ENEM13019 *Fluid Machinery*
Term 1 - 2026

Profile information current as at 08/06/2026 02:38 pm

All details in this unit profile for ENEM13019 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 introduce you to fluid drive systems and the design and control of integrated drive systems for use in industries. It covers comparison of characteristics, construction, selection, design and operation of fluid drives and control 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 language to present designs and problem solutions. Distance education students are required to have access to a computer, to make frequent use of the internet, and are required to participate in residential school activities.

Details
Career Level: *Undergraduate*
Unit Level: *Level 3*
Credit Points: *6*
Student Contribution Band: *8*
Fraction of Full-Time Student Load: *0.125*

Pre-requisites or Co-requisites
Pre-requisites: ENEM12006 Fluid Mechanics and ENEM12010 Engineering Dynamics
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 - 2026
- Bundaberg
- Cairns
- Gladstone
- Mackay
- Mixed Mode
- Rockhampton

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

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

Class and Assessment Overview

Recommended Student Time Commitment

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

Class Timetable

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

Metropolitan Campuses
Adelaide, Brisbane, Melbourne, Perth, Sydney

Assessment Overview

1. Written Assessment
Weighting: 20%
2. Written Assessment
Weighting: 20%
3. Practical and Written Assessment
Weighting: 20%
4. Online Quiz(zes)
Weighting: 40%

Assessment Grading

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

CQUniversity Policies

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

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

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

Previous Student Feedback

Feedback, Recommendations and Responses

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

Feedback from SUTE of unit comments report

Feedback
The weekly materials and information flow are managed in the right order.

Recommendation
Continue to follow the delivery pattern and unit materials.

Feedback from SUTE of unit comments report

Feedback
Lab demonstrations need improvement.

Recommendation
Better laboratory demonstrations should be planned based on available resources.

Unit Learning Outcomes

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

1. Design and analyse the fluid drives using mathematical modeling
2. Evaluate the charateristics of different drive systems with regard to the application
3. Design protection and control systems
4. Analyse electro-mechanical power and energy conversion systems
5. Evaluate methods to improve energy efficiency
6. Create professional documentation using terminology, symbols and diagrams related to electric and fluid drives.

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:

Intermediate 1.5 Knowledge of engineering design practice and contextual factors impacting the engineering discipline. (LO: 1I 2I 3I 4I 6I) 2.4 Application of systematic approaches to the conduct and management of engineering projects. (LO: 1I 2I 3I 4I 5N 6I)

Advanced 1.1 Comprehensive, theory-based understanding of the underpinning natural and physical sciences and the engineering fundamentals applicable to the engineering discipline. (LO: 1A 2A 3I 4I 5N 6I) 1.2 Conceptual understanding of the mathematics, numerical analysis, statistics, and computer and information sciences which underpin the engineering discipline. (LO: 1A 2A 3I 4I 5I 6A) 1.3 In-depth understanding of specialist bodies of knowledge within the engineering discipline. (LO: 1A 2A 3A 4I 5N 6A) 1.4 Discernment of knowledge development and research directions within the engineering discipline. (LO: 1I 2A 3I 4A 5N 6A) 1.6 Understanding of the scope, principles, norms, accountabilities and bounds of sustainable engineering practice in the specific discipline. (LO: 1A 2A 3I 4I 6I) 2.1 Application of established engineering methods to complex engineering problem solving. (LO: 1A 2A 3I 4I 6A) 2.2 Fluent application of engineering techniques, tools and resources. (LO: 1I 2A 3I 4I 5N 6I) 2.3 Application of systematic engineering synthesis and design processes. (LO: 1A 2A 3I 4I 5N 6A) 3.2 Effective oral and written communication in professional and lay domains. (LO: 1A 2A 3A 4A 6A) 3.3 Creative, innovative and pro-active demeanour. (LO: 1I 2I 3I 4I 5N 6A) 3.4 Professional use and management of information. (LO: 1A 2A 3A 4A 6A) 3.5 Orderly management of self, and professional conduct. (LO: 1A 2A 3A 4A 6A) 3.6 Effective team membership and team leadership. (LO: 1I 2A 3I 4I 6A)

Note: LO refers to the Learning Outcome number(s) which link to the competency and the levels: N – Introductory, I – Intermediate and A - Advanced.

