



# PHYS1520

## Physics for Electrical and Electronic Engineering

Session 1, Weekday attendance, North Ryde 2020

*Department of Physics and Astronomy*

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## General Information

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Unit convenor, and Lecturer

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Credit points

10

Prerequisites

PHYS140 or PHYS1510

Corequisites

Co-badged status

### Unit description

This unit, following on from PHYS1510 completes the overview of electric and magnetic physics required for further study in electrical and electronic engineering disciplines. We complete the theory of electromagnetism, studying fields, potentials, the origin and effects of magnetic fields and electromagnetic induction, all described by Maxwell's equations. We link this physics to the fundamental quantities used in circuit theory: emf, voltage, current, resistance, capacitance, and inductance. We develop the language and toolkit used to design and analyse simple circuits, including the circuit theorems and circuit analysis techniques, and provide an introduction to electromagnetic radiation (light). Laboratory sessions provide a practical context for students to consolidate key concepts via conducting experiments and carrying out open ended exploration of basic circuits.

## 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:** explain foundational concepts in electricity and magnetism, and describe them in terms of concise mathematical models.

**ULO2:** analyse linear electrical circuits through the use of appropriate models including circuit simplifications, mesh and node analysis, and equivalent circuits.

**ULO3:** perform and report on laboratory experiments using a broad range of equipment, with an increased sophistication in treatment of errors.

**ULO4:** build and model simple electrical circuits and measure circuit properties with a digital multi-meter.

**ULO5:** clearly explain physics concepts learned and illustrate these to peers.

## 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

The 'estimated time on task' for each assessment item is an estimate of the *additional* time needed to complete each assessment outside of all scheduled learning activities. These estimates assume that you actively engage with all scheduled learning activities *and* spend an additional 28 hours of self-led study during the session.

### LAB BOOKS AND LABORATORY WORK

Satisfactory completion of laboratory work is a **hurdle requirement**. Your laboratory work will be assessed based on the skills you demonstrate during the lab class, and on the work recorded in your lab book. Lab books will be collected for marking at the end of each class.

You **must** attend **all ten** laboratory sessions. The **first lab session is in week 1** and includes work health and safety information. Students may also be assigned to lab groups, lab books will be handed out, and computer access will be checked. It needs to be attended by all students regardless of whether this is their first Physics unit or not. It will be a little bit shorter than the other sessions, but attendance is absolutely mandatory – you can't do subsequent lab sessions if you don't attend the introductory one. The **next 9 lab sessions** involve experimental work and will be assessed. **You must obtain a mark of at least 40% for each of the laboratory sessions in order to pass the unit.**

**Preparation is required** for each of the lab sessions 2-10. You will find the **Prelab activities** in the Laboratory Resources section of iLearn. Your prelab work will account for some of the marks for each laboratory session.

**If you miss a session or fail to achieve at least 40% for any lab session**, you must complete a **"Request to schedule a Catch-up laboratory session"** form, which can be found on iLearn. Read the sections below for full details about catch up classes and when they are scheduled. **No more than 3 catch ups are allowed for missed labs/lab hurdles**, except where Special Consideration has been approved. If you fail to attend a catch-up class, then that will count as another missed lab.

Laboratory catch-up classes will be held during the mid-semester break and at the end of semester. The dates and times of the catch up classes will be available on the "Request a catch up lab" form.

### QUIZZES

There will be a marked quiz of approximately 15 minutes duration in each SGTA (problem solving session). Typically the tests will comprise questions based on material covered in lectures and tutorials during the same week. The quiz is closed book. The Quiz in week 1 is for practice and will not be marked. The other quizzes will be marked and will contribute to your marks for the unit. To meet the hurdle requirement you must submit nine quizzes and be present for the entire associated SGTA. If you have missed your SGTA and associated quiz, due to unavoidable circumstances, then you should apply for [special consideration](#).

Please bring a suitable (non-programmable) scientific calculator to all tutorials. Mobile phones may not be used.

Students should have prepared for the quiz by reviewing the preceding lecture content, reading the textbook, and attempting the tutorial questions in advance. The tutorial questions will be available on iLearn.

## VIDEO EXPOSITION

This project will give you an opportunity to work within a group to explore aspects of electricity that relate to contemporary applications. Students are expected to increase their understanding of electricity by relating what they have learnt in class to the topic they explore.

A list of topics for will be given out in week 2. Students will be asked to form groups of 4, and will nominate their preferred topic by week 4. Students will be asked to make a 5 minute video that explores their selected topic. The video will be graded based on the content and clarity of their presentation and not on their skills at video recording. Groups will be asked to upload their video to iLearn by the end of week 8. The video presentations will be made available to all students in the class, and students will be asked to critique the work of other groups. This part of the assessment will be due in week 10. Full details about the project, including marking guidelines, will be posted on iLearn and students will have the opportunity to discuss their progress during a tutorial.

## FINAL EXAMINATION

**The final examination is a hurdle requirement.** You must obtain a mark of at least 40% in the final exam to be eligible to pass the unit. If your mark in the final examination is between 30% and 39% inclusive, you may be given a second and final chance to attain the required level of performance; the mark awarded for the second exam towards your final unit mark will be capped at 40%, and you will be allowed to sit the second exam only if this mark would be sufficient to pass the unit overall.

