



# ENEG11009 *Fundamentals of Energy and Electricity*

## Term 3 - 2019

Profile information current as at 27/04/2024 08:18 am

All details in this unit profile for ENEG11009 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

In this unit, you will learn how to apply fundamental laws of physics related to energy and electricity using authentic engineering problems. You will be introduced to the concepts of heat, energy, work, energy conversion and laws of thermodynamics. You will apply energy principles of rotational motion, simple harmonic motion and oscillations. You will learn the concepts of voltage and current and use Kirchhoff's laws to analyse simple direct current (DC) and alternating current (AC) electrical circuits. You will also learn the operation of electrical machines such as motors and generators and how to select a machine for a given application. Throughout this unit you will be using experimental and measurement techniques to investigate relevant physical phenomena and learn how they can be used in practice to solve engineering problems. This unit will also provide you with opportunities to develop communication skills through collaborative team work and opportunities to create professional documentation through laboratory reports. Mixed mode students are required to attend the compulsory Residential School.

### Details

Career Level: *Undergraduate*

Unit Level: *Level 1*

Credit Points: 6

Student Contribution Band: 8

Fraction of Full-Time Student Load: 0.125

### Pre-requisites or Co-requisites

There are no requisites for this unit.

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

### Offerings For Term 3 - 2019

- Mixed Mode

### Attendance Requirements

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

### Residential Schools

This unit has a Compulsory Residential School for distance mode students and the details are: Click here to see your [Residential School Timetable](#).

### Website

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

## Class and Assessment Overview

### Recommended Student Time Commitment

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

### Class Timetable

#### [Regional Campuses](#)

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

#### [Metropolitan Campuses](#)

Adelaide, Brisbane, Melbourne, Perth, Sydney

### Assessment Overview

#### 1. **In-class Test(s)**

Weighting: 25%

#### 2. **Practical and Written Assessment**

Weighting: 12%

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

Weighting: 10%

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

Weighting: 13%

#### 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**

Pre-lecture videos and slides helped students.

**Recommendation**

Maintain the same practice.

#### Feedback from Unit Evaluation

**Feedback**

Lecturers clarified questions in timely manner and quality feedback was provided.

**Recommendation**

Maintain the same practice.

#### Feedback from Unit Evaluation

**Feedback**

Unit content was laid out in Moodle efficiently so that the material could be found easily.

**Recommendation**

Maintain the same structure.

#### Feedback from Unit Evaluation

**Feedback**

Laboratory report templates need a little improvement.

**Recommendation**

Revisit laboratory templates and make amendments or allow students to develop their own lab reports.

#### Feedback from Discipline Leader

**Feedback**

Improve the clarity of assessment requirements.

**Recommendation**

A separate paragraph will be added to the assignment to further clarify the assessment requirements describing the expectations in detail.

## Unit Learning Outcomes

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

1. Solve well defined engineering problems in work, energy and heat transfer
2. Apply physical and circuit laws to find electric fields, electric potentials and currents in Direct Current (DC) circuits
3. Calculate simple capacitor and inductor dimensions and transient behaviour of Resistor-Capacitor (RC) and Resistor-Inductor (RL) circuits
4. Analyse simple Alternating Current (AC) circuits
5. Solve problems related to rotational motion, and electrical machines
6. Conduct scientific experiments to investigate physical phenomena using safe work practices
7. Work individually and collaboratively in a team to produce professional laboratory documentation including error analyses.

Learning outcomes are linked to Engineers Australia Stage 1 Competencies and also discipline capabilities. You can find the mapping for this on the [Engineering Undergraduate Course website](#).

## 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 - In-class Test(s) - 25%	•	•					
2 - Practical and Written Assessment - 12%						•	•
3 - Online Quiz(zes) - 10%	•	•	•	•	•		
4 - Practical and Written Assessment - 13%						•	•
5 - Examination - 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
<b>1 - In-class Test(s) - 25%</b>	•	•	•	•		•				
<b>2 - Practical and Written Assessment - 12%</b>	•	•	•		•	•		•		
<b>3 - Online Quiz(zes) - 10%</b>		•	•			•				
<b>4 - Practical and Written Assessment - 13%</b>	•	•	•		•	•		•		
<b>5 - Examination - 40%</b>	•	•	•							

## Textbooks and Resources

### Textbooks

ENEG11009

#### Prescribed

#### Fundamentals of Energy and Electricity

1st Edition (2016)

Authors: R. Knight

Pearson Education Australia

ISBN: 9781488616006

Binding: Paperback

### IT Resources

**You will need access to the following IT resources:**

- CQUniversity Student Email
- Internet
- Unit Website (Moodle)

## Referencing Style

All submissions for this unit must use the referencing style: [Harvard \(author-date\)](#)

For further information, see the Assessment Tasks.

