PHYS1520

Physics for Electrical and Electronic Engineering

Session 2, Weekday attendance, North Ryde 2021

Department of Physics and Astronomy

Contents

Session 2 Learning and Teaching Update

The decision has been made to conduct study online for the remainder of Session 2 for all units WITHOUT mandatory on-campus learning activities. Exams for Session 2 will also be online where possible to do so.

This is due to the extension of the lockdown orders and to provide certainty around arrangements for the remainder of Session 2. We hope to return to campus beyond Session 2 as soon as it is safe and appropriate to do so.

Some classes/teaching activities cannot be moved online and must be taught on campus. You should already know if you are in one of these classes/teaching activities and your unit convenor will provide you with more information via iLearn. If you want to confirm, see the list of units with mandatory on-campus classes/teaching activities.

Visit the MQ COVID-19 information page for more detail.

General Information

Unit convenor and teaching staff
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://students.mq.edu.au/important-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.

ULO6: demonstrate foundational learning skills including active engagement in your learning process

General Assessment Information

Overall you are expected to spend 150 hours studying and reviewing teaching materials, and submitting assessments for this subject throughout the whole semester. 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 for this we recommend that each week you spend at least 1.5 hours consolidating the lecture content and attempting the weekly tutorial questions prior to attending the SGTA.

WEEKLY LEARNING LOG (10%)

The purpose of this assessment task is to encourage your consistent engagement with the unit throughout the semester. You are required to maintain a well-organised physical or electronic notebook in which you write notes, complete tutorial questions, and record other work showing evidence of engagement with the unit. This will be assessed each week during the SGTA session, so make sure you have your notebook with you. More details will follow on iLearn.

This task is a hurdle requirement. To pass the hurdle, you will need to present your work to the tutor in at least 10 SGTA classes during semester, *and* you will need to earn at least 5 marks out of a possible 10 in order to pass the hurdle. You can earn up to 1 mark every week, but your maximum mark for this assessment item will be capped at 10. Additional details about this assessment item will be available on iLearn.

We require effective participation in SGTA sessions, entailing a focused work effort and attendance for the full session. If you do not participate effectively in a given week, for example leaving the tutorial early without extenuating circumstances, it will be grounds for receiving a score of zero for that week's Weekly Learning Log.

ASSIGNMENTS (25%, estimated time on task = 20 hours)

There will be four assignments; these will be released in weeks 2, 5, 7 and 9. They will be due in weeks 4, 7, 9 and 11. See iLearn for dates and details of these submissions. You should attempt the assignments after you have attempted the tutorial questions and revised the solutions. They may contain a variety of activities; some will require you to consider the relevance of the unit content to real-world engineering and some will contain some exam-style questions. Individual feedback on assignments will be provided to students.

Assignments are not a hurdle requirement, but they account for 25% of your marks for the unit. If you are unable to complete an assignment by the specified date, then you should apply for special consideration.

FINAL EXAMINATION (40%, estimated time on task = 20 hours)

The final examination is a hurdle requirement. It will cover all the content from the unit. 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 a 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.

LABORATORY WORK (25%, estimated time on task = 10 hours)

Satisfactory completion of laboratories is a **hurdle requirement.** You **must** attend **all** laboratory sessions. There is a **online induction module and safety quiz** that needs to be completed in **Week 1** and includes work health and safety information. Students will also need to enrol in groups on iLearn so as to know which experiment to prepare for and complete in week 2. It needs to be completed by all students regardless of whether this is their first Physics unit or not. You can't do subsequent lab sessions if you don't complete the introduction. The **next nine 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 2-9. 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. See ilearn 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 the catch-up class you are booked into, then that will count as another missed lab.

Assessment Tasks

Name	Weighting	Hurdle	Due
Weekly learning log	10%	Yes	Weekly, during SGTA class
Final examination	40%	Yes	Formal examination period
Lab book	25%	Yes	At the end of each Lab class
Problem sets	25%	No	See iLearn

Weekly learning log

Assessment Type [1]: Participatory task
Indicative Time on Task [2]: 0 hours
Due: **Weekly, during SGTA class**
Weighting: **10%**
This is a hurdle assessment task (see assessment policy for more information on hurdle assessment tasks)

You are required to maintain a well-organised physical or electronic notebook in which you write notes, complete tutorial questions, and record other work showing evidence of engagement with the unit. This will be assessed each week during the SGTA session. The purpose of this assessment task is to encourage your consistent engagement with the unit throughout the

session.

