

# **ELEC2070**

# **Linear Circuits and Devices**

Session 1, Weekday attendance, North Ryde 2020

School of Engineering

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#### Disclaimer

Macquarie University has taken all reasonable measures to ensure the information in this publication is accurate and up-to-date. However, the information may change or become out-dated as a result of change in University policies, procedures or rules. The University reserves the right to make changes to any information in this publication without notice. Users of this publication are advised to check the website version of this publication [or the relevant faculty or department] before acting on any information in this publication.

### **General Information**

Unit convenor and teaching staff Convenor Stuart Jackson <u>stuart.jackson@mq.edu.au</u> Rm 315, 9 Wally Walk Wednesday 2-4pm

Co-convenor Yves De Deene yves.dedeene@mq.edu.au

Credit points 10

Prerequisites (PHYS1520 or PHYS143 or ENGG150) and (MATH1020 or MATH1025 or MATH136 or MATH133)

Corequisites

Co-badged status

Unit description

This unit develops the fundamentals in electric and electronic circuits and the laboratory investigation and reporting. The unit covers the key electric circuit elements and their models, and analysing circuits including these models. Topics include: linear electrical components; energy dissipation, energy storage and power transfer; Kirchhoff's laws; transient versus steady-state. Linear electrical components include voltage and current sources, resistors, capacitors, and inductors. Time domain vs frequency domain circuit analysis, and impedance concept is introduced, leading to ac circuit analysis and ac power concepts.

### 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:

**ULO1:** Calculate the response of circuits composed of linear circuit elements with a source of constant energy to determine all currents, voltages and power.

**ULO2:** Apply the method of time domain analysis of circuits composed of linear circuit elements with a source of constant energy to determine all currents, voltages and power when an abrupt change is applied to the circuit.

**ULO3:** Analyse circuits composed of linear circuit elements with a source of energy with a sinusoidal time dependence to determine the circuit's response in terms of current, voltage and power.

**ULO4:** Apply the method of frequency domain analysis and the Laplace Transform to determine the circuit response for all applied frequencies.

**ULO5:** Physically construct and experimentally characterise circuits with one or more linear components

**ULO6:** Write concise reports summarising methodologies used and the results obtained.

### Assessment Tasks

#### Coronavirus (COVID-19) Update

Assessment details are no longer provided here as a result of changes due to the Coronavirus (COVID-19) pandemic.

Students should consult iLearn for revised unit information.

Find out more about the Coronavirus (COVID-19) and potential impacts on staff and students

### **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 the original due date. All assignments should be prepared individually by you. 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.

#### Late submissions

Late submissions of assignments or absences from laboratories will not be accepted without prior arrangement made at least one week before the submission date. Extenuating circumstances will be considered upon lodgement 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.

#### **Supplementary Exam**

If you receive <u>special consideration</u> for the final exam, a supplementary exam will be scheduled in the week of December 17-21 2018. By making a special consideration application for the final exam you are declaring yourself available for a resit during the supplementary examination period and will not be eligible for a second special consideration approval based on pre-existing commitments. Please ensure you are familiar with the policy prior to submitting an application. Approved applicants will receive an individual notification one week prior to the exam with the exact date and time of their supplementary examination.

### **Delivery and Resources**

#### Coronavirus (COVID-19) Update

Any references to on-campus delivery below may no longer be relevant due to COVID-19. Please check here for updated delivery information: <u>https://ask.mq.edu.au/account/pub/</u>display/unit\_status

The unit will comprise of 12 lectures + one Q&A lecture in Week 13 with much review material placed on iLearn.

Textbooks

PRIMARY TEXT:

J. A. Svoboda, R. C. Dorf, "Introduction to Electric Circuits 9th edition," Wiley, 2014 (or 8th edition)

SECONDARY TEXTS:

W. H. Hayt, J. E. Kennedy, S. M. Durbin, "Engineering Circuit Analysis," McGraw Hill 2007 (8th edition)

A. R. Hambley, "Electrical Engineering, Principles and Applications, International Sixth Edition," Pearson, 2014.

Required unit materials: • The textbook J. A. Svoboda, R. C. Dorf, "Introduction to Electric Circuits 9th edition," is the primary text. Hayt can be used to supplement the unit. • 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.

### **Unit Schedule**

#### Coronavirus (COVID-19) Update

The unit schedule/topics and any references to on-campus delivery below may no longer be relevant due to COVID-19. Please consult iLearn for latest details, and check here for updated delivery information: https://ask.mq.edu.au/account/pub/display/unit\_status

This will be placed in iLearn.

### **Policies and Procedures**

Macquarie University policies and procedures are accessible from Policy Central (https://staff.m q.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-centr al). Students should be aware of the following policies in particular with regard to Learning and Teaching:

- Academic Appeals Policy
- Academic Integrity Policy
- Academic Progression Policy
- Assessment Policy
- Fitness to Practice Procedure
- Grade Appeal Policy
- Complaint Management Procedure for Students and Members of the Public
- Special Consideration Policy (Note: The Special Consideration Policy is effective from 4 December 2017 and replaces the Disruption to Studies Policy.)

Students seeking more policy resources can visit the <u>Student Policy Gateway</u> (<u>https://students.m</u> <u>q.edu.au/support/study/student-policy-gateway</u>). It is your one-stop-shop for the key policies you

need to know about throughout your undergraduate student journey.

If you would like to see all the policies relevant to Learning and Teaching visit Policy Central (http s://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/p olicy-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/study/getting-started/student-conduct

### Results

Results published on platform other than <u>eStudent</u>, (eg. iLearn, Coursera etc.) 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 <u>eStudent</u>. For more information visit <u>ask.mq.edu.au</u> or if you are a Global MBA student contact globalmba.support@mq.edu.au

### Student Support

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

### **Learning Skills**

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

- · Getting help with your assignment
- Workshops
- StudyWise
- Academic Integrity Module

The Library provides online and face to face support to help you find and use relevant information resources.

- Subject and Research Guides
- Ask a Librarian

### 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

If you are a Global MBA student contact globalmba.support@mq.edu.au

### IT Help

For help with University computer systems and technology, visit <u>http://www.mq.edu.au/about\_us/</u>offices\_and\_units/information\_technology/help/.

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

## **Changes from Previous Offering**

This unit is identical to ELEC270 offered previously.