ENEM12006 *Fluid Mechanics*
Term 2 - 2020

Profile information current as at 14/12/2025 12:39 pm

General Information

Overview
This unit introduces the fundamental properties of fluids, analysis of pipe flow, buoyancy, and stability of floating objects. It presents methods of analysing fluid systems using the concept of a control volume combined with the conservation of mass and momentum equations. Students analyse incompressible flows in pipe systems and use similitude and modelling principles and techniques to solve problems in fluid mechanics. Students will prepare technical and laboratory reports using appropriate 'mechanical engineering language', and document the process of modelling and analysis. They are required to act professionally in presenting information, communicating, working, and learning, both individually and in teams. Online students must have access to a computer and make frequent use of the Internet.

Details
Career Level: *Undergraduate*
Unit Level: *Level 2*
Credit Points: *6*
Student Contribution Band: *8*
Fraction of Full-Time Student Load: *0.125*

Pre-requisites or Co-requisites
Pre-requisites: MATH11219 Engineering Mathematics AND [ENEG11006 Engineering Statics OR ENEM12007 Statics & Dynamics] AND [ENEG11009 Fundamentals of Energy & Electricity OR PHYS11185 Engineering Physics B]
Important note: Students enrolled in a subsequent unit who failed their pre-requisite unit, should drop the subsequent unit before the census date or within 10 working days of Fail grade notification. Students who do not drop the unit in this timeframe cannot later drop the unit without academic and financial liability. See details in the Assessment Policy and Procedure (Higher Education Coursework).

Offerings For Term 2 - 2020

- Bundaberg
- Cairns
- Gladstone
- Mackay
- Online
- Rockhampton

Attendance Requirements
All on-campus students are expected to attend scheduled classes – in some units, these classes are identified as a mandatory (pass/fail) component and attendance is compulsory. International students, on a student visa, must maintain a full time study load and meet both attendance and academic progress requirements in each study period (satisfactory attendance for International students is defined as maintaining at least an 80% attendance record).

Website
This unit has a website, within the Moodle system, which is available two weeks before the start of term. It is important that you visit your Moodle site throughout the term. Please visit Moodle for more information.

Class and Assessment Overview

Recommended Student Time Commitment

Each 6-credit Undergraduate unit at CQUniversity requires an overall time commitment of an average of 12.5 hours of study per week, making a total of 150 hours for the unit.

Class Timetable

Regional Campuses
Bundaberg, Cairns, Emerald, Gladstone, Mackay, Rockhampton, Townsville

Metropolitan Campuses
Adelaide, Brisbane, Melbourne, Perth, Sydney

Assessment Overview

1. **Practical and Written Assessment**
Weighting: 20%
2. **Written Assessment**
Weighting: 20%
3. **Written Assessment**
Weighting: 20%
4. **Take Home Exam**
Weighting: 40%

Assessment Grading

This is a graded unit: your overall grade will be calculated from the marks or grades for each assessment task, based on the relative weightings shown in the table above. You must obtain an overall mark for the unit of at least 50%, or an overall grade of 'pass' in order to pass the unit. If any 'pass/fail' tasks are shown in the table above they must also be completed successfully ('pass' grade). You must also meet any minimum mark requirements specified for a particular assessment task, as detailed in the 'assessment task' section (note that in some instances, the minimum mark for a task may be greater than 50%). Consult the University's Grades and Results Policy for more details of interim results and final grades.

CQUniversity Policies

All University policies are available on the CQUniversity Policy site.
You may wish to view these policies:

- Grades and Results Policy
- Assessment Policy and Procedure (Higher Education Coursework)
- Review of Grade Procedure
- Student Academic Integrity Policy and Procedure
- Monitoring Academic Progress (MAP) Policy and Procedure – Domestic Students
- Monitoring Academic Progress (MAP) Policy and Procedure – International Students
- Student Refund and Credit Balance Policy and Procedure
- Student Feedback – Compliments and Complaints Policy and Procedure
- Information and Communications Technology Acceptable Use Policy and Procedure

This list is not an exhaustive list of all University policies. The full list of University policies are available on the CQUniversity Policy site.

Previous Student Feedback

Feedback, Recommendations and Responses

Every unit is reviewed for enhancement each year. At the most recent review, the following staff and student feedback items were identified and recommendations were made.

Feedback from Have your say

Feedback

A hands on experience in Laboratory exercise are helped students to understand the principles of fluid mechanics in real world situations.

Recommendation

The practice will continue in the future offering.

