



ENEE12016 *Signals and Systems*

Term 2 - 2022

Profile information current as at 14/12/2025 03:42 pm

All details in this unit profile for ENEE12016 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

Electrical systems are fundamental to our way of life, including electrical power, telecommunications and automatic control systems. In this unit, you will learn mathematical techniques to analyse and design a wide range of these electrical systems, such as electrical power distribution and transmission networks and control systems. You will be introduced to the concept of linear time invariant systems and a range of mathematical tools used in electrical circuit analysis such as forward and inverse Laplace transforms, s-domain circuit analysis and transfer functions. You will be also introduced to the frequency response of a system and you will identify different types of filters and design analogue filters for given specifications. Through this unit, you will gain programming experience in using MATLAB or equivalent software to analyse signals and linear systems. This unit will also provide you with opportunities to further develop communication skills through preparation of professional documentation and team communications. All students are required to have access to a computer and to make frequent use of the internet. 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

Pre-requisite: ENEE12014 Electrical Circuit Analysis

Important note: Students enrolled in a subsequent unit who failed their pre-requisite unit, should drop the subsequent unit before the census date or within 10 working days of Fail grade notification. Students who do not drop the unit in this timeframe cannot later drop the unit without academic and financial liability. See details in the [Assessment Policy and Procedure \(Higher Education Coursework\)](#).

Offerings For Term 2 - 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).

Website

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

Class and Assessment Overview

Recommended Student Time Commitment

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

Class Timetable

[Regional Campuses](#)

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

[Metropolitan Campuses](#)

Adelaide, Brisbane, Melbourne, Perth, Sydney

Assessment Overview

1. **Written Assessment**

Weighting: 20%

2. **Practical and Written Assessment**

Weighting: 25%

3. **Online Quiz(zes)**

Weighting: 15%

4. **Online Test**

Weighting: 40%

Assessment Grading

This is a graded unit: your overall grade will be calculated from the marks or grades for each assessment task, based on the relative weightings shown in the table above. You must obtain an overall mark for the unit of at least 50%, or an overall grade of 'pass' in order to pass the unit. If any 'pass/fail' tasks are shown in the table above they must also be completed successfully ('pass' grade). You must also meet any minimum mark requirements specified for a particular assessment task, as detailed in the 'assessment task' section (note that in some instances, the minimum mark for a task may be greater than 50%). Consult the [University's Grades and Results Policy](#) for more details of interim results and final grades.

CQUniversity Policies

All University policies are available on the [CQUniversity Policy site](#).

You may wish to view these policies:

- Grades and Results Policy
- Assessment Policy and Procedure (Higher Education Coursework)
- Review of Grade Procedure
- Student Academic Integrity Policy and Procedure
- Monitoring Academic Progress (MAP) Policy and Procedure – Domestic Students
- Monitoring Academic Progress (MAP) Policy and Procedure – International Students
- Student Refund and Credit Balance Policy and Procedure
- Student Feedback – Compliments and Complaints Policy and Procedure
- Information and Communications Technology Acceptable Use Policy and Procedure

This list is not an exhaustive list of all University policies. The full list of University policies are available on the [CQUniversity Policy site](#).

Previous Student Feedback

Feedback, Recommendations and Responses

Every unit is reviewed for enhancement each year. At the most recent review, the following staff and student feedback items were identified and recommendations were made.

Feedback from Unit survey

Feedback

The labs were really great and they really helped students to understand the concepts much better.

Recommendation

Continue this good practice.

Feedback from Unit survey

Feedback

The assignments on this unit were effective in assisting learning the unit content.

Recommendation

Continue this good practice.

Feedback from Unit survey

Feedback

The mix and match of old and new resources was good but there were two different teaching methods which made some things confusing.

Recommendation

Ensure consistency in unit delivery.

Unit Learning Outcomes

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

1. Explain the concepts of a linear time invariant system, unit impulse and step functions, convolution integral and convolution sum
2. Apply forward and inverse Laplace transforms and analyse electrical circuits in the s-domain
3. Identify and design different analogue filters
4. Perform Fourier transforms to find frequency domain representations of time domain functions
5. Use appropriate simulation tools to validate the signal and systems analysis techniques
6. Create professional documentation of the solutions, designs and analysis process using electrical terminology, diagrams and symbols that conform to Australian Standards
7. Work individually and collaboratively in a team to produce high-quality outputs.

