ENAE12006 *Electrical Machines and Drives*
Term 1 - 2021

Profile information current as at 12/10/2024 06:00 pm

All details in this unit profile for ENAE12006 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
In this unit, you will be introduced to different types of electrical machines that convert electrical energy to other forms of energy. You will cover construction and operational characteristics of DC and AC electrical machines. You will also get a basic understanding of machine protection and control schemes. You will work, learn and communicate ethically and professionally, to investigate and solve problems and present solutions. You will communicate technical aspects and operation of electrical machines and clearly document solutions to problems. You will attend a Residential School to complete the laboratory experiment component of the unit.

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
Pre-requisite: ENEE12015 Electrical Power Engineering OR ENAE12007 Electrical Power Systems
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 - 2021

- 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).

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. **Written Assessment**
Weighting: 25%
3. **Practical and Written Assessment**
Weighting: 30%
4. **Online Quiz(zes)**
Weighting: 20%

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 Unit Evaluation

Feedback
Students found enough time to do the assessments and quizzes and received assessment feedback in a timely manner.

Recommendation
This good practice will be continued.

Feedback from Unit Evaluation

Feedback
Even though students had to complete the residential school online, they still could manage to do it actively and share the tasks with each team member fairly.

Recommendation
This good practice will be continued.

Feedback from Unit Evaluation

Feedback
Students found the lecture notes very helpful and informative, however, they would like the lecture videos to expand more on the concepts.

Recommendation
In future offerings, the lecture videos will be adjusted in a manner that explains the concepts more.

Feedback from Unit Coordinator

Feedback
More detailed feedback can be included in the online quizzes.

Recommendation
In future offerings, the quizzes' feedback will be refined so it contains more detailed feedback.

Unit Learning Outcomes

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

1. Describe construction and operational characteristics of DC and AC electrical machines
2. Identify the schemes used to protect and control electric drives
3. Analyse and formulate industrial drive problems and solve them in a professional manner
4. Verify the operational characteristics of electrical machines through laboratory experiments
5. Communicate effectively using terminology, symbols and diagrams associated with electrical machines through professional documentation
6. Work, learn and communicate in an ethical, professional manner both individually and in teams, using information literacy skills to investigate problems and present solutions

Learning Outcomes are linked to Engineers Australia Stage 1 Competencies.

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

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

Textbooks and Resources

Textbooks

ENAE12006

Prescribed

Electrical Machines, Drives, and Power Systems
6th Edition (Pearson new international edition) (2014)
Authors: Theodore Wildi
Pearson Education Limited
Harlow , Essex , England
ISBN: 978-1-292-02458-5
Binding: Hardcover

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 document scanner

Referencing Style

All submissions for this unit must use the referencing style: Harvard (author-date)
For further information, see the Assessment Tasks.

Teaching Contacts

Kianoush Emami Unit Coordinator
k.emami@cqu.edu.au

Schedule

Week 1 - 08 Mar 2021

Module/Topic	Chapter	Events and Submissions/Topic
Electrical machines and basic Electrical Engineering	**Chapter 1 and Chapter 2**	

Week 2 - 15 Mar 2021

Module/Topic	Chapter	Events and Submissions/Topic
Electrical Engineering Principles	**Chapter 2 and Chapter 3**	

Week 3 - 22 Mar 2021

Module/Topic	Chapter	Events and Submissions/Topic
Electrical Engineering Principles (continued)	**Chapter 3 and Chapter 6**	Online Quiz 1 opens on Monday (22 Mar 21) 9:00 AM AEST and closes Tuesday (30 Mar 21) 11:45 PM AEST. The quiz covers contents from Week 1 and Week 2.

Week 4 - 29 Mar 2021

Module/Topic	Chapter	Events and Submissions/Topic

Direct-Current Machines	**Chapter 4 and Chapter 5**	

Week 5 - 05 Apr 2021

Module/Topic	Chapter	Events and Submissions/Topic
Direct-Current Machines (continued)	**Chapter 4 and Chapter 5**	Online Quiz 2 opens on Monday (5 Apr 21) 9:00 AM AEST and closes Tuesday (20 Apr 21) 11:45 PM AEST. The quiz covers contents from Week 3 and Week 4.

Vacation Week - 12 Apr 2021

Module/Topic	Chapter	Events and Submissions/Topic
		Residential school of this unit will be from 14th till 16th of April 2021 in Rockhampton B28/2.10.

Week 6 - 19 Apr 2021

Module/Topic	Chapter	Events and Submissions/Topic
Induction (AC) Machines	**Chapter 13, Chapter 14 and Chapter 18**	**Assignment 1** Due: Week 6 Friday (23 Apr 2021) 11:45 am AEST

Week 7 - 26 Apr 2021

Module/Topic	Chapter	Events and Submissions/Topic
Induction Machines (continued)	**Chapter 13, Chapter 14 and Chapter 18**	Online Quiz 3 opens on Monday (26 Apr 21) 9:00 AM AEST and closes Tuesday (4 May 21) 11:45 PM AEST. The quiz covers contents from Week 5 and Week 6.

