ELEC1103: FUNDAMENTALS OF ELECTRICAL AND ELECTRONIC ENGINEERING

Semester 1, 2018 | 6 Credit Points | Mode: Normal-Day
Sessions Valid: Semester 1
Coordinator(s): Omid Kavehei

WARNING: This unit version is currently under review and is subject to change!

1. INTRODUCTION

This unit of study aims to develop knowledge of the fundamental concepts and building blocks of electrical and electronics circuits. This is a foundation unit in circuit theory. Circuit theory is the electrical engineer's fundamental tool.

The concepts learnt in this unit will be made use of heavily in many units of study (in later years) in the areas of electronics, instrumentation, electrical machines, power systems, communication systems, and signal processing.

Topics: a) Basic electrical and electronic circuit concepts: Circuits, circuit elements, circuit laws, node and mesh analysis, circuit theorems, energy storage elements, capacitors and inductors, circuits with switches, transient response, sine waves and complex analysis, phasors, impedance, ac power.; b) Exposure to project management, teamwork, ethics; c) Safety issues

2. LEARNING OUTCOMES

Learning outcomes are the key abilities and knowledge that will be assessed in this unit. See assessment summary table below for details of which outcomes are assessed where. Outcomes are listed according to the course goals that they support.

Design (Level 1)

1. Ability to analyse and design simple circuits using a clearly defined system based approach to solve a specific problem.

Engineering/IT Specialisation (Level 2)

2. Knowledge of electrical and electronic circuits including the ability to recognize engineering limitations.
3. Ability to analyse circuits proficiently.
4. Proficiency with electronic lab equipment, making electrical measurements and interpretations.

Maths/Science Methods and Tools (Level 2)

5. Ability to demonstrate a basic understanding of physics of inductors, resistors and capacitors.
6. Ability to recall potential and current laws in the field of electrical and electronic engineering.

Information Seeking (Level 2)

7. Ability to draw on diverse sources of information such as the internet, and synthesise the information to draw clear and meaningful conclusions with respect to the project at hand.

Communication (Level 1)

8. Ability to clearly explain and deliver experiments for a laboratory tutors on a particular engineering subject matter.

Professional Conduct (Level 1)

9. An appreciation of the professional and ethical responsibilities to the limit afforded by lectures, assignments and labs.

Project and Team Skills (Level 1)

10. Ability to learn in a team and participate constructively in experiments by drawing on diverse skills and aptitudes for the purpose of engineering lab tests.

For further details of course goals related to these learning outcomes, see online unit outline at http://cusp.eng.usyd.edu.au/students/view-unit-page/alpha/ELEC1103 .

3. ASSESSMENT TASKS

ASSESSMENT SUMMARY

Assessment name	Team-based?	Weight	Due	Outcomes Assessed
Final Exam	No	40%	Exam Period	1, 2, 3, 5, 6
Weekly Homework	No	15%	Multiple Weeks	1, 2, 3, 5, 6, 7
Lab Work (including Pre-Lab online question)	Yes	20%	Multiple Weeks	1, 2, 4, 8, 9, 10
Lab Tests	No	20%	Multiple Weeks	1, 2, 3, 4, 5, 6, 8, 10
Conceptual Review Questions (Lecture review)	No	5%	Multiple Weeks	1, 2, 3, 5, 6

ASSESSMENT DESCRIPTION

Weekly Homework (Circuit analysis problems): 15%

Conceptual Review questions (Lecture review): 5%

Lab Work (including Pre-Lab online question): 20%, pre-lab questions carry 5% that is included in the total mark for this module. You are encouraged to keep a detailed log book for the purposes of lab work analysis and later lab tests.

Lab Tests: 20%, Two lab tests will be conducted for individual assessment.

Final Exam: 40%

Students must pass the final exam (achieve 50% or more in the final exam alone) to pass the course.

ASSESSMENT FEEDBACK

Tutorial participation and log book feedback will be given by tutors and lab assistants. Quiz feedback will be given on-line. Specific feedback will be given in lectures including exam preparation.

ASSESSMENT GRADING

Final grades in this unit are awarded at levels of HD for High Distinction, DI (previously D) for Distinction, CR for Credit, PS (previously P) for Pass and FA (previously F) for Fail as defined by University of Sydney Assessment Policy. Details of the Assessment Policy are available on the Policies website at http://sydney.edu.au/policies . Standards for grades in individual assessment tasks and the summative method for obtaining a final mark in the unit will be set out in a marking guide supplied by the unit coordinator.

4. ATTRIBUTES DEVELOPED

Attributes listed here represent the course goals designated for this unit. The list below describes how these attributes are developed through practice in the unit. See Learning Outcomes and Assessment sections above for details of how these attributes are assessed.

Attribute	Method
Design (Level 1)	Ability to design and analyse a range of elementary electrical circuits.
Engineering/IT Specialisation (Level 2)	Understand the fundamental concepts and building blocks of electrical and electronics circuits. Hence, apply these discipline specific skills to relevant problems through laboratory group work and assignments.
Maths/Science Methods and Tools (Level 2)	Understand the physics of circuit devices and voltage and current laws through lectures, tutorials, assignment, and laboratory
Information Seeking (Level 2)	Use of information resources in assignments and laboratory with concomitant critical information assessment for engineering application.
Communication (Level 1)	Present clearly an understanding of topics communicated with a technical language in a concise manner during our laboratory test sessions.
Professional Conduct (Level 1)	Understanding of the engineering environment, professional and ethical standards through lectures, assignment, laboratory group work, case studies and class discussion.
Project and Team Skills (Level 1)	Achieve prescribed goals in laboratory experiments within a team and be able to demonstrate skills to implement experiments asked during individual laboratory test assessments.

