ELEC270

Linear Circuits and Devices

S2 Day 2016

Dept of Engineering

Contents

General Information

Unit convenor and teaching staff
Unit Convener and Lecturer
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Lecturer
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Credit points
3

Prerequisites
(ELEC166(P) or ELEC170(P) or ENGG150 (P) or ENGG170(P)) and (MATH133 or MATH136(P)

Corequisites

Co-badged status

Unit description
This unit develops the key skills in basic electronic theory and in aspects of laboratory investigation and reporting procedures. The unit covers modelling of passive and active electric circuit elements, and analysing circuits including these models. For passive circuits, topics covered are: ideal electrical components; energy dissipation and energy storage; Kirchhoff's laws; transient versus steady-state response; first-order and second-order circuits; and simple filters. Devices include voltage and current sources, resistors, capacitors, inductors and ideal operational amplifiers.

Important Academic Dates

Information about important academic dates including deadlines for withdrawing from units are available at https://www.mq.edu.au/study/calendar-of-dates

Learning Outcomes

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

Be proficient in analysing dc circuits and dc power transfer

Apply fundamentals of circuit analysis with capacitors and inductors (transient response)

Apply impedance concept to analyse ac circuits and ac power (steady state response)

Apply frequency domain concepts to determine transfer functions of simple circuits (frequency response)

Connect circuit theory with measurement in laboratory

General Assessment Information

Notifications

Formal notification of assessment tasks, grading rubrics and due dates will be posted on iLearn. Although all reasonable measures to ensure the information is accurate, The University reserves the right to make changes without notice. Each student is responsible for checking iLearn for changes and updates.

Weekly Plan

A weekly plan of lectures, assignments, tests, laboratory and workshop sessions will be posted on iLearn. Students are expected to consult it and be aware of possible minor variations.

Assignment Tasks

Assignment questions will be posted on iLearn at least two weeks before their submission date. Assignment solutions will be posted within one to three days after the submission date. Submissions will not be accepted once the solution is posted.

All assignments must be submitted electronically through iLearn (in pdf format). Submissions are expected to be neatly written (or typed) in a logical layout and sequence. Markers WILL NOT grade poorly organized or illegible scans or drafts. The expected workload includes preparation of final copies and clear diagrams. Resubmissions will be permitted up to due date.

All assignments should be prepared individually. It is expected that students consult tutors, lecturers or other students while learning the concepts, but copying assignments from others is not accepted. Students are expected to have read and understood the academic honesty policy.

Absences

Late notices or absences from tests, workshops and laboratories will be considered under extenuating circumstances upon lodgement and approval of a formal notice of disruption of studies.

Grading

In order to pass this unit a student must obtain a mark of 50 or more overall or obtain a passing grade P/ CR/ D/ HD.

Assessment Tasks

Name	Weighting	Due
Laboratory	23%	Weekly
Assignment 1	3%	Week 3 or check iLearn
In-class Test 1	5%	Week 4 or check iLearn
Assignment 2	3%	Week 6 or check iLearn
In-class Test 2	5%	Week 7 or check iLearn
Assignment 3	3%	Week 9 or check iLearn
In-class Test 3	5%	Week 10 or check iLearn
Assignment 4	3%	Week 12 or check iLearn
Final Exam	50%	Will appear in Exam Calendar

Laboratory

Due: **Weekly**
Weighting: **23%**

Practical sessions start in Week 2. They are comprised of laboratory or problem-solving-workshop sessions linked to each learning outcome; and they are compulsory for all students. Students are expected to arrive on time and use the laboratory time efficiently. Students should enroll to one practical class at the beginning of the semester. Switching a practical class during semester is not possible unless a formal application of "disruption to studies" is approved.

All practical sessions are based on the learning outcomes of this unit and students are required to review the concepts introduced in lectures before coming to each session. Laboratory or workshop worksheets will be posted on iLearn prior to the weekly sessions and it is compulsory for students to complete the **preparatory work** before coming to the session.

Each student must have a bound notebook to be used as a **logbook** (A4 size preferred, graph pages are not required). This logbook should be used for all practical work including preliminary and post (reflection) work. It should contain dates, calculations and results recorded during these sessions, in time order. On the completion of each session, logbook entries must be signed and dated by a tutor. Logbooks must be kept in good order for a final check at the end of the semester.

