



PHYS1510

Engineering Physics

Session 1, In person-scheduled-weekday, North Ryde 2025

School of Mathematical and Physical Sciences

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General Information

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Credit points

10

Prerequisites

(HSC Mathematics Advanced Band 4 and above or Extension 1 Band E2 and above or Extension 2 Band E2 and above) or MATH1000

Corequisites

Co-badged status

Unit description

The design and development of new technologies is governed and constrained by the fundamental laws of nature, as described by the principles and practice of physics. The topics studied in this unit are illustrated with everyday examples to provide an overview of physics for students studying engineering disciplines. Laboratory sessions enable physics concepts to be explored in a practical way, and build skills in experimentation, measurement, data collection, analysis and reporting.

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 physics concepts in terms of their underlying physical principles and describe them in terms of concise mathematical models.
- ULO2:** analyse a real-world problem, break the problem into component parts relating to different areas of physics, identify known quantities and apply mathematical models to arrive at a numerical value for an unknown quantity, and interpret how the numerical results relate to the physical world.
- ULO3:** perform physical measurements, record experimental data, display data graphically, analyse data, and draw written conclusions in a clear, concise, and systematic manner.
- ULO4:** identify, record and explain sources of uncertainty in physical measurements; and undertake appropriate uncertainty analysis of results, including statistical analysis.
- ULO5:** demonstrate foundational learning skills including active engagement in your learning process.
- ULO6:** work collaboratively with peers.

General Assessment Information

The unit structure includes 26 hours of scheduled lecture time, 26 hours of scheduled SGTA time, and 30 hours of laboratory time. The balance of 65 hours (3 hours for the final exam) is allocated for you to spend on self-led study during the session. It is essential for your success in the unit that you schedule this self-led study time wisely and consistently throughout the session.

To pass this unit you must obtain a total mark equal to or greater than 50% across all assessments.

SGTAs and your Unit Learning Portfolio

SGTA attendance and engagement is very strongly recommended as it structures your self-led learning in the unit.

Timing: Each week, during the scheduled SGTA time. SGTAs start in Week 1, and each one is 1 hour and 50 minutes long.

Weighting: The Unit Learning Portfolio, which is based on your self-led study working, your practice SGTA problems and quizzes, and self-reflection on your learning process and success, will be worth 20% of your mark for the unit.

Format: The Unit Learning Portfolio will be submitted electronically via iLearn in Week 8 and will represent a snapshot of your learning journey in PHYS1510.

Your Unit Learning Portfolio is your record of your learning process in PHYS1510 and you will develop it as a natural record of your engagement in all non-laboratory aspects of the unit. It will represent a record of the approximately 65 hours of self-led study expected in the unit, plus any lecture or SGTA work you choose to include. You can record this portfolio in an exercise book or in electronic form, as you prefer, but it should be mostly hand-written. You will submit an electronic snapshot of your portfolio at the end of Week 8, which will be assessed and contribute 20% to your final result.

Each week you are scheduled for a 1 hour 50 min SGTA class. In this class you will work in small groups and progress through sets of problems related to the lecture content of that week. These problems will be posted on iLearn at the start of the week so you can look at them after the lectures, but before your SGTA class, and start thinking about how to solve them. Worked solutions to these problems will be posted at the end of the week after all SGTAs are complete. Your portfolio should include these solutions and your self assessment of your relative success at these each week.

Within each SGTA there will be a short formative 15 min quiz, which you will complete individually under exam-type conditions. This quiz will consist of shortened exam-style questions on the week's topics, which will help you self-assess how you are progressing with your understanding of the content. You will submit your quiz work, and you will receive feedback on your work at the next SGTA. This feedback will assist you in modifying your approach to problem solving and learning the content of the unit. Your quiz, with feedback, should be included in your portfolio, along with your self-assessment of your progress.

Between SGTA classes, during your approximately 65 hours of self-led study time, you should practice further problems (from the textbook, past exam papers, or other sources) and record these in your portfolio.

Your unit learning portfolio will be assessed against a rubric that covers aspects of consistent engagement in the unit, including steady progression in learning the content and developing your problem-solving skills in physics related to engineering.

Regular attendance and participation in SGTAs is a critically important way for students to keep up with, and master, the material covered in lectures, as well as to develop their

physics problem-solving skills.

Laboratory Work

Timing: During your scheduled laboratory session. See the lab schedule on iLearn for dates.

Weighting: Your Laboratory Work will be worth a total of 30% of your mark for the unit.

