



# ENAM12005 Thermal Energy Plant

## Term 2 - 2019

Profile information current as at 04/05/2024 01:01 am

All details in this unit profile for ENAM12005 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 introduces students to the analysis of thermal energy plant using basic principles of thermodynamics. They will be able to use standard thermodynamics tables and solve basic problems relating to flow and non-flow processes; apply the laws of thermodynamics and energy equations to basic energy plant problems; and analyse heat engine and refrigeration cycles. Students are required to communicate effectively regarding technical aspects of thermodynamics, prepare technical and laboratory reports, clearly document technical procedures problem solutions, and evaluate uncertainties and the results of their work. They are required to develop a capacity to work and communicate ethically and professionally, as individuals and in teams, to investigate and solve problems and present solutions professionally. A compulsory residential school is provided to promote development of unit learning outcomes.

#### 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

Prerequisites: [ENAG11002 Energy and Electricity or ENTA11005 Engineering Science] and MATH11160

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 - 2019

- Mixed Mode

#### 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 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. **Written Assessment**

Weighting: 35%

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

Weighting: 35%

#### 3. **On-campus Activity**

Weighting: 25%

#### 4. **Presentation**

Weighting: 5%

### 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 survey

##### Feedback

Weekly quizzes are very engaging and it enabled students to make regular study and remain on track.

##### Recommendation

This practice will be continued.

#### Feedback from Have your say survey, Discussion during residential school

##### Feedback

Residential school was well run, beneficial and enjoyable. Practicals helped students to have deep learning.

##### Recommendation

This practice will be continued.

#### Feedback from Have your say survey

##### Feedback

Some students would like to have more practicals in the unit.

##### Recommendation

The residential school has an introduction session, three different experiments, lab report preparation sessions, tutorial sessions and unit assignment discussion sessions. With all these activities, it will be difficult to accommodate more practicals, but way to do this will be explored.

## Unit Learning Outcomes

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

1. Use tables of properties for fluids and explain and solve basic problems relating to flow and non-flow process.
2. Apply the first law of thermodynamics, second law of thermodynamics and other energy equations to basic problems in thermodynamics.
3. Analyse typical heat engine cycles and refrigeration cycles.
4. Prepare technical and laboratory reports with evidence of thorough evaluation of experimental uncertainties and results obtained.
5. Communicate professionally and provide evidence of personal reflection on, and critical assessment of, team contributions and professional development.
6. Solve problems and record and communicate clearly and professionally the approach used to solve problems and the reasons for adopting such approaches to problems.

## Alignment of Learning Outcomes, Assessment and Graduate Attributes



### Alignment of Assessment Tasks to Learning Outcomes

Assessment Tasks	Learning Outcomes					
	1	2	3	4	5	6
1 - Written Assessment - 35%	•	•	•	•	•	•

Assessment Tasks	Learning Outcomes					
	1	2	3	4	5	6
2 - Written Assessment - 35%	•	•	•	•	•	•
3 - On-campus Activity - 25%	•	•	•	•	•	•
4 - Presentation - 5%	•	•	•	•	•	•

## Alignment of Graduate Attributes to Learning Outcomes

Graduate Attributes	Learning Outcomes					
	1	2	3	4	5	6
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 - Written Assessment - 35%	•	•	•	•		•		•		
2 - Written Assessment - 35%	•	•	•	•		•		•		
3 - On-campus Activity - 25%	•	•	•	•	•	•		•		
4 - Presentation - 5%	•	•	•	•		•		•		

## Textbooks and Resources

### Textbooks

ENAM12005

#### Prescribed

##### **Thermodynamics: Advanced Applications**

Edition: 1997 (1997)

Authors: Kinsky, Roger

McGraw-Hill, North Ryde, NSW, Australia

SYDNEY , NSW , Australia

ISBN: ISBN:780074703120

Binding: Paperback

ENAM12005

#### Prescribed

##### **Thermodynamics and Fluid Mechanics: An Introduction**

Edition: 1996 (1996)

Authors: Kinsky, Roger

McGraw-Hill, North Ryde, NSW

Sydney , NSW , Australia

ISBN: ISBN: 9780074702383

Binding: Paperback

#### Additional Textbook Information

[View textbooks at the CQUniversity Bookshop](#)

### IT Resources

**You will need access to the following IT resources:**

- CQUniversity Student Email
- Internet
- Unit Website (Moodle)
- Access to a computer with webcam, microphone and headphones/speakers for online tutorials
- Scanner

## Referencing Style

**All submissions for this unit must use the referencing styles below:**

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

For further information, see the Assessment Tasks.

