ENEM14011 *Energy Conversion*
Term 1 - 2017

Profile information current as at 27/04/2024 04:28 pm

General Information

Overview
This unit introduces you to key concepts and principles required to analyse problems involving heat exchange and energy conversion. You will analyse and design heat exchangers and analyse performance of compressors, internal combustion engines, gas turbines and jet propulsion. You will analyse combustion processes and estimate pollutant emissions, and analyse and design nozzles to promote safe and efficient combustion. You will prepare technical reports that demonstrate critical evaluation of results and experimental uncertainties. You are required to show your ability to work productively, both individually and collaboratively, to solve problems, and document and communicate their work clearly in a professional manner. On-campus students will be required to attend laboratory sessions to promote development of unit learning outcomes. Distance students will be required to attend a residential school to promote development of unit learning outcomes.

Details
Career Level: *Undergraduate*
Unit Level: *Level 4*
Credit Points: *6*
Student Contribution Band: *8*
Fraction of Full-Time Student Load: *0.125*

Pre-requisites or Co-requisites
Prereq: ENEM13014 Thermodynamics or ENEM12003 Thermodynamics
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 - 2017

- Bundaberg
- Distance
- Gladstone
- Mackay
- 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 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: 25%
2. **Practical and Written Assessment**
Weighting: 25%
3. **Examination**
Weighting: 50%

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 Course evaluation

Feedback

I enjoyed the content. The course was well presented. Course content was good, nothing wrong with that exam was good. The course had a plenty of reading materials. The topics covered in this course are interesting and I was grateful that the lectures and tutorials from the previous year had been made available which went someway to making up for the poor standard of delivery this year. Course material was detailed easy to understand. The lab supervisor was very good - thank you Pat.

Recommendation

Happy to know these good comments. We will try to maintain these good aspects of the course in future.

Action

The unit was delivered in much the same way in 2017 with good student-staff interactions in person and using Zoom video-conferencing software.

Feedback from Course evaluation

Feedback

Feedback on assessment took long and marking was too harsh.

Recommendation

Clear marking criteria, marking approach and distribution of marks in each component of each question will be made clear in advance in coming years.

Action

Marking was completed in a fair, reasonable and timely manner.

Feedback from Course evaluation

Feedback

Labs were not returned on-time. The lab report requirements should be made more clear early on.

Recommendation

Delay in returning feedback on lab reports were due to change in marking approach and understanding of the criteria. The lab report marking criteria will be made more clear in future.

Action

Labs assessed via interview which was well received by students.

Feedback from Course evaluation

Feedback

Assessment items should be revised and polished before published on Moodle to prevent complications from changes.

Recommendation

Some mistakes were observed, however, extra care will be taken for preparing assessment items with free of mistakes.

Action

No mistakes were reported in 2017.

Unit Learning Outcomes

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

1. Explain principles of heat transfer and conversion between heat energy and mechanical power and apply these principles to solution of heat transfer and energy conversion problems
2. Analyse, design and explain the performance of heat exchangers
3. Analyse and explain the performance of compressors, internal combustion engines, gas turbines and jet propulsion
4. Analyse and explain combustion processes and estimate pollutant emissions for internal combustion engines and gas turbines
5. Analyse, design and explain nozzles to promote safe and efficient combustion
6. Demonstrate individual capability to analyse, solve and explain energy conversion problems

This core Unit in the Mechanical Engineering course will help students meet the Engineers Australia's stage One Competencies by the completion of the degree.

