



ENEE12014 *Electrical Circuit Analysis*

Term 1 - 2021

Profile information current as at 06/05/2024 01:58 am

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 1 - 2021

- 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. **Online Quiz(es)**

Weighting: 15%

2. **In-class Test(s)**

Weighting: 25%

3. **Practical and Written Assessment**

Weighting: 10%

4. **Practical and Written Assessment**

Weighting: 10%

5. **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 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



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

COMPKIT_ENEE12014

Edition: 1 (2021)

CQU-SET

Binding: Other

ENEE12014

Prescribed

Electric Circuits

11th Edition (2018)

Authors: James W. Nilsson, Susan A. Riedel

Pearson

Upper Saddle River , NJ , USA

ISBN: 9781292261041

Binding: Other

ENEE12014

Prescribed

TIMKIT

Edition: 1 (2021)

CQU-SET

Binding: Other

ENEE12014

Prescribed

TIMKITU

Edition: 1 (2021)

CQU-SET

Binding: Other

Additional Textbook Information

TIMKIT

Distance students have the following options for completing the lab component of this unit:

1. Physically attend any of the lab (these are scheduled in blocks) scheduled in any of the campuses (please refer to time table for the dates and campuses)
2. If you can self-supply the equipment required for conducting the labs as listed below, you do not need to purchase TMKIT. You can complete the labs at home without attending the scheduled labs.

You need to purchase TMKIT which has the following items in case you are unable to do 1 or 2 above, please purchase TMKIT (this kit has brand new equipment) or TMKITU (a limited number of TMKITU are available which comprise used equipment on campus before. TMKITU comes with a replacement warranty from school of engineering and technology).

TIMKITU

Distance students have the following options for completing the lab component of this unit:

1. Physically attend any of the lab (these are scheduled in blocks) scheduled in any of the campuses (please refer to time table for the dates and campuses)
2. If you can self-supply the equipment required for conducting the labs as listed below, you do not need to purchase TMKIT. You can complete the labs at home without attending the scheduled labs.

You need to purchase TMKIT which has the following items in case you are unable to do 1 or 2 above, please purchase TMKIT (this kit has brand new equipment) or TMKITU (a limited number of TMKITU are available which comprise used equipment on campus before. TMKITU comes with a replacement warranty from school of engineering and technology).

COMPKIT_ENEE12014

Please see additional information on TMKIT or TMKITU.

Those who decide to order TMKIT or TMKITU should also order one COMPKIT_ENEE12014, which has all the components required to complete the labs of this unit from home.

Inclusions in TMKIT/TMKITU

- 1 12VAC Plug Pack Power Supply
- 1 3D Printed Component Box
- 4 4mm Banana Plug to Test Hook Clip Test Lead Cable
- 1 BNC Male Plug Q9 to Dual Hook Clip Test Probe Cable Leads (2 leads will come with scope)
- 1 Breadboard
- 1 A3 Box for Australia Post Tough Bag
- 1 Multimeter - True RMS, with Leads
- 1 Power Supply - 12VAC / 5VDC and -15V/0/15V
- 1 USB Cable for Oscilloscope (included with Pico Scope)
- 1 USB Oscilloscope (Pico will include two leads)

[View textbooks at the CQUniversity Bookshop](#)

IT Resources

You will need access to the following IT resources:

- CQUniversity Student Email
- Internet
- Unit Website (Moodle)
- Multisim 14.0 Education Edition or later (CQU will provide the licence key to install it on student computers).

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

Schedule

Week 1 - 08 Mar 2021

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

Week 2 - 15 Mar 2021

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

Week 3 - 22 Mar 2021

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

| | | |
|---------------|---|---|
| Mesh Analysis | 4 | Lab 1 Quiz Due on Sunday 11:45 pm AEST |
|---------------|---|---|

Week 4 - 29 Mar 2021

| Module/Topic | Chapter | Events and Submissions/Topic |
|------------------|---------|---|
| Network Theorems | 4 | Progressive Test 1 Due on Sunday 11:45 pm AEST |

Week 5 - 05 Apr 2021

| Module/Topic | Chapter | Events and Submissions/Topic |
|----------------------|---------|---|
| Transient Analysis I | 6 | Lab 2 Quiz Due on Sunday 11:45 pm AEST |

Vacation Week - 12 Apr 2021

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

Week 6 - 19 Apr 2021

| Module/Topic | Chapter | Events and Submissions/Topic |
|-----------------------|---------|---|
| Transient Analysis II | 7 | Online In-Class Test starts at 11:00 am (AEST) and finishes at 3.00 pm (AEST) on Wednesday (21 Apr 2021) |

Week 7 - 26 Apr 2021

| Module/Topic | Chapter | Events and Submissions/Topic |
|--------------|---------|---|
| RLC circuits | 8 | Progressive Test 2 Due on Sunday 11:45 pm AEST |