## Teaching Contacts

**Sanath Alahakoon** Unit Coordinator

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

## Schedule

### Week 1 - 11 Nov 2019

#### Module/Topic

Work, Energy and Power

#### Chapter

Part 1 - Chapter 10 & 11

#### Events and Submissions/Topic

### Week 2 - 18 Nov 2019

#### Module/Topic

#### Chapter

#### Events and Submissions/Topic

Introduction to Thermodynamics	Part 1 - Chapter 11 Part 2 - Chapter 13, 14 & 15	Online Quiz 1 opens Monday 6:00 am AEST
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**Week 3 - 25 Nov 2019**

Module/Topic	Chapter	Events and Submissions/Topic
Thermal Properties of Matter	Part 1 - Chapter 11 Part 2 - Chapter 13, 14 & 15	<b>Online Quiz 1</b> Due Week 3 Sunday 11:45 pm AEST

**Week 4 - 02 Dec 2019**

Module/Topic	Chapter	Events and Submissions/Topic
Electric Charges and Fields	Part 1 - Chapter 20 & 21	Online Quiz 2 opens Monday 6:00 am AEST

**Vacation Week - 09 Dec 2019**

Module/Topic	Chapter	Events and Submissions/Topic
		Residential school at Rockhampton (Dec.9 - Dec. 11).  <b>In-Class test</b> Due: Vacation Week Monday (9 Dec 2019) 11:45 am AEST

**Week 5 - 16 Dec 2019**

Module/Topic	Chapter	Events and Submissions/Topic
Electric Currents and DC Circuits	Part 1 - Chapter 22 & 23	<b>Online Quiz 2</b> Due Week 5 Sunday 11:45 pm AEST

**Week 6 - 23 Dec 2019**

Module/Topic	Chapter	Events and Submissions/Topic
Capacitors and RC circuits	Part 1 - Chapter 21 & 23	

**Week 7 - 06 Jan 2020**

Module/Topic	Chapter	Events and Submissions/Topic
Magnetism and Inductors	Part 1 - Chapter 24	Online Quiz 3 opens Monday 6:00 am AEST

**Week 8 - 13 Jan 2020**

Module/Topic	Chapter	Events and Submissions/Topic
Fundamentals of Alternating Current Circuits	Part 3 - Chapter 32	<b>Online Quiz 3</b> Due Week 8 Sunday 11:45 pm AEST

**Week 9 - 20 Jan 2020**

Module/Topic	Chapter	Events and Submissions/Topic
Alternating Current Circuits Analysis	Part 3 - Chapter 32	Online Quiz 4 opens Monday 6:00 am AEST

**Week 10 - 27 Jan 2020**

Module/Topic	Chapter	Events and Submissions/Topic
		<b>Online Quiz 4</b> Due Week 10 Sunday 11:45 pm AEST
Rotational Motion	Part 1 - Chapter 7	<b>Laboratory Activities and Report 1</b> Due: Week 10 Monday (27 Jan 2020) 11:00 pm AEST

**Week 11 - 03 Feb 2020**

Module/Topic	Chapter	Events and Submissions/Topic
Electrical Machines	Part 1 - Chapter 24 & 25	Online Quiz 5 opens Monday 6:00 am AEST

## Week 12 - 10 Feb 2020

Module/Topic	Chapter	Events and Submissions/Topic
Exam Revision		<b>Online Quiz 5</b> Due Week 12 Sunday 11:45 pm AEST  <b>Laboratory Activities and Report II</b> Due: Week 12 Monday (10 Feb 2020) 11:00 pm AEST

## Assessment Tasks

### 1 In-Class test

#### Assessment Type

In-class Test(s)

#### Task Description

This assessment covers weekly topics from Week 1 to Week 4. Students are required to answer analytical and numerical questions to demonstrate their theoretical knowledge and analytical and problem solving skills.

This test will be conducted during the residential school at Rockhampton.

#### Assessment Due Date

Vacation Week Monday (9 Dec 2019) 11:45 am AEST

Suggested date and time will be notified and confirmed via the unit Moodle site.

#### Return Date to Students

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

#### Weighting

25%

#### Minimum mark or grade

25%

#### Assessment Criteria

In-class test will be graded using the following criteria:

- Correct answers
- All working must be shown
- Answers must be neat, tidy and legible
- Correct format
- Application of correct methods and procedures
- Discussion of answers
- All questions must be attempted
- Each question in the test will be assessed separately.
- Need to score more than 25% to PASS

#### Referencing Style

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

#### Submission

Offline

#### Submission Instructions

In class test

#### Learning Outcomes Assessed

- Solve well defined engineering problems in work, energy and heat transfer
- Apply physical and circuit laws to find electric fields, electric potentials and currents in Direct Current (DC) circuits

#### Graduate Attributes

- Communication

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

## 2 Laboratory Activities and Report I

### Assessment Type

Practical and Written Assessment

### Task Description

This assessment item covers topics from 1 to 5

Laboratory sessions will be held at various times, as directed by the unit Moodle site, through the term or in case of online students at the residential school. All the information regarding the laboratories will be provided to the students via the unit Moodle site.