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:

Intermediate 1.5 Knowledge of engineering design practice and contextual factors impacting the engineering discipline. (LO: 3I 4I 5I) 1.6 Understanding of the scope, principles, norms, accountabilities and bounds of sustainable engineering practice in the specific discipline. (LO: 2N 3I 4N 5N) 3.3 Creative, innovative and pro-active demeanour. (LO: 5I) 3.4 Professional use and management of information. (LO: 5I)

Advanced 1.1 Comprehensive, theory-based understanding of the underpinning natural and physical sciences and the engineering fundamentals applicable to the engineering discipline. (LO: 1A 2A 3A) 1.2 Conceptual understanding of the mathematics, numerical analysis, statistics, and computer and information sciences which underpin the engineering discipline. (LO: 2I 3A 4I 5I) 1.3 In-depth understanding of specialist bodies of knowledge within the engineering discipline. (LO: 1A 2A 3A 4A 5A) 1.4 Discernment of knowledge development and research directions within the engineering discipline. (LO: 2I 3A 4I 5A) 2.1 Application of established engineering methods to complex engineering problem solving. (LO: 2A 3A 4A 5A) 2.2 Fluent application of engineering techniques, tools and resources. (LO: 2I 3I 4I 5A) 2.3 Application of systematic engineering synthesis and design processes. (LO: 5A) 3.2 Effective oral and written communication in professional and lay domains. (LO: 6A 7I)

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 - Written Assessment - 20%	•	•	•	•		•	•
2 - Practical and Written Assessment - 25%	•	•	•	•	•	•	•
3 - Online Test - 40%	•	•	•	•		•	
4 - Online Quiz(zes) - 15%	•	•	•	•			

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

ENEE12016

Prescribed

Signals and Systems : Pearson New International Edition

Edition: 2nd edn (1983)

Authors: ALAN V. OPPENHEIM, ALAN S. WILLSKY & S. HAMID NAWAB

Prentice-Hall

Upper Saddle River , NJ , USA

ISBN: 0-13-814757-4

Binding: Paperback

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Supplementary

Matlab/SIMULINK Software

Edition: R2019b (R2021b)

Mathworks

Binding: Other

Additional Textbook Information

1. **SIGNALS & SYSTEMS:** This book maybe out of print from the publisher. However, eBook maybe downloaded from various sources.
2. **MATLAB/SIMULINK Software:** This unit has several tutorial and assignment exercises that require MATLAB/SIMULINK Software. Students can log in to Mathworks website and download the software free after setting up a log in account using the university email ID.

IT Resources

You will need access to the following IT resources:

- CQUniversity Student Email
- Internet
- Unit Website (Moodle)
- MATLAB and Simulink Suite Software

Referencing Style

All submissions for this unit must use the referencing style: [Harvard \(author-date\)](#)
For further information, see the Assessment Tasks.

Teaching Contacts

Sanath Alahakoon Unit Coordinator

s.alahakoon@cqu.edu.au

Schedule

Week 1 - 11 Jul 2022

Module/Topic	Chapter	Events and Submissions/Topic
Signals and Systems	Chapter 1	

Week 2 - 18 Jul 2022

Module/Topic	Chapter	Events and Submissions/Topic
Linear Time Invariant Systems	Chapter 2	

Week 3 - 25 Jul 2022		
Module/Topic	Chapter	Events and Submissions/Topic
Laplace Transforms	Chapter 9	
Week 4 - 01 Aug 2022		
Module/Topic	Chapter	Events and Submissions/Topic
s Domain Circuit Analysis	Chapter 9	Online Quiz 1 Opens on 30-Jul-2022 - Due: Week 4 Friday (5-Aug-2022) 11:55 pm AEST
Week 5 - 08 Aug 2022		
Module/Topic	Chapter	Events and Submissions/Topic
Transfer Functions	Chapter 9	Online Quiz 2 Opens on 06-Aug-2022 - Due: Week 5 Friday (12-Aug-2022) 11:55 pm AEST
Vacation Week - 15 Aug 2022		
Module/Topic	Chapter	Events and Submissions/Topic
Week 6 - 22 Aug 2022		
Module/Topic	Chapter	Events and Submissions/Topic
Stability of LTI Systems	Chapter 9	Assignment Due: Week 6 Friday (26 Aug 2022) 11:59 pm AEST
Week 7 - 29 Aug 2022		
Module/Topic	Chapter	Events and Submissions/Topic
Fourier Series Representation of Periodic Signals	Chapter 3	Online Quiz 3 Opens on 27-Aug-2022 - Due: Week 7 Friday (2-Sept-2022) 11:55 pm AEST
Week 8 - 05 Sep 2022		
Module/Topic	Chapter	Events and Submissions/Topic
Fourier Transform	Chapter 4	
Week 9 - 12 Sep 2022		
Module/Topic	Chapter	Events and Submissions/Topic
Residential School		Residential School: Week 9 (12-13 September 2021, 9 am-5 pm), Online via ZOOM
Week 10 - 19 Sep 2022		
Module/Topic	Chapter	Events and Submissions/Topic
Frequency Characteristics of LTI Systems	Chapter 6	Online Quiz 4 Opens on 17-Sep-2022 - Due: Week 10 Friday (23-Sept-2022) 11:55 pm AEST
Week 11 - 26 Sep 2022		
Module/Topic	Chapter	Events and Submissions/Topic
Active Filter Design	Chapter 6	
Week 12 - 03 Oct 2022		
Module/Topic	Chapter	Events and Submissions/Topic
Exam Review		Online Quiz 5 Opens on 01-Oct-2022 - Due: Week 12 Friday (7-Oct-2022) 11:55 pm AEST
Review/Exam Week - 10 Oct 2022		
Module/Topic	Chapter	Events and Submissions/Topic

