



ENEX12002 *Introductory Electronics*

Term 2 - 2023

Profile information current as at 16/05/2024 12:10 pm

All details in this unit profile for ENEX12002 have been officially approved by CQU University 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 will introduce you to the fundamentals of analog and digital electronics. You will learn the working principles of commonly used active and passive electronic components such as resistors, capacitors, inductors, diodes, transistors, and operational amplifiers with their applications. This unit will provide you with sufficient knowledge of Boolean algebra necessary to understand digital electronics. You will learn logic gates, combinational logic circuits, logic minimization, flip-flops, counters and other basic digital logic circuits, and their applications. You will develop skills in analysing electronic circuits and modelling analog and digital circuits using industry-standard simulation software. In this unit, you will design analog and digital systems for real-world applications and verify their functionality in simulations. You are also required to complete compulsory practical activities that involve building electronic circuits to further strengthen your knowledge. This unit promotes UN sustainable development goal 12-Responsible Consumption and Production by developing electronic circuits to reduce wasteful consumption.

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: ENEX11009 Fundamentals of Sustainable Energy AND (MATH11160 Technology Mathematics OR MATH11218 Applied Mathematics)

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 - 2023

- Online

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: 40%

2. **Practical and Written Assessment**

Weighting: 20%

3. **Project (applied)**

Weighting: 20%

4. **Project (applied)**

Weighting: 20%

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 feedback

Feedback

Some students found that completing five assessment tasks was time-consuming and the assessment workload in the latter part of the term was high.

Recommendation

Assessment tasks should be reviewed to better manage staff and student workloads.

Feedback from Student feedback

Feedback

The use of Microsoft teams was very useful as the basis of the communication for the entire unit. This gave students a forum-like approach to solving problems and answering questions that proved more user-friendly than the moodle platform

Recommendation

Continue to use Microsoft Teams over Moodle forum to give assessment feedback and answer questions from students.

Unit Learning Outcomes

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

1. Describe the operation of semiconductor devices and basic analog electronic circuit building blocks
2. Understand the digital number systems and their hardware implementation in digital information processing systems
3. Analyse the operation of analogue and digital electronic circuits by applying industry-standard simulation tools
4. Test and validate the electronic circuits
5. Design analog and digital electronic circuits to solve real-world problems by interpreting functional requirements and circuit options
6. Communicate professionally using electronic engineering terminology, symbols and diagrams that conform to Australian and international standards.

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 1.4 Discernment of knowledge development and research directions within the engineering discipline. (LO: 4N 5N) 1.5 Knowledge of engineering design practice and contextual factors impacting the engineering discipline. (LO: 4N 5N) 1.6 Understanding of the scope, principles, norms, accountabilities and bounds of sustainable engineering practice in the specific discipline. (LO: 6N) 3.1 Ethical conduct and professional accountability. (LO: 6N) 3.3 Creative, innovative and pro-active demeanour. (LO: 6N) 3.5 Orderly management of self, and professional conduct. (LO: 6N)

Intermediate 1.1 Comprehensive, theory-based understanding of the underpinning natural and physical sciences and the engineering fundamentals applicable to the engineering discipline. (LO: 1I 2I) 1.2 Conceptual understanding of the mathematics, numerical analysis, statistics, and computer and information sciences which underpin the engineering discipline. (LO: 1I 2I 3I) 1.3 In-depth understanding of specialist bodies of knowledge within the engineering discipline. (LO: 1I 2I 3I 4N 5N) 2.1 Application of established engineering methods to complex engineering problem solving. (LO: 3I 4I 5I) 2.4 Application of systematic approaches to the conduct and management of engineering projects. (LO: 4N 5I) 3.2 Effective oral and written communication in professional and lay domains. (LO: 6I) 3.4 Professional use and management of information. (LO: 6I)

