



# ENEM20002 Fluid Power Engineering and Control

## Term 1 - 2019

Profile information current as at 01/07/2022 02:02 pm

All details in this unit profile for ENEM20002 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 project-based unit will give you the opportunity to design advanced integrated fluid drive systems for use in industry. It covers comparison of characteristics, construction, selection, design and operation of fluid drives and drive systems; use of mathematical models to analyse performance; machine protection and control schemes; and evaluation of drive system performance. You will apply formulas and explain and record calculations. You will adopt professional approaches to work in teams and learn collaboratively to manage and complete projects. You will manage your own learning; investigate, design and check designed works performed; and communicate professionally using discipline-specific terminology to present designs and problem solutions.

### 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 - 2019

- Melbourne
- Perth
- 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. **Practical Assessment**

Weighting: 20%

#### 4. **Online Quiz(zes)**

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](#).

## Unit Learning Outcomes

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

1. Use advanced mathematical models to design complex fluid drives and their performance
2. Evaluate the characteristics of different drive systems with regard to advanced applications
3. Design protection and control systems
4. Analyse electro-mechanical power and energy conversion systems
5. Evaluate methods to improve energy efficiency, including the use of renewable energy sources
6. Create professional documentation using terminology, symbols and diagrams related to electric and fluid drives.

The learning outcomes are linked to Engineers Australia Stage 1 Competency Standard and Australian Qualification Framework (AQF) 9 Level.

## 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 - 25%	•	•	•			•
2 - Written Assessment - 25%	•	•	•			•
3 - Practical Assessment - 20%				•	•	
4 - Online Quiz(zes) - 30%				•	•	

### Alignment of Graduate Attributes to Learning Outcomes

Graduate Attributes	Learning Outcomes					
	1	2	3	4	5	6
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 - Practical Assessment - 20%		○					○	
4 - Online Quiz(zes) - 30%	○					○	○	

## Textbooks and Resources

### Textbooks

ENEM20002

#### Prescribed

#### Fluid Power with Applications

Edition: 7th (2014)

Authors: Anthony Esposito

Pearson

Essex , Essex , England

ISBN: 978-1-292-02387-8

Binding: Hardcover

#### Additional Textbook Information

An eBook version can purchased from the publisher website here: <http://www.pearson.com.au/9781292036984>

However, if you prefer a paper copy, they can be purchased at the CQUni Bookshop here: <http://bookshop.cqu.edu.au> (search on the Unit code)

[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

**Nirmal Mandal** Unit Coordinator

[n.mandal@cqu.edu.au](mailto:n.mandal@cqu.edu.au)

## Schedule

**Week 1 - 11 Mar 2019**

Module/Topic	Chapter	Events and Submissions/Topic
Lecture: Introduction to Fluid Power Tute: Four tute problems will be solved	Chapter 1~4 of Esposito	

**Week 2 - 18 Mar 2019**

Module/Topic	Chapter	Events and Submissions/Topic
Lecture: Hydraulic Pumps Tute: Four tute problems will be solved	Chapter 5 of Esposito	

**Week 3 - 25 Mar 2019**

Module/Topic	Chapter	Events and Submissions/Topic
Lecture: Hydraulic motor Tute: Four tute problems will be solved	Chapter 7 of Esposito	

**Week 4 - 01 Apr 2019**

Module/Topic	Chapter	Events and Submissions/Topic
Lecture: Hydraulic Accumulators and receivers Tute: Four tute problems will be solved	Chapter 11 of Esposito	

**Week 5 - 08 Apr 2019**

Module/Topic	Chapter	Events and Submissions/Topic
Lecture: Hydraulic valves and controls Tute: Four tute problems will be solved	Chapter 8, 16 of Esposito	

