



# ENEM28004 Thermofluids Engineering Applications

## Term 1 - 2023

Profile information current as at 02/05/2024 09:33 am

All details in this unit profile for ENEM28004 have been officially approved by CQUniversity and represent a learning partnership between the University and you (our student). The information will not be changed unless absolutely necessary and any change will be clearly indicated by an approved correction included in the profile.

## General Information

### Overview

This unit will equip you with advanced knowledge and applications of the principles of thermodynamics, fluid mechanics and heat transfer to the design and analysis of complex thermofluid systems. You will apply your knowledge and understanding to evaluate the performance of air conditioning, cooling tower and other heat and energy transfer processes in various industrial plants. You will achieve the learning outcomes through an integration of advanced theoretical concepts and the application of modelling approaches, and experimental methods to solve industrial thermofluid problems. You will work both individually and collaboratively, to solve problems, and document and communicate your work clearly in a professional manner.

### Details

Career Level: *Postgraduate*

Unit Level: *Level 8*

Credit Points: 12

Student Contribution Band: 8

Fraction of Full-Time Student Load: 0.25

### Pre-requisites or Co-requisites

There are no requisites for this unit.

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 1 - 2023

- Melbourne
- 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).

### Residential Schools

This unit has a Compulsory Residential School for distance mode students and the details are:

Click here to see your [Residential School Timetable](#).

### 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 12-credit Postgraduate unit at CQUniversity requires an overall time commitment of an average of 25 hours of study per week, making a total of 300 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. **Written Assessment**

Weighting: 25%

#### 2. **Written Assessment**

Weighting: 25%

#### 3. **Laboratory/Practical**

Weighting: 20%

#### 4. **In-class Test(s)**

Weighting: 30%

### 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 Class room feedback

**Feedback**

Develop a design-based lab assessment

**Recommendation**

A new assessment will be developed on design-based laboratory activities to assess individual students' technical skills.

#### Feedback from Student's feedback

**Feedback**

Reducing study workload

**Recommendation**

The unit content will be revised by reducing less important content to the self-directed study content in the next offering.

#### Feedback from Student's feedback

**Feedback**

The more individual assessment than team assessment

**Recommendation**

Although the unit has an individual assessment as a class test, one more team assessment will be changed to the individual assessment in the next offering.

## Unit Learning Outcomes

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

1. Apply the principles of thermodynamics, fluid mechanics and heat transfer to design complex thermofluid processes related to air-conditioning, heating, cooling and ventilation systems
2. Critically evaluate the performance of complex mass, heat and energy transfer systems
3. Invoke discipline-specific theories to analyse the operating characteristics of pumps and turbines
4. Model fluid dynamics problems using advanced numerical methods
5. Work collaboratively in a team, communicate professionally and develop high-quality technical documentation related to theoretical, experimental and computational modalities in the discipline.

The Learning Outcomes for this unit are linked with the Engineers Australia Stage 1 Competency Standards for Professional Engineers in the areas of 1. Knowledge and Skill Base, 2. Engineering Application Ability and 3. Professional and Personal Attributes at the following levels:

#### Introductory Level

- 3.1 Ethical conduct and professional accountability.
- 3.2 Effective oral and written communication in professional and lay domains.
- 3.4 Professional use and management of information.
- 3.5 Orderly management of self, and professional conduct.

#### Intermediate Level

- 1.1 Comprehensive, theory-based understanding of the underpinning natural and physical sciences and the engineering fundamentals applicable to the engineering discipline.
- 1.5 Knowledge of engineering design practice and contextual factors impacting the engineering discipline.
- 1.6 Understanding of the scope, principles, norms, accountabilities and bounds of sustainable engineering practice in the specific discipline.
- 2.3 Application of systematic engineering synthesis and design processes.
- 3.3 Creative, innovative and pro-active demeanour.

#### Advanced Level

- 1.2 Conceptual understanding of the mathematics, numerical analysis, statistics, and computer and information sciences which underpin the engineering discipline.
- 1.3 In-depth understanding of specialist bodies of knowledge within the engineering discipline.
- 1.4 Discernment of knowledge development and research directions within the engineering discipline.
- 2.1 Application of established engineering methods to complex engineering problem solving.
- 2.2 Fluent application of engineering techniques, tools and resources.
- 2.4 Application of systematic approaches to the conduct and management of engineering projects.
- 3.6 Effective team membership and team leadership.

