ENEX12002 *Introductory Electronics*
Term 2 - 2017

Profile information current as at 04/05/2024 07:14 am

General Information

Overview

This unit will introduce you to the fundamentals of analog and digital electronics. You will learn the theory of operation of commonly used in active and passive electronic components such as resistors, capacitors, inductors, diodes, transistors, signal & power amplifiers, oscillators, and Op-amps . 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, shift-registers, memory, and multiplexers. You will develop skills in analysing electronic circuits and modelling of analog and digital circuits using industry standard simulation software packages. During this unit you will design analog and digital systems for real world applications and test them in simulation software. This unit will also provide you with an opportunity to further develop their professional skills such as communication, technical writing, and individual presentations.

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: MATH11219 Applied Calculus AND (ENEG11009 Fundamentals of Energy and Electricity or PHYS11185 Engineering Physics B)
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 - 2017

- Distance
- Mackay

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. **Written Assessment**
Weighting: 20%
3. **Practical and Written Assessment**
Weighting: 20%
4. **Practical and Written Assessment**
Weighting: 20%
5. **Practical and Written Assessment**
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

The content in the unit should be decreased to make it easier to remember the topics.

Recommendation

The unit includes topics from digital as well as analog electronics which have their own relevant contents that need to be covered in this unit. The importance and requirement of each topic covered will be discussed with students in the start of the unit during next offering. The unit schedule will be adjusted to make the content well distributed throughout the term and more manageable for students.

Unit Learning Outcomes

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

1. Describe the operation of semiconductor devices and use them to design circuits for practical applications.
2. Discuss digital number systems and explain how these systems are applied in digital information processing hardware
3. Analyse the operation of analogue and digital electronic circuits, and model them using industry standard simulation tools to verify their behaviour
4. Interpret function requirements, evaluate circuit options and design analog and digital electronic circuits to solve real world problems
5. Construct analog and digital electronic circuits to a given design and validate their operation
6. Solve real life problems and communicate professionally using electronic engineering terminology, symbols and diagrams that conform to Australian and international standards
7. Work collaboratively and autonomously and communicate professionally in presenting your solutions

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

— N/A Level ◦ Introductory Level • Intermediate Level • Graduate Level ◦ Professional Level ◦ Advanced Level

Alignment of Assessment Tasks to Learning Outcomes

Assessment Tasks	Learning Outcomes						
	1	2	3	4	5	6	7
1 - Written Assessment - 20%	•		•				•
2 - Written Assessment - 20%		•	•				•
3 - Practical and Written Assessment - 20%	•	•	•		•	•	•
4 - Practical and Written Assessment - 20%	•	•	•	•		•	•
5 - Practical and Written Assessment - 20%	•	•	•	•		•	•

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
1 - Written Assessment - 20%	•	•	•			•				
2 - Written Assessment - 20%	•	•	•			•				
3 - Practical and Written Assessment - 20%	•	•	•		•	•	•			
4 - Practical and Written Assessment - 20%	•	•	•			•		•		
5 - Practical and Written Assessment - 20%	•	•	•		•	•				

Textbooks and Resources

Textbooks

ENEX12002

Prescribed

Analog Fundamentals: A Systems Approach VitalSource eBook
Edition: 1 (2012)
Authors: Thomas L. Floyd & David M. Buchla
Pearson
NJ , USA
ISBN: 9780133109016
Binding: Hardcover
ENEX12002

Prescribed

Digital Fundamentals Global Edition VitalSource eBook
11th Global edition (2014)
Authors: Thomas L Floyd
Pearson
USA
ISBN: 9781292075990
Binding: Paperback

Additional Textbook Information
Digital Fundamentals Global Edition VitalSource eBook (11e) is available for purchase at

http://www.pearson.com.au/9781292075990

Analog Fundamentals: A Systems Approach VitalSource eBook is available for purchase at

http://www.pearson.com.au/9780133109016

Students preferring a paper version of the text can order the **value pack** of both books at a reduced price from the CQUni Bookshop here

The prescribed version of NI Multisim is the latest one (Ver. 14.1). Please see the Moodle site for further details.

