



# ENEE12014 *Electrical Circuit Analysis*

## Term 1 - 2024

Profile information current as at 19/05/2024 02:25 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. 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. In this unit, you must complete compulsory practical activities. Refer to the Engineering Undergraduate Course Moodle site for proposed dates.

### 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: ENEG11009 Fundamentals of Sustainable Energy 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 - 2024

- 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(zes)**

Weighting: 15%

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

Weighting: 25%

#### 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](#).

## 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 Student evaluation (SUTE)

**Feedback**

Good amount of coverage within this unit

**Recommendation**

Same content should be maintained.

#### Feedback from Student evaluation (SUTE)

**Feedback**

Referencing requirements for assessments were not clear.

**Recommendation**

Referencing requirements should be mentioned for the laboratory experimental-based assessment.

## Unit Learning Outcomes

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

1. Model electrical components and systems
2. Apply circuit laws to find electric fields, electric potentials, and currents in Direct Current (DC) circuits.
3. Apply network reduction techniques to analyse and solve Direct Current (DC) circuit problems.
4. Model and analyse the transient behaviour of circuits with resistors, inductors, and capacitors
5. Analyse and solve problems of Alternating Current (AC) circuits
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 the Engineers Australia Stage 1 Competency Standards for Professional Engineers in the areas of 1. Knowledge and Skill Base, 2. Engineering Application Ability and 3. Professional and Personal Attributes at the following levels:

#### Introductory

**1.1 Comprehensive, theory-based understanding of the underpinning natural and physical sciences and the engineering fundamentals applicable to the engineering discipline. (LO: 1N 2N)**

**1.3 In-depth understanding of specialist bodies of knowledge within the engineering discipline. (LO: 3N)**

**1.4 Discernment of knowledge development and research directions within the engineering discipline. (LO: 6N)**

**1.5 Knowledge of engineering design practice and contextual factors impacting the engineering design (LO: 2N)**

**1.6 Understanding of the scope, principles, norms, accountabilities and bounds of sustainable engineering practice in the specific discipline. (LO: 4N)**

#### Intermediate

**1.2 Conceptual understanding of the mathematics, numerical analysis, statistics, and computer and information sciences which underpin the engineering discipline. (LO: 2I 3I 4I 5I 6N)**

**1.3 In depth understanding of specialist bodies of knowledge within the engineering discipline (LO: 2N)**

**1.5 Knowledge of engineering design practice and contextual factors impacting the engineering discipline. (LO: 3I 4N 5N)**

**2.3 Application of systematic engineering synthesis and design processes. (LO: 3I 4N 5N)**

**3.2 Effective oral and written communication in professional and lay domains. (LO: 6I 7I)**

**3.6 Effective team membership and team leadership. (LO: 6 7I)**

#### Advanced

**2.1 Application of established engineering methods to complex engineering problem solving. (LO: 1I 2A 3I 4I 5I)**

**2.2 Fluent application of engineering techniques, tools and resources. (LO: 3A 4I 5I 6I )**

**Note: LO refers to the Learning Outcome number(s) which link to the competency and the levels: N - Introductory, I - Intermediate and A - Advanced.**

Refer to the Engineering Undergraduate Course Moodle site for further information on the Engineers Australia's Stage 1 Competency Standard for Professional Engineers and course level mapping information

<https://moodle.cqu.edu.au/course/view.php?id=1511>

## 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%	•	•		•	•		
2 - Online Test - 25%	•	•	•				
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
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							

## Textbooks and Resources

### Textbooks

ENEE12014

#### Prescribed

##### Electric Circuits

Edition: 11 (2018)

Authors: James W. Nilsson, Susan A. Riedel

Pearson

Upper Saddle River , NJ , USA

ISBN: 13:9781488657979

Binding: eBook

ENEE12014

#### Supplementary

##### COMPKIT\_ENEE12014

Edition: 02 (2023)

Authors: CQU-SET

Rockhampton , QLD , Australia

Binding: Other

ENEE12014

#### Supplementary

##### TAMKIT

Edition: 02 (2023)

Authors: CQU-SET

Rockhampton , QLD , Australia

Binding: Other

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

## Schedule

### Week 1 - 04 Mar 2024

Module/Topic	Chapter	Events and Submissions/Topic
Introduction to Electrical Circuit Analysis	1-2	

**Week 2 - 11 Mar 2024**

Module/Topic	Chapter	Events and Submissions/Topic
Resistance, Sources and Models	3	<b>Lab A Quiz</b> Due on Sunday 11:45 pm AEST

**Week 3 - 18 Mar 2024**

Module/Topic	Chapter	Events and Submissions/Topic
Nodal Analysis	4	<b>Lab B Quiz</b> Due on Sunday 11:45 pm AEST

**Week 4 - 25 Mar 2024**

Module/Topic	Chapter	Events and Submissions/Topic
Mesh Analysis	4	<b>Lab C Quiz</b> Due on Sunday 11:45 pm AEST

**Week 5 - 01 Apr 2024**

Module/Topic	Chapter	Events and Submissions/Topic
Network Theorems	4	<b>Lab D Quiz</b> Due on Sunday 11:45 pm AEST <b>Progressive Test 1</b> Due on Sunday 11:45 pm AEST

