



# ENEE12015 *Electrical Power Engineering*

## Term 2 - 2018

Profile information current as at 14/12/2025 06:34 am

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 - 2018

- Bundaberg
- Cairns
- Gladstone
- Mackay
- Mixed Mode
- Rockhampton

### Attendance Requirements

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

### Website

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

## Class and Assessment Overview

### Recommended Student Time Commitment

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

### Class Timetable

#### [Regional Campuses](#)

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

#### [Metropolitan Campuses](#)

Adelaide, Brisbane, Melbourne, Perth, Sydney

### Assessment Overview

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

Weighting: 20%

#### 2. **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 Unit survey

**Feedback**

The students have appreciated the assessment tasks in the unit.

**Recommendation**

These good practices will be continued.

#### Feedback from Unit survey

**Feedback**

The students have also appreciated the prompt response and clarifications from the unit coordinator with any issues with the course.

**Recommendation**

These good practices will be continued.

#### Feedback from Observations made in the scheduled lectures and tutorials

**Feedback**

Student attendance in the scheduled lectures and tutorials have significantly dropped.

**Recommendation**

Actions to make some innovative changes in the unit delivery model will be taken during the next offering.

#### Feedback from Unit survey statistics

**Feedback**

Assessment feedback and learning resources need further improvement.

**Recommendation**

Action will be taken to further strengthen assessment feedback. Learning resources will also be further improved.

## 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**

Edition: Sixth (2014)

Authors: Theodore Wildi

Pearson Education Limited

Upper Saddle River , NJ , USA

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

Binding: Hardcover

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#### Supplementary

##### **Power System Analysis and Design**

SI Edition 6th (2016)

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

Cengage Learning

Boston , 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.

[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

**Md Rakibuzzaman Shah** Unit Coordinator

[m.shah2@cqu.edu.au](mailto:m.shah2@cqu.edu.au)

## Schedule

### Week 1 - 09 Jul 2018

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

### Week 2 - 16 Jul 2018

| Module/Topic | Chapter | Events and Submissions/Topic |
|--------------|---------|------------------------------|
|--------------|---------|------------------------------|

Electrical Power Measurement and Three Phase Circuits

Chapter 7, Chapter 8

### Week 3 - 23 Jul 2018

| Module/Topic                      | Chapter               | Events and Submissions/Topic  |
|-----------------------------------|-----------------------|---|
| Transformers – Ideal to Practical | Chapter 9, Chapter 10 | <b>Online Quiz Part 1 (Open from 23 July 2018. Due by 11.45 pm AEST - 29 July 2018).</b><br><b>No tutorial on week 3.</b> |

### Week 4 - 30 Jul 2018

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

### Week 5 - 06 Aug 2018

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

### Vacation Week - 13 Aug 2018

| Module/Topic | Chapter | Events and Submissions/Topic |
|--------------|---------|------------------------------|
|--------------|---------|------------------------------|

### Week 6 - 20 Aug 2018

| Module/Topic                    | Chapter    | Events and Submissions/Topic  |
|---------------------------------|------------|---|
| Generation of Electrical Energy | Chapter 24 | <b>Online Quiz Part 2 (Open from 20 August 2018. Due by 11.45 pm AEST- 26 August 2018).</b><br><b>Residential school of this unit will be held in Rockhampton B 28/2.10 for three days from 23 August 2018 till 25 August 2018.</b> |

### Week 7 - 27 Aug 2018

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

### Week 8 - 03 Sep 2018

| Module/Topic             | Chapter    | Events and Submissions/Topic |
|--------------------------|------------|------------------------------|
| Transmission line models | Chapter 25 |                              |

### Week 9 - 10 Sep 2018

| Module/Topic   | Chapter                   | Events and Submissions/Topic  |
|--|---------------------------|---|
| Transmission line models & Distribution of Electrical Energy | Chapter 25 and Chapter 26 | <b>Online Quiz Part 3 (Open from 10 September 2018. Due by 11.45 pm AEST-16 September 2018).</b><br><b>No tutorial on week 9.</b><br><br><b>Written Assessment</b> Due: Week 9<br>Monday (10 Sept 2018) 11:45 pm AEST |

### Week 10 - 17 Sep 2018

| Module/Topic  | Chapter                 | Events and Submissions/Topic |
|---|-------------------------|------------------------------|
| Distribution of Electrical Energy & Direct-Current Transmission | Chapter 26 & Chapter 28 |                              |

### Week 11 - 24 Sep 2018

| Module/Topic | Chapter | Events and Submissions/Topic |
|--------------|---------|------------------------------|
|--------------|---------|------------------------------|

**Written Assessment Feedback:  
Week 11 (28 September 2018).**

Costing of Electricity and Electricity Supply Industry Chapter 27

**Practical and Written Assessment**  
Due: Week 11 Friday (28 Sept 2018)  
11:45 pm AEST

**Week 12 - 01 Oct 2018**

| Module/Topic  | Chapter | Events and Submissions/Topic   |
|---------------|---------|--|
| Unit Revision |         | <b><u>Online Quiz Part 4 (Open from 1 Oct. 2018. Due by 11.45 pm AEST- 7 Oct. 2018).</u></b><br><b><u>Practical and Written Assessment Feedback: Week 12 Friday.</u></b> |

**Review/Exam Week - 08 Oct 2018**

| Module/Topic | Chapter | Events and Submissions/Topic |
|--------------|---------|------------------------------|
|--------------|---------|------------------------------|

**Exam Week - 15 Oct 2018**

| Module/Topic | Chapter | Events and Submissions/Topic |
|--------------|---------|------------------------------|
|--------------|---------|------------------------------|

## Term Specific Information

Residential school of this unit will be held in **Rockhampton** for **three days** from 23 AUG - 25 AUG 2018

## 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 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 (10 Sept 2018) 11:45 pm AEST

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

**Return Date to Students**

Week 11 Friday (28 Sept 2018)

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: 20%; Tutorial workbook 20%, and Professional presentation and layout: 10%.

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.
- Tutorial workbook.

### 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 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 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 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 5-6 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 immediately 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 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 Practical and Written Assessment

### 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 experiments. Students will submit laboratory reports for assessment. More information on the experiments and lab sheets will be made available on the unit Moodle site.

### Assessment Due Date

Week 11 Friday (28 Sept 2018) 11:45 pm AEST

Submit to the link in Week 11 of the unit website in Moodle as a WORD or PDF file. One submission per student.

### Return Date to Students

Week 12 Friday (5 Oct 2018)

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 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

### Minimum mark or grade

50%

### Exam Conditions

Closed Book.

### Materials

Dictionary - non-electronic, concise, direct translation only (dictionary must not contain any notes or comments).  
Calculator - all non-communicable calculators, including scientific, programmable and graphics calculators are authorised

## 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