



# ENEE12014 *Electrical Circuit Analysis*

## Term 3 - 2020

Profile information current as at 05/05/2024 08:36 pm

All details in this unit profile for ENEE12014 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

This unit introduces you to modelling electrical components and systems. You will apply theorems and network reduction techniques to DC and AC circuits, and apply problem-solving techniques in the analysis of AC and DC circuits. You will also cover the concepts of transient response and two-port network theorems. You will apply laboratory techniques and appropriate software tools to the analysis of electrical circuits, use fundamental electrical engineering language in context and document the process of modelling and analysis. You will present information, communicate, work and learn in a professional manner. Online students must complete practical activities by attending a compulsory residential school.

### 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

Prerequisites: (PHYS11185 Engineering Physics B OR ENEG11009 Fundamentals of Energy and Electricity) AND MATH11219 Applied Calculus

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 3 - 2020

- Mixed Mode

### Attendance Requirements

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

### 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. **Online Quiz(zes)**

Weighting: 15%

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

Weighting: 25%

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

Weighting: 10%

#### 4. **Practical and Written Assessment**

Weighting: 10%

#### 5. **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](#).

## 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

Progressive tests kept students engaged in the unit

##### Recommendation

Keep the same quizzes.

#### Feedback from Unit Evaluation

##### Feedback

Students found it a little bit difficult to adopt suddenly changed lab kit based laboratory exercise activities.

##### Recommendation

Organise compulsory Zoom based lab sessions.

#### Feedback from Unit Evaluation

##### Feedback

Some lectures need more information

##### Recommendation

Include more explanation for lecture slides with clear supporting notes.

## Unit Learning Outcomes

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

1. Model electrical components and systems
2. Analyse and solve problems of Direct Current (DC) circuits using network reduction techniques
3. Model and analyse the transient behaviour of circuits with resistors, inductors, and capacitors
4. Analyse and solve problems of Alternating Current (AC) circuits
5. Model and solve electrical circuit problems using two-port circuit model theorems
6. Use appropriate software tools to simulate electrical circuits and verify the results by conducting laboratory experiments using safe work practices
7. Work individually and in a team to solve electrical circuit problems and produce professional laboratory documents.

The Learning Outcomes for this unit are linked with Engineers Australia's Stage 1 Competency Standard for Professional Engineers.

## 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 | 7 |
| 1 - Online Quiz(zes) - 15% | •                 | • |   | • | • |   |   |

| Assessment Tasks                           | Learning Outcomes |   |   |   |   |   |   |
|--|-------------------|---|---|---|---|---|---|
|  | 1                 | 2 | 3 | 4 | 5 | 6 | 7 |
| 2 - Online Test - 25%                      | •                 | • | • |   |   |   |   |
| 3 - Practical and Written Assessment - 10% |                   |   |   |   |   | • | • |
| 4 - Practical and Written Assessment - 10% |                   |   |   |   |   | • | • |
| 5 - Take Home Exam - 40%                   |                   |   | • | • | • |   |   |

## Alignment of Graduate Attributes to Learning Outcomes

| Graduate Attributes                                 | Learning Outcomes |   |   |   |   |   |   |
|---|-------------------|---|---|---|---|---|---|
|   | 1                 | 2 | 3 | 4 | 5 | 6 | 7 |
| 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 - Online Quiz(zes) - 15%                 |                     | • | • |   |   |   |   |   |   |    |
| 2 - Online Test - 25%                      |                     | • | • |   |   |   |   |   |   |    |
| 3 - Practical and Written Assessment - 10% | •                   | • | • |   |   | • |   |   |   |    |
| 4 - Practical and Written Assessment - 10% | •                   | • | • |   |   | • |   |   |   |    |
| 5 - Take Home Exam - 40%                   |                     | • | • |   |   |   |   |   |   |    |

## Textbooks and Resources

### Textbooks

ENEE12014

#### Prescribed

##### Electric Circuits

11th Edition (2018)

