



MECH2002

Fluid Mechanics

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

School of Engineering

Contents

<u>General Information</u>	2
<u>Learning Outcomes</u>	2
<u>General Assessment Information</u>	3
<u>Assessment Tasks</u>	3
<u>Delivery and Resources</u>	6
<u>Unit Schedule</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

Unit Convenor

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Contact via Email

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Appointment via Email

Credit points

10

Prerequisites

(MECH1001 or ENGG1050 or ENGG150 or CIVL1001 or PHYS140) and (MATH1025 or MATH1020 or MATH136 or MATH133)

Corequisites

Co-badged status

Unit description

This unit will examine the basic concepts of fluid mechanics. It will examine the roles of static fluid systems, dynamic fluid systems, and techniques to analyse these systems. This will include the concepts of pressure and head; hydrostatics; buoyancy; fundamental laws of fluid motion; accounting for losses, experimental and numerical techniques.

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: Exhibit proficiency in mathematical analysis, and the application of physics, associated with fluid mechanics.

ULO2: Explain the fundamentals of static and dynamic fluid systems.

ULO3: Analyse simple static and dynamic fluid problems applied to real world problems.

ULO4: Apply appropriate technology to investigate more complex fluid flow problems.

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.

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 of zero.

Assessment Tasks

Name	Weighting	Hurdle	Due
<u>Mid Session Test</u>	15%	No	Week 7
<u>Simulation Assignment</u>	10%	No	Week 12
<u>Participation and engagement</u>	5%	No	Week 2-13
<u>Fluid Dynamic Laboratory Reports</u>	12%	No	Week 13
<u>Fluid Static Laboratory Reports</u>	8%	No	Week 6
<u>Final examination</u>	50%	No	TBA

Mid Session Test

Assessment Type ¹: Examination

Indicative Time on Task ²: 10 hours

Due: **Week 7**

Weighting: **15%**

Test assessing material delivered prior to this assessment. A portion of this assessment work will be conducted during learning activities.

On successful completion you will be able to:

- Exhibit proficiency in mathematical analysis, and the application of physics, associated with fluid mechanics.
- Explain the fundamentals of static and dynamic fluid systems.
- Analyse simple static and dynamic fluid problems applied to real world problems.

Simulation Assignment

Assessment Type ¹: Case study/analysis

Indicative Time on Task ²: 15 hours

Due: **Week 12**

Weighting: **10%**

An assignment that requires the student to perform simulations for an engineering fluid mechanics problem with relevant software and analyse the results. A portion of this assessment work will be conducted during learning activities.

On successful completion you will be able to:

- Analyse simple static and dynamic fluid problems applied to real world problems.
- Apply appropriate technology to investigate more complex fluid flow problems.

Participation and engagement

Assessment Type ¹: Participatory task

Indicative Time on Task ²: 0 hours

Due: **Week 2-13**

Weighting: **5%**

This assessment includes students participation in SGTAs and other activities embedded in other learning activities described in the unit.

On successful completion you will be able to:

- Exhibit proficiency in mathematical analysis, and the application of physics, associated with fluid mechanics.
- Explain the fundamentals of static and dynamic fluid systems.
- Analyse simple static and dynamic fluid problems applied to real world problems.
- Apply appropriate technology to investigate more complex fluid flow problems.

Fluid Dynamic Laboratory Reports

Assessment Type ¹: Lab report

Indicative Time on Task ²: 6 hours

Due: **Week 13**

Weighting: **12%**

Laboratory reports written for three unique experiments demonstrating three different fluid dynamic principles. A portion of this assessment work will be conducted during learning activities.

On successful completion you will be able to:

- Explain the fundamentals of static and dynamic fluid systems.
- Analyse simple static and dynamic fluid problems applied to real world problems.

Fluid Static Laboratory Reports

Assessment Type ¹: Lab report

Indicative Time on Task ²: 4 hours

Due: **Week 6**

Weighting: **8%**

Laboratory reports written for two unique experiments demonstrating two different fluid static principles. A portion of this assessment work will be conducted during learning activities.

On successful completion you will be able to:

- Explain the fundamentals of static and dynamic fluid systems.

- Analyse simple static and dynamic fluid problems applied to real world problems.

Final examination

Assessment Type ¹: Examination

Indicative Time on Task ²: 25 hours

Due: **TBA**

Weighting: **50%**

Final Examination assessing all material delivered throughout the unit. A portion of the preparation for this assessment task will be conducted during learning activities.

On successful completion you will be able to:

- Exhibit proficiency in mathematical analysis, and the application of physics, associated with fluid mechanics.
- Explain the fundamentals of static and dynamic fluid systems.
- Analyse simple static and dynamic fluid problems applied to real world problems.
- Apply appropriate technology to investigate more complex fluid flow problems.

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

The main text required for this course is: Potter, Wiggert and Ramadan, Mechanics of Fluids, 4th or 5th Ed.

Scientific calculators and EPANET (which is free software) are required. Refer to iLearn for further information.

Unit Schedule

Refer to iLearn and lecture notes for the unit schedule.

Policies and Procedures

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

[s.mq.edu.au](https://www.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 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 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/.

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

The Assessment tasks are slightly modified to reduce the portation of the invigilated assesment in 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.	

	1.2 Conceptual understanding of underpinning maths, analysis, statistics, computing.	ULO1, ULO2
	1.3 In-depth understanding of specialist bodies of knowledge	ULO1
	1.4 Discernment of knowledge development and research directions	ULO3
	1.5 Knowledge of engineering design practice	
	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	ULO2
	2.2 Fluent application of engineering techniques, tools and resources.	
	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.	ULO1, ULO3
Professional and Personal Attributes	3.1 Ethical conduct and professional accountability.	ULO4
	3.2 Effective oral and written communication in professional and lay domains.	ULO4
	3.3 Creative, innovative and pro-active demeanour.	
	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	ULO4