Week 8 - 03 May 2021

Module/Topic	Chapter	Events and Submissions/Topic
Synchronous (AC) Machines	**Chapter 16 and Chapter 17**	**Residential School and Lab Report** Due: Week 8 Friday (7 May 2021) 11:45 pm AEST

Week 9 - 10 May 2021

Module/Topic	Chapter	Events and Submissions/Topic
Synchronous Machines (continued)	**Chapter 16 and Chapter 17**	Online Quiz 4 opens on Monday (10 May 21) 9:00 AM AEST and closes Tuesday (18 May 21) 11:45 PM AEST. The quiz covers contents from Week 7 and Week 8.

Week 10 - 17 May 2021

Module/Topic	Chapter	Events and Submissions/Topic
Fundamentals in Protection and Control of Electrical Machines	**Chapter 20**	

Week 11 - 24 May 2021

Module/Topic	Chapter	Events and Submissions/Topic
Fundamental Elements of Power Electronics	**Chapter 21**	Online Quiz 5 Opens on Monday (24 May 21) 9:00 AM AEST and closes Friday (4 June 21) 11:45 PM AEST. The quiz covers contents from Week 9, Week 10 and Week 11.

Week 12 - 31 May 2021

Module/Topic	Chapter	Events and Submissions/Topic
Power Electronic Control of AC and DC Electrical Machines (Introduction)	**Chapter 22 and Chapter 23**	**Assessment 2** Due: Week 12 Friday (4 June 2021) 11:45 pm AEST

Review/Exam Week - 07 Jun 2021		
Module/Topic	Chapter	Events and Submissions/Topic

Exam Week - 14 Jun 2021		
Module/Topic	Chapter	Events and Submissions/Topic

Assessment Tasks

1 Assignment 1

Assessment Type
Written Assessment

Task Description
Students are expected to successfully complete the exercises specified in the unit website in Moodle covering the learning outcomes 1, 5, and 6. This **compulsary** assignment contains 5-10 problems which will require the theoretical knowledge gained through your learning during the first five weeks. Marking scheme for each question will be published with the assignment and the marks for this assignment will contribute to 25% of the overall marks of this unit. Assignment questions will be available in the unit Moodle site at the beginning of the term. Please also refer to assessment criteria for more details.

Assessment Due Date
Week 6 Friday (23 Apr 2021) 11:45 am AEST

To be submitted as a PDF file to unit web site, one submission per student

Return Date to Students
Week 8 Friday (7 May 2021)

Feedback will be provided through unit website in Moodle.

Weighting
25%

Minimum mark or grade
A minimum mark of 50% is required to pass the assessment

Assessment Criteria
Assessment Criteria
Each question in this assignment will be assessed separately for the criterion accuracy and correct results. **20% of the total marks for this assignment are based on accuracy and correct results, including**:

- Correct application of maths and arithmetic
- Answers clearly identified
- Correct results

In addition, the assignment as a whole will be assessed against the following criteria:
Evidence of correct procedures (40% of the total marks for the assignment)

- All necessary steps in analysis are present on 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)

Evidence of understanding of the topic (30% of the total marks for the assignment)

- Explanation of choices made in the analysis (why is procedure required, why this particular procedure)
- Interpretation of results, e.g. limitations, direction of vectors

Professional presentation (10% of the total marks for the assignment)

- Clear statement of each problem and its details and requirements
- Logical layout of analysis
- Appropriate use of diagrams, clear diagrams
- Correct use of terminology, conventions

- Referencing of authoritative sources of equations and data

Referencing Style

- Harvard (author-date)

Submission
Online

Submission Instructions
To be submitted as a PDF file to unit web site, one submission per student

assessmentOutcome

- Describe construction and operational characteristics of DC and AC electrical machines
- Analyse and formulate industrial drive problems and solve them in a professional manner
- Communicate effectively using terminology, symbols and diagrams associated with electrical machines through professional documentation
- Work, learn and communicate in an ethical, professional manner both individually and in teams, using information literacy skills to investigate problems and present solutions

assessmentGradAttribute

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

2 Assessment 2

Assessment Type
Written Assessment

Task Description
Students are expected to successfully complete the exercises specified in the unit website in Moodle covering the learning outcomes 1, 2, 3, 4, and 5. This **compulsary** assignment contains 5-10 problems which will require the theoretical knowledge gained through your learning during the term. Marking scheme for each question will be published with the assignment and the marks for this assignment will contribute to 25% of the overall marks of this unit. Assignment questions will be available in unit Moodle site at the beginning of the term. Please also refer to assessment criteria for more details.