Refer to the Engineering Postgraduate Units Moodle site for further information on the Engineers Australia's Stage 1 Competency Standard for Professional Engineers and course level mapping information

<https://moodle.cqu.edu.au/course/view.php?id=11382>

## Alignment of Learning Outcomes, Assessment and Graduate Attributes



### Alignment of Assessment Tasks to Learning Outcomes

Assessment Tasks	Learning Outcomes				
	1	2	3	4	5
<b>1 - Written Assessment - 25%</b>	•			•	
<b>2 - Written Assessment - 25%</b>		•	•		•
<b>3 - Laboratory/Practical - 20%</b>		•	•		•

Assessment Tasks	Learning Outcomes				
	1	2	3	4	5
4 - In-class Test(s) - 30%	•			•	

## Alignment of Graduate Attributes to Learning Outcomes

Graduate Attributes	Learning Outcomes				
	1	2	3	4	5
1 - Knowledge	○	○	○	○	
2 - Communication					○
3 - Cognitive, technical and creative skills	○	○	○	○	
4 - Research		○		○	
5 - Self-management					○
6 - Ethical and Professional Responsibility					○
7 - Leadership					○
8 - 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
1 - Written Assessment - 25%	○			○	○			
2 - Written Assessment - 25%	○	○	○	○				
3 - Laboratory/Practical - 20%		○	○	○	○	○		
4 - In-class Test(s) - 30%	○							

## Textbooks and Resources

### Textbooks

ENEM28004

#### Prescribed

##### Munson's Fluid Mechanics

8th Global Edition (2017)

Authors: P. M. Gerhart, A. L. Gerhart, J.I. Hochstein

John Wiley & Sons

ISBN: 978-1-119-24898-9

Binding: Paperback

ENEM28004

#### Prescribed

##### Refrigeration and Air Conditioning

Second Edition (1982)

Authors: Stoecker, Wilbert and Jones, Jerold

John Wiley & Sons

ISBN: 978-007-0665-91-0

Binding: Paperback

#### Additional Textbook Information

The Stoecker text is Out of Print. The Gerhart text can be accessed at the CQUni Library website. If you prefer your own copy, you can purchase at the CQUni Bookshop here: <http://bookshop.cqu.edu.au> (search on the Unit code)

### 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

**Kalam Azad** Unit Coordinator

[a.k.azad@cqu.edu.au](mailto:a.k.azad@cqu.edu.au)

## Schedule

### Week 1 - 06 Mar 2023

Module/Topic	Chapter	Events and Submissions/Topic
<b>Lecture:</b> Introduction and overview of course and assessment. Fluid flow - steady & unsteady flows, compressible & incompressible flows.	Munson: Ch 3, 4 and 5	<b>Tutorial:</b> Fluid Flow Problems. <b>Workshop:</b> Introduction to Project 1 and handover - aims, objectives, and scopes.

### Week 2 - 13 Mar 2023

Module/Topic	Chapter	Events and Submissions/Topic
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**Lecture:** Pumps - fluid flows, flow in pipes.

Munson: Ch 8

**Tutorial:** Pipe flows, flow losses.

**Workshop:** Discussion & feedback on Project 1.

### Week 3 - 20 Mar 2023

#### Module/Topic

#### Chapter

#### Events and Submissions/Topic

**Lecture:** Fluid machinery- analysis, performance, characteristics of pumps.

Munson: Ch 12

**Tutorial:** Fluid machinery and characteristics.

**Workshop:** Discussion and feedback on Project 1.

### Week 4 - 27 Mar 2023

#### Module/Topic

#### Chapter

#### Events and Submissions/Topic

**Lecture:** Turbines - energy transfer calculations for Pelton Turbine.

Munson: Ch 12

**Tutorial:** Turbines design and calculations.

**Workshop:** Discussion and feedback on Project 1.

### Week 5 - 03 Apr 2023

#### Module/Topic

#### Chapter

#### Events and Submissions/Topic

**Lecture:** Thermal comfort and psychrometry. Mass, energy & heat transfer-cooling and dehumidification.

Stoecker: Ch 3 and 4  
Eastop: Ch 15

**Tutorial:** Thermal comfort, principles, Psychrometry, steam Table and charts.

**Workshop:** Discussion & feedback on Project 1.

**Lab 1 & 2 Due:**

### Vacation Week - 10 Apr 2023

#### Module/Topic

#### Chapter

#### Events and Submissions/Topic

Vacation Week: No teaching material will be delivered.