Laboratory **attendance is compulsory** and all students **must pass** the laboratory exercise assessment in order to pass the unit. Laboratory reports of students who did not attend the laboratory sessions will not be accepted for marking and will be awarded zero marks.

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

Students will be working in teams during the laboratory sessions.

### Assessment Due Date

Week 10 Monday (27 Jan 2020) 11:00 pm AEST

### Return Date to Students

We strive to return assessments within 2 weeks after due date

### Weighting

12%

### Minimum mark or grade

Combined laboratory part I and II marks need to be more than 50%

### 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
- Combined laboratory part I and II marks need to be more than 50% to PASS

### Referencing Style

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

### Submission

Online Group

### Learning Outcomes Assessed

- Conduct scientific experiments to investigate physical phenomena using safe work practices
- Work individually and collaboratively in a team to produce professional laboratory documentation including error analyses.

### Graduate Attributes

- Communication
- Problem Solving
- Critical Thinking
- Team Work
- Information Technology Competence
- Ethical practice



## 3 Online Progressive tests

### Assessment Type

Online Quiz(zes)

### Task Description

The assessment is accessible via the unit Moodle site and comprises of a set of online multiple choice questions on the topics covered each week. These progressive tests are an important activity to check and enhance your comprehension. The progressive tests are an integrated part of the study to test on the key aspects of each topic. Accurately completing the Progressive tests are vital for proper preparation for In-class test and end of term examination.

Each online progressive test quiz weights (2%) of your final mark (10% in total). Each progressive test will be available up to 1 week after the relevant fortnight to allow some study flexibility. For example progressive test on topics covered in Week 1 and 2 will close at the end of Week 3. Each attempt will include questions randomly selected from a set of related problems. Correct answers will be available immediately after you complete the test. If you encounter any network access during tests, contact the unit coordinator at your earliest convenience. Further details of the assessment will be available on the unit Moodle site at the beginning of the term.

- Each progressive test has set time to complete and once a student start a test, it will close after the set time.
- Once started, a test cannot be paused in the middle. Students are strongly advised to sufficiently cover the material related to each test before starting the test.
- You can attempt each test 2 times, within the given time frame as specified in the schedule.
- Final mark will be the highest of all the attempts

### Number of Quizzes

5

### Frequency of Quizzes

Other

### Assessment Due Date

Progressive Test 1, 2, 3, 4, and 5 due on Week 3, 5, 8, 10 and 12 on Sunday at 11.45 pm AEST respectively.

### Return Date to Students

Results are available immediately after the completion of each progressive test

### Weighting

10%

### Assessment Criteria

No Assessment Criteria

### Referencing Style

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

### Submission

Online

### Learning Outcomes Assessed

- Solve well defined engineering problems in work, energy and heat transfer
- Apply physical and circuit laws to find electric fields, electric potentials and currents in Direct Current (DC) circuits
- Calculate simple capacitor and inductor dimensions and transient behaviour of Resistor-Capacitor (RC) and Resistor-Inductor (RL) circuits
- Analyse simple Alternating Current (AC) circuits
- Solve problems related to rotational motion, and electrical machines

### Graduate Attributes

- Problem Solving
- Critical Thinking
- Information Technology Competence

## 4 Laboratory Activities and Report II

### Assessment Type

Practical and Written Assessment

### **Task Description**

This assessment item covers topics from 6 to 11.

Laboratory sessions will be held at various times, as directed by the unit Moodle site, through the term or in case of online students at the residential school. All the information regarding the laboratories will be provided to the students via the unit Moodle site.

Laboratory **attendance is compulsory** and all students **must pass** the laboratory exercise assessment in order to pass the unit. Laboratory reports of students who did not attend the laboratory sessions will not be accepted for marking and will be awarded zero marks.

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

Students will be working in teams during the laboratory sessions.

### **Assessment Due Date**

Week 12 Monday (10 Feb 2020) 11:00 pm AEST

### **Return Date to Students**

We strive to return assessments within 2 weeks after due date

### **Weighting**

13%

### **Minimum mark or grade**

Combined laboratory part I and II marks need to be more than 50%

### **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
- Combined laboratory part I and II marks need to be more than 50% to Pass

### **Referencing Style**

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

### **Submission**

Online Group

### **Learning Outcomes Assessed**

- Conduct scientific experiments to investigate physical phenomena using safe work practices
- Work individually and collaboratively in a team to produce professional laboratory documentation including error analyses.

### **Graduate Attributes**

- Communication
- Problem Solving
- Critical Thinking
- Team Work
- Information Technology Competence
- Ethical practice

## **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%

**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

## 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