Assessment Due Date
Week 12 Friday (4 June 2021) 11:45 pm AEST

To be submitted as a PDF file to unit web site, one submission per student

Return Date to Students
Review/Exam Week Friday (11 June 2021)

Feedback given through unit website in Moodle

Weighting
25%

Minimum mark or grade
A minimum mark of 50% is required to pass the assessment

Assessment Criteria
Assessment Criteria
Each question in this assignment will be assessed separately for the criterion accuracy and correct results. **20% of the total marks for this assignment are based on accuracy and correct results, including**:

- Correct application of maths and arithmetic
- Answers clearly identified
- Correct results

In addition, the assignment as a whole will be assessed against the following criteria:

Evidence of correct procedures (40% of the total marks for the assignment)

- All necessary steps in analysis are present on 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)

Evidence of understanding of the topic (30% of the total marks for the assignment)

- Explanation of choices made in the analysis (why is procedure required, why this particular procedure)
- Interpretation of results, e.g. limitations, direction of vectors

Professional presentation (10% of the total marks for the assignment)

- Clear statement of each problem and its details and requirements
- Logical layout of analysis
- Appropriate use of diagrams, clear diagrams
- Correct use of terminology, conventions
- Referencing of authoritative sources of equations and data

Referencing Style

- Harvard (author-date)

Submission
Online

Submission Instructions
To be submitted online through unit website in Moodle

assessmentOutcome

- Identify the schemes used to protect and control electric drives
- Analyse and formulate industrial drive problems and solve them in a professional manner
- Communicate effectively using terminology, symbols and diagrams associated with electrical machines through professional documentation
- Work, learn and communicate in an ethical, professional manner both individually and in teams, using information literacy skills to investigate problems and present solutions

assessmentGradAttribute

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

3 Residential School and Lab Report

Assessment Type
Practical and Written Assessment

Task Description
Dates for the **compulsary** residential school will be notified to students through the unit Website. Students will be formed into teams for all residential school activities. A group professional technical laboratory report after three weeks of carrying out the labs during the residential school. The details of the experiments will be notified to students through the unit Website. Please also refer to assessment criteria for more details.

Assessment Due Date
Week 8 Friday (7 May 2021) 11:45 pm AEST

To be submitted as a PDF file to unit web site, one submission per student

Return Date to Students
Week 10 Friday (21 May 2021)

Feedback given through unit website in Moodle

Weighting
30%

Minimum mark or grade
A minimum mark of 50% is required to pass the assessment

Assessment Criteria
Assessment Criteria
Marking of the individual report will be done according to the following criteria.

- The accuracy and relevance of information
- Application of knowledge
- Language and grammar used in answering questions
- Proper referencing of sources of information
- Inclusion of all relevant Equations, images, data and tables, and the quality of presentation and layout

Referencing Style

- Harvard (author-date)

Submission
Online Group

Submission Instructions
To be submitted online through unit website in Moodle

assessmentOutcome

- Describe construction and operational characteristics of DC and AC electrical machines
- Identify the schemes used to protect and control electric drives
- Analyse and formulate industrial drive problems and solve them in a professional manner
- Verify the operational characteristics of electrical machines through laboratory experiments
- Communicate effectively using terminology, symbols and diagrams associated with electrical machines through professional documentation
- Work, learn and communicate in an ethical, professional manner both individually and in teams, using information literacy skills to investigate problems and present solutions

assessmentGradAttribute

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

4 Online Quiz(zes)

Assessment Type
Online Quiz(zes)

Task Description
The assessment is a set of five online fortnightly quizzes which can be accessed via the unit Moodle site. Each online quiz weights 4% of your final mark (20% in total). The quizzes are an integrated part of the study to test on the key concepts of each topic. Each quiz will be available up to 1 week after the relevant fortnight to allow students who cannot find time each week for study. For example quiz on Week 1 and 2 will be available on Tuesday Week 3 and will close on Tuesday the week after.
Important Notes:

- Each quiz has a set time to complete and once a student start a quiz, it will close after the set time.
- Once started, a quiz cannot be paused in the middle. Students are strongly advised to sufficiently cover the material related to each quiz before starting the quiz.
- You can attemp each quiz 3 times within the given time frame as specified in the schedule.
- Final mark will be the highest of all the attempts.

Number of Quizzes
5

Frequency of Quizzes
Fortnightly

Assessment Due Date

Tuesday weeks 4,6,8,10 and Friday Week 12 at 11:45 PM AEST

Return Date to Students

Results are available immediately after the completion of each quiz

Weighting
20%

Assessment Criteria
No Assessment Criteria

Referencing Style

- Harvard (author-date)

Submission
Online

assessmentOutcome

- Describe construction and operational characteristics of DC and AC electrical machines
- Identify the schemes used to protect and control electric drives
- Analyse and formulate industrial drive problems and solve them in a professional manner
- Communicate effectively using terminology, symbols and diagrams associated with electrical machines through professional documentation
- Work, learn and communicate in an ethical, professional manner both individually and in teams, using information literacy skills to investigate problems and present solutions

assessmentGradAttribute

- 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