Feedback from Have your say

Feedback

The amount of detailed information about the unit is great. The tutorials for the assignments and the preparation of the study materials for the exam are excellent.

Recommendation

The practice will continue in the future offering.

Feedback from Have your say

Feedback

The return dates of the laboratory reports.

Recommendation

Students informed that the submission dates of the laboratory reports are needed to be spread out through the entire term instead of all being due on week 12. This issue will be reviewed and amended in the next offering.

Unit Learning Outcomes

On successful completion of this unit, you will be able to:

1. Prepare technical and laboratory reports based on thorough evaluation of data and associated uncertainties
2. Use appropriate mechanical engineering language in context
3. Document the process of modelling and analysis and present the information in a professional manner
4. Communicate, work, and learn, individually and in peer learning teams in a professional manner
5. Explain the fundamental properties of fluids and apply this knowledge to analyse fluid flow in pipes
6. Analyse the buoyancy and stability of floating bodies
7. Analyse fluid systems using the concept of a control volume combined with the conservation of mass and momentum equations
8. Analyse incompressible flows in pipe systems
9. Apply similitude and modelling principles and techniques to problems in fluid mechanics.

The Learning Outcomes for this unit are linked to the Engineers Australia Stage 1 Competencies.

Alignment of Learning Outcomes, Assessment and Graduate Attributes

— N/A Level • Introductory Level • Intermediate Level • Graduate Level ◦ Professional Level ◦ Advanced Level

Alignment of Assessment Tasks to Learning Outcomes

Assessment Tasks	Learning Outcomes								
	1	2	3	4	5	6	7	8	9
1 - Practical and Written Assessment - 20%	•	•	•	•	•	•	•	•	
2 - Written Assessment - 20%	•	•	•	•	•	•	•		
3 - Written Assessment - 20%		•	•		•	•	•	•	•
4 - Take Home Exam - 40%		•	•	•	•	•	•	•	•

Alignment of Graduate Attributes to Learning Outcomes

Graduate Attributes	Learning Outcomes								
	1	2	3	4	5	6	7	8	9
1 - Communication	•	•	•	•	•	•	•	•	•
2 - Problem Solving	•	•	•	•	•	•	•	•	•
3 - Critical Thinking	•	•	•	•	•	•	•	•	•
4 - Information Literacy	•	•	•	•	•	•	•	•	•
5 - Team Work	•		•	•					
6 - Information Technology Competence	•	•	•	•	•	•	•	•	•
7 - Cross Cultural Competence									
8 - Ethical practice									
9 - Social Innovation									
10 - Aboriginal and Torres Strait Islander Cultures									

Alignment of Assessment Tasks to Graduate Attributes

Assessment Tasks	Graduate Attributes									
	1	2	3	4	5	6	7	8	9	10
1 - Practical and Written Assessment - 20%	•	•	•	•	•	•		•		
2 - Written Assessment - 20%	•	•	•	•		•		•		
3 - Written Assessment - 20%	•	•	•	•				•		
4 - Take Home Exam - 40%	•	•	•					•		

Textbooks and Resources

Textbooks

ENEM12006

Prescribed

Munson's Fluid Mechanics
8th Edition (2017)
Authors: Gerhart, P.M.; Gerhart, A. L.; Hochstein, J.I.
John Wiley & Sons
Hoboken , NJ , USA
ISBN: 9781119248989
Binding: Hardcover
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Supplementary

Elementary Fluid Mechanics
7th Edition (1996)
Authors: Street, R.L., Watters, G.Z. and Vennard, J.K.
John Wiley & Sons
New York , New York , USA
ISBN: 9780471013105
Binding: Hardcover

Additional Textbook Information
If you prefer to study with a paper copy, they are available at the CQUni Bookshop here: http://bookshop.cqu.edu.au (search on the Unit code). eBooks are available at the publisher's website.

View textbooks at the CQUniversity Bookshop

IT Resources

You will need access to the following IT resources:

- CQUniversity Student Email
- Internet
- Unit Website (Moodle)

Referencing Style

All submissions for this unit must use the referencing style: Harvard (author-date)
For further information, see the Assessment Tasks.