Format: Laboratory Work will be recorded in a Laboratory Notebook.

Laboratory work entails hands-on practical activities that are undertaken during scheduled laboratory classes. The first laboratory session will introduce you to the lab program and the skills you will develop. It also includes important workplace health and safety information. Students may also be assigned to lab groups, lab books will be handed out, and computer access will be checked. Session 1 needs to be attended by *all* students. It will be shorter than the other sessions, but attendance is mandatory – ***you cannot do subsequent lab sessions if you have not completed the introductory one.***

The next *nine* lab sessions involve experimental work and will be assessed. Preparation is required for each of these lab sessions and you will find the Prelab activities in the Laboratory Resources section of iLearn.

All laboratory work will be documented in the lab book provided to you. The teaching staff will assist you throughout each lab session, providing feedback, allocating “points” for pre-lab work, for demonstrating particular skills during class, and for the documentation in your lab book. The points will be recorded in your lab book after each class so that you can track your progress. You can earn up to 20 “points” for your work each lab session, and your final mark for the Laboratory work will be determined from these points. To achieve full marks you would need to attend all lab sessions and achieve 20 points in all nine practical lab sessions. **Your laboratory work accounts for 30% of your final mark for the unit.**

A limited number of catch-up labs will be offered for students who miss a lab session. These will be held during the mid-session break, and towards the end of semester. A student can request ***no more than three*** catch up labs, via an online form on iLearn. Further details will be made available in the Lab Resources section of iLearn and during the first Lab session.

Final Examination

Timing: University Examination Period

Weighting: 50% of your mark for the unit.

Format: The Final Examination will be an invigilated written test.

You are expected to present yourself for examination at the time and place designated in the University Examination Timetable (<https://iexams.mq.edu.au/>).

The final examination will be three hours long and will cover content from the entire unit.

The use of calculators in examinations for this unit is permitted but, in accordance with the

Faculty's policy, calculators with a full alphabet on the keyboard are not allowed.

If you receive **Special Consideration** for the final exam, a supplementary exam will be scheduled after the end of the normal exam period. 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.

Late Assessment Submission Penalty

Unless a Special Consideration request has been submitted and approved, a 5% penalty (of the total possible mark of the task) will be applied for each day the unit learning portfolio or laboratory work book assessment is not submitted, up until the 7th day (including weekends). After the 7th day, a grade of '0' will be awarded even if the assessment is submitted. The submission time for all uploaded assessments is 11:55 pm. A 1-hour grace period will be provided to students who experience a technical concern. For any late submission of time-sensitive tasks, such as scheduled tests/exams, performance assessments/presentations, and/or scheduled practical assessments/labs, please apply for Special Consideration.

Assessment Tasks

Name	Weighting	Hurdle	Due
<u>Unit learning portfolio</u>	20%	No	02/05/2025
<u>Lab book</u>	30%	No	See laboratory schedule information on the unit iLearn page.
<u>Final examination</u>	50%	No	As published in the university examination schedule

Unit learning portfolio

Assessment Type ¹: Portfolio

Indicative Time on Task ²: 0 hours

Due: **02/05/2025**

Weighting: **20%**

Students will document their learning development and progression by creating a portfolio of their non-laboratory work towards this unit.

On successful completion you will be able to:

- explain foundational physics concepts in terms of their underlying physical principles and describe them in terms of concise mathematical models.
- analyse a real-world problem, break the problem into component parts relating to different areas of physics, identify known quantities and apply mathematical models to arrive at a numerical value for an unknown quantity, and interpret how the numerical results relate to the physical world.
- demonstrate foundational learning skills including active engagement in your learning process.

Lab book

Assessment Type ¹: Lab book

Indicative Time on Task ²: 0 hours

Due: **See laboratory schedule information on the unit iLearn page.**

Weighting: **30%**

Students will be required to demonstrate some of the basic skills and techniques that are used in experimental physical science and engineering. They will need to record all laboratory work in a laboratory notebook and submit their lab books to the teacher at the specified time.

On successful completion you will be able to:

- perform physical measurements, record experimental data, display data graphically, analyse data, and draw written conclusions in a clear, concise, and systematic manner.
- identify, record and explain sources of uncertainty in physical measurements; and undertake appropriate uncertainty analysis of results, including statistical analysis.
- work collaboratively with peers.

