1. General Course Information

1.1 Course Details

Course Code:	**1301ENG**
Course Name:	**Electric Circuits**
Trimester:	**Trimester 1, 2020**
	In Person
Program:	Diploma of Engineering
	Mt Gravatt/Gold Coast
Credit Points:	10
Course Coordinator:	Dr James A. Kirkup
Document modified:	10 January 2019

Course Description

Electric Circuits is a 10 credit point course within the Diploma of Engineering. The course is situated within the second semester of the program. The Diploma of Engineering is designed to provide students with a pathway to:

* further university studies in Engineering and related degrees; or
* direct employment.

This course introduces students to four fundamental engineering concepts related to electrical and electronic engineering: storage of electrical energy and transport of an electrical charge, interconnection of passive components to make small or large systems, operation of systems under conditions of constant electrical load or excitation, and the operation of systems under conditions of variable electrical load or excitation. The concepts are studied using the physical processes within the components and circuits of electrical systems in a practical context. The fundamental rules used to analyse electrical circuits are also covered in the course.

Assumed Knowledge

1018ENG Engineering Science is prerequisite for this course and must be completed successfully before you can be elegiable to undertake this course.

1.2 Teaching Team

Your lecturer/tutor can be contacted via the email system on the portal.

Name	Email
Dr James A. Kirkup	james.kirkup@staff.griffithcollege.edu.au

1.3 Staff Consultation

Your lecturer/tutor is available each week for consultation outside of normal class times. Times that your lecturer/tutor will be available for consultation will be given in the first week of lectures. A list of times and rooms will be published on the Griffith College Portal under the “Support and Services/Teacher Consultation Times” link.

1.4 Timetable

Your timetable is available on the Griffith College Portal at Class Timetable in Student and Services.

1.5 Technical Specifications

All students must have access to a computer or suitable mobile device.

2. Aims, Outcomes & Generic Skills

2.1 Course Aims

To introduce students to the basic principles and practice of electrical and electronic engineering concepts that apply to the behaviour of electric circuits. In the process, the course will introduce mathematical models and physical processes.

Engineering practice involves the detection and measurement of various engineering and physical properties. As most detection and measurement systems are currently electrical and\or electronic in nature, knowledge of the fundamental principles of electric circuits is essential for all engineers.

2.2 Learning Outcomes

After successfully completing this course you should be able to:

1. Explain the purpose and use of simple circuit components, devices and signal sources;
2. Apply established theoretical laws and frameworks on simple electrical circuits;
3. Design basic electrical circuits using simple circuit components and web-based circuit simulation software;
4. Correctly and safely use electronic laboratory instruments for the measurement of various electrical parameters including, voltage, current, resistance and power;
5. Write technical reports, both individually and in groups, from practical and theoretical activities that analyse and display results while providing logical and comprehensive conclusions;
6. Explain the principles of generation, distribution and safety systems of electrical power.

2.3 Generic skills

For further details on the Generic Skills please refer to the Graduate Generic Skills and Capabilities policy.

Griffith College aims to develop graduates who have an open and critical approach to learning and a capacity for lifelong learning. Through engagement in their studies, students are provided with opportunities to begin the development of these and other generic skills.

Studies in this course will give you opportunities to begin to develop the following skills:

Generic Skills	Taught	Practised	Assessed
Knowledge and skills with critical judgement	✓	✓	✓
Communication and collaboration skills	✓	✓	✓
Self-directed and active learning skills	✓	✓	✓
Creative and future thinking skills		✓	
Social responsibility and ethical awareness		✓	
Cultural competence and awareness in a culturally diverse environment		✓	

Additional Course Generic Skills

Specific Skills	Taught	Practiced	Assessed
Ethical behaviour in social/professional/work environments	Yes	Yes	Yes
Work autonomously	Yes	Yes	Yes

3. Learning Resources

3.1 Required Resources

Boylestad, Robert, L., 2016 Introductory Circuit Analysis, Global Edition, 13/E, Pearson Education, ISBN-10: 1292098953, ISBN-13: 9781292098951.

Secondary (Optional)

Hambley, A.R., (2017) Electrical Engineering: Principles & Applications, 7/E (5th Edition or greater acceptable) Pearson Education, United States, ISBN-13: 9780134484143.

3.2 Recommended Resources

To be advised.

3.3 College Support Services and Learning Resources

The College provides many facilities and support services to assist students in their studies. Links to information about College support resources that are available to students are included below for easy reference.

Digital Library – Databases to which Griffith College students have access to through the Griffith Library Databases.

MyStudy – there is a dedicated website for this course via MyStudy on the Griffith College Portal.