## Teaching Contacts

**Ramadas Narayanan** Unit Coordinator

[r.narayanan@cqu.edu.au](mailto:r.narayanan@cqu.edu.au)

## Schedule

### Week 1 - 15 Jul 2019

Module/Topic	Chapter	Events and Submissions/Topic

Energy and Humanity	Thermodynamics and Fluid Mechanics : An Introduction. Chapter1	Zoom Tutorial
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#### Week 2 - 22 Jul 2019

Module/Topic	Chapter	Events and Submissions/Topic
Basic concepts	Thermodynamics and Fluid Mechanics : An Introduction. Chapter 2	Zoom Tutorial Week 2 online quiz

#### Week 3 - 29 Jul 2019

Module/Topic	Chapter	Events and Submissions/Topic
Energy	Thermodynamics and Fluid Mechanics : An Introduction. Chapter 3	Zoom Tutorial Week 3 online quiz

#### Week 4 - 05 Aug 2019

Module/Topic	Chapter	Events and Submissions/Topic
Closed and open systems	Thermodynamics and Fluid Mechanics : An Introduction. Chapter 4	Zoom Tutorial Week 4 online quiz

#### Week 5 - 12 Aug 2019

Module/Topic	Chapter	Events and Submissions/Topic
Gases	Thermodynamics and Fluid Mechanics : An Introduction. Chapter 5	Zoom Tutorial Week 5 online quiz

#### Vacation Week - 19 Aug 2019

Module/Topic	Chapter	Events and Submissions/Topic
Vacation		

#### Week 6 - 26 Aug 2019

Module/Topic	Chapter	Events and Submissions/Topic
Heat engines	Thermodynamics and Fluid Mechanics : An Introduction. Chapter 6	Zoom Tutorial Week 6 online quiz

#### Week 7 - 02 Sep 2019

Module/Topic	Chapter	Events and Submissions/Topic
Heat engine performance	Thermodynamics and Fluid Mechanics : An Introduction. Chapter 7	Zoom Tutorial Week 7 online quiz

#### Week 8 - 09 Sep 2019

Module/Topic	Chapter	Events and Submissions/Topic
Steam-water systems	Thermodynamics : Advanced Applications. Chapter 3	Zoom Tutorial Week 8 online quiz

#### Week 9 - 16 Sep 2019

Module/Topic	Chapter	Events and Submissions/Topic
Residential school	Lab experiments	

#### Week 10 - 23 Sep 2019

Module/Topic	Chapter	Events and Submissions/Topic
Refrigeration and heat pumps	Thermodynamics : Advanced Applications. Chapter 4	Zoom Tutorial  <b>Residential School Activities Report</b> Due: Week 10 Friday (27 Sept 2019) 11:45 pm AEST

#### Week 11 - 30 Sep 2019

Module/Topic	Chapter	Events and Submissions/Topic
Heat transfer	Thermodynamics : Advanced Applications. Chapter 1	Zoom Tutorial

#### Week 12 - 07 Oct 2019

Module/Topic	Chapter	Events and Submissions/Topic
Revision	All chapters previously stated	Zoom Tutorial <b>Assignment</b> Due: Week 12 Friday (11 Oct 2019) 11:45 pm AEST
<b>Review/Exam Week - 14 Oct 2019</b>		
Module/Topic	Chapter	Events and Submissions/Topic
		<b>Video Presentation</b> Due: Review/Exam Week Friday (18 Oct 2019) 11:45 pm AEST
<b>Exam Week - 21 Oct 2019</b>		
Module/Topic	Chapter	Events and Submissions/Topic

## Assessment Tasks

### 1 Weekly Online quizzes

#### Assessment Type

Written Assessment

#### Task Description

These weekly quizzes assess contents from each week. There will be 7 quizzes starting from week 2 extending up to week 8. All quizzes together will have 35% weighting of the unit. The assessment task can be accessed from the unit Moodle site on a weekly basis. Each quiz will be open for a week and students need to attempt within the open period.

#### Assessment Due Date

Weekly due dates will be given in the Moodle

#### Return Date to Students

Students will be getting feedback immediately after the submission of the quizzes.

#### Weighting

35%

#### Minimum mark or grade

50%

#### Assessment Criteria

The correct answer will get full marks and the incorrect answer will be given zero marks.