End of Term Online Test may be scheduled in Week 13 (REVIEW/EXAM WEEK) or Week 14 (EXAM WEEK)

Laboratory Activities and Report
Due: Review/Exam Week Monday (10 Oct 2022) 11:59 pm AEST

Exam Week - 17 Oct 2022

Module/Topic	Chapter	Events and Submissions/Topic
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Term Specific Information

The whole chapter from the prescribed textbook (Signals and Systems by Oppenheim) specified in the schedule is not relevant for some topics. More details about the relevant textbook content will be included in the lecture material. Some lecture contents will be covered from the following book:
Electric Circuits 10th edition (Global Edition) (2015)
Authors: Nilsson J. W. and Riedel S, A.
This is the same textbook used in the ENEE12014 Electrical Circuit Analysis unit.

Assessment Tasks

1 Assignment

Assessment Type

Written Assessment

Task Description

This assessment item covers the topics covered from week 1-6. The assignment questions will be released on the unit website three weeks prior to the submission due date. It is not expected that students will type up equations and calculations. Students can scan clear and legible hand written calculations for online submission.

Assessment Due Date

Week 6 Friday (26 Aug 2022) 11:59 pm AEST

Submitted through unit Moodle site as a PDF file.

Return Date to Students

Week 8 Friday (9 Sept 2022)

Feedback given through unit website in Moodle

Weighting

20%

Assessment Criteria

The assignments will be graded using the following criteria:

- Correct Answers;
- Correct format;
- All working must be shown to obtain marks;
- Assignments must be neat, tidy and legible;
- All questions must be attempted.

Referencing Style

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

Submission

Online

Submission Instructions

Submit to the link in the unit website in Moodle as a WORD or PDF file.

Learning Outcomes Assessed

- Explain the concepts of a linear time invariant system, unit impulse and step functions, convolution integral and convolution sum
- Apply forward and inverse Laplace transforms and analyse electrical circuits in the s-domain
- Identify and design different analogue filters
- Perform Fourier transforms to find frequency domain representations of time domain functions
- Create professional documentation of the solutions, designs and analysis process using electrical terminology, diagrams and symbols that conform to Australian Standards
- Work individually and collaboratively in a team to produce high-quality outputs.

2 Laboratory Activities and Report

Assessment Type

Practical and Written Assessment

Task Description

This assessment item covers all topics.

Simulation Laboratory sessions will be held at various times, as directed by the unit website, through the term or in the case of distance students at the online residential school. All information regarding the laboratories will be provided to the students via the unit website. Laboratories are compulsory and all students must pass the laboratory exercise assessment in order to pass the unit.

Details of the laboratory exercises will be posted on the unit website at the start of the term.

Assessment Due Date

Review/Exam Week Monday (10 Oct 2022) 11:59 pm AEST

Submit to the link in the unit website in Moodle as a WORD or PDF file.

Return Date to Students

Exam Week Friday (21 Oct 2022)

Feedback given through unit website in Moodle

Weighting

25%

Minimum mark or grade

Students must score 50% of the allocated marks.

