



# **ENEE12015 *Electrical Power Engineering***

## **Term 2 - 2017**

Profile information current as at 01/07/2022 02:39 pm

All details in this unit profile for ENEE12015 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 model basic electrical power system components using simplified linear equivalent circuits, explain the relationship between power and energy, and calculate power and energy in electrical power networks. You will describe electric and magnetic fields and explain their generation and application in power transformers. You will discuss generation, transmission and distribution of electrical energy. You will apply problem solving techniques in the analysis of balanced three-phase power circuits using per-unit methodology. You will discuss electrical distribution system components and configurations, and apply appropriate mathematical tools to the analysis of power systems. You are expected to use appropriate electrical engineering language in context, and to document the process of modelling and analysis. You will present the information, and communicate, work and learn, both individually and in teams, in a professional manner. If you are studying in distance mode, you will be required to attend a compulsory residential school to assist your achievement of the Learning Outcomes for 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-requisites: ENAE12013 Electrical Components and Circuit Analysis OR ENEE12014 Electrical Circuit Analysis

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 - 2017

- Bundaberg
- Cairns
- Distance
- Gladstone
- Mackay
- Rockhampton

### Attendance Requirements

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

### Residential Schools

This unit has a Compulsory Residential School for distance mode students and the details are:

Click here to see your [Residential School Timetable](#).

### Website

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

## Class and Assessment Overview

### Recommended Student Time Commitment

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

### Class Timetable

#### [Regional Campuses](#)

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

#### [Metropolitan Campuses](#)

Adelaide, Brisbane, Melbourne, Perth, Sydney

### Assessment Overview

#### 1. **Written Assessment**

Weighting: 20%

#### 2. **Online Test**

Weighting: 20%

#### 3. **Practical and Written Assessment**

Weighting: 20%

#### 4. **Examination**

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 Course survey

**Feedback**

Students have pointed out the need to make slight improvements to the slides used towards the latter part of the term.

**Recommendation**

These improvements will be made before the next offering.

#### Feedback from Course survey

**Feedback**

Students have commended the tutorials

**Recommendation**

This good practice will be continued with face-to-face tutors in each campus.

#### Feedback from Course survey

**Feedback**

Students have appreciated the clear instructions, lectures, laboratory experiments and design of assessment items

**Recommendation**

These good practices will be continued.

#### Feedback from Course survey

**Feedback**

Students have highlighted the need for keeping students more engaged with the course

**Recommendation**

This view is due to the fact that the Assessment items are distributed apart and not many assessment submissions are requested in the early part of the term. This will be changed by splitting the written assessment into two parts and making the students do a mid and end of term submission.

## Unit Learning Outcomes

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

1. Model electrical components and machines using simplified linear equivalent circuits.
2. Explain the relationship between power and energy; calculate power and energy in electrical machines and networks.
3. Describe electric and magnetic fields; explain their generation and application.
4. Discuss generation, transmission and utilisation of electrical energy.
5. Apply problem solving techniques in the analysis of balanced three-phase power network using per-unit methodology.
6. Discuss electrical distribution system components and configurations.
7. Apply appropriate laboratory techniques and software tools to the analysis of power systems.
8. Use appropriate electrical engineering language in context.
9. Document the process of modelling and analysis; present the information in a professional manner.
10. Communicate, work and learn, both individually and in teams, in a professional manner.

The Learning Outcomes for this unit are linked to the Engineers Australia Stage 1 competencies.