Academic Integrity Tutorial - this tutorial helps students to understand what academic integrity is and why it matters. You will be able to identify types of breaches of academic integrity, understand what skills you will need in order to maintain academic integrity, and learn about the processes of referencing styles.

Services and Support provides a range of services to support students throughout their studies including personal support such as Counselling; Academic support; and Welfare support.

Jobs and Employment in the Student Hub can assist students with career direction, resume and interview preparation, job search tips, and more.

IT Support provides details of accessing support, information on s numbers and internet access and computer lab rules.

3.4 Other Learning Information

Attendance

You are expected to attend all lectures and tutorials and to actively engage in learning during these sessions. You are expected to bring all necessary learning resources to class such as the required textbook and /or Workbook. In addition, you may BYOD (bring your own device) to class such as a laptop or tablet. This is not a requirement as computer lab facilities are available on campus, however, the use of such devices in the classroom is encouraged with appropriate and considerate use principles being a priority.

Preparation and Participation in Class

In order to enhance learning, prepare before lectures and tutorials. Read the relevant section of your text book before a lecture, and for a tutorial read both the textbook and the relevant lecture notes. If you have been given tutorial exercises, make sure you complete them. Active participation in lectures and tutorials will improve your learning. Ask questions when something is unclear or when you want to bring some issue to your lecturer or tutor's attention; respond to questions to test your knowledge and engage in discussion to help yourself and others learn.

Consultation Sessions

Teachers offer extra time each week to assist students outside the classroom. This is known as 'consultation time.' You may seek assistance from your teacher on email or in person according to how the teacher has explained this to the class. Attendance during consultation time is optional but you are encouraged to use this extra help to improve your learning outcomes.

Course Materials

Lecture notes will be made available to you in MyStudy on the Griffith College Portal and you are advised to either print these out and bring them to each class so that extra notes can be added or BYOD (bring your own device) and add extra notes digitally.

Self-Directed Learning

You will be expected to learn independently. This means you must organise and learn the course content even when you are not specifically asked to do so by your lecturer or tutor. This involves revising the weekly course material. It also means you will need to find additional information for some assessment items beyond that given to you in textbooks and lecture notes, and to construct your own response to a question or topic. All of this requires careful planning of your time. Expect to spend, on average, at least 10 hours per week including class time for each of your courses.

Program Progression

You are reminded that satisfactory Program Progression requires that attendance in classes is maintained at equal to or greater than 80%, and that GPA is maintained at equal to or greater than 3.5 [please see Griffith College Policy Library - Program Progression Policy - for more information].

Teacher and course Evaluation

Your feedback is respected and valued by your lecturers and tutors. You are encouraged to provide your thoughts on the course and teaching, both positive and critical, directly to your lecturer and tutor or by completing course and lecturer evaluations via Griffith College's evaluation tool whenever these are available.

4. Learning and Teaching Activities

4.1 Weekly Learning Activities

Weekly Teaching Schedule

Week	Topic	Activity	Readings	Learning Outcomes
1	Introductory Concepts	Lecture	Boylestad Chapters 1 - 4	1,2
	Introduction to the course and content. Charge, electric field, current, voltage, power, measuring voltage and current, circuit elements, basic circuit laws, conductors and insulators.			
2	Basic Electrical Concepts	Lecture	Boylestad Chapters 5 - 9	1,2
	Resistivity, Series and Parallel Circuits, Voltage and Current Divider rules, Kirchoff's voltage and current laws and power dissipation.	Tutorial		
	Project 1	Project		1,2,3,5
	Scaffolding Lab 1	Laboratory		1,2,4,5
3	Resistive Circuits	Lecture	Boylestad Chapters 8,9	1,2
	Thevenin and Norton Equivalent, Ammeter and Voltmeter, Superposition principle, Introduction to Node and Mesh Analysis.	Tutorial		
	Computer Lab	Laboratory		1,2,3,5
4	Capacitance:	Lecture	Boylestad Chapter 10	1,2
	Electrostatics, electric charge, Coulomb's law, electric field, electric potential, dielectrics, physical design equation, series and parallel.	Tutorial		
	Computer Lab	Laboratory		1,2,3,5
5	Inductance	Lecture	Boylestad Chapter 11-12, 23	1,2
	Electromagnetics, Magnetism, magnetic field, magnetic induction, Faraday's law, Lenz's law, transformers, physical design equation, series and parallel.	Tutorial		
	Computer Lab	Laboratory		1,2,3,5