Assessment Criteria

Laboratory exercises will be graded using the following criteria:

- Correct Answers;
- Correct format;
- Correct description of laboratory procedures;
- Discussion of laboratory results;
- All working must be shown;
- Proper use of references;
- Report must be neat, tidy and legible;
- All laboratory exercises must be attempted.

Referencing Style

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

Submission

Online

Submission Instructions

Submit to the link in the unit website in Moodle as a WORD or PDF file.

Learning Outcomes Assessed

- Explain the concepts of a linear time invariant system, unit impulse and step functions, convolution integral and convolution sum
- Apply forward and inverse Laplace transforms and analyse electrical circuits in the s-domain

- Identify and design different analogue filters
- Perform Fourier transforms to find frequency domain representations of time domain functions
- Use appropriate simulation tools to validate the signal and systems analysis techniques
- Create professional documentation of the solutions, designs and analysis process using electrical terminology, diagrams and symbols that conform to Australian Standards
- Work individually and collaboratively in a team to produce high-quality outputs.

3 Online Quizzes

Assessment Type

Online Quiz(zes)

Task Description

The assessment is a set of online fortnightly quizzes which can be accessed via the unit Moodle site. A set of multiple choice and calculation questions is assigned each week. The quizzes are an integrated part of the study to test on the key concepts of each topic. Details of the assessment will be available on the unit Moodle site at the beginning of the team. Each quiz has a set time to complete and once a student start a quiz, it will close after the set time. Once started, a quiz cannot be paused in the middle. Students are strongly advised to sufficiently cover the material related to each quiz before starting the quiz. Each quiz will be available up to 1 week after the relevant fortnight to allow students who cannot find time each week for study. For example quiz on week 1 and 2 material will close at the end of week 3 and quiz on week 3 and 4 material will close at the end of 5 etc.

Each quiz can be attempted several times, but the score for the quiz will be the score for your first attempt. In your different attempts you will be receive different problems as the system randomly select the problems from a set of problems specified for each question. 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 convenient.

Number of Quizzes

5

Frequency of Quizzes

Other

Assessment Due Date

Friday weeks 4,5,7,10,12 at 11:55 pm

Return Date to Students

Results are available immediately after the completion of each quiz.

Weighting

15%

Minimum mark or grade

Students must score 50% of the allocated total marks for the quizzes

Assessment Criteria

No Assessment Criteria

Referencing Style

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

Submission

Online

Learning Outcomes Assessed

- Explain the concepts of a linear time invariant system, unit impulse and step functions, convolution integral and convolution sum
- Apply forward and inverse Laplace transforms and analyse electrical circuits in the s-domain
- Identify and design different analogue filters
- Perform Fourier transforms to find frequency domain representations of time domain functions

4 End of Term Online Test

Assessment Type

Online Test

Task Description

This online test may cover all topics from weeks 1 to 12 and may consist of a mix 4-6 numerical as well as descriptive answer questions.

This online test will be held during the University exam period (Week 13 or 14). The exact date and time will be confirmed by the end of week 9. This online test has a duration of 3 hrs. You will be provided with an additional 30 minutes to read the paper and to scan and upload the answer scripts. The Moodle submission link will become inactive 3.5 hrs after the start time. You are encouraged to sit the test from a location with a good Internet connection and where you have access to a scanner. If you are unable to find a scanner, you can use your mobile phone to scan and upload the answer scripts. Please find a list of Camera Scan apps below that is suitable for this.

1. Adobe Scan (DC) <https://adobescan.app.link/d/1n1NntFHTkb>
2. Microsoft Lens <https://apps.apple.com/au/app/microsoft-lens-pdf-scanner/id975925059>
3. SwiftScan <https://swiftscan.app/en/index.html>
4. CamScanner <https://www.camscanner.com/>
5. ClearScan <https://clearscanapp.com/>

Assessment Due Date

Submitted through unit Moodle site as a PDF file.

Return Date to Students**Weighting**

40%

Minimum mark or grade

Students must score at least 50% of the allocated marks.

Assessment Criteria

No Assessment Criteria

Referencing Style

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

Submission

Online

Submission Instructions

Submitted through unit Moodle site as a PDF file.

Learning Outcomes Assessed

- Explain the concepts of a linear time invariant system, unit impulse and step functions, convolution integral and convolution sum
- Apply forward and inverse Laplace transforms and analyse electrical circuits in the s-domain
- Identify and design different analogue filters
- Perform Fourier transforms to find frequency domain representations of time domain functions
- Create professional documentation of the solutions, designs and analysis process using electrical terminology, diagrams and symbols that conform to Australian Standards

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