Authors: James W. Nilsson, Susan A. Riedel

Pearson

ISBN: 9781292261041

Binding: Other

#### Additional Textbook Information

[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

**Shaminda De Silva** Unit Coordinator

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

## Schedule

### Week 1 - 09 Nov 2020

| Module/Topic                   | Chapter | Events and Submissions/Topic |
|--------------------------------|---------|------------------------------|
| Resistance, Sources and Models | 1-3     |                              |

### Week 2 - 16 Nov 2020

| Module/Topic   | Chapter | Events and Submissions/Topic |
|----------------|---------|------------------------------|
| Nodal Analysis | 4       |                              |

### Week 3 - 23 Nov 2020

| Module/Topic  | Chapter | Events and Submissions/Topic |
|---------------|---------|------------------------------|
| Mesh Analysis | 4       |                              |

### Week 4 - 30 Nov 2020

| Module/Topic     | Chapter | Events and Submissions/Topic   |
|------------------|---------|--|
| Network Theorems | 4       | <ul style="list-style-type: none"><li>• Progressive test 1 Due on Sunday 11:45 pm AEST</li></ul> |

### Vacation Week - 07 Dec 2020

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

Residential school from 7 to 11 Dec 2020

- Fully online via Zoom
- Attendance is Mandatory

#### Week 5 - 14 Dec 2020

| Module/Topic         | Chapter | Events and Submissions/Topic |
|----------------------|---------|------------------------------|
| Transient Analysis I | 6       |                              |

#### Week 6 - 21 Dec 2020

| Module/Topic          | Chapter | Events and Submissions/Topic |
|-----------------------|---------|------------------------------|
| Transient Analysis II | 7       |                              |

#### Vacation Week - 28 Dec 2020

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

#### Week 7 - 04 Jan 2021

| Module/Topic | Chapter | Events and Submissions/Topic  |
|--------------|---------|---|
| RLC circuits | 8       | <ul style="list-style-type: none"><li>• Mid-term exam (Online test)</li><li>• Progressive test 2 Due on Sunday 11:45 pm AEST</li></ul> <b>Mid-term exam</b> Due: Week 7 Monday (4 Jan 2021) 11:59 am AEST |

#### Week 8 - 11 Jan 2021

| Module/Topic                       | Chapter | Events and Submissions/Topic |
|------------------------------------|---------|------------------------------|
| Steady State Sinusoidal Analysis I | 9       |                              |

#### Week 9 - 18 Jan 2021

| Module/Topic                        | Chapter | Events and Submissions/Topic   |
|-------------------------------------|---------|--|
| Steady State Sinusoidal Analysis II | 9       | <ul style="list-style-type: none"><li>• Progressive test 3 Due on Sunday 11:45 pm AEST</li></ul> |

#### Week 10 - 25 Jan 2021

| Module/Topic                               | Chapter | Events and Submissions/Topic |
|--|---------|------------------------------|
| Sinusoidal Steady State Power calculations | 10      |                              |

#### Week 11 - 01 Feb 2021

| Module/Topic      | Chapter | Events and Submissions/Topic |
|-------------------|---------|------------------------------|
| Two port networks | 18      |                              |

#### Week 12 - 08 Feb 2021

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

#### Exam Week - 15 Feb 2021

| Module/Topic | Chapter | Events and Submissions/Topic                                     |
|--------------|---------|--|
|              |         | <ul style="list-style-type: none"><li>• Take-Home Exam</li></ul> |

## Assessment Tasks

### 1 PROGRESSIVE TESTS

#### Assessment Type

Online Quiz(zes)

**Task Description**

This assessment item is a set of online quizzes that can be accessed via the unit Moodle site.