Refer to the Engineering Undergraduate Course 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=1511

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 - 20%	•	•		•	•	•
2 - Written Assessment - 20%	•	•		•	•	
3 - Practical and Written Assessment - 20%			•			•
4 - Online Quiz(zes) - 40%			•			

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 - First Nations Knowledges						
11 - 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	11
1 - Written Assessment - 20%	•	•	•	•	•	•		•			
2 - Written Assessment - 20%	•	•	•	•	•	•		•			
3 - Practical and Written Assessment - 20%	•	•	•	•	•	•					

Assessment Tasks	Graduate Attributes										
	1	2	3	4	5	6	7	8	9	10	11
4 - Online Quiz(zes) - 40%		•	•	•							

Textbooks and Resources

Textbooks

ENEM13019

Prescribed

Fluid Power with Applications
Edition: 7th (2014)
Authors: Esposito
Pearson
Essek , Essek , UK
ISBN: 978-1-292-02387-8

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

Schedule

Week 1 - 09 Mar 2026

Module/Topic	Chapter	Events and Submissions/Topic
Lecture: Introduction to Fluid Power	Chapters 1~4 of Esposito	Tutorial: Four tute problems will be solved & demonstration of SimScape software, Project 1 scope of hydraulic power systems will be introduced. Team building activities will be finished.

Week 2 - 16 Mar 2026

Module/Topic	Chapter	Events and Submissions/Topic

Lecture: Hydraulic Pumps	Chapter 5 of Esposito	Tutorial: Four tute problems will be solved & SimScape Library tutorials, For project 1, the progress of it will be monitored and recorded using meeting minutes, 4-square charts, agenda items, and weekly planning documents
Week 3 - 23 Mar 2026		
Module/Topic	Chapter	Events and Submissions/Topic
Lecture: Hydraulic motors	Chapter 7 of Esposito	Tutorial: Four tute problems will be solved and SimScape tutorials, For project 1, the progress of it will be monitored and recorded using meeting minutes, 4-square charts, agenda items, and weekly planning documents
Week 4 - 30 Mar 2026		
Module/Topic	Chapter	Events and Submissions/Topic
Lecture: Hydraulic Cylinders, Cushioning and shock absorbers	Chapter 6 of Esposito	Tutorial: Four tute problems will be solved and SimScape tutorials, For project 1, the progress of it will be monitored and recorded using meeting minutes, 4-square charts, agenda items, and weekly planning documents
Week 5 - 06 Apr 2026		
Module/Topic	Chapter	Events and Submissions/Topic
Lecture: Hydraulic valves and controls	Chapters 8, 16 of Esposito	Tutorial: Four tute problems will be solved and SimScape tutorials, For project 1, the progress of it will be monitored and recorded using meeting minutes, 4-square charts, agenda items, and weekly planning documents
Week 6 - 13 Apr 2026		
Module/Topic	Chapter	Events and Submissions/Topic
Lecture: Hydraulic Circuit Design and Analysis	Chapter 9 of Esposito	Tutorial: Four tute problems will be solved, For project 1, team presentation. Project 1 Due: Week 6 Friday (17 Apr 2026) 11:45 pm AEST
Vacation Week - 20 Apr 2026		
Module/Topic	Chapter	Events and Submissions/Topic
Teaching free week	N/A	
Week 7 - 27 Apr 2026		
Module/Topic	Chapter	Events and Submissions/Topic
Lecture: Hydraulic Accumulators and receivers, further controls of fluid power systems	Chapters11, 15, 16 of Esposito	Tutorial: Four tute problems will be solved, Project 2 scope of fluid power systems will be introduced. The same Team will be employed if it is ok
Week 8 - 04 May 2026		
Module/Topic	Chapter	Events and Submissions/Topic