OTHER REQ. RESOURCES

> CQUniversity Email

> Internet

> Unit Website (Moodle)

> Windows PC with USB port to operate USB oscilloscope

> Eagle PCB Design - Trial (Only if you don't have Ultiboard or any other PCB layout software)

IT Resources

You will need access to the following IT resources:

- CQUniversity Student Email
- Internet
- Unit Website (Moodle)
- Eagle PCB Design - Trial
- Multisim 14.0
- Windows PC with USB port to operate USB Oscilloscope

Referencing Style

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

Teaching Contacts

Umer Izhar Unit Coordinator
u.izhar@cqu.edu.au

Schedule

Week 1 - 10 Jul 2017

Module/Topic	Chapter	Events and Submissions/Topic
Analog Concepts, Diodes and Applications	Book 2: Analog Fundamentals Chapters 1 and 2	

Week 2 - 17 Jul 2017

Module/Topic	Chapter	Events and Submissions/Topic
Specialized Diodes and Introduction to BJT	Book 2: Analog Fundamentals Chapters 2 and 3	

Week 3 - 24 Jul 2017

Module/Topic	Chapter	Events and Submissions/Topic
Transistor Amplifiers, Signal and Power Amplification	Book 2: Analog Fundamentals Chapters 3 and 5	

Week 4 - 31 Jul 2017

Module/Topic	Chapter	Events and Submissions/Topic
Operational Amplifier	Book 2: Analog Fundamentals Chapters 6 and 7	

Week 5 - 07 Aug 2017

Module/Topic	Chapter	Events and Submissions/Topic
Special Operational Amplifier Circuits Active Filters	Book 2: Analog Fundamentals Chapters 8 and 9	Written Assessment 1 **Assignment 1** Due: Week 5 Monday (7 Aug 2017) 4:00 pm AEST

Vacation Week - 14 Aug 2017

Module/Topic	Chapter	Events and Submissions/Topic

Week 6 - 21 Aug 2017

Module/Topic	Chapter	Events and Submissions/Topic
Oscillators Voltage Regulators	Book 2: Analog Fundamentals Chapters 10 and 11	Practical and Written Assessment 1A: Lab Report 1 (Analog) Due Friday (25 Aug 17) 04:00 PM AEST

Week 7 - 28 Aug 2017

Module/Topic	Chapter	Events and Submissions/Topic
Number Systems, Operations, and Logic Gates	Book 1: Digital Fundamentals Chapters 1,2, and 3	

Week 8 - 04 Sep 2017

Module/Topic	Chapter	Events and Submissions/Topic
Boolean Algebra and Logic Simplification	Book 1: Digital Fundamentals Chapter 4	Practical and Written Assessment 2: **Design Assignment 1 (Analog)** Due: Week 8 Monday (4 Sept 2017) 4:00 pm AEST

Week 9 - 11 Sep 2017

Module/Topic	Chapter	Events and Submissions/Topic

Combinational Logic Analysis and Functions of Combinational Logic	Book 1: Digital Fundamentals Chapters 5 and 6	

Week 10 - 18 Sep 2017

Module/Topic	Chapter	Events and Submissions/Topic
Latches and Flip-flops	Book 1: Digital Fundamentals Chapter 7	Written Assessment 2 **Assignment 2** Due: Week 10 Friday (22 Sept 2017) 4:00 pm AEST

Week 11 - 25 Sep 2017

Module/Topic	Chapter	Events and Submissions/Topic
Timers and Counters	Book 1: Digital Fundamentals Chapter 7 and 9	

Week 12 - 02 Oct 2017

Module/Topic	Chapter	Events and Submissions/Topic
Shift Registers Data Storage	Book 1: Digital Fundamentals Chapter 8 and 11	Practical and Written Assessment 1B: Lab Report 2 (Digital) Due Monday (06 Oct 17) 04:00 PM AEST

Review/Exam Week - 09 Oct 2017

Module/Topic	Chapter	Events and Submissions/Topic
		Practical and Written Assessment 3: **Design Assignment 2 (Digital)** Due: Review/Exam Week Friday (13 Oct 2017) 4:00 pm AEST