Food and drink are not permitted in the laboratory. Students will not be permitted to enter the laboratory without appropriate footwear. Thongs and sandals are not acceptable.

On successful completion you will be able to:

- Connect circuit theory with measurement in laboratory

Assignment 1

Due: **Week 3 or check iLearn**
Weighting: **3%**

Questions to be solved at home on the concepts learning outcome 1 and to be submitted electronically to iLearn. Please read the General Assessments Information above.

On successful completion you will be able to:

- Be proficient in analysing dc circuits and dc power transfer

In-class Test 1

Due: **Week 4 or check iLearn**
Weighting: **5%**

A short invigilated test in class on learning outcome 1

On successful completion you will be able to:

- Be proficient in analysing dc circuits and dc power transfer

Assignment 2

Due: **Week 6 or check iLearn**
Weighting: **3%**

Questions to be solved at home on the concepts learning outcome 2 and to be submitted electronically to iLearn. Please read the General Assessments Information above.

On successful completion you will be able to:

- Apply fundamentals of circuit analysis with capacitors and inductors (transient response)

In-class Test 2

Due: **Week 7 or check iLearn**
Weighting: **5%**

A short invigilated test in class on learning outcome 2

On successful completion you will be able to:

- Apply fundamentals of circuit analysis with capacitors and inductors (transient response)

Assignment 3

Due: **Week 9 or check iLearn**

Weighting: **3%**

Questions to be solved at home on the concepts learning outcome 3 and to be submitted electronically to iLearn. Please read the General Assessments Information above.

On successful completion you will be able to:

- Apply impedance concept to analyse ac circuits and ac power (steady state response)

In-class Test 3

Due: **Week 10 or check iLearn**
Weighting: **5%**

A short invigilated test in class on learning outcome 3

On successful completion you will be able to:

- Apply impedance concept to analyse ac circuits and ac power (steady state response)

Assignment 4

Due: **Week 12 or check iLearn**
Weighting: **3%**

Questions to be solved at home on the concepts learning outcome 4 and to be submitted electronically to iLearn. Please read the General Assessments Information above.

On successful completion you will be able to:

- Apply frequency domain concepts to determine transfer functions of simple circuits (frequency response)

Final Exam

Due: **Will appear in Exam Calendar**
Weighting: **50%**

A closed-book 3-hour exam will be conducted in the formal examination period.

On successful completion you will be able to:

- Be proficient in analysing dc circuits and dc power transfer
- Apply fundamentals of circuit analysis with capacitors and inductors (transient response)
- Apply impedance concept to analyse ac circuits and ac power (steady state response)
- Apply frequency domain concepts to determine transfer functions of simple circuits (frequency response)
- Connect circuit theory with measurement in laboratory

Delivery and Resources

Text books:

1. J. A. Svoboda, R. C. Dorf, “Introduction to Electric Circuits 9th edition,” Wiley, 2014 (or 8th edition)
2. A. R. Hambley, “Electrical Engineering, Principles and Applications, International Sixth Edition,” Pearson, 2014.

Required unit materials:

- One of the text books listed (hard copy or electronic version)
- Lecture notes and worksheets for laboratory sessions (available from iLearn)
- Bound logbook for all practical sessions

Technology used: Typical electronic and electrical laboratory instruments such as voltage and current sources, voltmeters, ammeters, oscilloscopes, simulation software such as MATLAB and ORCAD (PSpice) will be used.

Policies and Procedures

Macquarie University policies and procedures are accessible from Policy Central. Students should be aware of the following policies in particular with regard to Learning and Teaching:

Academic Honesty Policy http://mq.edu.au/policy/docs/academic_honesty/policy.html

New Assessment Policy in effect from Session 2 2016 http://mq.edu.au/policy/docs/assessment/policy_2016.html. For more information visit http://students.mq.edu.au/events/2016/07/19/new_assessment_policy_in_place_from_session_2/

Assessment Policy prior to Session 2 2016 http://mq.edu.au/policy/docs/assessment/policy.html

Grading Policy prior to Session 2 2016 http://mq.edu.au/policy/docs/grading/policy.html

Grade Appeal Policy http://mq.edu.au/policy/docs/gradeappeal/policy.html

Complaint Management Procedure for Students and Members of the Public http://www.mq.edu.au/policy/docs/complaint_management/procedure.html

Disruption to Studies Policy http://www.mq.edu.au/policy/docs/disruption_studies/policy.html *The Disruption to Studies Policy is effective from March 3 2014 and replaces the Special Consideration Policy.*

In addition, a number of other policies can be found in the Learning and Teaching Category of Policy Central.

Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: https://students.mq.edu.au/support/student_conduct/

Results

Results shown in *iLearn*, or released directly by your Unit Convenor, are not confirmed as they are subject to final approval by the University. Once approved, final results will be sent to your student email address and will be made available in eStudent. For more information visit ask.mq.edu.au.

Student Support

Macquarie University provides a range of support services for students. For details, visit http://students.mq.edu.au/support/

Learning Skills

Learning Skills (mq.edu.au/learningskills) provides academic writing resources and study strategies to improve your marks and take control of your study.

- Workshops
- StudyWise
- Academic Integrity Module for Students
- Ask a Learning Adviser

Student Services and Support

Students with a disability are encouraged to contact the Disability Service who can provide appropriate help with any issues that arise during their studies.

Student Enquiries

For all student enquiries, visit Student Connect at ask.mq.edu.au

IT Help

For help with University computer systems and technology, visit http://www.mq.edu.au/about_us/offices_and_units/information_technology/help/.

When using the University's IT, you must adhere to the Acceptable Use of IT Resources Policy. The policy applies to all who connect to the MQ network including students.

Graduate Capabilities

Discipline Specific Knowledge and Skills

Our graduates will take with them the intellectual development, depth and breadth of knowledge, scholarly understanding, and specific subject content in their chosen fields to make them competent and confident in their subject or profession. They will be able to demonstrate, where relevant, professional technical competence and meet professional standards. They will be able to articulate the structure of knowledge of their discipline, be able to adapt discipline-specific knowledge to novel situations, and be able to contribute from their discipline to inter-disciplinary solutions to problems.

This graduate capability is supported by:

Learning outcomes

- Be proficient in analysing dc circuits and dc power transfer
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- Apply frequency domain concepts to determine transfer functions of simple circuits (frequency response)
- Connect circuit theory with measurement in laboratory

Assessment tasks

- Laboratory
- Assignment 1
- In-class Test 1
- Assignment 2
- In-class Test 2
- Assignment 3
- In-class Test 3
- Assignment 4
- Final Exam

Critical, Analytical and Integrative Thinking

We want our graduates to be capable of reasoning, questioning and analysing, and to integrate and synthesise learning and knowledge from a range of sources and environments; to be able to critique constraints, assumptions and limitations; to be able to think independently and systemically in relation to scholarly activity, in the workplace, and in the world. We want them to have a level of scientific and information technology literacy.

This graduate capability is supported by:

Learning outcomes

- Be proficient in analysing dc circuits and dc power transfer
- Apply fundamentals of circuit analysis with capacitors and inductors (transient response)
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Assessment tasks

- Laboratory

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- Assignment 2
- In-class Test 2
- Assignment 3
- In-class Test 3
- Assignment 4
- Final Exam

Problem Solving and Research Capability

Our graduates should be capable of researching; of analysing, and interpreting and assessing data and information in various forms; of drawing connections across fields of knowledge; and they should be able to relate their knowledge to complex situations at work or in the world, in order to diagnose and solve problems. We want them to have the confidence to take the initiative in doing so, within an awareness of their own limitations.

This graduate capability is supported by:

Learning outcome

- Connect circuit theory with measurement in laboratory

Assessment task

- Laboratory

Effective Communication

We want to develop in our students the ability to communicate and convey their views in forms effective with different audiences. We want our graduates to take with them the capability to read, listen, question, gather and evaluate information resources in a variety of formats, assess, write clearly, speak effectively, and to use visual communication and communication technologies as appropriate.

This graduate capability is supported by:

Learning outcome

- Connect circuit theory with measurement in laboratory

Assessment task

- Laboratory

Changes from Previous Offering

This unit replaces ENGG270, which was the previous offering. There are no major changes to the learning outcomes. Assessment tasks are modified to follow the new Assessment Policy of

the University.