Teaching Contacts

Nur Hassan Unit Coordinator
n.hassan@cqu.edu.au

Schedule

Week 1 - 13 Jul 2020

Module/Topic	Chapter	Events and Submissions/Topic
Unit Overview and Fluid properties	1	Tutorial 1: Fluid properties

Week 2 - 20 Jul 2020

Module/Topic	Chapter	Events and Submissions/Topic

Fluid Statics and Manometry	2	Tutorial 2: Fluids Statics and Menometry

Week 3 - 27 Jul 2020

Module/Topic	Chapter	Events and Submissions/Topic
Equilibrium, Buoyancy and Forces on Submerged Bodies	2	Tutorial 3: Buoyancy and Forces on Submerged Bodies

Week 4 - 03 Aug 2020

Module/Topic	Chapter	Events and Submissions/Topic
Eulerian and Lagrangian mechanics, One dimensional flow, Euler's equation and Bernoulli's equation	3 and 4	Tutorial 4: Euler's equation and Bernoulli's equation

Week 5 - 10 Aug 2020

Module/Topic	Chapter	Events and Submissions/Topic
Control Volume, Conversion of Mass, Momentum Equation	4, 5 and 6	Tutorial 5: Control Volume, Conversion of Mass, and Momentum Equation

Vacation Week - 17 Aug 2020

Module/Topic	Chapter	Events and Submissions/Topic
Non teaching week	Self reading	No tutorial. For more information, see Handbook **Assignment 1** Due: Vacation Week Monday (17 Aug 2020) 11:55 pm AEST

Week 6 - 24 Aug 2020

Module/Topic	Chapter	Events and Submissions/Topic
Application of Momentum Equation	6	Tutorial 6: Momentum Equation

Week 7 - 31 Aug 2020

Module/Topic	Chapter	Events and Submissions/Topic
Boundary Layer Concept, Laminar and Turbulent Flow, Reynolds Stress	6, 8 and 9	Tutorial 7: Boundary Layer Concept, Laminar and Turbulent Flow, Reynolds Stress

Week 8 - 07 Sep 2020

Module/Topic	Chapter	Events and Submissions/Topic
Incompressible Flow in Pipes, Moody Diagram, Pipe Bends, and Fittings, Measurement of Fluid Flow	8	Tutorial 8: Incompressible Flow in Pipes

Week 9 - 14 Sep 2020

Module/Topic	Chapter	Events and Submissions/Topic
Dimensional Analysis, Buckingham Pi Theorem, Common Dimensionless Numbers	7	Tutorial 9: Dimensional Analysis

Week 10 - 21 Sep 2020

Module/Topic	Chapter	Events and Submissions/Topic
Dynamic Similarity, Modelling Technique and Experimentation	7	Tutorial 10: Dynamic Similarity, Modelling Technique and Experimentation

Week 11 - 28 Sep 2020

Module/Topic	Chapter	Events and Submissions/Topic

Viscous Effects, Navier Stoke's equation and Computaional Fluid Dynamic	6	Tutorial 11: Viscous Effects and Navier Stoke's equation **Assignment 2** Due: Week 11 Friday (2 Oct 2020) 11:55 pm AEST

Week 12 - 05 Oct 2020

Module/Topic	Chapter	Events and Submissions/Topic
Reveiw	Sample problems	Revision: tutorials and previous exam problems **Laboratory Reports** Due: Week 12 Friday (9 Oct 2020) 11:55 pm AEST

Review/Exam Week - 12 Oct 2020

Module/Topic	Chapter	Events and Submissions/Topic
Unit review		

Exam Week - 19 Oct 2020

Module/Topic	Chapter	Events and Submissions/Topic
		Home Examination Due: Exam Week Tuesday (20 Oct 2020) 11:45 pm AEST

Assessment Tasks

1 Laboratory Reports

Assessment Type
Practical and Written Assessment

Task Description
Each student will be required to complete the laboratory exercises as per the instruction sheets which will be available in the unit website. Laboratory sessions are compulsory, and each session will be up to 2 hours in duration. The timetable of laboratories will be supplied separately via unit website (Moodle).
The following laboratory activities will be conducted by all students:

1. Flow Rate Measurement and Pipe Flow.
2. Stability of Floating Bodies and Cenre of Pressure.
3. Wind Tunnels Tests.

Assessment Due Date
Week 12 Friday (9 Oct 2020) 11:55 pm AEST

Return Date to Students

In two weeks from the date of submission

Weighting
20%

Minimum mark or grade
You must get a minimum 50% on this assessemnt item to secure a Pass in this unit

Assessment Criteria
Reporting of major elements/steps (eg. Theory, Objective, Procedures, Results etc) taken to undertake the laboratory sessions (40% of total marks).
Clarity of expression, including correct grammar, spelling, punctuation and appropriate referencing of sources (10% of total marks).
Accurate and correct use and presentation of mathematical equations or graphs, tables, diagrams and/or drawings (30% of total marks).
Discussion and logical presentation of ideas and arguments by means of data analysis and synthesis (20% of total marks).