- The quizzes are an integrated part of the study to test the key concepts of each week.
- Details of the assessment can be found on the unit Moodle site at the beginning of the term.
- Each quiz will be available for up to 2 weeks to allow students who cannot find time each week to study. For example, quiz one will open in Week 2 and close at the end of week 4, and the last quiz must be completed by week 9.
- Each quiz can be attempted several times, but the score for the quiz will be the score for your first attempt. The correct answer for the quiz questions will be available immediately after you submit your answers.
- If you encounter any network access issues during the quiz, the unit coordinator should be notified at your earliest convenience.

**Number of Quizzes**

3

**Frequency of Quizzes**

Fortnightly

**Assessment Due Date****Return Date to Students**

Immediate Feedback

**Weighting**

15%

**Assessment Criteria**

No assessment criteria

**Referencing Style**

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

**Submission**

Online

**Learning Outcomes Assessed**

- Model electrical components and systems
- Analyse and solve problems of Direct Current (DC) circuits using network reduction techniques
- Analyse and solve problems of Alternating Current (AC) circuits
- Model and solve electrical circuit problems using two-port circuit model theorems

**Graduate Attributes**

- Problem Solving
- Critical Thinking

## 2 Mid-term exam

**Assessment Type**

Online Test

**Task Description**

The assessment is accessible via the unit Moodle site and comprises of a set of online multiple-choice questions on the topics covered from Week 1 to Week 5. Students are required to answer analytical and numerical questions to demonstrate their theoretical knowledge and analytical and problem-solving skills. This exam is an important activity to check and enhance your comprehension. This exam is an integrated part of the study to test the key aspects of each topic.

- This exam weighs 25% of your final mark.
- This exam will be available for a limited time in Week 7 and students need to attend this Moodle-based Online exam in real-time (For example, this exam will be available ONLY on Week 7 Monday from 9 AM to 11 AM). Further specific details (including day and time) of the assessment will be available on the unit Moodle site at the beginning of the term.
- The exam will include questions randomly selected from a set of related problems.
- The exam has a set start time and end time. It will close after the set end time.

If you encounter any difficulty with network access during tests, contact the unit coordinator at your earliest

convenience.

**Assessment Due Date**

Week 7 Monday (4 Jan 2021) 11:59 am AEST

Two weeks after the exam

**Return Date to Students****Weighting**

25%

**Minimum mark or grade**

25% of allocated marks for this assessment

**Assessment Criteria**

Students are assessed on the accuracy of calculated results and the correctness of the method used.

**Referencing Style**

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

**Submission**

Online

**Learning Outcomes Assessed**

- Model electrical components and systems
- Analyse and solve problems of Direct Current (DC) circuits using network reduction techniques
- Model and analyse the transient behaviour of circuits with resistors, inductors, and capacitors

**Graduate Attributes**

- Problem Solving
- Critical Thinking

### 3 LABORATORY EXERCISES AND REPORTS PART I

**Assessment Type**

Practical and Written Assessment

**Task Description**

This assessment item relates to 1 to 4 of the unit topics.

- Laboratories will be conducted at the residential school (Fully online through Zoom). All information regarding the laboratories will be provided to the students via the unit website.
- Laboratories are compulsory. Attendance to all the laboratories is one of the pass requirements.
- All students must pass the laboratory techniques assessments to obtain an overall pass for this unit.
- Students need to submit individual lab reports for assessment by the due date.

**Assessment Due Date****Return Date to Students**

Two Weeks after submission

**Weighting**

10%

**Minimum mark or grade**

Combined laboratory part 1 and 2 marks need to be more than 50% to Pass

**Assessment Criteria**

The lab reports will be graded using the following criteria:

- Proper formatting and structuring of reports
- Correct workings and solutions;
- Where appropriate show the calculated values based on theory and compare them against the measured values;
- Appropriate discussion of laboratory results;
- Proper use of references;
- Have neat and tidy work and presentation in the lab book;

All laboratory exercises must be attempted.

