ENEE14007 *Electrical Machines and Drives Applications*
Term 2 - 2023

Profile information current as at 12/10/2024 05:32 pm

All details in this unit profile for ENEE14007 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 project-based learning unit, you will analyse and design systems and components that convert electrical energy into mechanical energy. You will investigate the construction and operational characteristics of various DC and AC electrical machines, analyse machine protection and control schemes and select and specify machines for particular applications. Furthermore, you will learn about components and materials for electrical machines, and use power electronics to optimise the performance of energy conversion. You are expected to learn and work individually and in teams to complete projects, to develop interpersonal and technical communication skills and to prepare professional documentation, including problem solutions, electrical designs and project reports. Distance education students are required to have access to a computer, to make frequent use of the Internet. In this unit, you must complete compulsory practical activities. Refer to the Engineering Undergraduate Course Moodle site for proposed dates.

Details

Career Level: *Undergraduate*
Unit Level: *Level 4*
Credit Points: *12*
Student Contribution Band: *8*
Fraction of Full-Time Student Load: *0.25*

Pre-requisites or Co-requisites

Pre-requisite: ENEE12015 Electrical Power Engineering
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 - 2023

- 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 12-credit Undergraduate 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: 15%
2. **Written Assessment**
Weighting: 15%
3. **Practical and Written Assessment**
Weighting: 15%
4. **Written Assessment**
Weighting: 40%
5. **Online Quiz(zes)**
Weighting: 15%

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 this unit well-taught and appreciated the good level of support available throughout the term by the unit coordinator.

Recommendation
Continue this good practice.

Feedback from Unit evaluation

Feedback
Students found some of the assessment questions not descriptive and clear as they should be.

Recommendation
In the future offering, add more details to the assessment questions to avoid confusion and more clarity.

Feedback from Unit evaluation

Feedback
Learning materials in this unit might be not properly linked with a few online quiz questions.

Recommendation
In the future offering, check online quiz questions and make sure that the questions can be answered by students using the available learning resources on Moodle.

Unit Learning Outcomes

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

1. Compare and explain features of DC and AC electrical machines
2. Design and justify innovative electrical drive systems for industrial applications
3. Apply protection and control schemes for electrical drives
4. Deploy power electronic devices and circuits for optimising energy conversion in electrical drive system applications
5. Create professional documentation of the design, analysis process and solutions using electrical terminology, symbols and diagrams
6. Work collaboratively in a team to produce high quality outputs.

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: 2I) 2.4 Application of systematic approaches to the conduct and management of engineering projects. (LO: 2I) 3.3 Creative, innovative and pro-active demeanour. (LO: 1I 2I 3I 4N)

Advanced 1.1 Comprehensive, theory-based understanding of the underpinning natural and physical sciences and the engineering fundamentals applicable to the engineering discipline. (LO: 1I 2A 3A 4A 5A) 1.2 Conceptual understanding of the mathematics, numerical analysis, statistics, and computer and information sciences which underpin the engineering discipline. (LO: 1I 2A 3A 4A 5A) 1.3 In-depth understanding of specialist bodies of knowledge within the engineering discipline. (LO: 2A 5A) 1.4 Discernment of knowledge development and research directions within the engineering discipline. (LO: 1I 2A 3I 4I 5A) 1.6 Understanding of the scope, principles, norms, accountabilities and bounds of sustainable engineering practice in the specific discipline. (LO: 2A 5A) 2.1 Application of established engineering methods to complex engineering problem-solving. (LO: 1I 2A 3I 4I 5A) 2.2 Fluent application of engineering techniques, tools and resources. (LO: 2A 3A 4I 5A) 2.3 Application of systematic engineering synthesis and design processes. (LO: 1I 2A 3A) 3.2 Effective oral and written communication in professional and lay domains. (LO: 5A 6A) 3.4 Professional use and management of information. (LO: 2A 5A) 3.5 Orderly management of self, and professional conduct. (LO: 2A 5A 6A) 3.6 Effective team membership and team leadership. (LO: 2A 5A 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 informationhttps://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 - 15%	•				•	
2 - Written Assessment - 15%		•	•			
3 - Practical and Written Assessment - 15%				•		•
4 - Written Assessment - 40%		•			•	•
5 - Online Quiz(zes) - 15%	•		•			