### Week 6 - 17 Apr 2023

#### Module/Topic

#### Chapter

#### Events and Submissions/Topic

**Lecture:** Cooling tower - Heat and mass transfer in the thermodynamic system - heat exchanger.

Eastop: Ch 14  
Stoecker: Ch 10 and 17

**Tutorial:** Cooling tower design.

**Workshop:** Introduction to Project 2 and handover - aims, objectives, and scopes.

**Project 1 Due:** Week 6 Tuesday (18 Apr 2023) 11:59 pm AEST

### Week 7 - 24 Apr 2023

#### Module/Topic

#### Chapter

#### Events and Submissions/Topic

**Lecture:** Refrigeration - types/systems, coefficient of performanc.

Eastop Ch 14  
Stoecker: Ch 10 and 17

**Tutorial:** Refrigeration system design.

**Workshop:** Discussion and feedback on Project 2.

### Week 8 - 01 May 2023

#### Module/Topic

#### Chapter

#### Events and Submissions/Topic

**Lecture:** Air conditioning systems.

Eastop: Ch 15

**Tutorial:** Air conditioning systems design

**Workshop:** Discussion and feedback on Project 2.

### Week 9 - 08 May 2023

#### Module/Topic

#### Chapter

#### Events and Submissions/Topic

**Lecture:** Air conditioning - cooling & heating systems design.

Eastop: Ch 15  
Stoecker: Ch 5

**Tutorial:** Air conditioning load

calculation and ducting system design.  
**Workshop:** Discussion & feedback on Project 2.

**Week 10 - 15 May 2023**

Module/Topic	Chapter	Events and Submissions/Topic
<b>Lecture:</b> Computational Fluid Dynamics (CFD)-Basic equations and modelling.	Munson: Section A	<b>Tutorial:</b> Navier-Stokes equations <b>Workshop:</b> Project 2 report preparation assistance and support.

**Week 11 - 22 May 2023**

Module/Topic	Chapter	Events and Submissions/Topic
<b>Lecture:</b> The unit material review.	Review of previous week's materials.	<b>Class test:</b> The suggested venue will be confirmed and notified via Moodle. The schedule is as shown below.  <b>Class test</b> Due: Week 11 Thursday (25 May 2023) 10:00 am AEST

**Week 12 - 29 May 2023**

Module/Topic	Chapter	Events and Submissions/Topic
<b>Lecture:</b> The unit material review.	Review of previous weeks materials.	<b>Tutorial:</b> Project 2 report preparation assistance and support. <b>Workshop:</b> Discussion & feedback on Project 2. <b>Lab 3 &amp; 4 Due:</b>  <b>Laboratory report</b> Due: Week 12 Friday (2 June 2023) 11:59 pm AEST

**Review/Exam Week - 05 Jun 2023**

Module/Topic	Chapter	Events and Submissions/Topic
Prepare the Project 2 report for submission.		<b>Project 2</b> Due: Review/Exam Week Friday (9 June 2023) 11:59 pm AEST

## Assessment Tasks

### 1 Project 1

**Assessment Type**

Written Assessment

**Task Description**

Students are required to undertake this project which will allow them to exercise and demonstrate their knowledge of fluid machinery and flows, and application skills in a fluid transportation system. In particular, they will be required to analyse and design a fluid flow/transportation system using fluid dynamics principles and piping systems and pumps. The project task and scope will be uploaded to the unit website (Moodle).

**Assessment Due Date**

Week 6 Tuesday (18 Apr 2023) 11:59 pm AEST

Submission via Moodle site

**Return Date to Students**

Week 8 Monday (1 May 2023)

It is expected that the assessment item will be returned in 2 weeks after the due date.