Advanced 2.2 Fluent application of engineering techniques, tools and resources. (LO: 3I 4I 5A) 2.3 Application of systematic engineering synthesis and design processes. (LO: 4I 5A)

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
1 - Online Quiz(zes) - 40%	•	•				•
2 - Practical and Written Assessment - 20%				•		•
3 - Project (applied) - 20%	•		•		•	
4 - Project (applied) - 20%		•	•		•	

Alignment of Graduate Attributes to Learning Outcomes

Graduate Attributes	Learning Outcomes					
	1	2	3	4	5	6
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

ENEX12002

Prescribed

Digital Fundamentals Global Edition VitalSource eBook

11th Global edition (2015)

Authors: Thomas L Floyd

Pearson

USA

ISBN: 9781292075990

Binding: eBook

ENEX12002

Prescribed

Electronic Devices

Global Edition, 10th Edition (2018)

Authors: Thomas L. Floyd

Pearson

NJ , USA

ISBN: 9781292223018

Binding: eBook

IT Resources

You will need access to the following IT resources:

- CQUniversity Student Email
- Internet
- Unit Website (Moodle)
- Pdf creator/scanner
- MS Office (mainly Word and Powerpoint)
- Zoom Video Conference Application
- Windows 8 or later PC with admin rights to install software and USB port to operate USB Oscilloscope
- NI Multisim Software (license provided by CQU)
- Microsoft Teams - camera and microphone

Referencing Style

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

For further information, see the Assessment Tasks.

Teaching Contacts

Lam Bui Unit Coordinator

l.bui@cqu.edu.au

Schedule

Week 1 - 10 Jul 2023

Module/Topic	Chapter	Events and Submissions/Topic
Basic Analog Concepts and Diodes	Book 1: Electronic Devices Chapters 1 and 2	

Week 2 - 17 Jul 2023

Module/Topic	Chapter	Events and Submissions/Topic
Diode applications and special purpose diodes	Book 1: Electronic Devices Chapters 2 and 3	

Week 3 - 24 Jul 2023

Module/Topic	Chapter	Events and Submissions/Topic
Bipolar junction transistor and transistor bias circuits	Book 1: Electronic Devices Chapters 4 and 5	

Week 4 - 31 Jul 2023

Module/Topic	Chapter	Events and Submissions/Topic
BJT amplifiers and operational amplifier	Book 1: Electronic Devices Chapters 6 and 12	Online quiz 1 due on Monday of Week 5

Week 5 - 07 Aug 2023

Module/Topic	Chapter	Events and Submissions/Topic
Operational amplifier with feedback and basic op-amp circuits	Book 1: Electronic Devices Chapters 12 and 13	

Vacation Week - 14 Aug 2023

Module/Topic	Chapter	Events and Submissions/Topic
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Week 6 - 21 Aug 2023

Module/Topic	Chapter	Events and Submissions/Topic
Special purpose op-amp circuits and active filters	Book 1: Electronic Devices Chapters 14 and 15	Online quiz 2 due on Monday of Week 7

Week 7 - 28 Aug 2023

Module/Topic	Chapter	Events and Submissions/Topic
Number Systems, Operations, and Codes and Logic Gates	Book 2: Digital Fundamentals Chapters 2, and 3	Practicals, Laboratory Exercise, and Report Due: Week 7 Monday (28 Aug 2023) 11:59 pm AEST

Week 8 - 04 Sep 2023

Module/Topic	Chapter	Events and Submissions/Topic
Boolean Algebra and Logic Simplification	Book 2: Digital Fundamentals Chapter 4	

Week 9 - 11 Sep 2023

Module/Topic	Chapter	Events and Submissions/Topic
Combinational Logic Analysis	Book 2: Digital Fundamentals Chapter 5	Online quiz 3 due on Monday of Week 10