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						

Textbooks and Resources

Textbooks

ENEE14007

Prescribed

Electrical machines, drives and power systems
6th edn - new international edition (2013)
Authors: Wildi, T
Pearson Education
Upper Saddle River , NJ , USA
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)

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 - 10 Jul 2023

Module/Topic	Chapter	Events and Submissions/Topic
Fundamentals of Electrical Machines	Scan read Chapter 1, Chapter 2 and Chapter 3 as revision.	

Week 2 - 17 Jul 2023

Module/Topic	Chapter	Events and Submissions/Topic
DC Machines	Chapter 4 and Chapter 5	

Week 3 - 24 Jul 2023

Module/Topic	Chapter	Events and Submissions/Topic
Induction (AC) Machines	Chapter 13, Chapter 14 and Chapter 18	**Online Quiz Part 1** opens Week 3 Monday 9:00 am AEST and closes Week 4 Monday 11:45 pm AEST

Week 4 - 31 Jul 2023

Module/Topic	Chapter	Events and Submissions/Topic
Induction (AC) Machines	Chapter 13, Chapter 14 and Chapter 18	

Week 5 - 07 Aug 2023

Module/Topic	Chapter	Events and Submissions/Topic
Synchronous (AC) Machines	Chapter 16, Chapter 17	

Vacation Week - 14 Aug 2023

Module/Topic	Chapter	Events and Submissions/Topic
		Option 1 of Residential School is held in Bundaberg campus from Wednesday to Friday. Mixed Mode/Online students can choose option 1 and attend the campus of their choice.

Week 6 - 21 Aug 2023

Module/Topic	Chapter	Events and Submissions/Topic
Synchronous (AC) Machines	Chapter 16, Chapter 17	**Online Quiz Part 2** opens Week 6 Monday 9:00 am AEST and closes Week 7 Monday 11:45 pm AEST **Assignment 1** Due: Week 6 Monday (21 Aug 2023) 11:45 pm AEST

Week 7 - 28 Aug 2023

Module/Topic	Chapter	Events and Submissions/Topic
Fundamentals in Protection and Control of Electrical Machines	Chapter 20	**Option 2 of Residential School** is held in Gladstone and Mackay campuses from Wednesday to Friday. Mixed Mode/Online students can choose option 2 and attend the campus of their choice.

Week 8 - 04 Sep 2023

Module/Topic	Chapter	Events and Submissions/Topic
Power Electronics and Power Converters	Chapter 21	**Option 3 of Residential School** is held in Cairns and Rockhampton campuses from Wednesday to Friday this week. Mixed Mode/Online students can choose option 3 and attend the campus of their choice.

Week 9 - 11 Sep 2023

Module/Topic	Chapter	Events and Submissions/Topic
Electronic Control of DC machines	Chapter 22	**Online Quiz Part 3** opens Week 9 Monday 9:00 am AEST and closes Week 10 Monday 11:45 pm AEST

Week 10 - 18 Sep 2023

Module/Topic	Chapter	Events and Submissions/Topic
Electronic Control of AC machines	Chapter 23	

Week 11 - 25 Sep 2023

Module/Topic	Chapter	Events and Submissions/Topic
Unconventional and Special Machines	Chapter 19	**Laboratory/Residential School and Lab Reports** Due: Week 11 Friday (29 Sept 2023) 11:45 pm AEST

Week 12 - 02 Oct 2023

Module/Topic	Chapter	Events and Submissions/Topic

Reflection and completion of the Team Project Report		**Online Quiz Part 4** opens Week 12 Monday 9:00 am AEST and closes Week 13 Monday 11:45 pm AEST **Assignment 2** Due: Week 12 Friday (6 Oct 2023) 11:45 pm AEST