## 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	7	8	9	10
1 - Written Assessment - 20%	•	•	•	•	•			•		
2 - Online Test - 20%	•	•	•	•	•					
3 - Practical and Written Assessment - 20%	•	•	•			•	•	•	•	•
4 - Examination - 40%	•	•	•	•	•	•		•	•	

## Alignment of Graduate Attributes to Learning Outcomes

Graduate Attributes	Learning Outcomes									
	1	2	3	4	5	6	7	8	9	10
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 - 20%	•	•	•	•		•				
2 - Online Test - 20%	•	•	•	•		•				
3 - Practical and Written Assessment - 20%	•	•	•	•	•	•				
4 - Examination - 40%	•	•	•	•						

## Textbooks and Resources

### Textbooks

ENEE12015

#### Prescribed

#### Electrical machines, drives and power systems

6th edn - new international edition (2014)

Authors: Wildi, T

Pearson Education

Upper Saddle River , NJ , USA

ISBN: 1-292-02458-5/978-1-292-02458-5

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
- Access to Lab-Volt Simulation software LVSIM-EMS in computer labs

## Referencing Style

All submissions for this unit must use the referencing style: [Harvard \(author-date\)](#)

For further information, see the Assessment Tasks.

## Teaching Contacts

**Sanath Alahakoon** Unit Coordinator

[s.alahakoon@cqu.edu.au](mailto:s.alahakoon@cqu.edu.au)

## Schedule

### Week 1 - 10 Jul 2017

Module/Topic	Chapter	Events and Submissions/Topic
Introduction to Electrical Power Systems	Chapter 7	

### Week 2 - 17 Jul 2017

Module/Topic	Chapter	Events and Submissions/Topic
Electrical Power Measurement and Three Phase Circuits	Chapter 7, Chapter 8	

### Week 3 - 24 Jul 2017

Module/Topic	Chapter	Events and Submissions/Topic
Transformers - Ideal to Practical	Chapter 9, Chapter 10	Online Quiz Part 1 (Open from 24th July 2017. Due by 23.45 - 31st July 2017)

### Week 4 - 31 Jul 2017

Module/Topic	Chapter	Events and Submissions/Topic
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Per-Unit system methodology Chapter 10

#### Week 5 - 07 Aug 2017

Module/Topic	Chapter	Events and Submissions/Topic
Special and Three Phase Transformers	Chapter 11, Chapter 12	

#### Vacation Week - 14 Aug 2017

Module/Topic	Chapter	Events and Submissions/Topic
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#### Week 6 - 21 Aug 2017

Module/Topic	Chapter	Events and Submissions/Topic
Generation of Electrical Energy	Chapter 24	Online Quiz Part 2 (Open from 21st August 2017. Due by 23.45 - 28th August 2017)

#### Week 7 - 28 Aug 2017

Module/Topic	Chapter	Events and Submissions/Topic
Transmission of Electrical Energy	Chapter 25	

#### Week 8 - 04 Sep 2017

Module/Topic	Chapter	Events and Submissions/Topic
Transmission line models	Chapter 25	Residential school of this unit will be held in Rockhampton B28/2.10 for three days from 4th Monday till 6th Wednesday in September 2017.

#### Week 9 - 11 Sep 2017

Module/Topic	Chapter	Events and Submissions/Topic
Distribution of Electrical Energy	Chapter 26	Online Quiz Part 3 (Open from 11th September 2017. Due by 23.45 - 18th September 2017)  <b>Assignment 1</b> Due: Week 9 Monday (11 Sept 2017) 11:45 pm AEST

#### Week 10 - 18 Sep 2017

Module/Topic	Chapter	Events and Submissions/Topic
Direct-Current Transmission	Chapter 28	

#### Week 11 - 25 Sep 2017

Module/Topic	Chapter	Events and Submissions/Topic
Costing of Electricity and Electricity Supply Industry	Chapter 27	

#### Week 12 - 02 Oct 2017

Module/Topic	Chapter	Events and Submissions/Topic
Unit Revision		Online Quiz Part 4 (Open from 2nd October 2017. Due by 23.45 - 9th October 2017)  <b>Laboratory Report</b> Due: Week 12 Friday (6 Oct 2017) 11:45 pm AEST

#### Review/Exam Week - 09 Oct 2017

Module/Topic	Chapter	Events and Submissions/Topic
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#### Exam Week - 16 Oct 2017

Module/Topic	Chapter	Events and Submissions/Topic
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## Term Specific Information

Residential school of this unit will be held in Rockhampton **only for three days** from 4th Monday till 6th Wednesday in September 2017.