Final examination

Assessment Type ¹: Examination

Indicative Time on Task ²: 3 hours

Due: **As published in the university examination schedule**

Weighting: **50%**

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

On successful completion you will be able to:

- explain foundational physics concepts in terms of their underlying physical principles and describe them in terms of concise mathematical models.
- analyse a real-world problem, break the problem into component parts relating to different areas of physics, identify known quantities and apply mathematical models to arrive at a numerical value for an unknown quantity, and interpret how the numerical results relate to the physical world.

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 [Writing Centre](#) 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

Classes

Lectures (beginning in Week 1, in-person, on campus, and streamed / recorded on Echo360):

There are two one-hour lectures each week.

SGTAs (beginning in Week 1, in-person, on campus, not recorded; attendance and engagement are strongly encouraged):

You are scheduled for one SGTA each week, lasting 1 hour and 50 minutes.

Laboratory Sessions (beginning in Week 1, In-person, on campus; register for one):

You are scheduled for one each week, each lasting 3 hours.

The timetable for classes can be found on the University website at: <https://publish.mq.edu.au/>.

Enrolment can be managed using eStudent at: <https://students.mq.edu.au/support/technology/systems/estudent>

Information About the 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, 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.

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 closed-toe shoes must be worn in the labs (that is, no sandals, thongs, crocs, etc.); students without suitable covered footwear will be refused admission.**

NB: Required laboratory introduction sessions and SGTAs with an introductory quiz will occur in Week 1. Full laboratories and SGTAs will commence in Week 2 of the semester. You must complete the Week 1 laboratory introduction before you will be allowed to attend any further labs.

Required and Recommended Texts and/or Materials

Required Text

The prescribed textbook for this unit is *Fundamentals of Physics, 1st Australian & New Zealand Edition*, Halliday et al., from Wiley. Electronic and physical copies can be obtained at <https://www.wileydirect.com.au/buy/fundamentals-of-physics-australian-new-zealand-edition/>. The library also has copies available. **It is essential that you obtain a copy of the textbook as the lecture powerpoints only contain a summary of the content of the unit and are not a complete resource for study in the unit.**

Required Resources

The PHYS Laboratory Notes will be available online using iLearn before the laboratory sessions begin in the first week of the semester.

Web Resources

More information on the required text as well as additional resource material can be found on the iLearn page for the unit under the Resources section.

Communication

We will communicate with you through announcements and the discussion channel on iLearn, or via your university email. Queries to convenors can be submitted on the iLearn discussion board or emailed to PHYS1510@mq.edu.au **from your university email address.**

Policies and Procedures

Macquarie University policies and procedures are accessible from [Policy Central \(https://policies.mq.edu.au\)](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](#)
- [Assessment Procedure](#)
- [Complaints Resolution Procedure for Students and Members of the Public](#)
- [Special Consideration Policy](#)

Students seeking more policy resources can visit [Student Policies \(https://students.mq.edu.au/support/study/policies\)](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 \(https://policies.mq.edu.au\)](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 connect.mq.edu.au or if you are a Global MBA student contact globalmba.support@mq.edu.au

Academic Integrity

At Macquarie, we believe [academic integrity](#) – honesty, respect, trust, responsibility, fairness and courage – is at the core of learning, teaching and research. We recognise that meeting the expectations required to complete your assessments can be challenging. So, we offer you a range of resources and services to help you reach your potential, including free [online writing and maths support](#), [academic skills development](#) and [wellbeing consultations](#).

Student Support

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

Academic Success

[Academic Success](#) provides resources to develop your English language proficiency, academic writing, and communication skills.

- [Workshops](#)
- [Chat with a WriteWISE peer writing leader](#)
- [Access StudyWISE](#)
- [Upload an assignment to Studiosity](#)
- [Complete the 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

Macquarie University offers a range of [Student Support Services](#) including:

- [IT Support](#)
- [Accessibility and disability support](#) with study
- Mental health [support](#)
- [Safety support](#) to respond to bullying, harassment, sexual harassment and sexual assault
- [Social support including information about finances, tenancy and legal issues](#)
- [Student Advocacy](#) provides independent advice on MQ policies, procedures, and processes

Student Enquiries

Got a question? Ask us via the [Service Connect Portal](#), or contact [Service Connect](#).

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.

Changes from Previous Offering

To enable students more time to focus on learning, understanding and reflecting on the content of our unit we have revised the assessment structure as follows. There are now only three assessments: a unit learning portfolio, laboratory workbook, and final exam. Although no marks

are associated with attendance, all activities provide you with key content designed to help you understand content and complete the assessments.

Unit information based on version 2025.03 of the [Handbook](#)