Review/Exam Week - 09 Oct 2023

Module/Topic	Chapter	Events and Submissions/Topic
Reflection and completion of online quiz		**Team Project** Due: Review/Exam Week Friday (13 Oct 2023) 11:45 pm AEST

Exam Week - 16 Oct 2023

Module/Topic	Chapter	Events and Submissions/Topic

Assessment Tasks

1 Assignment 1

Assessment Type
Written Assessment

Task Description
This compulsory assessment has 6 - 8 numerical problems where students are expected to workout answers and present their working demonstrating logical steps of calculations. The questions cover the unit contents from Week 1 to Week 5. The questions of this assignment are published in Moodle at the beginning of the term.

Assessment Due Date
Week 6 Monday (21 Aug 2023) 11:45 pm AEST

To be submitted as WORD or PDF file to the unit Moodle website, One submission per student

Return Date to Students
Week 8 Monday (4 Sept 2023)

Feedback is given through the unit website in Moodle after 2 weeks from the submission deadline

Weighting
15%

Minimum mark or grade
In order to pass, students must score at least 50% out of the allocated marks for this assignment

Assessment Criteria
Each question in this assignment will be assessed separately for the criterion accuracy and correct results and given a mark from zero to 100 marks. 10% 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 (50% 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 the procedure required, why is the particular procedure

required)
- Interpretation of results, e.g., limitations, direction of vectors

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

- The work (job) is clearly identified (problem, date, analyst)
- 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
- Clear English in the explanation of procedure and interpretation of results.

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

- Compare and explain features of DC and AC electrical machines
- Create professional documentation of the design, analysis process and solutions using electrical terminology, symbols and diagrams

assessmentGradAttribute

2 Assignment 2

Assessment Type
Written Assessment

Task Description
This compulsory assessment has 6 - 8 numerical problems where students are expected to workout answers and present their working demonstrating logical steps of calculations. The questions cover learning contents from Week 6 to Week 10. The questions of this assignment are published in Moodle at the beginning of the term.

Assessment Due Date
Week 12 Friday (6 Oct 2023) 11:45 pm AEST

To be submitted as WORD or PDF file in the unit Moodle website, One submission per student

Return Date to Students
Exam Week Friday (20 Oct 2023)

Feedback is given through the unit website in Moodle after 2 weeks from the submission deadline

Weighting
15%

Minimum mark or grade
In order to pass, students must score at least 50% out of the allocated marks for this assignment

Assessment Criteria
Each question in this assignment will be assessed separately for the criterion accuracy and correct results and given a mark from zero to 100 marks. 10% 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 (50% 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 the procedure required, why is the particular procedure required)
- Interpretation of results, e.g., limitations, direction of vectors

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

- The work (job) is clearly identified (problem, date, analyst)
- 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
- Clear English in the explanation of procedure and interpretation of results.

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

- Design and justify innovative electrical drive systems for industrial applications
- Apply protection and control schemes for electrical drives

assessmentGradAttribute

3 Laboratory/Residential School and Lab Reports

Assessment Type
Practical and Written Assessment

Task Description
Students will be formed into teams of generally 2-3 members for this assessment item. The laboratory experiments will be conducted in the following manner:

1. On-campus and all MIX/Online students will conduct the labs in a three day intensive laboratory sessions (residential school). Therefore all ENEE14007 students will do all the lab exercises during residential schools.
2. Attendance in one of those sessions is compulsory for all students.
3. Scheduled date/time of residential school can be accessed in CQU Handbook, or Weekly Schedule Section of this Unit Profile, or Unit Moodle website.
4. All students must submit team laboratory reports for this assessment. More information on the experiments and lab sheets is made available on the unit Moodle website.

Assessment Due Date
Week 11 Friday (29 Sept 2023) 11:45 pm AEST

To be submitted as WORD or PDF file in Moodle, One submission per team.

Return Date to Students
Review/Exam Week Friday (13 Oct 2023)

Feedback is given through the unit website in Moodle after 2 weeks from the submission deadline

Weighting
15%

Minimum mark or grade
In order to pass, students must score at least 50% out of the allocated marks for this assignment

Assessment Criteria
Marking of the team reports is 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.
- The marking scheme is published in Moodle site together with Laboratory instruction sheets.