**Weighting**

25%

**Minimum mark or grade**

50%

**Assessment Criteria**

1. Reporting of necessary elements (e.g. introduction, theory, aims, objective, brief literature review, etc.) of the project.
2. Design of pump, piping system, development of system equation, duty point, cavitation checks, etc. for the given project.



3. Schematic diagram of the heat exchanger system, friction loss, heat transfer and sustainability of the energy conservation strategies.
4. Clarity of expression, including correct grammar, spelling, punctuation and appropriate referencing of sources.
5. Accurate and correct use and presentation of mathematical equations or graphs, tables, diagrams and/or drawings.
6. Discussion and logical presentation of ideas and arguments by means of data analysis and synthesis.

**Detailed project assessment criteria, declaration of contribution and SPA templates will be provided on Moodle.** This is a Team Project and initially, team submission will be assessed and a grade will be given for each team. Then individual grades will be determined using the equation below and based on their contribution and performance. Team members will need to submit the Team Charter (Declaration of individual student contributions) and SPA (Self and Peer Assessment) report. It may be possible that individual grade could be higher than the team mark, but capped at the maximum mark for the assessment.

**Please note** that if a team declares ZERO contribution for any of the members of the team in a submission for assessment then he/she will not be considered as a team member (for equal team share calculation) for that particular assessment item. The report must meet the minimum standard of the set criteria regardless of the number of team members involved in this task to satisfy the requirement of this unit.

Individual student marks = Total project 1 marks achieved by the team out of 25 x (Individual share / Equal team share)  
For example, the Individual contributions of 3 students in Team A are given below. Team A received 36 marks (out of 40) for their project.

S1 - 30%; S2 - 33%; S3 - 37% (Total 100% contribution)

Based on the contribution, Individual marks are given as follows.

$S1 = 36 \times (30/33.3) = 32.4$  (out of 40)

$S2 = 36 \times (33/33.3) = 35.6$  (out of 40)

$S3 = 36 \times (37/33.3) = 40.0$  (out of 40)

Please note: Students are advised to meet the submission due date to avoid the **delay penalty of 5% marks per day** which may be deducted for delaying in submission according to the CQUniversity assessment policy. The assessment item will not be accepted if the submission is delayed by more than 20 days after the due date of the submission. Generally, the extension request will not be granted because it is a team submission, not individual submission. However, it could be considered for special circumstances based on the evidence (i.e. medical certificate from a GP or hospital medical certificate) of a serious medical condition of members of the team.

### Referencing Style

- [Harvard \(author-date\)](#)

### Submission

Online Group

### Submission Instructions

Submission link will be provided on Moodle of this assessment item.

### Learning Outcomes Assessed

- Apply the principles of thermodynamics, fluid mechanics and heat transfer to design complex thermofluid processes related to air-conditioning, heating, cooling and ventilation systems
- Model fluid dynamics problems using advanced numerical methods

### Graduate Attributes

- Knowledge
- Research
- Self-management

## 2 Project 2

### Assessment Type

Written Assessment

### Task Description

Students are required to undertake this project which will allow them to exercise and demonstrate their theoretical thermo-fluid knowledge and skills in a practical application in the area of building HVAC systems. In particular, they will be required to investigate the energy and thermal performance of a reference building and develop energy management strategies for this building.

The project task and scope will be uploaded to the unit website (Moodle).

### Assessment Due Date

Review/Exam Week Friday (9 June 2023) 11:59 pm AEST

Submission via Moodle site

## Return Date to Students

The assessment marks will be provided along with the certification of Grades.

### Weighting

25%

### Minimum mark or grade

50%

### Assessment Criteria

1. Reporting of necessary elements (e.g. introduction, theory, aims, objective, brief literature review, clear methodology, etc.) for the given project.
2. Design of HVAC system, cooling, and heating load calculation, model development and simulation for thermal comfort profile, etc. for the given project.
3. Single zone and multi-zone modelling, evaluation of alternative HVAC system, CFD analysis and sustainable energy conservation measure.
4. Clarity of expression, including correct grammar, spelling, punctuation and appropriate referencing of sources.
5. Accurate and correct use and presentation of mathematical equations or graphs, tables, diagrams and/or drawings.
6. Discussion and logical presentation of ideas and arguments by means of data analysis and synthesis.