Referencing Style

- Harvard (author-date)

Submission
Online Group

Submission Instructions
Submission should be via unit website (Moodle)

Learning Outcomes Assessed

- Prepare technical and laboratory reports based on thorough evaluation of data and associated uncertainties
- Use appropriate mechanical engineering language in context
- Document the process of modelling and analysis and present the information in a professional manner
- Communicate, work, and learn, individually and in peer learning teams in a professional manner
- Explain the fundamental properties of fluids and apply this knowledge to analyse fluid flow in pipes
- Analyse the buoyancy and stability of floating bodies
- Analyse fluid systems using the concept of a control volume combined with the conservation of mass and momentum equations
- Analyse incompressible flows in pipe systems

Graduate Attributes

- Communication
- Problem Solving
- Critical Thinking
- Information Literacy
- Team Work
- Information Technology Competence
- Ethical practice

2 Assignment 1

Assessment Type
Written Assessment

Task Description
This assignment covers the weekly topics from Week 1 to Week 5. Students are required to answer analytical and numerical questions. The assignment tasks will be uploaded on the unit website (Moodle).

Assessment Due Date
Vacation Week Monday (17 Aug 2020) 11:55 pm AEST

Return Date to Students

In two weeks from the date of submission

Weighting
20%

Minimum mark or grade
You must get a minimum 50% on this assessemnt item to secure a Pass in this unit

Assessment Criteria
Each question in the assignment will be assessed separately against the following criterion:
20% of the total marks are for accuracy and correct result
Correct application of maths and arithmetic
Correct answer to the questions
Correct use of terminology, units and conventions
40% for correct method and procedure
Correct selection and application of formula and maths
Clear presentation of mathematical and arithmetical calculations for the results obtained
Evidence of checking results (mathematical, graphical etc.)
30% for evidence of understanding
Explanation of choices made (why a particular procedure/method is selected)
Interpretation of results including limitations etc, if any
Correct and orderly procedures and required steps
10% for professional presentation
Clear identification and statement of each problem
Logical layout of analysis
Appropriate use of diagrams

Referencing Style

- Harvard (author-date)

Submission
Online

Submission Instructions
Submission should be via unit website (Moodle)

Learning Outcomes Assessed

- Prepare technical and laboratory reports based on thorough evaluation of data and associated uncertainties
- Use appropriate mechanical engineering language in context
- Document the process of modelling and analysis and present the information in a professional manner
- Communicate, work, and learn, individually and in peer learning teams in a professional manner
- Explain the fundamental properties of fluids and apply this knowledge to analyse fluid flow in pipes
- Analyse the buoyancy and stability of floating bodies
- Analyse fluid systems using the concept of a control volume combined with the conservation of mass and momentum equations

Graduate Attributes

- Communication
- Problem Solving
- Critical Thinking
- Information Literacy
- Information Technology Competence
- Ethical practice

3 Assignment 2

Assessment Type
Written Assessment

Task Description
This assignment covers the weekly topics from Week 6 to Week 10. Students are required to answer analytical and numerical questions. The assignment tasks will be uploaded on the unit website (Moodle).

Assessment Due Date
Week 11 Friday (2 Oct 2020) 11:55 pm AEST

Return Date to Students

In two weeks from the date of submission

Weighting
20%

Minimum mark or grade
You must get a minimum 50% on this assessemnt item to secure a Pass in this unit

Assessment Criteria
Each question in the assignment will be assessed separately against the following criterion:
20% of the total marks are for accuracy and correct result
Correct application of maths and arithmetic
Correct answer to the questions
Correct use of terminology, units and conventions
40% for correct method and procedure
Correct selection and application of formula and maths
Clear presentation of mathematical and arithmetical calculations for the results obtained
Evidence of checking results (mathematical, graphical etc.)
30% for evidence of understanding
Explanation of choices made (why a particular procedure/method is selected)
Interpretation of results including limitations etc, if any
Correct and orderly procedures and required steps
10% for professional presentation
Clear identification and statement of each problem
Logical layout of analysis
Appropriate use of diagrams

Referencing Style

- Harvard (author-date)

Submission
Online

Submission Instructions
Submission should be via unit website (Moodle)

Learning Outcomes Assessed

- Use appropriate mechanical engineering language in context
- Document the process of modelling and analysis and present the information in a professional manner
- Explain the fundamental properties of fluids and apply this knowledge to analyse fluid flow in pipes
- Analyse the buoyancy and stability of floating bodies
- Analyse fluid systems using the concept of a control volume combined with the conservation of mass and momentum equations
- Analyse incompressible flows in pipe systems
- Apply similitude and modelling principles and techniques to problems in fluid mechanics.