Week 8 - 03 May 2021

| Module/Topic | Chapter | Events and Submissions/Topic |
|------------------------------------|---------|---|
| Steady State Sinusoidal Analysis I | 9 | Lab Quiz 3 Due on Sunday 11:45 pm AEST |

Week 9 - 10 May 2021

| Module/Topic | Chapter | Events and Submissions/Topic |
|-------------------------------------|---------|--|
| Steady State Sinusoidal Analysis II | 9 | Lab Quiz 4 Due on Sunday 11:45 pm AEST Progressive Test 3 Due on Sunday 11:45 pm AEST |

Week 10 - 17 May 2021

| Module/Topic | Chapter | Events and Submissions/Topic |
|--|---------|--|
| Sinusoidal Steady State Power calculations | 10 | LABORATORY EXERCISES AND REPORTS PART I Due: Week 10 Wednesday (19 May 2021) 7:00 am AEST |

Week 11 - 24 May 2021

| Module/Topic | Chapter | Events and Submissions/Topic |
|-------------------|---------|--|
| Two port networks | 18 | LABORATORY EXERCISES AND REPORTS PART II Due: Week 11 Monday (24 May 2021) 7:00 am AEST |

Week 12 - 31 May 2021

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

Review/Exam Week - 07 Jun 2021

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

Term Specific Information

This information is applicable ONLY to Online (Distance or Mixed mode) students.

In this term we are not conducting a dedicated attendance compulsory residential school for Online (distance or Mixed mode) students in Rockhampton. However, we come up with number of alternatives while making sure that they will not discount student learning experiences. We believe it will be an attractive, cost-effective and convenient solution for Online (Distance or Mixed mode) students.

Option 1: Complete laboratory exercises by physically attending scheduled laboratory sessions with On-campus students in one of the campuses. (Bundaberg, Cairns, Gladstone, Mackay, or Rockhampton). Please refer to the unit Moodle site for further information.

Option 2: Online (Distance or Mixed mode) students can complete laboratory exercises at home without attending planned laboratory sessions if students can self-supply equipment and components required to complete laboratory exercises. Please refer to the unit Moodle site for further information.

Option 3: Online (Distance or Mixed mode) students can complete laboratory exercises at home without attending planned laboratory sessions if Online (Distance or Mixed mode) students purchase laboratory exercise kit (named as TMKIT or TMKITU) from CQUniversity. This laboratory exercise kit (TMKIT or TMKITU) has all the equipment required to complete laboratory exercises. However Online (Distance or Mixed mode) students need to purchase components listed in COMPKIT_ENEE12014 as well. Please refer to the unit Moodle site for further information.

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 integral 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 Online In-Class test

Assessment Type

In-class Test(s)

Task Description

This assessment covers weekly topics from Week 1 to Week 5. Students are required to answer analytical and numerical questions to demonstrate their theoretical and analytical problem solving skills. Further information about this Online-In Class test will be provided in the unit Moodle site.

Assessment Due Date**Return Date to Students**

Week 10 Wednesday (19 May 2021)

We strive to release the assessment marks in 2 weeks after due date

Weighting

25%

Assessment Criteria

- Correct answers
- All working must be shown
- Working must be neat, tidy and legible
- Correct interpretation and discussion of answers
- On-time submission

Referencing Style

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

Submission

Online

Submission Instructions

as a single pdf file

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.

- All information regarding the laboratories will be provided to the students via the unit website.
- Attendance to laboratories exercise are compulsory for all On-campus students to Pass this unit.

- Online (Distance and Mixed mode) students are provided with alternative solutions to complete the laboratory exercises,
- Students need to submit **individual lab reports** for assessment by the due date regardless of whether students complete laboratory exercises in teams or individually.

Assessment Due Date

Week 10 Wednesday (19 May 2021) 7:00 am AEST

Return Date to Students

Week 12 Wednesday (2 June 2021)

We strive to release the assessment marks in 2 weeks after due date

Weighting

10%

Minimum mark or grade

Combined marks for laboratory exercise report part I, II and Lab Quizzes 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 marks for laboratory exercise report part I, II and Lab Quizzes 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.

- All information regarding the laboratories will be provided to the students via the unit website.
- Attendance to laboratories exercise are compulsory for all On-campus students to Pass this unit.
- Online (Distance and Mixed mode) students are provided with alternative solutions to complete the laboratory exercises,
- All students must pass the laboratory techniques assessments to obtain an overall pass for this unit.
- Students need to submit **individual lab reports** for this assessment by the due date regardless of whether students complete laboratory exercises in teams or individually.

Assessment Due Date

Week 11 Monday (24 May 2021) 7:00 am AEST

Return Date to Students

Review/Exam Week Monday (7 June 2021)

We strive to release the assessment marks in 2 weeks after due date

Weighting

10%

Minimum mark or grade

Combined laboratory exercise report part I, part II and Lab Quizzes 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 exercise report part I, part II and Lab Quizzes 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

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% of the allocated marks of this assessment

Exam Conditions

Restricted.

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

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