; Hydraulics Lab Report - 15%, Hydrology Assignment -15%, Hydrology Lab Report- 10%*) are considered in the unit with a total weighting of 50%. On successful completion you will be able to:

- Demonstrate an in-depth understanding of the basic principles of hydraulics and hydrology used in civil engineering.
- Analyse and design open channels including estimating water surface profiles, and hydraulic structures such as weirs and culverts.
- Carry out hydrological investigations of natural and urban catchments.
- Analyse and estimate floods for engineering design and forecasting.

## Midterm Exam

Assessment Type <sup>1</sup>: Quiz/Test Indicative Time on Task <sup>2</sup>: 15 hours Due: **Week 7** Weighting: **10%**

This is a two-hours test assessing material delivered prior to this assessment. On successful completion you will be able to:

- Demonstrate an in-depth understanding of the basic principles of hydraulics and hydrology used in civil engineering.
- Analyse and design open channels including estimating water surface profiles, and hydraulic structures such as weirs and culverts.

<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

## Assessment Tasks

Name	Weighting	Hurdle	Due
<a href="#">Midterm Exam</a>	10%	No	
<a href="#">Final Exam</a>	40%	No	
<a href="#">Assignment</a>	50%	No	

### Midterm Exam

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

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

Due:

Weighting: **10%**

This is a two-hours test assessing material delivered prior to this assessment.

On successful completion you will be able to:

- Demonstrate an in-depth understanding of the basic principles of hydraulics and hydrology used in civil engineering.
- Analyse and design open channels including estimating water surface profiles, and hydraulic structures such as weirs and culverts.

### Final Exam

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

Indicative Time on Task <sup>2</sup>: 35 hours

Due:

Weighting: **40%**

Final Examination assessing all material delivered throughout the unit.

On successful completion you will be able to:

- Demonstrate an in-depth understanding of the basic principles of hydraulics and

hydrology used in civil engineering.

- Analyse and design open channels including estimating water surface profiles, and hydraulic structures such as weirs and culverts.
- Carry out hydrological investigations of natural and urban catchments.
- Analyse and estimate floods for engineering design and forecasting.

## Assignment

Assessment Type <sup>1</sup>: Quantitative analysis task

Indicative Time on Task <sup>2</sup>: 50 hours

Due:

Weighting: **50%**

Four assignments are considered in the unit with a total weighting of 50%.

On successful completion you will be able to:

- Demonstrate an in-depth understanding of the basic principles of hydraulics and hydrology used in civil engineering.
- Analyse and design open channels including estimating water surface profiles, and hydraulic structures such as weirs and culverts.
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## Delivery and Resources

### Textbook(s):

- Cengel and Cimbala, Fluid Mechanics, Fundamentals and Applications, 4th Ed (SI Units)
- Chaudhry, Open Channel Flow, 2nd Ed, Springer
- Singh, Handbook of Applied Hydrology, 2nd Ed
- Ball J, Babister M, Nathan R, Weeks W, Weinmann E, Retallick M, Testoni I, (Editors) Australian Rainfall and Runoff: A Guide to Flood Estimation, © Commonwealth of

Australia (Geoscience Australia), 2016.(available from <http://arr.ga.gov.au/arrguideline>)

### 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

Please refer to iLearn for the unit schedule.

## 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 [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.

## Changes from Previous Offering

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## Engineers Australia Competency Mapping

All key learning outcomes of this unit (see learning outcomes section; ULO1 – ULO4) are designed to meet the requirements of the Engineers Australia competency standard. The table below shows how the learning outcomes are mapped to the requirements.

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, ULO3
	1.2 Conceptual understanding of underpinning maths, analysis, statistics, computing.	ULO1, ULO2, ULO3, ULO4
	1.3 In-depth understanding of specialist bodies of knowledge	ULO1, ULO3
	1.4 Discernment of knowledge development and research directions	
	1.5 Knowledge of engineering design practice	ULO1, ULO3
	1.6 Understanding of scope, principles, norms, accountabilities of sustainable engineering practice.	ULO1, ULO3
Engineering Application Ability	2.1 Application of established engineering methods to complex problem solving	ULO2, ULO4
	2.2 Fluent application of engineering techniques, tools and resources.	ULO2, ULO4
	2.3 Application of systematic engineering synthesis and design processes.	
	2.4 Application of systematic approaches to the conduct and management of engineering projects.	ULO2, ULO4
Professional and Personal Attributes	3.1 Ethical conduct and professional accountability.	
	3.2 Effective oral and written communication in professional and lay domains.	ULO2, ULO4

	3.3 Creative, innovative and pro-active demeanour.	
	3.4 Professional use and management of information.	ULO2, ULO4
	3.5 Orderly management of self, and professional conduct.	ULO2, ULO4
	3.6 Effective team membership and team leadership	

Unit information based on version 2024.02 of the [Handbook](#)