Lecture: Hydraulic Conductors and fittings	Chapter 10 of Esposito	Tutorial: Four tute problems will be solved, For project 2, the progress of it will be monitored and recorded using meeting minutes, 4-square charts, agenda items, and weekly planning documents

Week 9 - 11 May 2026

Module/Topic	Chapter	Events and Submissions/Topic
Lecture: Pneumatics: components - compressors, circuits, and applications	Chapters 13, 14 of Esposito	Tutorial: Four tute problems will be solved, For project 2, the progress of it will be monitored and recorded using meeting minutes, 4-square charts, agenda items, and weekly planning documents Laboratory Team Report Due: Week 9 Friday (15 May 2026) 11:45 pm AEST

Week 10 - 18 May 2026

Module/Topic	Chapter	Events and Submissions/Topic
Lecture: Electrical Machines and controls by guest lecturers	Chapters 15, 17 of Esposito, lecture notes	Tutorial: For project 2, the progress of it will be monitored and recorded using meeting minutes, 4-square charts, agenda items, and weekly planning documents

Week 11 - 25 May 2026

Module/Topic	Chapter	Events and Submissions/Topic
Lecture: Maintenance of Hydraulic System	Chapter 12 of Esposito	Tutorial: An online quiz will be held for 2.5 hours Online Test Due: Week 11 Tuesday (26 May 2026) 11:00 am AEST

Week 12 - 01 Jun 2026

Module/Topic	Chapter	Events and Submissions/Topic
Lecture: Review of the unit	Chapters: all	Tutorial: Project 2 formal progress presentation in the workshop section and getting ready to submit the team project on Friday, Week 12 in the submission link set in the Moodle. Project 2 Due: Week 12 Friday (5 June 2026) 11:45 pm AEST

Exam Week - 08 Jun 2026

Module/Topic	Chapter	Events and Submissions/Topic

Vacation/Exam Week - 15 Jun 2026

Module/Topic	Chapter	Events and Submissions/Topic

Assessment Tasks

1 Project 1

Assessment Type
Written Assessment

Task Description
Project 1 is a team project. It focuses on the content of the unit covered in week 1 to week 6. The scope of Assignment 1 will be populated in the unit Moodle before term starts and will be discussed in the week 1 tutorial session. It is a team submission. A team project presentation of this project will be held on Week 6 in tutorial time and venue.

Project 1 is focusing on Hydraulic fluid power applications. Matlab, SimScape and SimScape simulation software will be used to model the fluid power system design as per the Project 1 scopes provided in the unit Moodle site.

Assessment Due Date
Week 6 Friday (17 Apr 2026) 11:45 pm AEST

Compulsory team submission

Return Date to Students
Week 8 Friday (8 May 2026)

After two weeks of submission date

Weighting
20%

Minimum mark or grade
50%

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 team project report assessment criteria and individual marking criteria of the team-based projects. A detailed description of both marking schemes will be provided in the Moodle site on time. It is based on some factors such as Team Charter and/or peer assessments.

Referencing Style
- Harvard (author-date)

Submission
Online Group

Submission Instructions
Students can scan their handwritten calculations for online submission

Learning Outcomes Assessed
- Design and analyse the fluid drives using mathematical modeling
- Evaluate the charateristics of different drive systems with regard to the application
- Analyse electro-mechanical power and energy conversion systems
- Evaluate methods to improve energy efficiency
- Create professional documentation using terminology, symbols and diagrams related to electric and fluid drives.