## Assessment Tasks

### 1 Assignment 1

#### Assessment Type

Written Assessment

#### Task Description

Assignment 1 will constitute a number of questions (usually 6 to 8), similar to the unit tutorial questions, on the topics covered in the first 8 weeks of the term's work. They will require the calculation of electrical quantities pertaining to various electrical circuits in power engineering. The assignment will be made available in Moodle by the time the unit website becomes active. Please submit as a single PDF file.

#### Assessment Due Date

Week 9 Monday (11 Sept 2017) 11:45 pm AEST

Submit to the link in Week 9 of the unit website in Moodle as a WORD or PDF file.

#### Return Date to Students

Monday (25 Sept 2017)

Marked Assignment 1 will be returned for student's feedback within two weeks of the due date.

#### Weighting

20%

#### Minimum mark or grade

Students must score more than 40% for this assessment item

#### Assessment Criteria

##### Assessment criteria

Correct procedure and steps toward correct solutions: 70%

Correct answers and units: 20%

Professional presentation and layout: 10%

#### Referencing Style

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

#### Submission

Online

#### Submission Instructions

Assignment 1 should be submitted electronically via the unit Moodle Site by the due date and time

#### Learning Outcomes Assessed

- Model electrical components and machines using simplified linear equivalent circuits.
- Explain the relationship between power and energy; calculate power and energy in electrical machines and networks.
- Describe electric and magnetic fields; explain their generation and application.
- Discuss generation, transmission and utilisation of electrical energy.
- Apply problem solving techniques in the analysis of balanced three-phase power network using per-unit methodology.
- Use appropriate electrical engineering language in context.

#### Graduate Attributes

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



## 2 Online Quiz

### Assessment Type

Online Test

### Task Description

The On-line Quiz (with several Multiple Choice Questions - MCQs) will generally be in the form of problems that require simple calculations to find the correct answer. Students are expected to work individually.

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 week term as indicated in the unit schedule. Each part of the quiz will cover the unit content covered in each quarter. More information on this will be provided through the unit Moodle site. Each part of the online quiz will be open on the Unit Moodle Website 5 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. This will be a time limited assignment and more details will be made available for the students through Moodle site. Marks of all 4 parts of the quiz will be added and scaled to a score out of 20 to be added to the unit total.

Students are expected to submit the working for the questions through submission links provided in Moodle site for each of the quarterly quizzes.

### Assessment Due Date

Please see the weekly schedule for information about due dates for the 4 quizzes.

### Return Date to Students

Students will know their marks immediately after completing each quiz.

### Weighting

20%

### Assessment Criteria

#### Assessment Criteria

Each correct answer of the quiz will receive full marks assigned for the particular question. The assigned marks will be visualised for the students when they access each of the quizzes. Marks of all 4 parts of the quiz will be added and scaled to a score out of 20 to be added to the unit total.

### Referencing Style

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

### Submission

Online

### Submission Instructions

All parts of the On-line Test will be posted on the Unit's Website 5 working days prior to the due date and is to be completed and submitted by that date.

### Learning Outcomes Assessed

- Model electrical components and machines using simplified linear equivalent circuits.
- Explain the relationship between power and energy; calculate power and energy in electrical machines and networks.
- Describe electric and magnetic fields; explain their generation and application.
- Discuss generation, transmission and utilisation of electrical energy.
- Apply problem solving techniques in the analysis of balanced three-phase power network using per-unit methodology.

### Graduate Attributes

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

## 3 Laboratory Report

### Assessment Type

Practical and Written Assessment

### Task Description

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

1. On-campus students in Rockhampton, Gladstone, Bundaberg, Cairns and Mackay will have scheduled 3 hour laboratory session per Week in the term and attendance in those sessions is compulsory for all on-campus students.
2. All distance students must attend the compulsory residential school in Rockhampton to conduct these experiments. Students will submit team laboratory reports for the assessment. More information on the experiments and lab sheets will be made available in the unit Moodle site.