On successful completion you will be able to:

- demonstrate foundational learning skills including active engagement in your learning process

Final examination

Assessment Type [1]: Examination
Indicative Time on Task [2]: 20 hours
Due: **Formal examination period**
Weighting: **40%**
This is a hurdle assessment task (see assessment policy for more information on hurdle assessment tasks)

Examination in the university exam period, covering the entire content from the unit.

On successful completion you will be able to:

- explain foundational concepts in electricity and magnetism, and describe them in terms of concise mathematical models.
- analyse linear electrical circuits through the use of appropriate models including circuit simplifications, mesh and node analysis, and equivalent circuits.

Lab book

Assessment Type [1]: Lab book
Indicative Time on Task [2]: 10 hours
Due: **At the end of each Lab class**
Weighting: **25%**
This is a hurdle assessment task (see assessment policy for more information on hurdle assessment tasks)

Assessment of in-lab record of experimental activities, as well as any pre-lab work.

On successful completion you will be able to:

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

- build and model simple electrical circuits and measure circuit properties with a digital multi-meter.
- clearly explain physics concepts learned and illustrate these to peers.

Problem sets

Assessment Type [1]: Problem set
Indicative Time on Task [2]: 20 hours
Due: **See iLearn**
Weighting: **25%**

Assignments for problem solving and exploring physics concepts.

On successful completion you will be able to:

- explain foundational concepts in electricity and magnetism, and describe them in terms of concise mathematical models.
- analyse linear electrical circuits through the use of appropriate models including circuit simplifications, mesh and node analysis, and equivalent circuits.

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[1] If you need help with your assignment, please contact:

- the academic teaching staff in your unit for guidance in understanding or completing this type of assessment
- the Learning Skills Unit for academic skills support.

[2] Indicative time-on-task is an estimate of the time required for completion of the assessment task and is subject to individual variation

Delivery and Resources

General Information Important instructions and study materials are hosted on the iLearn webpage for the unit as are all announcements. You will find it at 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.

The second textbook that you will find useful for the portion of this unit that delves into Electric Circuits is ***Introduction to Electric Circuits*** by Dorf and Svoboda The text book will also be a useful resource for further Engineering study in Electronics, Electrical, and Mechatronics Engineering..

Students can purchase the e-text from here: https://www.wiley.com/en-au/Dorf%27s+Introduction+to+Electric+Circuits%2C+Global+Edition-p-9781119456162

Technology: Audio recordings and copies of slides from lectures will be available on iLearn.

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 tutorials, 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. Lectures are an important part of studying physics, where the lecturers seek to explain the concepts from several points of view, point out and explain the most important aspects of the material and, very importantly, illustrate the relationships and connections between the different concepts that are studied in PHYS1520 – no subject in physics stands on its own. This semester, lectures will be delivered online, and may be recordings from previous semesters due to Covid-19 constraints.

2) SGTA - TUTORIALS

These classes are where you will consolidate and apply the concepts and methods taught in lectures, to solving problems. There will be a mix of activities such as demonstrations, informal quizzes and presentations, solving tutorial questions, and past exam questions. Tutorials form an important learning component of PHYS1520,

Attending and participating in SGTA activities is a required part of the unit, and students who do not attend and participate for the full duration of most (at least ten) SGTAs risk failing the unit, Attendance will be recorded. Students are expected to prepare for each SGTA by attending or listening to the lectures. It is further recommended to read relevant portions of the textbook and

attempt the tutorial problems before class.

Check the MQ timetable for the availability of on-campus and online options.

3) LABORATORY SESSIONS

Laboratory Sessions

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 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 1st 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.

Covid-19 considerations: Labs are scheduled for on-campus delivery. You will need to comply with a number of Covid safety procedures, including the wearing of masks, sanitising hands and cleaning of work surfaces. In the event that a Covid outbreak causes the suspension of on-campus delivery, then an online version lab program will be provided, at the same time as your timetabled on-campus lab class. Instructions will be provided via iLearn should this change become necessary.

Policies and Procedures

Macquarie University policies and procedures are accessible from Policy Central (https://policies.mq.edu.au). 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

Students seeking more policy resources can visit Student Policies (https://students.mq.edu.au/support/study/policies). It is your one-stop-shop for the key policies you need to know about throughout your undergraduate student journey.

To find other policies relating to Teaching and Learning, visit Policy Central (https://policies.mq.edu.au) and use the search tool.

Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: https://students.mq.edu.au/admin/other-resources/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 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 http://students.mq.edu.au/support/

Learning Skills

Learning Skills (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 Enquiry Service

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

Equity 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.

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.