



# ENGG150

## Electrical and Mechanical Principles

S2 Day 2016

*Dept of Engineering*

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#### **Disclaimer**

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## General Information

### Unit convenor and teaching staff

Convenor, Lecturer

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E6B-127

Monday 2-3pm, Thursday 9-10am

Lecturer, Convenor

Shaokoon Cheng

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E6B-128

Tuesday 1-3pm

### Credit points

3

### Prerequisites

(MATH132 or MATH135) and (PHYS140 or corequisite of PHYS106)

### Corequisites

### Co-badged status

### Unit description

This unit introduces engineering principles and practices. It describes laws and theories in electronic engineering and their application to basic linear analogue circuits. Electrical circuit variables and circuit elements are introduced. Resistive circuits are analysed by applying a range of circuit theorems and analysis methods. Energy storage elements and operational amplifiers are introduced. Engineering practices, including record keeping, documenting and searching for information, are emphasised and practised in workshops and laboratory sessions.

## 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:

Ability to analyse equilibrium forces in machines and structures.

Ability to analyse complex resistive electrical circuits through the use of appropriate models.

Demonstrate an understanding of inductance, capacitance, power and energy in the context of electrical circuits.

## **General Assessment Information**

### **Student Responsibilities**

Be familiar with University policy and College procedures and act in accordance with those policy and procedures.

It is the responsibility of the student to retain a copy of any work submitted. Students must produce these documents upon request. Copies should be retained until the end of the grade appeal period each term.

Student is to perform the required due diligent for their assessment grade and rectify as soon as possible upon finding any errors.

### **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.

### **Report and Assignment Tasks**

Assignment Problems will be posted on iLearn at least two weeks before their submission date. Assignment solutions will be posted within a week after the submission date. Submissions will not be accepted once the solution is posted.

### **Assignment submissions and plagiarism policies**

All assignments and reports must be submitted electronically through iLearn (in pdf format). Submissions will undergo automatic plagiarism checking. For more details on the policies of academic penalties relating to academic honesty, please refer to the policies and procedures section below.

Submissions are expected to be typed set 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.

## Late submissions

Late submissions or absences from tutorials and 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.

## Hurdle Requirement

The final examination is a hurdle requirement because it is the only reliable assessment of individual performance for this unit. A passing grade of 50% or more in the final examination is a condition of passing this unit. Students who make a serious attempt but fail to meet the hurdle requirement will be given one further opportunity to pass. A serious attempt is defined as achievement of a mark of 40% or greater.

Participation in tutorial sessions is a hurdle requirement and students are required to attend at least 3 mech and 3 elec tutorial sessions to pass this unit.

## Grading and passing requirement for unit

In order to pass this unit a student must obtain a mark of 50 or more for the unit (i.e. obtain a passing grade P/ CR/ D/ HD).

For further details about grading, please refer below in the policies and procedures section.

## Final Examinations

Final examinations will typically take place at the end of the semester. For further information, please refer to the Examination Timetable website on [www.mq.edu.au](http://www.mq.edu.au)

# Assessment Tasks

Name	Weighting	Due
<a href="#">Final Exam</a>	50%	TBA
<a href="#">Assignments</a>	15%	Week 7 and Week 13
<a href="#">Tutorials</a>	20%	Everyweek
<a href="#">Online quiz</a>	15%	Week 2, week 7 and week 13

## Final Exam

Due: **TBA**

Weighting: **50%**

The final exam will test mechanical and electrical concepts, with equal weighting to each. It will be a three hour, closed book exam.

On successful completion you will be able to:

- Ability to analyse equilibrium forces in machines and structures.
- Ability to analyse complex resistive electrical circuits through the use of appropriate models.
- Demonstrate an understanding of inductance, capacitance, power and energy in the context of electrical circuits.

## Assignments

Due: **Week 7 and Week 13**

Weighting: **15%**

There will be two assignments, each worth 7.5%. The first assignment will consist of Mechanical Engineering problems (testing learning outcome 1) and the second assignment will consist of Electrical Engineering problems (learning outcomes 2 and 3).

Assignment 1 is due the Friday of week 7 at 8pm and assignment 2 is due the Friday of week 13 at 8pm. A portion of the available grades will be awarded for presentation of work. Well presented work is highly legible, annotated, well structured, and presented with page numbers and student IDs on every page. Photographs of handwritten work will not be accepted.