Please also see assessment criteria for details.

### Assessment Due Date

Week 12 Friday (6 Oct 2017) 11:45 pm AEST

Submit to the link in Week 12 of the unit website in Moodle as a WORD or PDF file.

### Return Date to Students

Monday (16 Oct 2017)

Laboratory Report Feedback will be available for students within review week.

### Weighting

20%

### Minimum mark or grade

Students must score more than 40% for this assessment item.

### Assessment Criteria

#### Assessment Criteria

Correct procedure and steps towards collecting data from the experiments: 60%

Correct computations, answers and units: 20%

Proper use of reference 5%

Professional presentation and layout of the report: 15%

### Referencing Style

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

### Submission

Online Group

### Submission Instructions

The Project Report is to be submitted through the appropriate link on the Moodle Website by the due date and time.

### Learning Outcomes Assessed

- Model electrical components and machines using simplified linear equivalent circuits.
- Explain the relationship between power and energy; calculate power and energy in electrical machines and networks.
- Describe electric and magnetic fields; explain their generation and application.
- Discuss electrical distribution system components and configurations.
- Apply appropriate laboratory techniques and software tools to the analysis of power systems.
- Use appropriate electrical engineering language in context.
- Document the process of modelling and analysis; present the information in a professional manner.
- Communicate, work and learn, both individually and in teams, in a professional manner.

### Graduate Attributes

- Communication
- Problem Solving
- Critical Thinking

- Information Literacy
- Team Work
- Information Technology Competence

## Examination

### **Outline**

Complete an invigilated examination.

### **Date**

During the examination period at a CQUniversity examination centre.

### **Weighting**

40%

### **Length**

180 minutes

### **Exam Conditions**

Open Book.

### **Materials**

Calculator - all non-communicable calculators, including scientific, programmable and graphics calculators are authorised

Dictionary - non-electronic, concise, direct translation only (dictionary must not contain any notes or comments).

## Academic Integrity Statement

As a CQUniversity student you are expected to act honestly in all aspects of your academic work.

Any assessable work undertaken or submitted for review or assessment must be your own work. Assessable work is any type of work you do to meet the assessment requirements in the unit, including draft work submitted for review and feedback and final work to be assessed.

When you use the ideas, words or data of others in your assessment, you must thoroughly and clearly acknowledge the source of this information by using the correct referencing style for your unit. Using others' work without proper acknowledgement may be considered a form of intellectual dishonesty.

Participating honestly, respectfully, responsibly, and fairly in your university study ensures the CQUniversity qualification you earn will be valued as a true indication of your individual academic achievement and will continue to receive the respect and recognition it deserves.

As a student, you are responsible for reading and following CQUniversity's policies, including the [Student Academic Integrity Policy and Procedure](#). This policy sets out CQUniversity's expectations of you to act with integrity, examples of academic integrity breaches to avoid, the processes used to address alleged breaches of academic integrity, and potential penalties.

### What is a breach of academic integrity?

A breach of academic integrity includes but is not limited to plagiarism, self-plagiarism, collusion, cheating, contract cheating, and academic misconduct. The Student Academic Integrity Policy and Procedure defines what these terms mean and gives examples.

### Why is academic integrity important?

A breach of academic integrity may result in one or more penalties, including suspension or even expulsion from the University. It can also have negative implications for student visas and future enrolment at CQUniversity or elsewhere. Students who engage in contract cheating also risk being blackmailed by contract cheating services.

### Where can I get assistance?

For academic advice and guidance, the [Academic Learning Centre \(ALC\)](#) can support you in becoming confident in completing assessments with integrity and of high standard.

### What can you do to act with integrity?



#### Be Honest

If your assessment task is done by someone else, it would be dishonest of you to claim it as your own



#### Seek Help

If you are not sure about how to cite or reference in essays, reports etc, then seek help from your lecturer, the library or the Academic Learning Centre (ALC)



#### Produce Original Work

Originality comes from your ability to read widely, think critically, and apply your gained knowledge to address a question or problem