Referencing Style

- Harvard (author-date)

Submission
Online

Submission Instructions
Submit to the link in the unit website in Moodle as a WORD or PDF file.

assessmentOutcome

- Deploy power electronic devices and circuits for optimising energy conversion in electrical drive system applications
- Work collaboratively in a team to produce high quality outputs.

assessmentGradAttribute

4 Team Project

Assessment Type
Written Assessment

Task Description
This compulsory assessment item is the project component of the unit. Students carry out this in teams. Complete details of an Electrical machines and drive system design project is provided in the unit Moodle site at the beginning of the term. Students carry out the project in teams through out the term and submit a professional team report. The project is carried out by the teams like a team of electrical engineering consulting engineers. It requires the student teams to submit an expression of interest before a specified deadline communicated to the students through Moodle at the early stages of the term. Afterwards, the teams are supposed to attend a debriefing meeting in the mid-way of the project execution. Final reports that must be prepared as one submission per team are expected before the deadline specified below.

Assessment Due Date
Review/Exam Week Friday (13 Oct 2023) 11:45 pm AEST

Submit to the link in the unit website in Moodle as a WORD or PDF file. One submission per team.

Return Date to Students

Feedback is given through the unit website in Moodle after 2 weeks from the submission deadline

Weighting
40%

Minimum mark or grade
In order to pass, students must score at least 50% out of the allocated marks for this assignment

Assessment Criteria
Marks for the project is given based on the quality of each project activity; i.e. Expression of interest, debriefing meeting, project report. The marking rubrics for each components of the project are published in the unit Moodle website.

Referencing Style

- Harvard (author-date)

Submission
Online

Submission Instructions
Submit to the link in the unit website in Moodle as a WORD or PDF file.

assessmentOutcome

- Design and justify innovative electrical drive systems for industrial applications
- Create professional documentation of the design, analysis process and solutions using electrical terminology, symbols and diagrams
- Work collaboratively in a team to produce high quality outputs.

assessmentGradAttribute

5 Online Quiz

Assessment Type
Online Quiz(zes)

Task Description
The Online Quiz (with several Numerical and Multiple Choice Questions (MCQs)) is generally in the form of problems that require simple calculations to find the correct answer. Students are expected to work individually for this assessment task.To ensure continuous engagement of the students with the learning of this unit, the quiz has been separated to 4 parts and distributed over the 12 weeks of the term as indicated in the Unit Schedule Section. Each part of the quiz covers the unit content covered in each quarter of the term. More information on the online quizzes is provided through the unit Moodle website. Each part of the online quiz opens on the Unit Moodle Website 6 clear working days prior to the respective due dates. The online quiz will randomly draw questions from a pre-designed question bank for each individual student. The quiz is a time limited assignment. More details is available for the students through the unit Moodle website. Marks of all 4 parts of the quiz is added and scaled to a score out of 15 to be added to the unit total.

Number of Quizzes
4

Frequency of Quizzes
Other

Assessment Due Date

Please see the weekly schedule for information about due dates for the 4 quizes

Return Date to Students

The mark for each quiz is available immediately after completing the quiz.

Weighting
15%

Minimum mark or grade
In order to pass, students must score at least 50% out of the allocated marks for this assignment

Assessment Criteria
This quiz will be setup as 4 parts distributed over the 12 week term as below:
Part 1 - Open during Week 3
Part 2 - Open during Week 6
Part 3 - Open during Week 9
Part 4 - Open during Week 12
Each correct answer to a question will carry 1 mark. Marks of all 4 parts of the quiz will be added and scaled to a score out of 15 to be added to the unit total.

Referencing Style

- Harvard (author-date)

Submission
Online

Submission Instructions
Complete the online quiz through the links provided in the unit Moodle website.

assessmentOutcome

- Compare and explain features of DC and AC electrical machines
- Apply protection and control schemes for electrical drives

assessmentGradAttribute

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