Graduate Attributes

- Communication
- Problem Solving
- Critical Thinking
- Information Literacy
- Ethical practice

4 Home Examination

Assessment Type
Take Home Exam

Task Description
Home examination will be scheduled in the exam week. The exam questions will be uploaded in the Moodle and will be available to all students at the same time. Students download the Exam paper and start working on the solution. Students are given three hours to complete the solution. Additional two hours are considered to provide them for downloading, uploading and perusal of the questions. Students use blank A4 papers to write answers. Students upload their answer booklet as a single pdf file on Moodle.

Assessment Due Date
Exam Week Tuesday (20 Oct 2020) 11:45 pm AEST

Students upload their answers as a single pdf file on Moodle.

Return Date to Students

Weighting
40%

Minimum mark or grade
You must get a minimum 50% on this assessemnt item to secure a Pass in this unit

Assessment Criteria
Students can use Dictionary - non-electronic, concise, direct translation only (dictionary must not contain any notes or comments). Studnets can use calculator - all non-communicable calculators, including scientific, programmable and graphics calculators are authorised. Each question in the exam will be assessed separately against the following criterion:

- 20% of the total marks are for accuracy and correct result;
- Correct application of maths and arithmetic;
- Correct answer to the questions;
- Correct use of terminology, units and conventions
- 50% for correct method and procedure;
- Correct selection and application of formula and maths;
- Clear presentation of mathematical and arithmetical calculations for the results obtained;
- 30% for evidence of understanding;

Referencing Style

- Harvard (author-date)

Submission
Online

Learning Outcomes Assessed

- Use appropriate mechanical engineering language in context
- Document the process of modelling and analysis and present the information in a professional manner
- Communicate, work, and learn, individually and in peer learning teams in a professional manner
- Explain the fundamental properties of fluids and apply this knowledge to analyse fluid flow in pipes
- Analyse the buoyancy and stability of floating bodies
- Analyse fluid systems using the concept of a control volume combined with the conservation of mass and momentum equations
- Analyse incompressible flows in pipe systems
- Apply similitude and modelling principles and techniques to problems in fluid mechanics.

Graduate Attributes

- Communication
- Problem Solving
- Critical Thinking
- Ethical practice

Academic Integrity Statement

As a CQUniversity student you are expected to act honestly in all aspects of your academic work.

Any assessable work undertaken or submitted for review or assessment must be your own work. Assessable work is any type of work you do to meet the assessment requirements in the unit, including draft work submitted for review and feedback and final work to be assessed.

When you use the ideas, words or data of others in your assessment, you must thoroughly and clearly acknowledge the source of this information by using the correct referencing style for your unit. Using others' work without proper acknowledgement may be considered a form of intellectual dishonesty.

Participating honestly, respectfully, responsibly, and fairly in your university study ensures the CQUniversity qualification you earn will be valued as a true indication of your individual academic achievement and will continue to receive the respect and recognition it deserves.

As a student, you are responsible for reading and following CQUniversity's policies, including the **Student Academic Integrity Policy and Procedure**. This policy sets out CQUniversity's expectations of you to act with integrity, examples of academic integrity breaches to avoid, the processes used to address alleged breaches of academic integrity, and potential penalties.

What is a breach of academic integrity?
A breach of academic integrity includes but is not limited to plagiarism, self-plagiarism, collusion, cheating, contract cheating, and academic misconduct. The Student Academic Integrity Policy and Procedure defines what these terms mean and gives examples.

Why is academic integrity important?
A breach of academic integrity may result in one or more penalties, including suspension or even expulsion from the University. It can also have negative implications for student visas and future enrolment at CQUniversity or elsewhere. Students who engage in contract cheating also risk being blackmailed by contract cheating services.

Where can I get assistance?
For academic advice and guidance, the Academic Learning Centre (ALC) can support you in becoming confident in completing assessments with integrity and of high standard.

What can you do to act with integrity?

Be Honest
If your assessment task is done by someone else, it would be dishonest of you to claim it as your own

Seek Help
If you are not sure about how to cite or reference in essays, reports etc, then seek help from your lecturer, the library or the Academic Learning Centre (ALC)

Produce Original Work
Originality comes from your ability to read widely, think critically, and apply your gained knowledge to address a question or problem