**Vacation Week - 08 Apr 2024**

Module/Topic	Chapter	Events and Submissions/Topic
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**Week 6 - 15 Apr 2024**

Module/Topic	Chapter	Events and Submissions/Topic
Transient Analysis I	6	<b>In class test</b> (Online) (covering materials from Week 1 to Week 5)

**Week 7 - 22 Apr 2024**

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

**Week 8 - 29 Apr 2024**

Module/Topic	Chapter	Events and Submissions/Topic
RLC circuits	8	

**Week 9 - 06 May 2024**

Module/Topic	Chapter	Events and Submissions/Topic
Steady State Sinusoidal Analysis I	9	<b>Progressive Test 2</b> Due on Sunday 11:45 pm AEST

**Week 10 - 13 May 2024**

Module/Topic	Chapter	Events and Submissions/Topic
Steady State Sinusoidal Analysis II	9	<b>Laboratory Exercises and Report</b> Due: Week 10 Friday (17 May 2024) 11:45 pm AEST

**Week 11 - 20 May 2024**

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

## Week 12 - 27 May 2024

Module/Topic	Chapter	Events and Submissions/Topic
Exam Revision		<b>Progressive Test 3</b> Due on Sunday 11:45 pm AEST

## Review/Exam Week - 03 Jun 2024

Module/Topic	Chapter	Events and Submissions/Topic
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## Exam Week - 10 Jun 2024

Module/Topic	Chapter	Events and Submissions/Topic
		Online Test

## 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 3 and close at the end of week 5, and the last quiz must be completed by week 12.
- Each quiz can be attempted several times, but the score for the quiz will be the score of 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

Other

#### Assessment Due Date

#### Return Date to Students

Immediate Feedback

#### Weighting

15%

#### Minimum mark or grade

Cumulative marks for Progressive Test 1, 2, and 3 need to be more than 25% to Pass this unit.

#### Assessment Criteria

No assessment criteria

#### Referencing Style

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

#### Submission

Online

#### Learning Outcomes Assessed

- Model electrical components and systems
- Apply circuit laws to find electric fields, electric potentials, and currents in Direct Current (DC) circuits.



- Model and analyse the transient behaviour of circuits with resistors, inductors, and capacitors
- Analyse and solve problems of Alternating Current (AC) circuits

## 2 In class test

### Assessment Type

Online Test

### 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 In class test (Online) will be provided in the unit Moodle site.

### Assessment Due Date

### Return Date to Students

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

### Weighting

25%

### Minimum mark or grade

25% of the allocated marks of this assessment

### Assessment Criteria

- 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
- Apply circuit laws to find electric fields, electric potentials, and currents in Direct Current (DC) circuits.
- Apply network reduction techniques to analyse and solve Direct Current (DC) circuit problems.

## 3 Laboratory Exercises and Report

### 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 Moodle site.
- This assessment item is related to laboratory exercises A, B, C and D.
- All students must complete Lab Quiz A, B, C and D on or before the due date.
- Attendance to laboratories exercises 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 are expected to successfully complete Lab A Quiz, Lab B Quiz, Lab C Quiz and Lab D Quiz.
- Students need to submit an **individual** laboratory report for this assessment by the due date regardless of whether students complete laboratory exercises in teams or individually.
- All students must pass the laboratory techniques based assessments to obtain an overall pass for this unit.

### Assessment Due Date

Week 10 Friday (17 May 2024) 11:45 pm AEST

**Return Date to Students**

Week 12 Friday (31 May 2024)

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

**Weighting**

20%

**Minimum mark or grade**

Combined laboratory exercise report 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.

**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.

## 4 Online Test

**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 test is an important activity to check and enhance your comprehension. This test is an integral part of the study to test on the key aspects of each topic.

This Online test weights 40% your final mark. This Online test will be available for a limited time during Exam week and students need to attend this Online test during that time. (For example this Online test questions will be released on exam week either Monday or Tuesday or Wednesday or Thursday or Friday at 9 AM. Online test answers should be submitted through the unit Moodle site within the specified given time period. In addition, students should submit their scanned detailed solution and workings within the allowed time period to Moodle). Further specific details(including day and time) related to this assessment will be published on the unit Moodle site.

Online test will have essay type questions. Students are supposed to answer all the questions and submit the answers through the unit Moodle site. Students need to copy the questions to their workbook (or blank papers) and solve the problems in their workbook. Students need to include all steps, workings and final answers. Students should scan the workings/answers and collate them into a single PDF file and upload it.

Online test has a set start time and answers/workings submission link will be closed after the end time.

Students are strongly advised to sufficiently cover the related material before the online test.

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

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

**Weighting**

40%

**Minimum mark or grade**

50% of the allocated marks of this assessment

**Assessment Criteria**

Online test 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.
- 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**

- Apply network reduction techniques to analyse and solve Direct Current (DC) circuit problems.
- Model and analyse the transient behaviour of circuits with resistors, inductors, and capacitors
- Analyse and solve problems of Alternating Current (AC) circuits

## 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