6	DC RLC Circuits	Lecture	Boylestad Chapter 10-12	1,2
	DC Charge/Discharge, time constant, transients, DC steady state.	Tutorial		
	Computer Lab	Laboratory		1,2,3,5
7	AC RLC Circuits	Lecture	Boylestad Chapter 13	1,2
	Sinusoidal signal representation, phasors, average and effective values (RMS), power in ac circuits, AC generation, Wheatstone Bridge.	Tutorial		
	Project 2	Project		1,2,3,5
	Scaffolding lab 2	Laboratory		1,2,4,5
	Mid-Trimester Exam (time and venue to be advised)	Examination		1,2
8	Steady state sinusoidal analysis	Lecture	Boylestad Chapter 13-20	1,2
	AC response of capacitors and inductors, reactance and impedance, filters, capacitor and inductor balancing, resonance.	Tutorial		
	Computer Lab	Laboratory		1,2,3,5
9	AC Electrical Circuits	Lecture	Boylestad Chapters 13-20,	1,2
	AC voltage, current and power, complex numbers, phasor analysis, power in ac circuits.	Tutorial		
	Computer Lab	Laboratory		1,2,3,5
10	AC to DC Conversion	Lecture	Boylestad Chapter 7	1,26
	A basic introduction to AC to DC conversion.	Tutorial		
	Computer Lab	Laboratory		1,2,3,5
11	Electrical Power and Safety	Lecture	Boylestad Chapters 4, 20, 24	1,26
	Principle of operation single and three phase generators and motors. Power generation, distribution, and usage. Electrical safety including fuses, circuit breakers, earth leakage and earthing systems.	Tutorial		
	Computer Lab	Laboratory		1,2,3,5
12	Final Exam Revision	Lecture		1,26
13/14	**Final Exam (time and venue to be advised)**	Examination		1,2,6

5. Assessment Plan

5.1 Assessment Summary

Summary of Assessment

Item	Assessment Task	Weighting	Relevant Learning Outcomes	Due Date
1	Test or quiz In Class Quizzes	10%	1,2,6	Weeks 2 - 11
2	Scaffolding Lab 1	5%	1,2,3,4,5	Week 2
3	Project 1	10%	1,2,3,4,5	Week 6
4	Mid-Trimester Exam	15%	1,2	Week 7
5	Scaffolding Lab 2	5%	1,2,3,4,5,6	Week 7
6	Project 2	20%	1,2,3,4,5,6	Week 12
7	Final Exam Students must pass the 40% hurdle in this assessment to pass the course	35%	1,2,6	Examination Period

5.2 Assessment Detail

Weekly Quizzes

Each week there will be an online or in-class multiple choice quiz to promote some independent (blended) learning. Out of the 10 quizzes for the course the student's top five
Quiz marks will be counted towards a maximum of 10% where each quiz is worth 2%. There is no deferment or repeat of a quiz no matter what reason.

Scaffolding Laboratory

The Scaffolding Laboratory activities will be used to verify fundamental laws of various electrical systems and provide additional foundation learning for the course projects.

Scaffolding Laboratory 1

This laboratory covers the use of a Digital Mustimeter (DMM) to measure Voltage, Current and Resistance, to examine resistors and capacitors and their naming codes and to consider various electrical circuit concepts using a variety of light bulb circuits.

Scaffolding Laboratory 2

This laboratory introduces students to basic Electrical/Electronic test and measurement equipment (Digital Storage Oscilloscope & Signal Generator) by investigating simple AC to DC conversion through the use of transformers, rectifiers and regulators.

Criteria & Marking:

Each scaffolding laboratory worksheet will be marked out of ten (10) with each worth 5%. Marks will be deducted for incomplete or incorrect work.

Computer Laboratory

There are four computer laboratory sessions available for each project. There is no grading for these sessions. Students are expected to use these sessions towards the completion of their projects.

Projects

Students are required to complete two projects during the course using circuit simulation software (Tinkercad and Lushprojects). These projects are circuit-based practical development exercises using real world examples. Details of the task for each project will be provided on an assignment sheet that will be available from the course website.

Project 1 is a group based project following on from scaffolding lab 1 and the content covered in the lectures. Project 1 is due in week 6.

Criteria & Marking:
A report based on the project task and final product. Marking will be done by rubric given at the start of the semester. Report Presentation: 15%. Product and Deliverables: 85%.

Project 2 is an individual based project following on from scaffolding lab 2 and the content covered in the lectures. Project 2 is due in week 12.

Criteria & Marking
A report based on the project task and final product. Marking will be done by rubric given at the start of the semester. Report Presentation: 15%. Product and Deliverables: 85%.

Mid-Trimester Exam

The 2 hour mid-trimester exam is a closed book in-class assessment item, which covers weeks 1 to 6 of the course content. The 2hr closed-book assessment will evaluate theoretical understanding of electric circuits and will be conducted at a separate time to the normal class schedule.