Exam Week - 16 Oct 2017

Module/Topic	Chapter	Events and Submissions/Topic

Term Specific Information

Please refer to the course Moodle site for any guidelines regarding use of forums in communicating with the course coordinator and related staff. Students are advised and encouraged to use Q&A forum for queries regarding assignments. Failure to use the guidelines will not guarantee a response. In this unit, we will use Multisim to simulate different electronic circuits that will help strengthen the theoretical concepts. Due to recent updates in the Multisim software license, students would have easier access to it. More information will be available at the start of the term on course Moodle website. Information about the text books with links is listed in the textbooks and resources section. There are three practical and written assignment (PWA) tasks. PWA 1 is subdivided in 2 labs; one for analog and the other for digital. All labs and practicals are mandatory for all students. PWA 2 and 3 are design assignments one from each section. All PWAs are mandatory for students. For that matter optional residential school will be held on Thursday, 17th Aug to 18th Aug for FLEX students. FLEX students will have the option to request for a lab kit by contacting Niki Ryan at n.ryan@cqu.edu.au, if they cannot come to the residential school. For on-campus students, attending labs would be mandatory.

Assessment Tasks

1 Assignment 1

Assessment Type
Written Assessment

Task Description
This assessment would cover the topics from first four weeks of analog fundamentals. The assessment criteria would be provided with the questions well before the submission date and would be strictly followed. The students are not expected to draw any waveforms or write any equations in the word editor, instead they can scan a clear and legible handwritten document and submit it as a *pdf* file. Details will be given on the Moodle unit website.

Assessment Due Date
Week 5 Monday (7 Aug 2017) 4:00 pm AEST

Return Date to Students

Within 2 weeks after due date

Weighting
20%

Assessment Criteria
1. Correct Answers
2. Correct Format
3. *All working* must be shown to obtain full marks
4. Assignment answers must be neat, tidy and legible
5. Structure and Format of the Submission (cover page, file name, page orientation and numbering)

Referencing Style

- Harvard (author-date)

Submission
Online

Submission Instructions
One pdf file

Learning Outcomes Assessed

- Describe the operation of semiconductor devices and use them to design circuits for practical applications.
- Analyse the operation of analogue and digital electronic circuits, and model them using industry standard simulation tools to verify their behaviour
- Work collaboratively and autonomously and communicate professionally in presenting your solutions

Graduate Attributes

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

2 Assignment 2

Assessment Type
Written Assessment

Task Description
This assessment would cover the topics from first three weeks of digital electronics domain. The assessment criteria would be provided with the questions well before the submission date and would be strictly followed. The students are not expected to draw any waveforms or write any equations in the word editor, instead they can scan a clear and legible handwritten document and submit it as a *pdf* file. Details will be given on the Moodle unit website.

Assessment Due Date
Week 10 Friday (22 Sept 2017) 4:00 pm AEST

Return Date to Students

Within 2 weeks after due date

Weighting
20%

Assessment Criteria
1. Correct Answers
2. Correct Format
3. *All working* must be shown to obtain full marks
4. Assignment answers must be neat, tidy and legible
5. Structure and Format of the Submission (cover page, file name, page orientation and numbering)

Referencing Style

- Harvard (author-date)

Submission
Online

Submission Instructions
One pdf file

Learning Outcomes Assessed

- Discuss digital number systems and explain how these systems are applied in digital information processing hardware
- Analyse the operation of analogue and digital electronic circuits, and model them using industry standard simulation tools to verify their behaviour
- Work collaboratively and autonomously and communicate professionally in presenting your solutions

Graduate Attributes

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

3 Practicals, Laboratory Exercise, and Report

Assessment Type
Practical and Written Assessment

Task Description
This assessment corresponds to lab practicals and collectively covers almost all topics from both digital and analog domain. There are mainly two labs in total out of which, lab 1 covers the analogue electronics portion and lab 2 covers the digital portion.
The assessment is distributed as per the content and the details and modalities of these practicals will be available from the unit Moodle website at the start of the term. These practicals are compulsory for every student. Residential school is highly encouraged for any distance student however, lab kits can be issued in case the student is unable to attend.

Assessment Due Date

Lab report 1 (Analog): Due on Friday (Week 6) at 04:00 PM AEST. Lab reports 2 (Digital): Due on Monday (week 12) at 04:00 PM AEST.