### Detailed project assessment criteria, declaration of contribution and SPA templates will be provided on Moodle.

This is a Team Project and initially, team submission will be assessed and a grade will be given for each team. Then individual grades will be determined using the equation below and based on their contribution and performance. Team members will need to submit the Team Charter (Declaration of individual student contributions) and SPA (Self and Peer Assessment) report. It may be possible that individual grade could be higher than the team mark, but capped at the maximum mark for the assessment.

**Please note** that if a team declares ZERO contribution for any of the members of the team in a submission for assessment then he/she will not be considered as a team member (for equal team share calculation) for that particular assessment item. The report must meet the minimum standard of the set criteria regardless of the number of team members involved in this task to satisfy the requirement of this unit.

Individual student marks = Total project 2 marks achieved by the team out of 25 x (Individual share / Equal team share)  
For example, the Individual contributions of 3 students in Team A are given below. Team A received 36 marks (out of 40) for their project.

S1 - 30%; S2 - 33%; S3 - 37% (Total 100% contribution)

Based on the contribution, Individual marks are given as follows.

$S1 = 36 \times (30/33.3) = 32.4$  (out of 40)

$S2 = 36 \times (33/33.3) = 35.6$  (out of 40)

$S3 = 36 \times (37/33.3) = 40.0$  (out of 40)

Please note: Students are advised to meet the submission due date to avoid the **delay penalty of 5% marks per day** which may be deducted for delaying in submission according to the CQUniversity assessment policy. The assessment item will not be accepted if the submission is delayed by more than 20 days after the due date of the submission. Generally, the extension request will not be granted because it is a team submission, not individual submission. However, it could be considered for special circumstances based on the evidence (i.e. medical certificate from a GP or hospital medical certificate) of a serious medical condition of members of the team.

### Referencing Style

- [Harvard \(author-date\)](#)

### Submission

Online Group

### Submission Instructions

Submission link will be provided on Moodle of this assessment item.

### Learning Outcomes Assessed

- Critically evaluate the performance of complex mass, heat and energy transfer systems
- Invoke discipline-specific theories to analyse the operating characteristics of pumps and turbines
- Work collaboratively in a team, communicate professionally and develop high-quality technical documentation related to theoretical, experimental and computational modalities in the discipline.

### Graduate Attributes

- Knowledge
- Communication
- Cognitive, technical and creative skills
- Research

### 3 Laboratory report

#### Assessment Type

Laboratory/Practical

#### Task Description

Each student will be required to complete the laboratory exercises as per the instruction sheets which will be available on 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 the unit website (Moodle). Statement on Safety According to the Workplace Health and Safety Act, 1995, it is a legal requirement that all persons at a workplace must not act in a manner that endangers the health or safety of any person at that workplace. As a student, your University is your workplace. When attending laboratories, workshops and field activities, fully enclosed footwear covering the whole foot must be worn at all times. Other personal protective equipment must be worn when required, or as directed by the lecturer or technical officer-in-charge. All requirements of the School Workplace Clothing Policy must also be observed. In the laboratory, clothing must fully cover the torso and have at least a short sleeve (i.e. no singlets). Failure to comply with any of the above health and safety requirements may result in your exclusion from laboratory, workshop or activities - most of which are compulsory.

#### At the laboratory session

Arrive early; communicate with other members of the groups, discuss individual tasks/contributions in readiness for the laboratory experiment.

Ensure to bring; Laboratory instruction sheets if any; Graph paper (A4 linear, 10 div/cm); Notebook (A4 hardbound); Ruler (30 cm clear plastic); Pen and pencil; Scientific calculator; Correct footwear.

Students are expected to complete the entire laboratory exercise including the drawing of graphs and calculating (excel sheet) the final answer. All raw data must be entered into the notebook immediately.

#### Assessment Due Date

Week 12 Friday (2 June 2023) 11:59 pm AEST

Lab reports submission is on a weekly basis as per the schedule provided.

#### Return Date to Students

It is expected that the assessment item will be returned in 2 weeks after the due date.