For further details of course goals and professional attribute standards, see the online version of this outline at http://cusp.eng.usyd.edu.au/students/view-unit-page/alpha/ELEC1103 .

5. STUDY COMMITMENT

Independent Study: Read textbook and other material, prepare for lectures, allow enough time for studying assignments and homeworks and their timely delivery, read laboratory notes in advance, work effectively as part a laboratory team and prepare for individual laboratory tests and laboratory works. There may be a rap contest for which detail will be given in lectures.

Activity	Hours per Week	Sessions per Week	Weeks per Semester
Lecture	2.00	1	13
Laboratory	3.00	1	11
Tutorial	2.00	1	12
Independent Study	4.00		13

Standard unit of study workload at this university should be from 1.5 to 2 hours per credit point which means 9-12 hours for a normal 6 credit point unit of study. For units that are based on research or practical experience, hours may vary. For lecture and tutorial timetable, see University timetable site at: web.timetable.usyd.edu.au/calendar.jsp

6. TEACHING STAFF AND CONTACT DETAILS

COORDINATOR(S)

Name	Room	Phone	Email	Contact note
Kavehei, Omid			omid.kavehei@sydney.edu.au	

LECTURERS

Name	Room	Phone	Email	Contact note
Kavehei, Omid			omid.kavehei@sydney.edu.au	

7. RESOURCES

PRESCRIBED TEXTBOOK(S)

James Nilsson and Susan Riedel, *Electric Circuits* (9th). Pearson, 2011. 13:978-0-13-705051-2.

James Nilsson and Susan Riedel, *Introduction to Multisim*. Pearson, 2011. 13:978-0-13-213234-3.

COURSE WEBSITE(S)

https://elearning.sydney.edu.au

8. ENROLMENT REQUIREMENTS

ASSUMED KNOWLEDGE

Basic knowledge of differentiation and integration, and HSC Physics

PREREQUISITES

None.

9. POLICIES

ACADEMIC HONESTY

While the University is aware that the vast majority of students and staff act ethically and honestly, it is opposed to and will not tolerate academic dishonesty or plagiarism and will treat all allegations of dishonesty seriously.

All students are expected to be familiar and act in compliance with the relevant University policies, procedures and codes, which include:

– *Academic Honesty in Coursework Policy 2015*

– *Academic Honesty Procedures 2016*

– *Code of Conduct for Students*

– *Research Code of Conduct 2013* (for honours and postgraduate dissertation units)

They can be accessed via the University"s Policy Register: http://sydney.edu.au/policies (enter "Academic Honesty" in the search field).

Students should never use document-sharing sites and should be extremely wary of using online “tutor” services. Further information on academic honesty and the resources available to all students can be found on the Academic Integrity page of the University website: http://sydney.edu.au/elearning/student/EI/index.shtml

Academic Dishonesty and Plagiarism

Academic dishonesty involves seeking unfair academic advantage or helping another student to do so.

You may be found to have engaged in academic dishonesty if you:

– Resubmit (or “recycle”) work that you have already submitted for assessment in the same unit or in a different unit or previous attempt;

– Use assignment answers hosted on the internet, including those uploaded to document sharing websites by other students.

– Have someone else complete part or all of an assignment for you, or do this for another student.

– Except for legitimate group work purposes, providing assignment questions and answers to other students directly or through social media platforms or document (“notes”) sharing websites, including essays and written reports.

– Engage in examination misconduct, including using cheat notes or unapproved electronic devices (e.g., smartphones), copying from other students, discussing an exam with another person while it is in progress, or removing confidential examination papers from the examination venue.

– Engage in dishonest plagiarism.

Plagiarism means presenting another person’s work as if it is your own without properly or adequately referencing the original source of the work.

Plagiarism is using someone else’s ideas, words, formulas, methods, evidence, programming code, images, artworks, or musical creations without proper acknowledgement. If you use someone’s actual words you must use quotation marks as well as an appropriate reference. If you use someone’s ideas, formulas, methods, evidence, tables or images you must use a reference. You must not present someone’s artistic work, musical creation, programming code or any other form of intellectual property as your own. If referring to any of these, you must always present them as the work of their creator and reference in an appropriate way.

Plagiarism is always unacceptable, regardless of whether it is done intentionally or not. It is considered dishonest if done knowingly, with intent to deceive or if a reasonable person can see that the assignment contains more work copied from other sources than the student’s original work. The University understands that not all plagiarism is dishonest and provides students with opportunities to improve their academic writing, including their understanding of scholarly citation and referencing practices.

USE OF SIMILARITY DETECTION SOFTWARE

All written assignments submitted in this unit of study will be submitted to the similarity detecting software program known as **Turnitin**. Turnitin searches for matches between text in your written assessment task and text sourced from the Internet, published works and assignments that have previously been submitted to Turnitin for analysis.

There will always be some degree of text-matching when using Turnitin. Text-matching may occur in use of direct quotations, technical terms and phrases, or the listing of bibliographic material. This does not mean you will automatically be accused of academic dishonesty or plagiarism, although Turnitin reports may be used as evidence in academic dishonesty and plagiarism decision-making processes.

Computer programming assignments may also be checked by specialist code similarity detection software. The Faculty of Engineering & IT currently uses the MOSS similarity detection engine (see http://theory.stanford.edu/~aiken/moss/) . These programs work in a similar way to TII in that they check for similarity against a database of previously submitted assignments and code available on the internet, but they have added functionality to detect cases of similarity of holistic code structure in cases such as global search and replace of variable names, reordering of lines, changing of comment lines, and the use of white space.

See the policies page of the faculty website at http://sydney.edu.au/engineering/student-policies/ for information regarding university policies and local provisions and procedures within the Faculty of Engineering and Information Technologies.