*If you receive special consideration for the final exam, a supplementary exam will be scheduled after results are released. Please see FSE101 in iLearn for dates. 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. Second chance exams for hurdle assessments will also be scheduled in this period.*

## 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: [https://ask.mq.edu.au/account/pub/display/unit\\_status](https://ask.mq.edu.au/account/pub/display/unit_status)

**General Information** Important instructions and Study materials are hosted on the iLearn webpage for the unit as are all announcements <http://ilearn.mq.edu.au> Please refer to it

frequently!

### **Asking for help**

A number of people can assist students while they undertake PHYS1520. For any inquiry please use this e-mail address:

**PHYS1520@mq.edu.au** instead of using people's personal e-mails. This will ensure that the best answer to your question is obtained.

**Unit textbook.** The textbook for most of this unit is "Fundamentals of Physics" by Halliday, Resnick and Walker, 11th edition. It is essential that you obtain a copy (digital or physical) of this textbook (10th edition is sufficient) as we will be following it closely and you will find it an invaluable resource. This is the same textbook that you used for PHYS1510.

Print versions or digital options are available through <https://www.wileydirect.com.au/buy/fundamentals-of-physics-11th-australia-new-zealand-edition/>.

The Library has an unlimited license to **Fundamentals Of Physics Extended 10th Edition**. Access the book online from the library by using multisearch, or look for the link on iLearn.

Additional textbooks that cover the content relating to electrical circuits will be posted on iLearn.

**Technology:** Audio recordings and copies of slides from lectures will be available in iLearn through the Echo360 system. By virtue of the activities that occur in a physics lecture (demonstrations, problem-solving) making use of these resources is not equivalent to attending in person.

The use of calculators in the laboratory classes, when completing quizzes, in the in-session exam and in the final examination for this unit is usually necessary. In accordance with the Science & Engineering Faculty's policy, calculators with a full alphabet on the keyboard are not allowed in the quizzes, or the final examination. Personal electronic devices such as smartphones, tablets, or laptops will be used for self-assessment quizzes and other learning enhancement classroom activities.

### **Lectures, SGTA problem solving classes, and Lab classes**

This unit consists of three different formal types of activity:

#### **1) LECTURES**

In lectures, new material is presented, discussed and illustrated by examples and demonstrations. Attending lectures is an important part of studying physics since it allows you to gain an insight into the subject matter that reading the textbook alone cannot provide. The lecturers can explain the concepts from several points of view, can point out and explain the most important aspects of the material and, very importantly, can illustrate the relationships and connections between the different concepts that are studied in PHYS1520 – no subject in physics stands on its own.

#### **2) SGTA - PROBLEM SOLVING CLASSES**

These classes are where you will consolidate and apply the concepts and methods taught in lectures, to solving problems. Each tutorial will include a 15 minute quiz, typically based on the

content covered in the same week. Tutorials form an important learning component of PHYS1520 and are therefore compulsory. **We require effective participation in tutorials, entailing a focused work effort and attendance for the duration of the class. If you do not participate effectively in a given week, for example arriving late or leaving the tutorial early without extenuating circumstances, you will be deemed not to have participated, and this will be grounds for receiving a score of zero for that week's quiz.**

Students are expected to prepare for each SGTA by reading the textbook, attending (or listening to) lectures, and attempting the tutorial problems.

### 3) LABS

The laboratory component is an essential component of your studies and so counts for an appreciable fraction of your final assessment. You will be introduced to some of the basic skills and techniques required of practicing physicists, scientists and engineers. **You will be issued with a Laboratory Notebook**, provided with instructional material in the form of **Laboratory Notes** which can be found in the Laboratory Resources section of iLearn, and assisted in the laboratory by a team of demonstrators. For each laboratory session, except in week 1, you are required to complete some preparatory work (**Pre-Lab**) before attending your nominated Lab session. To figure out which Prelab to do, please consult the **Laboratory Schedule** on iLearn.

Location: There are two laboratories used for 1<sup>st</sup> year physics they are both in **14 SCO (formerly E7B)**:

**Room 114** (Ground floor at the North-East corner of building)

**Room 254** (First floor, north-facing side of the atrium)

Please check iLearn to see where your lab class will take place.

Laboratory Safety: You are required to follow all safety guidelines given in the first Lab session, your lab notes, and the lab staff. Food and drink cannot be consumed in the lab, and students without suitable covered footwear will be refused admission.

## Policies and Procedures

Macquarie University policies and procedures are accessible from [Policy Central](https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central) (<https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central>). 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 [Student Policy Gateway](https://students.mq.edu.au/support/study/student-policy-gateway) (<https://students.mq.edu.au/support/study/student-policy-gateway>). 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://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central) (<http://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/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/study/getting-started/student-conduct>

## Results

Results published on platform other than [eStudent](#), (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 [eStudent](#). For more information visit [ask.mq.edu.au](http://ask.mq.edu.au) or if you are a Global MBA student contact [globalmba.support@mq.edu.au](mailto:globalmba.support@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 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](http://ask.mq.edu.au)

If you are a Global MBA student contact [globalmba.support@mq.edu.au](mailto:globalmba.support@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.