Return Date to Students

Within 2 weeks after due date

Weighting
20%

Assessment Criteria
1. Correct Answers
2. Correct Format
3. All Tasks Attempted
4. Correct Procedures
5. Result Discussion
6. *All working* must be shown to obtain full marks
7. Assignment answers must be neat, tidy and legible
8. Structure and Format of the Submission (cover page, file name, page orientation and numbering)

Referencing Style

- Harvard (author-date)

Submission
Online

Submission Instructions
One folder containing pdf and software files (if applicable)

Learning Outcomes Assessed

- Describe the operation of semiconductor devices and use them to design circuits for practical applications.
- Discuss digital number systems and explain how these systems are applied in digital information processing hardware

- Analyse the operation of analogue and digital electronic circuits, and model them using industry standard simulation tools to verify their behaviour
- Construct analog and digital electronic circuits to a given design and validate their operation
- Solve real life problems and communicate professionally using electronic engineering terminology, symbols and diagrams that conform to Australian and international standards
- Work collaboratively and autonomously and communicate professionally in presenting your solutions

Graduate Attributes

- Communication
- Problem Solving
- Critical Thinking
- Team Work
- Information Technology Competence
- Cross Cultural Competence

4 Design Assignment 1 (Analog)

Assessment Type
Practical and Written Assessment

Task Description
This assessment relates to the design of a component / device mainly using contents covered in analog portion of the unit. This mainly software based task would be submitted individually by every student. After the submission the students can fabricate it physically but it would not count towards the grades. Details of this assessment will be available on Moodle unit website.

Assessment Due Date
Week 8 Monday (4 Sept 2017) 4:00 pm AEST

Return Date to Students

Within 2 weeks after due date

Weighting
20%

Assessment Criteria
1. Correct Answers
2. Correct Format
3. All Tasks Attempted
4. Correct Procedures and Steps Shown
5. Result Discussion
6. *All working* must be shown to obtain full marks
7. Assignment answers must be neat, tidy and legible
8. Structure and Format of the Submission (cover page, file name, page orientation and numbering)

Referencing Style

- Harvard (author-date)

Submission
Online

Submission Instructions
One folder containing pdf and software file(s)

Learning Outcomes Assessed

- Describe the operation of semiconductor devices and use them to design circuits for practical applications.
- Discuss digital number systems and explain how these systems are applied in digital information processing hardware
- Analyse the operation of analogue and digital electronic circuits, and model them using industry standard simulation tools to verify their behaviour
- Interpret function requirements, evaluate circuit options and design analog and digital electronic circuits to solve real world problems
- Solve real life problems and communicate professionally using electronic engineering terminology, symbols and diagrams that conform to Australian and international standards
- Work collaboratively and autonomously and communicate professionally in presenting your solutions

Graduate Attributes

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

5 Design Assignment 2 (Digital)

Assessment Type
Practical and Written Assessment

Task Description
This assessment relates to the design of a component / device mainly using material covered in digital portion of the unit. This mainly software based task would be submitted individually by every student. After the submission the students can fabricate it physically but it would not count towards the grades. Details of this assessment will be available on Moodle unit website.

Assessment Due Date
Review/Exam Week Friday (13 Oct 2017) 4:00 pm AEST

Return Date to Students

Within 2 weeks after due date

Weighting
20%

Assessment Criteria
1. Correct Answers
2. Correct Format
3. All Tasks Attempted
4. Correct Procedures and Steps Shown
5. Result Discussion
6. *All working* must be shown to obtain full marks
7. Assignment answers must be neat, tidy and legible
8. Structure and Format of the Submission (cover page, file name, page orientation and numbering)

Referencing Style

- Harvard (author-date)

Submission
Online

Submission Instructions
One folder containing pdf and software file(s)

Learning Outcomes Assessed

- Describe the operation of semiconductor devices and use them to design circuits for practical applications.
- Discuss digital number systems and explain how these systems are applied in digital information processing hardware
- Analyse the operation of analogue and digital electronic circuits, and model them using industry standard simulation tools to verify their behaviour
- Interpret function requirements, evaluate circuit options and design analog and digital electronic circuits to solve real world problems
- Solve real life problems and communicate professionally using electronic engineering terminology, symbols and diagrams that conform to Australian and international standards
- Work collaboratively and autonomously and communicate professionally in presenting your solutions

Graduate Attributes

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

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