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

2 Project 2

Assessment Type
Written Assessment

Task Description
Project 2 is a team project. It focuses on the content of the unit covered in week 1 to week 12. The scope of project 2 will be populated in the unit Moodle in Week 7 and will be discussed in the week 7 tutorial session. It is a team submission. A team project presentation of this project will be held on Week 12 in tutorial time and venue.
Project 2 is focusing on Pneumatic fluid power applications. Matlab, SimScape and SimScape simulation software will be used to model the fluid power system design as per the Project 2 scopes provided in the unit Moodle site.

Assessment Due Date
Week 12 Friday (5 June 2026) 11:45 pm AEST

Compulsory team submission

Return Date to Students
Exam Week Friday (12 June 2026)

After two weeks of submission date

Weighting
20%

Minimum mark or grade
50%

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 fluid powered 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 team project report assessment criteria and individual marking criteria of the team-based projects. A detailed description of both marking schemes will be provided in the Moodle site on time. It is based on some factors such as Team Charter and/or peer assessments.

Referencing Style
- Harvard (author-date)

Submission
Online Group

Submission Instructions
Students can scan their handwritten calculations for online submission

Learning Outcomes Assessed
- Design and analyse the fluid drives using mathematical modeling
- Evaluate the charateristics of different drive systems with regard to the application
- Analyse electro-mechanical power and energy conversion systems
- Evaluate methods to improve energy efficiency

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

3 Laboratory Team Report

Assessment Type
Practical and Written Assessment

Task Description
It is based on the content covered in Hydraulic Test rig experiments. It is a team submission. For any change of date and time, the students will be notified before in the Moodle site. Pl. see the information in the Moodle site regularly.

Assessment Due Date
Week 9 Friday (15 May 2026) 11:45 pm AEST

Compulsory Team submission

Return Date to Students
Week 11 Friday (29 May 2026)

After two weeks of submission date

Weighting
20%

Minimum mark or grade
50%

Assessment Criteria
Assessment criteria are based on detailed calculations and presentations of data obtained in the hydraulic test rig experiments. It is based on accuracy in calculations, and validation of results obtained by properly interpreting results. It

is also based on the way how students are putting symbols and hydraulic diagrams to present the sequence of operations in the experiments.
No team charter approach or other marking schemes are considered for individual student marking. All students on a team will get the same marks as those on the team lab report. The discipline's Practical assessment marking rubric will be available in the unit Moodle site.

Referencing Style
- Harvard (author-date)

Submission
Online Group

Submission Instructions
Students can scan their handwritten calculations for online submission

Learning Outcomes Assessed
- Design protection and control systems
- Create professional documentation using terminology, symbols and diagrams related to electric and fluid drives.

Graduate Attributes
- Communication
- Problem Solving
- Critical Thinking
- Information Literacy
- Team Work
- Information Technology Competence

4 Online Test

Assessment Type
Online Quiz(zes)

Task Description
This is an invigilated individual online class test that will be held in Week 11 of this unit during tutorial time. The duration will be 2.5 hours. The detailed description and important information relating to this individual online test will be populated on the unit Moodle site.

Number of Quizzes
1

Frequency of Quizzes
Other

Assessment Due Date
Week 11 Tuesday (26 May 2026) 11:00 am AEST

Due date and time is based on the tutorial time of this unit set by the timetable team. It will be held in Week 11. Information on it will be populated in Moodle site and weekly e-mails.

Return Date to Students

After a few days or the selected day stated above

Weighting
40%

Minimum mark or grade
40%

Assessment Criteria
You have to employ your technical knowledge and problem-solving skills to answer the questions. There are yes/no, multiple-choice questions. You have to get answers to some questions by proper calculations focusing on units of parameters. For a right answer, you will get 1 (one) and for a wrong answer, you will get a 0 (zero).

Referencing Style
- Harvard (author-date)

Submission
Online

Submission Instructions
an automatic submission when it is done.

Learning Outcomes Assessed
- Design protection and control systems

Graduate Attributes
- Problem Solving
- Critical Thinking
- Information Literacy

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