



# **ENEE12015 *Electrical Power Engineering***

## **Term 2 - 2020**

Profile information current as at 01/07/2022 03:29 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, 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 - 2020

- 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).

### 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. **Take Home Exam**

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](#).



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 - Take Home Exam - 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 - Take Home Exam - 40%	•	•	•	•						

## Textbooks and Resources

### Textbooks

ENEE12015

#### Prescribed

##### **Electrical Machines, Drives, and Power Systems Sixth (2014)**

Edition: 6 (2014)

Authors: Theodore Wildi

Pearson Education Limited

Upper Saddle River, NJ, USA , NJ , USA

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

Binding: Hardcover

ENEE12015

#### Supplementary

##### **Power System Analysis and Design SI Edition 6th (2016)**

Edition: 6 (2016)

Authors: Glover, G, Overbye, T & Sarma, M

Cengage Learning

Boston, MA, USA , MA , USA

ISBN: 9781305636187

Binding: Hardcover

#### Additional Textbook Information

Both of these books will be used later for other units such as ENEE 14007, ENEE 13021.

If you prefer to study with a paper copy, they are available at the CQUni Bookshop here: <http://bookshop.cqu.edu.au> (search on the Unit code). eBooks are available at the publisher's website.

[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

**Sanath Alahakoon** Unit Coordinator

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## Schedule

### Week 1 - 13 Jul 2020

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

### Week 2 - 20 Jul 2020

Module/Topic	Chapter	Events and Submissions/Topic
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Electrical Power Measurement and Three Phase Circuits	Chapter 7, Chapter 8	
<b>Week 3 - 27 Jul 2020</b>		
<b>Module/Topic</b>	<b>Chapter</b>	<b>Events and Submissions/Topic</b>
Transformers – Ideal to Practical	Chapter 9, Chapter 10	<b>Online Quiz Part 1 (Open from 27 July 2020 Due by 11.59 pm AEST - 02 August 2020).</b>
<b>Week 4 - 03 Aug 2020</b>		
<b>Module/Topic</b>	<b>Chapter</b>	<b>Events and Submissions/Topic</b>
Per-Unit system methodology	Chapter 10	
<b>Week 5 - 10 Aug 2020</b>		
<b>Module/Topic</b>	<b>Chapter</b>	<b>Events and Submissions/Topic</b>
Special and Three-Phase Transformers	Chapter 11, Chapter 12	
<b>Vacation Week - 17 Aug 2020</b>		
<b>Module/Topic</b>	<b>Chapter</b>	<b>Events and Submissions/Topic</b>
<b>Week 6 - 24 Aug 2020</b>		
<b>Module/Topic</b>	<b>Chapter</b>	<b>Events and Submissions/Topic</b>
Generation of Electrical Energy	Chapter 24 & IEEE PES AND CIGRE Reports	<b>Online Quiz Part 2 (Open from 24 August 2020. Due by 11.59 pm AEST- 30 August 2020). Residential school of this unit will be held through ZOOM for three days from 24 August 2020 till 26 August 2020.</b>
<b>Week 7 - 31 Aug 2020</b>		
<b>Module/Topic</b>	<b>Chapter</b>	<b>Events and Submissions/Topic</b>
Renewable Energy and Storage System Overview & Transmission of Electrical Energy	Chapter 25 & IEEE PES AND CIGRE Reports	
<b>Week 8 - 07 Sep 2020</b>		
<b>Module/Topic</b>	<b>Chapter</b>	<b>Events and Submissions/Topic</b>
Transmission Line Models	Chapter 25	
<b>Week 9 - 14 Sep 2020</b>		
<b>Module/Topic</b>	<b>Chapter</b>	<b>Events and Submissions/Topic</b>
Transmission Line Models & Distribution of Electrical Energy	Chapter 25 and Chapter 26	<b>Online Quiz Part 3 (Open from 14 September 2020. Due by 11.59 pm AEST-20 September 2020).</b> <b>Written Assessment</b> Due: Week 9 Monday (14 Sept 2020) 11:59 pm AEST
<b>Week 10 - 21 Sep 2020</b>		
<b>Module/Topic</b>	<b>Chapter</b>	<b>Events and Submissions/Topic</b>
Distribution of Electrical Energy & Direct-Current Transmission	Chapter 26 & Chapter 28	
<b>Week 11 - 28 Sep 2020</b>		
<b>Module/Topic</b>	<b>Chapter</b>	<b>Events and Submissions/Topic</b>
Direct-Current Transmission & Costing of Electricity and Electricity Supply Industry	Chapter 28 & Chapter 27	<b>Practical and Written Assessment</b> Due: Week 11 Monday (28 Sept 2020) 11:59 pm AEST

## Week 12 - 05 Oct 2020

Module/Topic	Chapter	Events and Submissions/Topic
Unit Revision		<b><u>Online Quiz Part 4 (Open from 5 Oct. 2020. Due by 11.59 pm AEST- 11 Oct. 2020).</u></b>

## Review/Exam Week - 12 Oct 2020

Module/Topic	Chapter	Events and Submissions/Topic
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## Exam Week - 19 Oct 2020

Module/Topic	Chapter	Events and Submissions/Topic
		<b>Take home examination (Date and time will be notified later)</b>

## Assessment Tasks

### 1 Written Assessment

#### Assessment Type

Written Assessment

#### Task Description

Written Assessment will constitute a number of questions (usually 6 to 8), similar to the unit tutorial questions, on the topics covered in the first 7 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 word/PDF file.

