PHYS1510

Engineering Physics

Session 3, In person-scheduled-weekday, North Ryde 2026

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 36 hours of scheduled SGTA time, and 30 hours of laboratory time. There are no lectures in this unit, but students are expected to spend at least 2 hours per week (26 hours) on the iLearn weekly content, in advance of each week's SGTA and labs. The balance of 53 hours (2 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

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 2 hours and 50 minutes long.

Each lesson you are scheduled for all SGTA classes. In this class you will work in small groups and progress through sets of problems related to the iLearn content of that lesson. These problems are posted on iLearn at the start of the lesson so you can look at them before your SGTA class, and start thinking about how to solve them. Worked solutions to these problems are posted at the end of the lesson after all SGTAs are complete.

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 previous week's topics, which will help you self-assess how you are progressing with your understanding of the content. Your quiz work will be peer-assessed during the SGTA, and you may receive additional feedback during the SGTA. This feedback will assist you in improving your approach to problem solving and learning the content of the unit. You should review your quiz performance and include time during your self-directed study to master any challenging topics or concepts identified.

Between SGTA classes, during your approximately 53 hours of self-led study time, you should practice further problems (from the textbook, past exam papers, or other sources) in order to study for the Problem-based task, and then the Final Exam at the end of the unit.

Regular attendance and participation in SGTAs is a a critically important way for students to keep up with, and master, the material covered on iLearn, as well as to develop their physics problem-solving skills.

Problem-based task: Skills development: Physics problem solving

Timing: The Problem-based task will be held during your regular SGTA in lesson 7.

Weighting: The Problem-based task, which is based on your practice SGTA problems and quizzes, textbook questions, and iLearn content, is worth 30% of your mark for the unit.

Format: The Problem-based task will consist of a series of harder questions in the style of those presented during SGTAs and quizzes, and be conducted under exam-style conditions.

The Problem-based task: Physics problem solving will assess your ability to solve physics problems relevant to engineering. It will cover only the content of the unit presented during lessons 1 to 6. If you miss this assessment you must apply for special consideration to be given a chance to re-take the assessment later in the session.

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 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; it is **NOT** necessary to apply for Special Consideration if you miss a lab class. The catch up classes 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: 40% 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 two hours long and will only cover content from weeks 7-13 of the 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

For the Problem-based task and the Final Exam, an approved Special Consideration request is required to sit a supplementary assessment. If you miss a lab session, you can apply for a make-up lab without special consideration.

Assessment Tasks

Name	Weighting	Hurdle	Due	Groupwork/Individual	Short Extension	AI Approach
Lab book	30%	No	25/01/2027	Individual	No	Observed
Skills development: Physics problem solving	30%	No	12/01/2027	Individual	No	Observed
Final exam	40%	No	Final exam period	Individual	No	Observed

Lab book

Assessment Type [1]: Experiential task
Indicative Time on Task [2]: 10 hours
Due: **25/01/2027**
Weighting: **30%**
Groupwork/Individual: Individual
Short extension [3]: No
AI Approach: Observed

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.

Skills development: Physics problem solving

Assessment Type [1]: Problem-based task
Indicative Time on Task [2]: 10 hours
Due: **12/01/2027**
Weighting: **30%**
Groupwork/Individual: Individual
Short extension [3]: No
AI Approach: Observed

Students will demonstrate their learning development and progression by solving written physics problems based on the course content and SGTA work in 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.

Final exam

Assessment Type [1]: Examination
Indicative Time on Task [2]: 20 hours
Due: **Final exam period**
Weighting: **40%**
Groupwork/Individual: Individual
Short extension [3]: No
AI Approach: Observed

You will undertake a final examination during the formal examination period.

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.

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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
- Academic Success 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.

[3] An automatic short extension is available for some assessments. Apply through the Service Connect Portal.

Delivery and Resources

Classes

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

You are scheduled for one SGTA each lesson, lasting 2 hours and 50 minutes.

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

You are scheduled for one each lesson, 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 Lesson 1, you are required to complete some preparatory work (Pre-Lab) before attending your nominated Lab session. To figure out which Pre-Lab 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 Lesson 1. Full laboratories and SGTAs will commence in Lesson 2 of the semester. You must complete the Lesson 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 iLearn material only contains an overview of the content of the unit and does not consitute a**

complete resource for study in the unit.

Required Resources

The 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 Textbook 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). 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). 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 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.

- Ask a Study Coach
- 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 https://students.mq.edu.au/support/technology/service-desk.

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

This unit has seen significant evolution from the 2025 offerings. The S3 2026 offering is identical to the S1 and S2 2026 unit.

The main changes compared to 2025 are:

- There are no lectures. Content delivery is provided through iLearn with structured student-led learning activities. These must be completed each week prior to attending SGTAs and labs. In the past there were 2 hours of lectures each week, with an expectation of an additional 3 hours of self-directed learning. In the current model, students are expected to spend about 2 hours on the iLearn content with an additional 2 hours of self-directed learning.
- SGTA durations have been increased from 2 hours in previous offerings to 3 hours. This is to accommodate the SGTA quiz held at the start of each SGTA, and to ensure sufficient face-to-face interaction between students and teaching staff.
- One assessment task has changed from recent offerings. In recent sessions the assessment was a portfolio task, but this is now replaced by the problem-based task, to be run during week 7 SGTAs.

Unit information based on version 2026.04 of the Handbook