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
1 - Written Assessment - 25%	•	•	•	•	•	•
2 - Practical and Written Assessment - 25%	•	•	•	•	•	
3 - Examination - 50%	•	•	•	•	•	•

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						

Graduate Attributes	Learning Outcomes					
	1	2	3	4	5	6
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 - 25%	•	•	•	•		•		•		
2 - Practical and Written Assessment - 25%	•	•	•	•	•	•		•		
3 - Examination - 50%	•	•	•	•				•		

Textbooks and Resources

Textbooks

ENEM14011

Prescribed

Applied Thermodynamics for Engineering Technologists
Edition: 5th or later (1993)
Authors: Eastop, T.D. and McConkey, A.
Pearson, Prentice Hall
UK
Binding: Paperback
ENEM14011

Prescribed

Thermodynamics and Transport Properties of Fluids (SI Units)
Edition: 5th or later (1995)
Authors: Rogers, G.F.C. & Mayhew, Y.R.
John Wiley & Sons
Queensland , Australia
Binding: Paperback

View textbooks at the CQUniversity Bookshop

IT Resources

You will need access to the following IT resources:

- CQUniversity Student Email
- Internet
- Unit Website (Moodle)
- Video and audio equipment to join online classes

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

Justin Hyde Unit Coordinator
j.hyde@cqu.edu.au

Schedule

Week 1 - 06 Mar 2017

Module/Topic	Chapter	Events and Submissions/Topic
Heat Transfer	Chapter 16	Problems: 16.1, 16.5, 16.6, 16.8

Week 2 - 13 Mar 2017

Module/Topic	Chapter	Events and Submissions/Topic
Heat Transfer	Chapter 16	Problems: 16.16, 16.18, 16.20, 16.21, 16.22

Week 3 - 20 Mar 2017

Module/Topic	Chapter	Events and Submissions/Topic
Heat Transfer	Chapter 16	Problems: 16.30, 16.37, 16.38, 16.44, 16.46

Week 4 - 27 Mar 2017

Module/Topic	Chapter	Events and Submissions/Topic
Internal Combustion Engines	Chapter 13	Problems: 13.1, 13.2, 13.6, 13.8, 13.9

Week 5 - 03 Apr 2017

Module/Topic	Chapter	Events and Submissions/Topic
Internal Combustion Engines	Chapter 13	Problems: 13.10, 13.11,13.13

Vacation Week - 10 Apr 2017

Module/Topic	Chapter	Events and Submissions/Topic

Week 6 - 17 Apr 2017

Module/Topic	Chapter	Events and Submissions/Topic
Combustion	Chapter 7	Residential school for Mixed Mode students (18-21 April)

Week 7 - 24 Apr 2017

Module/Topic	Chapter	Events and Submissions/Topic
Combustion	Chapter 7	Problems: 7.1, 7.3, 7.5, 7.6 **Assignment** Due: Week 7 Monday (24 Apr 2017) 12:00 pm AEST

Week 8 - 01 May 2017

Module/Topic	Chapter	Events and Submissions/Topic
Combustion	Chapter 7	Problems: 7.8, 7.9, 7.12

Week 9 - 08 May 2017

Module/Topic	Chapter	Events and Submissions/Topic
Gas Turbine	Chapter 9	Problems: 9.1, 9.2, 9.3, 9.5

Week 10 - 15 May 2017

Module/Topic	Chapter	Events and Submissions/Topic
Nozzles and Jet Propulsion	Chapter 10	Problems: 10.1, 10.2, 10.3, 10.4

Week 11 - 22 May 2017

Module/Topic	Chapter	Events and Submissions/Topic
Nozzles and Jet Propulsion	Chapter 10	Problems: 10.7, 10.8, 10.9

Week 12 - 29 May 2017

Module/Topic	Chapter	Events and Submissions/Topic
Compressors	Chapter 12	Problems: 12.3, 12.5, 12.9

Review/Exam Week - 05 Jun 2017

Module/Topic	Chapter	Events and Submissions/Topic
Review		Problems: 7.7, 10.5, 12.10

Exam Week - 12 Jun 2017

Module/Topic	Chapter	Events and Submissions/Topic

Assessment Tasks

1 Assignment

Assessment Type
Written Assessment

Task Description
The assignment will be based on topics covered in weeks one to five.