#### Referencing Style

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

#### Submission

Online

#### Learning Outcomes Assessed

- Use tables of properties for fluids and explain and solve basic problems relating to flow and non-flow process.
- Apply the first law of thermodynamics, second law of thermodynamics and other energy equations to basic problems in thermodynamics.
- Analyse typical heat engine cycles and refrigeration cycles.
- Prepare technical and laboratory reports with evidence of thorough evaluation of experimental uncertainties and results obtained.
- Communicate professionally and provide evidence of personal reflection on, and critical assessment of, team contributions and professional development.
- Solve problems and record and communicate clearly and professionally the approach used to solve problems and the reasons for adopting such approaches to problems.

#### Graduate Attributes

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

## 2 Assignment

### Assessment Type

Written Assessment

### Task Description

Assignment is based on content from week 1 until week 11 inclusive.

Questions will be released in Moodle at the beginning of the term

### Assessment Due Date

Week 12 Friday (11 Oct 2019) 11:45 pm AEST

### Return Date to Students

2 weeks after the due date

### Weighting

35%

### Minimum mark or grade

50%

### Assessment Criteria

It will be graded based on the presentation, the method of solution, appropriate explanation and completeness of the solution. A complete solution should include any assumptions made, relevant sketches, clear step by step solution and conclusion/judgement on the answer. Detailed criteria will be given in the assignment task sheet.

### Referencing Style

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

### Submission

Online

### Learning Outcomes Assessed

- Use tables of properties for fluids and explain and solve basic problems relating to flow and non-flow process.
- Apply the first law of thermodynamics, second law of thermodynamics and other energy equations to basic problems in thermodynamics.
- Analyse typical heat engine cycles and refrigeration cycles.
- Prepare technical and laboratory reports with evidence of thorough evaluation of experimental uncertainties and results obtained.
- Communicate professionally and provide evidence of personal reflection on, and critical assessment of, team contributions and professional development.
- Solve problems and record and communicate clearly and professionally the approach used to solve problems and the reasons for adopting such approaches to problems.

### Graduate Attributes

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

## 3 Residential School Activities Report

### Assessment Type

On-campus Activity

### Task Description

Attend the residential school and participate in the learning activities and complete a report. Details of the residential



school activities will be available in Moodle.

The residential school is compulsory and students must attend to pass the unit.

**Assessment Due Date**

Week 10 Friday (27 Sept 2019) 11:45 pm AEST

**Return Date to Students**

Two weeks after the submission

**Weighting**

25%

**Minimum mark or grade**

50%

**Assessment Criteria**

Students will be assessed on attendance, participation, test results, presentation skills, experimental activities and reflections.

**Referencing Style**

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

**Submission**

Online

**Learning Outcomes Assessed**

- Use tables of properties for fluids and explain and solve basic problems relating to flow and non-flow process.
- Apply the first law of thermodynamics, second law of thermodynamics and other energy equations to basic problems in thermodynamics.
- Analyse typical heat engine cycles and refrigeration cycles.
- Prepare technical and laboratory reports with evidence of thorough evaluation of experimental uncertainties and results obtained.
- Communicate professionally and provide evidence of personal reflection on, and critical assessment of, team contributions and professional development.
- Solve problems and record and communicate clearly and professionally the approach used to solve problems and the reasons for adopting such approaches to problems.

**Graduate Attributes**

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

## 4 Video Presentation

**Assessment Type**

Presentation

**Task Description**

Prepare a video presentation on your learning in this unit. Length : Maximum 5 minutes.

**Assessment Due Date**

Review/Exam Week Friday (18 Oct 2019) 11:45 pm AEST

**Return Date to Students**

The assessment feedback will be given 2 weeks after the due date.

**Weighting**

5%

**Assessment Criteria**

Student demonstrates understanding of the unit learning outcomes and reflects on their learning in the unit  
Quality of presentation slides and video presentation. More information will be there in the moodle.

## **Referencing Style**

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

## **Submission**

Online

## **Learning Outcomes Assessed**

- Use tables of properties for fluids and explain and solve basic problems relating to flow and non-flow process.
- Apply the first law of thermodynamics, second law of thermodynamics and other energy equations to basic problems in thermodynamics.
- Analyse typical heat engine cycles and refrigeration cycles.
- Prepare technical and laboratory reports with evidence of thorough evaluation of experimental uncertainties and results obtained.
- Communicate professionally and provide evidence of personal reflection on, and critical assessment of, team contributions and professional development.
- Solve problems and record and communicate clearly and professionally the approach used to solve problems and the reasons for adopting such approaches to problems.

## **Graduate Attributes**

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