Week 10 - 18 Sep 2023

Module/Topic	Chapter	Events and Submissions/Topic
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Functions of Combinational Logic	Book 2: Digital Fundamentals Chapter 6	Analog Electronics Design Assignment Due: Week 10 Monday (18 Sept 2023) 11:59 pm AEST
Week 11 - 25 Sep 2023		
Module/Topic	Chapter	Events and Submissions/Topic
Latches, Flip-flops and Timers	Book 2: Digital Fundamentals Chapter 7	
Week 12 - 02 Oct 2023		
Module/Topic	Chapter	Events and Submissions/Topic
Counters	Book 2: Digital Fundamentals Chapter 9	Online quiz 4 due on Monday of Week 13 (Review/Exam Week)
Review/Exam Week - 09 Oct 2023		
Module/Topic	Chapter	Events and Submissions/Topic
		Digital Electronics Design Assignment Due: Review/Exam Week Monday (9 Oct 2023) 11:59 pm AEST
Exam Week - 16 Oct 2023		
Module/Topic	Chapter	Events and Submissions/Topic

Term Specific Information

The residential school is compulsory. Students must elect the campus that they wish to attend for the laboratory experiments or attend the residential school to complete the laboratory activities. Alternatively, students also have the option to purchase the electronic lab kit and complete the laboratory experiments at home **without** supervision. This latter option requires approval from the unit coordinator. If you wish to proceed with this option, please contact the unit coordinator prior to week 3 of term.

Assessment Tasks

1 Online quizzes

Assessment Type

Online Quiz(zes)

Task Description

There are 4 online quizzes that test the students understanding and application of the learning materials in the immediate weeks leading up to the quizzes. The quizzes comprise of both multiple choices and short calculation questions, and they will be timed. Students are encouraged to review the relevant materials before they attempt the quizzes. Each quiz is worth of 10% of the unit total marks. The online quizzes contribute to 40% of the unit mark. The quizzes are due in weeks 5, 7, 10 and 13 (review/exam) respectively.

Number of Quizzes

4

Frequency of Quizzes

Other

Assessment Due Date

Must complete the quiz by its relevant due week. Please refer to the quizzes for specific deadlines.

Return Date to Students

Quiz results will be available to students after the quiz is closed.

Weighting

40%

Assessment Criteria

Correct numerical answers or choose the best answer among the available multiple choices.

Referencing Style

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

Submission

Online

Submission Instructions

Do the quizzes online. The quizzes will be available in the unit Moodle website.

Learning Outcomes Assessed

- Describe the operation of semiconductor devices and basic analog electronic circuit building blocks
- Understand the digital number systems and their hardware implementation in digital information processing systems
- Communicate professionally using electronic engineering terminology, symbols and diagrams that conform to Australian and international standards.

2 Practicals, Laboratory Exercise, and Report

Assessment Type

Practical and Written Assessment

Task Description

This assessment corresponds to the lab experiments and collectively covers topics from the analog electronics domain. There are two labs in total out of which, lab 1 covers diodes, rectifiers and bipolar transistors and lab 2 covers operational amplifiers. The assessment is distributed as per the lab documents and the details and modalities of these lab experiments will be available from the lab documents in the unit Moodle website. These laboratory exercises are compulsory learning and assessment activities. Students are required to submit lab reports that includes results from the lab experiments.

The laboratory sessions will be run at several campus locations around the middle of the term. Please refer to the unit timetable for the detail. Students are required to select the campus location for their lab sessions. Further information will be provided in the unit Moodle about the lab sessions at the start of the term. Alternatively, students have the option to purchase the electronic lab kit and complete the laboratory experiments at home **without** supervision. This latter option requires approval from the unit coordinator. If you wish to proceed with this option, please contact the unit coordinator prior to week 3 of term.

Assessment Due Date

Week 7 Monday (28 Aug 2023) 11:59 pm AEST

Submission of a single pdf lab report and a single zip file of Multisim simulations as per the instructions of the lab document

Return Date to Students

Week 9 Monday (11 Sept 2023)

Marked lab report with feedback will be provided within 2 weeks of the submission date.