Final Exam

The 2 hour final exam is a closed book exam, which covers weeks 7 to 12 of the course content including some underlying content from weeks 1 to 6. The 2hr closed-book assessment will evaluate theoretical understanding of electric circuits.

Requirements to pass the course

Students must achieve a passing mark (40%) in the final exam to be eligible for a passing grade in this course.

5.3 Late Submission

An assessment item submitted after the due date, without an approved extension from the Course Coordinator, will be penalised. The standard penalty is the reduction of the mark allocated to the assessment item by 5% of the maximum mark applicable for the assessment item, for each working day or part working day that the item is late. Assessment items submitted more than five working days after the due date are awarded zero marks.

Please refer to the Griffith College website - Policy Library > Assessment Policy for guidelines and penalties for late submission.

5.4 Other Assessment Information

Retention of Originals

You must be able to produce a copy of all work submitted if so requested. Copies should be retained until after the release of final results for the course.

Requests for extension

To apply for an extension of time for an assignment, you must submit an Application for Extension of Assignment form to your teacher at least 24 hours before the date the assignment is due. Grounds for extensions are usually: serious illness, accident, disability, bereavement or other compassionate circumstances and must be able to be substantiated with relevant documentation [e.g. Griffith College Student Medical Certificate]. Please refer to the Griffith College website - Policy Library - for guidelines regarding extensions and deferred assessment.

Return of Assessment Items

1. Marks awarded for in-trimester assessment items, except those being moderated externally with Griffith University, will be available on the Student Portal within fourteen [14] days of the due date. This does not apply to the final assessment item in this course (marks for this item will be provided with the final course result).

2. Students will be advised of their final grade through the Student Portal. Students can review their exam papers after student grades have been published (see relevant Griffith College Fact Sheet for allocated times at Support> Factsheets). Review of exam papers will not be permitted after the final date to enrol.

3. Marks for **all** assessment items including the final exam (if applicable) will be recorded in the Moodle Course Site and made available to students through the Moodle Course Site.

The sum of your marks overall assessment items in this course does not necessarily imply your final grade for the course. Standard grade cut off scores can be varied for particular courses, so you need to wait for the official release of grades to be sure of your grade for this course.

6. Policies & Guidelines

Griffith College assessment-related policies can be found in the Griffith College Policy Library which include the following policies:

Assessment Policy, Special Consideration, Deferred Assessment, Alternate Exam Sitting, Medical Certificates, Academic Integrity, Finalisation of Results, Review of Marks, Moderation of Assessment, Turn-it-in Software Use. These policies can be accessed using the 'Document Search' feature within the Policy Library

Academic Integrity Griffith College is committed to maintaining high academic standards to protect the value of its qualifications. Academic integrity means acting with the values of honesty, trust, fairness, respect and responsibility in learning, teaching and research. It is important for students, teachers, researchers and all staff to act in an honest way, be responsible for their actions, and show fairness in every part of their work. Academic integrity is important for an individual's and the College's reputation.

All staff and students of the College are responsible for academic integrity. As a student, you are expected to conduct your studies honestly, ethically and in accordance with accepted standards of academic conduct. Any form of academic conduct that is contrary to these standards is considered a breach of academic integrity and is unacceptable.

Some students deliberately breach academic integrity standards with intent to deceive. This conscious, pre-meditated form of cheating is considered to be one of the most serious forms of fraudulent academic behaviour, for which the College has zero tolerance and for which penalties, including exclusion from the College, will be applied.

However, Griffith College also recognises many students breach academic integrity standards without intent to deceive. In these cases, students may be required to undertake additional educational activities to remediate their behaviour and may also be provided appropriate advice by academic staff.

As you undertake your studies at Griffith College, your lecturers, tutors and academic advisors will provide you with guidance to understand and maintain academic integrity; however, it is also your responsibility to seek out guidance if and when you are unsure about appropriate academic conduct.

In the case of an allegation of a breach of academic integrity being made against a student he or she may request the guidance and support of a Griffith College Student Learning Advisor or Student Counsellor.

Please ensure that you are familiar with the Griffith College Academic Integrity Policy; this policy provides an overview of some of the behaviours that are considered breaches of academic integrity, as well as the penalties and processes involved when a breach is identified.

For further information please refer to the Griffith College website - Policy Library > Academic Integrity Policy

Reasonable Adjustments for Assessment – The Disability Services policy

The Disability Services policy (accessed using the Document Search' feature with the Policy Library) outlines the principles and processes that guide the College in making reasonable adjustments to assessment for students with disabilities while maintaining academic robustness of its programs.

Risk Assessment Statement

There are no out of the ordinary risks associated with this course.

Note: For all Diploma level programs, Griffith College acknowledges content derived from Griffith University.