**Vacation Week - 15 Apr 2019**

Module/Topic	Chapter	Events and Submissions/Topic
no activities		

**Week 6 - 22 Apr 2019**

Module/Topic	Chapter	Events and Submissions/Topic
Lecture: Hydraulic Circuit Design and Analysis Tute: Four tute problems will be solved	Chapter 9 of Esposito	<b>Assignment 1</b> Due: Week 6 Friday (26 Apr 2019) 11:45 pm AEST

**Week 7 - 29 Apr 2019**

Module/Topic	Chapter	Events and Submissions/Topic
Lecture: Hydraulic Cylinders, Cushioning and shock absorbers Tute: Four tute problems will be solved	Chapter 6 of Esposito	

**Week 8 - 06 May 2019**

Module/Topic	Chapter	Events and Submissions/Topic
Lecture: Hydraulic Conductors and fittings Tute: Four tute problems will be solved	Chapter 10 of Esposito	

Week 9 - 13 May 2019		
Module/Topic	Chapter	Events and Submissions/Topic
Lecture: Pneumerics: components - compressors, circuits and applications Tute: Four tute problems will be solved	Chapter 13, 14 of Esposito	
Week 10 - 20 May 2019		
Module/Topic	Chapter	Events and Submissions/Topic
Lecture: Electrical Machines and controls Tute: Four tute problems will be solved	Chapter 15, 17 of Esposito, CRO	<b>Laboratory team report</b> Due: Week 10 Friday (24 May 2019) 11:45 pm AEST
Week 11 - 27 May 2019		
Module/Topic	Chapter	Events and Submissions/Topic
Lecture: Maintenance of Hydraulic Systems Tute: Four tute problems will be solved	Chapter 12 of Esposito	<b>Online Quiz(zes)</b> Due: Week 11 Friday (31 May 2019) 11:45 pm AEST
Week 12 - 03 Jun 2019		
Module/Topic	Chapter	Events and Submissions/Topic
Lecture: Review of the unit Tute: no tute	Chapters covered	<b>Assignment 2</b> Due: Week 12 Friday (7 June 2019) 11:45 pm AEST
Review/Exam Week - 10 Jun 2019		
Module/Topic	Chapter	Events and Submissions/Topic
Exam Week - 17 Jun 2019		
Module/Topic	Chapter	Events and Submissions/Topic

## Assessment Tasks

### 1 Assignment 1

#### Assessment Type

Written Assessment

#### Task Description

Assignment 1 focuses on contents cover in week 1 to week 6. The scope of the Assignment 1 will be populated and discussed in week 1 of the unit Moodle site. It is a team submission.

#### Assessment Due Date

Week 6 Friday (26 Apr 2019) 11:45 pm AEST

Compulsory team submission online

#### Return Date to Students

Week 8 Friday (10 May 2019)

After two weeks of submission date

#### Weighting

25%

#### Minimum mark or grade

is 50% of the allocated marks of this assignment to pass it

#### Assessment Criteria

This team based project will be assessed considering both technical and professional aspects. The technical

aspects cover a wide range of applications of design and analysis of a hydraulic system, comparison and safety checking of the new design using proper engineering procedures. The professional skills cover a higher level of teamwork, leadership, research and communication skills.

Students should refer to the Unit Moodle site for individual marking criteria of the team based projects and labs. Detailed description of the marking scheme will be provided in the Moodle site on time. It is based on some factors such as Team Charter and peer assessments.

### **Referencing Style**

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

### **Submission**

Online

### **Submission Instructions**

Students can scan their handwritten calculations for online submission

### **Learning Outcomes Assessed**

- Use advanced mathematical models to design complex fluid drives and their performance
- Evaluate the characteristics of different drive systems with regard to advanced applications
- Design protection and control systems
- Create professional documentation using terminology, symbols and diagrams related to electric and fluid drives.

### **Graduate Attributes**

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

## **2 Assignment 2**

### **Assessment Type**

Written Assessment

### **Task Description**

This assignment is based on the contents covered in week 1 to week 12. The scopes of the assignment 2 will be populated in week 7 in the unit Moodle site. It is a team submission.