Weighting

20%

Minimum mark or grade

50

Assessment Criteria

1. Correctly connects various analog and digital semiconductor components by referring to pin diagrams, power requirements and connection procedures.
2. Tests the operation of analog and digital circuit devices by connecting various laboratory measurement devices.
3. Uses measurement devices to troubleshoot analog and digital circuits.
4. Configures simulation software to analyse various analog and digital circuits.
6. Report is presented to a professional standard by including all workings and circuit outputs

Referencing Style

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

Submission

Online

Submission Instructions

Submission of a single pdf lab report and a single zip file of Multisim simulations as per the instructions of the lab document

Learning Outcomes Assessed

- Test and validate the electronic circuits
- Communicate professionally using electronic engineering terminology, symbols and diagrams that conform to Australian and international standards.

3 Analog Electronics Design Assignment

Assessment Type

Project (applied)

Task Description

This assessment relates to the design of a circuit to solve a real-world problem by using material covered in the analog electronics portion of the unit. It's mainly a simulation-based task that would be submitted individually and would include a report that details the entire design process. Details of this assessment will be available on the Moodle unit website.

Assessment Due Date

Week 10 Monday (18 Sept 2023) 11:59 pm AEST

Submission of a single pdf design report and a single zip file of Multisim simulations as per the instructions of the design task document

Return Date to Students

Week 12 Monday (2 Oct 2023)

Marked design with feedback will be provided.

Weighting

20%

Minimum mark or grade

50

Assessment Criteria

1. Identifies the most suitable analog components that can be used to design a circuit to solve a real-world problem.
2. Justifies the selection of different circuit components by calculations.
3. Explores different analog circuit options by using calculations and simulations.
4. Designs the final circuit by using standard symbols and correct connection methods.
5. Simulates the designed circuit to verify the functional requirements.
6. Report is presented to a professional standard by including all workings and circuit outputs.

Referencing Style

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

Submission

Online

Submission Instructions

Submission of a single pdf design report and a single zip file of Multisim simulations as per the instructions of the design task document

Learning Outcomes Assessed

- Describe the operation of semiconductor devices and basic analog electronic circuit building blocks
- Analyse the operation of analogue and digital electronic circuits by applying industry-standard simulation tools
- Design analog and digital electronic circuits to solve real-world problems by interpreting functional requirements and circuit options

4 Digital Electronics Design Assignment

Assessment Type

Project (applied)

Task Description

This assessment relates to the design of a circuit to solve a real-world problem by using material covered in the digital electronics portion of the unit. It's mainly a simulation-based task that would be submitted individually and would

include a report that details the entire design process. Details of this assessment will be available on the Moodle unit website.

Assessment Due Date

Review/Exam Week Monday (9 Oct 2023) 11:59 pm AEST

Submission of a single pdf design report and a single zip file of Multisim simulations as per the instructions of the design task document.

Return Date to Students

Marked digital design assignment will be released to students after result moderation process.

Weighting

20%

Minimum mark or grade

50

Assessment Criteria

1. Identifies the most suitable digital components that can be used to design a circuit to solve a real-world problem.
2. Justifies the selection of different circuit components by using logic expressions and truth tables.
3. Explores different digital circuit options by using calculations and simulations.
4. Designs the final circuit by using standard symbols and correct connection methods.
5. Simulates the designed circuit to verify the functional requirements.
5. Report is presented to a professional standard by including all workings and circuit outputs.

Referencing Style

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

Submission

Online

Submission Instructions

Submission of a single pdf design report and a single zip file of Multisim simulations as per the instructions of the design task document

Learning Outcomes Assessed

- Understand the digital number systems and their hardware implementation in digital information processing systems
- Analyse the operation of analogue and digital electronic circuits by applying industry-standard simulation tools
- Design analog and digital electronic circuits to solve real-world problems by interpreting functional requirements and circuit options

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