



ENEE12014 *Electrical Circuit Analysis*

Term 1 - 2022

Profile information current as at 08/05/2024 11:08 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. 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: (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 - 2022

- 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: 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 Student evaluation

Feedback

Weekly tutorials need to be back to back with weekly lectures.

Recommendation

Tutorials will be discussed in the same week (not in the following week).

Feedback from In-Class

Feedback

Application of theorems using examples were helpful.

Recommendation

Theorems will be further emphasised using examples.

Feedback from In-class

Feedback

Students were appreciative for providing individual attention, keeping frequent engagement, providing tutorial solutions with appropriate scaffolding.

Recommendation

Maintain same practice.

Feedback from In-Class

Feedback

Laboratory exercises need additional support.

Recommendation

Additional Zoom based sessions will be provided to clarify laboratory activities.

Feedback from In-Class

Feedback

Demand timely Lab reports feedback.

Recommendation

Lab report Part I and Part II will be combined as a single submission and that will enable to achieve timely assignment return.

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 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)

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

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

1.6 Understanding of the scope, principles, norms, accountabilities and bounds of sustainable engineering practice in the specific discipline. (LO: 3N)

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)

1.5 Knowledge of engineering design practice and contextual factors impacting the engineering discipline. (LO: 2I 3N 4N)

2.3 Application of systematic engineering synthesis and design processes. (LO: 2I 3N 4N)

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

3.6 Effective team membership and team leadership. (LO: 6I 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: 2A 3I 4I 6I 7N)

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

 N/A Level	 Introductory Level	 Intermediate Level	 Graduate Level	 Professional Level	 Advanced Level
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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 - 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							

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

TAMKIT

Edition: 1 (2021)

CQU-SET

Binding: Other

ENEE12014

Prescribed

TAMKITU

Edition: 1 (2021)

CQU-SET

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

Schedule

Week 1 - 07 Mar 2022

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

Week 2 - 14 Mar 2022

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

Week 3 - 21 Mar 2022

Module/Topic	Chapter	Events and Submissions/Topic
Mesh Analysis	4	Lab 1 Quiz Due on Sunday 11:45 pm AEST

Week 4 - 28 Mar 2022

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

Week 5 - 04 Apr 2022

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

Vacation Week - 11 Apr 2022

Module/Topic	Chapter	Events and Submissions/Topic
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Week 6 - 18 Apr 2022

Module/Topic	Chapter	Events and Submissions/Topic
Transient Analysis II	7	In class test (Online) starts at 8:00 am (AEST) on Wednesday (20 Apr 2022) In class test Due: Week 6 Wednesday (20 Apr 2022) 12:00 pm AEST

Week 7 - 25 Apr 2022

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

Week 8 - 02 May 2022

Module/Topic	Chapter	Events and Submissions/Topic
Steady State Sinusoidal Analysis I	9	Lab Quiz 3 Due on Sunday 11:45 pm AEST LABORATORY EXERCISES AND REPORTS PART I Due: Week 8 Friday (6 May 2022) 11:45 pm AEST

Week 9 - 09 May 2022

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 LABORATORY EXERCISES AND REPORTS PART II Due: Week 9 Friday (13 May 2022) 11:45 pm AEST

Week 10 - 16 May 2022

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

Week 11 - 23 May 2022

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

Week 12 - 30 May 2022

Module/Topic	Chapter	Events and Submissions/Topic
Exam Revision		

Review/Exam Week - 06 Jun 2022

Module/Topic	Chapter	Events and Submissions/Topic
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Exam Week - 13 Jun 2022

Module/Topic	Chapter	Events and Submissions/Topic
		Take Home Examination

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 TAMKIT or TAMKITU) from CQUniversity. This laboratory exercise kit (TAMKIT or TAMKITU) 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.

TAMKIT or TAMKITU has all the components required to complete the labs of this unit from home.

Inclusions in TAMKIT/TAMKITU is as below

- 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)

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

Other

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

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

Week 6 Wednesday (20 Apr 2022) 12:00 pm AEST

Return Date to Students

Week 8 Wednesday (4 May 2022)

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

Weighting

25%

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
- 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

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.
- This assessment item is related to laboratory exercise 1 and 2.
- Attendance to laboratories sessions 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 8 Friday (6 May 2022) 11:45 pm AEST

Return Date to Students

Week 10 Friday (20 May 2022)

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.

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.
- This assessment item is related to laboratory exercise 3 and 4.
- 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 9 Friday (13 May 2022) 11:45 pm AEST

Return Date to Students

Week 11 Friday (27 May 2022)

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.

5 Take Home Examination

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 integrated part of the study to test on the key aspects of each topic. This take home exam weights 40% your final mark. This exam will be available for a limited time during Exam week and students need to attend this examination during that time. (For example this examination questions will be released on exam week either Monday or Tuesday or Wednesday or Thursday or Friday at 9 AM. 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.

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 your workbook (or blank papers) and solve the problems in your workbook. Students need to include all steps of your workings and final answers. Students should scan the workings and answers to a single PDF file and upload it.

Take home examination has a set start time and answer/workings submission link will be closed after the end time. Students are strongly advised to sufficiently cover the material related to test before the test.

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

Weighting

40%

Minimum mark or grade

50% of the allocated marks of this assessment

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.
- 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

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