Assessment Due Date
Week 7 Monday (24 Apr 2017) 12:00 pm AEST

Return Date to Students
Monday (8 May 2017)

Weighting
25%

Minimum mark or grade
50%

Assessment Criteria
Responses to questions will be assessed against the following criteria:

- Correct application of arithmetic and mathematics
- Answers clearly identified
- Correct results
- All necessary steps in analysis are present in correct order
- Clear presentation of mathematical and arithmetical working linking given details of the problem to the results obtained
- Evidence of checking results (mathematical, graphical, logic-common sense)
- Explanation of choices made in the analysis (why is procedure required, why this particular procedure)
- Interpretation of results, eg limitations, direction of vectors, etc
- Logical layout of analysis
- Appropriate use of diagrams, clear diagrams
- Correct use of terminology and conventions
- Clear English in the explanation of procedure and interpretation of results
- Referencing of authoritative sources of equations and data

Referencing Style

- Harvard (author-date)
- Turabian

Submission
Online

Learning Outcomes Assessed

- Explain principles of heat transfer and conversion between heat energy and mechanical power and apply these principles to solution of heat transfer and energy conversion problems
- Analyse, design and explain the performance of heat exchangers
- Analyse and explain the performance of compressors, internal combustion engines, gas turbines and jet propulsion
- Analyse and explain combustion processes and estimate pollutant emissions for internal combustion engines and gas turbines
- Analyse, design and explain nozzles to promote safe and efficient combustion
- Demonstrate individual capability to analyse, solve and explain energy conversion problems

Graduate Attributes

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

2 Laboratory Activities and Interview

Assessment Type
Practical and Written Assessment

Task Description
Each student will be required to complete the following:

1. Performance study of heat exchangers (group-work) (Pass/Fail)
2. Performance study of diesel engine (group-work) (Pass/Fail)
3. Performance study of petrol engine (group-work) (Pass/Fail)
4. Individual interview at completion of laboratory activities (25%)

The residential school for Mixed Mode students will be held in Rockhampton, 18-21 April 2017.
A detailed schedule for on-campus and Mixed Mode students will be supplied separately in Moodle.
The laboratory activities and interview are compulsory, non-attendance will be marked as zero and will result in a Fail for the entire unit.

Assessment Due Date

As per the schedule provided in Moodle.

Return Date to Students

Feedback provided during the labs and on completion of the interview.

Weighting
25%

Minimum mark or grade
50%

Assessment Criteria
For the three Pass/Fail components students are expected to participate in the lab activity in order to enhance their understanding of the concepts demonstrated by the lab activity.
Students will be interviewed by the Unit Coordinator and where possible their laboratory supervisor also. In the interview students will be asked a series of questions which test their understanding of the lab activities, the concepts behind each lab activity and an understanding of how the theories apply to everyday machinery which use these concepts. Each student's mark will depend on their ability to answer the questions. Example questions will be available in Moodle. Interviews will be done in person or via video conferencing technology (likely to be Zoom). The interview will be recorded.

Referencing Style

- Harvard (author-date)
- Turabian

Submission
Online

Learning Outcomes Assessed

- Explain principles of heat transfer and conversion between heat energy and mechanical power and apply these principles to solution of heat transfer and energy conversion problems
- Analyse, design and explain the performance of heat exchangers
- Analyse and explain the performance of compressors, internal combustion engines, gas turbines and jet propulsion
- Analyse and explain combustion processes and estimate pollutant emissions for internal combustion engines and gas turbines
- Analyse, design and explain nozzles to promote safe and efficient combustion

Graduate Attributes

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

Examination

Outline
Complete an invigilated examination.

Date
During the examination period at a CQUniversity examination centre.

Weighting
50%

Length
180 minutes

Minimum mark or grade
50%

Exam Conditions
Restricted.

Materials
Calculator - all non-communicable calculators, including scientific, programmable and graphics calculators are authorised
Dictionary - non-electronic, concise, direct translation only (dictionary must not contain any notes or comments).

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