Combined laboratory part 1 and 2 marks need to be more than 50% to Pass



## Referencing Style

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

## Submission

Online

## Submission Instructions

As a single PDF document

## Learning Outcomes Assessed

- Use appropriate software tools to simulate electrical circuits and verify the results by conducting laboratory experiments using safe work practices
- Work individually and in a team to solve electrical circuit problems and produce professional laboratory documents.

## Graduate Attributes

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

# 4 LABORATORY EXERCISES AND REPORTS PART II

## Assessment Type

Practical and Written Assessment

## Task Description

This assessment item relates to all the unit topics.

- Laboratories will be conducted at the residential school (Fully online through Zoom). All information regarding the laboratories will be provided to the students via the unit website.
- Laboratories are compulsory. Attendance to all the laboratories is one of the pass requirements.
- All students must pass the laboratory techniques assessments to obtain an overall pass for this unit.
- Students need to submit individual lab reports for assessment by the due date.

## Assessment Due Date

## Return Date to Students

Two weeks after submission

## Weighting

10%

## Minimum mark or grade

Combined laboratory part 1 and 2 marks need to be more than 50%

## Assessment Criteria

The lab reports will be graded using the following criteria:

- Proper formatting and structuring of reports
- Correct workings and solutions;
- Where appropriate show the calculated values based on theory and compare them against the measured values;
- Appropriate discussion of laboratory results;
- Proper use of references;
- Have neat and tidy work and presentations in the lab work.

All laboratory exercises must be attempted.

Combined laboratory part 1 and 2 marks need to be more than 50% to Pass

## Referencing Style

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

## Submission

Online

## Submission Instructions

As a single PDF document

## Learning Outcomes Assessed

- Use appropriate software tools to simulate electrical circuits and verify the results by conducting laboratory experiments using safe work practices
- Work individually and in a team to solve electrical circuit problems and produce professional laboratory documents.

## Graduate Attributes

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

## 5 Take home exam

### Assessment Type

Take Home Exam

### Task Description

This is an individual assessment accessible via the unit Moodle site and comprises of a set of questions on the topics covered from Week 6 to Week 12. Students are required to answer analytical and numerical questions to demonstrate their theoretical knowledge and analytical and problem-solving skills. This exam is an important activity to check and enhance your comprehension. This exam is an integrated part of the study to test the key aspects of each topic. This take-home exam weighs 40% of your final mark. This exam will be available for a limited time during examination week and students need to attend this examination during that time. Exam answers should be submitted to Moodle within the specified examination time period. In addition, students should submit their scanned detailed solution and workings within the allowed time period to Moodle). Further specific details (including days and times) related to this assessment will be published on the unit Moodle site.

- The Take-home examination will have essay type questions.
- Students are supposed to answer all the questions through the unit Moodle site.
- Students need to copy the questions to a workbook (or blank papers) and solve the problems in the workbook.
- Students need to include all steps of workings and final answers.
- Students should scan the workings and answers to a single PDF file and upload it.
- The Take-home examination has a set start time and the answer/workings submission link will be closed after the end time.
- Students are strongly advised to sufficiently cover the material related to the exam.

If you encounter any difficulty with network access during tests, contact the unit coordinator at your earliest convenience.

### Assessment Due Date

During the University examination period

### Return Date to Students

Two weeks after submission

### Weighting

40%

### Minimum mark or grade

50%

### Assessment Criteria

Take-home examination will be graded using the following criteria:

- Proper formatting and structuring.
- Have neat, legible, and tidy work and presentation.
- On-time submission.
- Correct workings, answers, and solutions.
- A correct description of procedures.
- Appropriate discussion of results.
- Proper use of references.
- All questions must be attempted.

## Referencing Style

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

## Submission

Online

## Submission Instructions

As a single PDF file

## Learning Outcomes Assessed

- Model and analyse the transient behaviour of circuits with resistors, inductors, and capacitors
- Analyse and solve problems of Alternating Current (AC) circuits
- Model and solve electrical circuit problems using two-port circuit model theorems

## Graduate Attributes

- Problem Solving
- Critical Thinking

## 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