Late assignments will attract the following penalties; 1 to 24 hours -20%, 24 hours to 48 hours -40%, greater than 48 hours will result in no mark being awarded.

On successful completion you will be able to:

- Ability to analyse equilibrium forces in machines and structures.
- Ability to analyse complex resistive electrical circuits through the use of appropriate models.
- Demonstrate an understanding of inductance, capacitance, power and energy in the context of electrical circuits.

## Tutorials

Due: **Everyweek**

Weighting: **20%**

6 mech and 6 elec focussed tutorial sessions are run to assess and assist student learning.

Participation in at least 4 mech and 4 elec tutorial or laboratory sessions is required to pass the unit.

Tutorial problems will be assigned in advance. Selected problems will be graded by tutors based on written solutions (in log books only) and verbal comprehension.

Marking rubrics will be included with the task description.

Each student must have a bound notebook to be used as a laboratory/tutorial log (A4 size preferred, graph pages are not required). This logbook should also be used for any preliminary work. It should contain all results recorded during these sessions and student's comments on how a problem can be solved. It may also be used for taking notes in class, and should be used to study for exams.

On successful completion you will be able to:

- Ability to analyse equilibrium forces in machines and structures.
- Ability to analyse complex resistive electrical circuits through the use of appropriate models.
- Demonstrate an understanding of inductance, capacitance, power and energy in the context of electrical circuits.

## Online quiz

Due: **Week 2, week 7 and week 13**

Weighting: **15%**

There will be three online quizzes, each worth 5%. The first quiz will test background knowledge, the second will test learning outcome 1, and the second quiz will test learning outcomes 2 and 3.

The quiz will be open for a specific time and all students must take the quiz during that time. All students are to ensure that they have their own resources (Computers, tablet, smart phone etc) to take part in the quiz.

On successful completion you will be able to:

- Ability to analyse equilibrium forces in machines and structures.
- Ability to analyse complex resistive electrical circuits through the use of appropriate models.
- Demonstrate an understanding of inductance, capacitance, power and energy in the context of electrical circuits.

## Delivery and Resources

Text books

1. JL Meriam and LG Kraige, "Engineering Mechanics (volume 1), Statics." Chapters 1,2,3,4 and 6.

or "Engineering Mechanics, Statics", RC Hibbeler, 14th Edition in SI units, Chapters 1,2,3,4,5,6,7,8

2. Allan R. Hambley, "Electrical Engineering, Principles and Applications (6th International Edition)." We will use Chapters 1-3.

We strongly recommend that you obtain print or online access to this text, as it will be used by other units in your degree:

ELEC260 - chapter 15

ELEC270 - chapters 4, 5 and 6

ELEC275 - chapters 10, 11, 12, 13, 14

## 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](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](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/](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](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](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/](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](http://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](http://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](http://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/](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

### Creative and Innovative

Our graduates will also be capable of creative thinking and of creating knowledge. They will be imaginative and open to experience and capable of innovation at work and in the community. We want them to be engaged in applying their critical, creative thinking.

This graduate capability is supported by:

### Assessment task

- Assignments

### Capable of Professional and Personal Judgement and Initiative

We want our graduates to have emotional intelligence and sound interpersonal skills and to demonstrate discernment and common sense in their professional and personal judgement.

They will exercise initiative as needed. They will be capable of risk assessment, and be able to



handle ambiguity and complexity, enabling them to be adaptable in diverse and changing environments.

This graduate capability is supported by:

### **Assessment task**

- Tutorials

## **Commitment to Continuous Learning**

Our graduates will have enquiring minds and a literate curiosity which will lead them to pursue knowledge for its own sake. They will continue to pursue learning in their careers and as they participate in the world. They will be capable of reflecting on their experiences and relationships with others and the environment, learning from them, and growing - personally, professionally and socially.

This graduate capability is supported by:

### **Assessment task**

- Tutorials

## **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**

- Ability to analyse equilibrium forces in machines and structures.
- Ability to analyse complex resistive electrical circuits through the use of appropriate models.
- Demonstrate an understanding of inductance, capacitance, power and energy in the context of electrical circuits.

### **Assessment task**

- Online quiz

## **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 outcome**

- Demonstrate an understanding of inductance, capacitance, power and energy in the context of electrical circuits.

## **Assessment tasks**

- Final Exam
- Assignments
- Tutorials
- Online quiz

## **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:

## **Assessment tasks**

- Final Exam
- Assignments

## **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:

## **Assessment tasks**

- Assignments
- Tutorials