### **Assessment Due Date**

Week 12 Friday (7 June 2019) 11:45 pm AEST

Compulsory team submission online

### **Return Date to Students**

Exam Week Friday (21 June 2019)

After two weeks of submission date

### **Weighting**

25%

### **Minimum mark or grade**

is 50% of the allocated marks of this assignment to pass it

### **Assessment Criteria**

This team based project will be assessed considering both technical and professional aspects. The technical aspects cover a wide range of applications of design and analysis of a hydraulic system, comparison and safety checking of the new design using proper engineering procedures. The professional skills cover a higher level of teamwork, leadership, research and communication skills. Students should refer to the Unit Moodle site for individual marking criteria of the team based projects and labs. Detailed description of the marking scheme will be provided in the Moodle site on time. It is

based on some factors such as Team Charter and peer assessments.

#### **Referencing Style**

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

#### **Submission**

Online

#### **Submission Instructions**

Students can scan their handwritten calculations for online submission

#### **Learning Outcomes Assessed**

- Use advanced mathematical models to design complex fluid drives and their performance
- Evaluate the characteristics of different drive systems with regard to advanced applications
- Design protection and control systems
- Create professional documentation using terminology, symbols and diagrams related to electric and fluid drives.

#### **Graduate Attributes**

- Knowledge
- Cognitive, technical and creative skills
- Research

### 3 Laboratory team report

#### **Assessment Type**

Practical Assessment

#### **Task Description**

Based on the content covered in Hydraulic Test rig experiments. It is a team submission  
Compulsory Team submission

#### **Assessment Due Date**

Week 10 Friday (24 May 2019) 11:45 pm AEST  
Compulsory team submission online

#### **Return Date to Students**

Week 12 Friday (7 June 2019)  
After two weeks of submission date

#### **Weighting**

20%

#### **Minimum mark or grade**

is 50% of the allocated marks of this assignment to pass it

#### **Assessment Criteria**

Assessment criteria are based on a detailed calculations and presentations of data obtained in the hydraulic test rig experiments. It is based on accuracy in calculations, validation of results obtained by proper interpretation of results. It is also based on the way how students are putting symbols and hydraulic diagrams to present sequence of operations in the experiments.

Students should refer to the Unit Moodle site for individual marking criteria of the team based projects and labs. Detailed description of the marking scheme will be provided in the Moodle site on time.

#### **Referencing Style**

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

#### **Submission**

Online

#### **Submission Instructions**

Students can scan their handwritten calculations for online submission

#### **Learning Outcomes Assessed**

- Analyse electro-mechanical power and energy conversion systems



- Evaluate methods to improve energy efficiency, including the use of renewable energy sources

**Graduate Attributes**

- Communication
- Ethical and Professional Responsibility

## 4 Online Quiz(zes)

**Assessment Type**

Online Quiz(zes)

**Task Description**

This quiz will be held in week 11 covering the contents from week 1 to week 11. The assessment task can be assessed using unit Moodle site. The quiz will open at the start of week 11 and finish at the end of week 11 Friday till 11:45pm. Students need to attempt within this open period. This is an open book style quiz

**Number of Quizzes**

1

**Frequency of Quizzes**

Other

**Assessment Due Date**

Week 11 Friday (31 May 2019) 11:45 pm AEST

Compulsory individual submission

**Return Date to Students**

Week 11 Friday (31 May 2019)

Students will get feedback immediately after the submission of the quiz

**Weighting**

30%

**Minimum mark or grade**

is 50% of the allocated marks of this quiz to pass it

**Assessment Criteria**

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

**Referencing Style**

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

**Submission**

Online

**Submission Instructions**

Students should attempt and submit within the stipulated time limit.

**Learning Outcomes Assessed**

- Analyse electro-mechanical power and energy conversion systems
- Evaluate methods to improve energy efficiency, including the use of renewable energy sources

**Graduate Attributes**

- Knowledge
- Self-management
- Ethical and Professional Responsibility

## 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