#### Weighting

20%

#### Minimum mark or grade

50% (overall lab reports but not individual)

#### Assessment Criteria

Reporting of major elements/steps (i.e. 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).

Assessment item details:

This is also a Team report submission and initially, team submission will be assessed and a grade will be given for each team. Then individual grades will be determined using the equation below and based on their contribution and performance. Team members will need to submit the Team Charter (Declaration of individual student contributions). It may be possible that individual grade could be higher than the team mark, but capped at the maximum mark for the assessment. Detailed lab report marking criteria and declaration of contribution templates will be provided on Moodle. Individual student marks = Total lab marks achieved by the team out of 20 x (Individual share / Equal team share) x lab attendance

For example, the Individual contributions of 3 students in Team A are given below. Team A received 16 marks (out of 20) for their lab.

S1 - 30%; S2 - 33%; S3 - 37% (Total 100% contribution)

Based on the contribution, Individual marks are given as follows.

$S1 = 16 \times (30/33.3) \times 1 = 14.40$  (out of 20)

$S2 = 16 \times (33/33.3) \times 1 = 15.85$  (out of 20)

$S3 = 16 \times (37/33.3) \times 1 = 17.78$  (out of 20)

#### Please note the key information:

1. Average 50% marks in all lab reports (but not individual) are the minimum requirement to pass in this assessment item.

2. The lab attendances are compulsory and really important because it is a mandatory component and a multiplication factor (i.e. **Present - 1, Absent - 0**) for individual mark calculation as shown in the above equation will be used. The student must follow the lab schedule which will be provided on Moodle.
3. Please follow the individual lab report due date as mentioned in the weekly schedule.
4. Students are advised to meet the submission due date to avoid the **delay penalty of 5% marks per day** which may be deducted for delaying in submission according to the CQUniversity assessment policy. The assessment item will not be accepted if the submission is delayed by more than 20 days after the due date of the submission. Generally, the extension request will not be granted because it is a team submission, not individual submission. However, it could be considered for special circumstances based on the evidence (i.e. medical certificate from a GP or hospital medical certificate) of a serious medical condition of members of the team.
5. If a team declares ZERO contribution for any of the members of the team in a submission for assessment then he/she will not be considered as a team member (for equal team share calculation) for that particular assessment item. The report must meet the minimum standard of the set criteria regardless of the number of team members involved in this task to satisfy the requirement of this unit.

### Referencing Style

- [Harvard \(author-date\)](#)

### Submission

Online Group

### Submission Instructions

Submission link will be provided on Moodle of this assessment item

### Learning Outcomes Assessed

- Critically evaluate the performance of complex mass, heat and energy transfer systems
- Invoke discipline-specific theories to analyse the operating characteristics of pumps and turbines
- Work collaboratively in a team, communicate professionally and develop high-quality technical documentation related to theoretical, experimental and computational modalities in the discipline.

### Graduate Attributes

- Communication
- Cognitive, technical and creative skills
- Research
- Self-management
- Ethical and Professional Responsibility

## 4 Class test

### Assessment Type

In-class Test(s)

### Task Description

This assessment covers weekly topics from Week 1 to Week 11. Students are required to answer analytical and numerical questions to demonstrate their theoretical knowledge and analytical and solving skills in thermo-fluid processes.

### Assessment Due Date

Week 11 Thursday (25 May 2023) 10:00 am AEST

The individual student will sit for the class test in the given venue under the supervision of an academic.

### Return Date to Students

Review/Exam Week Friday (9 June 2023)

The assessment marks will be provided along with the certification of Grades.

### Weighting

30%

### Minimum mark or grade

50%

### Assessment Criteria

Each question in the test will be assessed separately for criterion accuracy and correct results. A question will be deemed to have been completed if the student has shown a correct procedure and sound understanding of the work.

### Referencing Style

- [Harvard \(author-date\)](#)

**Submission**

Offline

**Submission Instructions**

Submission link will be provided on Moodle of this assessment item

**Learning Outcomes Assessed**

- Apply the principles of thermodynamics, fluid mechanics and heat transfer to design complex thermofluid processes related to air-conditioning, heating, cooling and ventilation systems
- Model fluid dynamics problems using advanced numerical methods

**Graduate Attributes**

- Knowledge

## 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