#### Assessment Due Date

Week 9 Monday (14 Sept 2020) 11:59 pm AEST

Submit to the link in Week 9 of the unit website in Moodle as a WORD file. One submission per student.

#### Return Date to Students

Week 11 Monday (28 Sept 2020)

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

#### Weighting

20%

#### Minimum mark or grade

50%

#### 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 20 marks. Correct procedure and steps toward correct solutions: 50%; Correct answers and units: 30%; and Professional presentation and layout: 20%.

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

- All necessary steps in the analysis are presented in correct order.
- Clear presentation of mathematical and arithmetical works.
- Explanation of choices made in the analysis.
- Interpretation of results.
- Appropriate use of diagram, clear diagrams.
- Correct use of terminology.

#### Referencing Style

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

#### Submission

Online

#### Submission Instructions

The assignment should be submitted electronically via the unit Moodle Site by the due date and time



## Learning Outcomes Assessed

- Model electrical components 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 Test

### 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 into 4 parts and distributed over the 12-week term as indicated in the unit schedule. Each part of the quiz will test the students on 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 5-6 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. This will be a time-limited assignment and more details will be made available to the students through Moodle site. Marks of all four parts of the quiz will be added and scaled to a score out of 20 to be added to the unit total.

### 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 after completing each quiz.

### Weighting

20%

### Minimum mark or grade

50%

### Assessment Criteria

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

- Part 1 - Open during week 3
- Part 2 - Open during week 6
- Part 3 - Open during week 9
- Part 4 - Open during week 12

### Referencing Style

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

### Submission

Online

### Submission Instructions

All parts of the On-line Test will be posted on the Unit's Website 5-6 working days prior to the due date and is to be

completed and submitted by that date.

### **Learning Outcomes Assessed**

- Model electrical components 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 Practical and Written Assessment**

### **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 students will have scheduled 3-hour laboratory session per Week in the term and these will be conducted online through ZOOM in T2-2020 and attendance in those sessions is compulsory for all on-campus students. Please check the class time table for the information about the scheduled session.
2. All distance students must attend the compulsory residential school held through ZOOM in T2-2020. The dates for this residential school are the same as the residential school dates mentioned in the handbook
3. All students will submit team laboratory reports for this assessment. More information on the experiments and lab sheets will be made available on the unit Moodle site.

### **Assessment Due Date**

Week 11 Monday (28 Sept 2020) 11:59 pm AEST

Submit to the link in Week 11 of the unit website in Moodle as a WORD/PDF file. This is a Team Submission (i.e. one report per team).

### **Return Date to Students**

Review/Exam Week Monday (12 Oct 2020)

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

### **Weighting**

20%

### **Minimum mark or grade**

50%

### **Assessment Criteria**

1. Correct procedure and steps towards collecting data from the experiments: 55%.
2. Correct computations, answers and units: 20%.
3. Proper use of reference 10%.
4. Professional presentation and layout of the report: 15%

### **Referencing Style**

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

### **Submission**

Online

### **Submission Instructions**

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 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

## 4 Take Home Examination

#### **Assessment Type**

Take Home Exam

#### **Task Description**

This take home examination will be monitored through a ZOOM session and students will have to provide written answers to some questions similar to past examination questions in this unit.

1. Examination will be time scheduled and will take place for everyone at the same time.
2. Each student stays home with a device (preferably a laptop) **essentially having a camera** through which we can watch the student in a ZOOM session during the examination (please make sure you have a device with these requirements functioning).
3. That ZOOM link needs to be open throughout the exam.
4. The examination paper will be loaded to the Moodle so that students only can access it during examination period.
5. The student uses blank A4 papers (single side) to write answers.
6. At the end of the examination, he/she first takes photos of all written pages and email invigilator.
7. Later he/she scan the pages and upload to Moodle within a specified time at the end of examination.
8. Examination date and time will be within the standard examination period for Term 2-2020.

#### **Assessment Due Date**

This will be held in the examination week. The exact date and time of the examination will be notified later.

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

Outcomes will be published with the grade certification.

#### **Weighting**

40%

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

Students must score 50% of the allocated marks for this assessment.

#### **Assessment Criteria**

##### **Objectives**

This assessment item relates to the course learning outcomes 1, 2, 3, 4, 5, 6, 8 and 9 as stated.

##### **Assessment criteria**

Correct procedure and steps toward correct solutions: 60%

Correct answers and units: 20%

Professional presentation and layout: 20%

#### **Referencing Style**

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

#### **Submission**

Online

#### **Submission Instructions**

Scan and upload to the link provided in unit Moodle site.

### **Learning Outcomes Assessed**

- Model electrical components 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
- Discuss electrical distribution system components and configurations
- Use appropriate electrical engineering language in context
- Document the process of modelling and analysis; present the information in a professional manner

### **Graduate Attributes**

- Communication
- 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