



PHYS1510

Engineering Physics

Session 2, In person-scheduled-weekday, North Ryde 2023

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 or WFMA0003

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 and analysis.

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

Requirements to Pass this Unit

To pass this unit you must:

- Attempt all assessments, and
- Achieve a total mark equal to or greater than 50%, and
- Participate in a minimum of 8 of the weekly SGTAs and submit a minimum of 8 SGTA quizzes, and
- Participate in and submit satisfactory lab reports (equal to or greater than 40%) for all of the laboratory tasks, and
- Achieve at least 40% in the final examination

Macquarie University uses a standards-based assessment system and, as such, satisfactory performance in all aspects of the unit assessment is required to pass the unit overall. This unit contains hurdle assessments which must be completed to the specified standard in order to pass the unit overall irrespective of the final total mark.

Quizzes

Due: Weekly **SGTA**

Weighting: **25%**

This is a hurdle assessment task (see [assessment policy](#) for more information on hurdle assessment tasks)

The key way to develop physics engineering skills is through solving problems based on the topics being studied. We dedicate 2 hours per week to SGTA classes, where you learn physics engineering skills in a supportive environment with academic staff and peers to help you. During the sessions, in weeks 1-6, 8-13, you will be provided with a set of *problems* based on the week's lecture topics. You work through these and then, to reinforce and test your learning, at the end of each SGTA class you will complete a 10-minute quiz based on one of the assigned problems. These quizzes will be marked by your instructors and returned with feedback. This feedback, and more general feedback to the SGTA class, is designed to help you develop your skills so read / listen and think about what it means.

Your best 8 quiz scores will contribute a total of 25% to your final mark. The quizzes are a hurdle requirement; you must complete at least 8 in order to be eligible to pass the unit overall. No catch-up quizzes are offered. If you have an unavoidable commitment, you may be able to attend a different SGTA class for that week: please email PHYS1510@mq.edu.au to seek advice.

Mid-session Exam

Due: Timetabled **Week 7 SGTA class**

Weighting: **10%**

Hurdle: No

A mid-session exam will be held in your timetabled Week 7 SGTA class – please attend the correct one. This 50-minute exam will cover content from Weeks 1-5 inclusive. Further details will be provided in lectures leading up to this date.

Laboratory Work

Due: During class. See the lab schedule on iLearn for dates.

Weighting: 25%

This is a hurdle assessment task (see [assessment policy](#) for more information on hurdle assessment tasks)

Satisfactory completion of laboratories is a **hurdle requirement**. You **must attend all ten** laboratory sessions in your timetabled timeslot. The **first lab session is in Week 1** of the session 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. This **must** be attended by all students regardless of whether this is their first Physics unit or not. It will be 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. 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 or 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.

Final Examination

Due: During the Examination Period

Weighting: **40%**

This is a hurdle assessment task (see [assessment policy](#) for more information on hurdle assessment tasks)

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

The final examination will be two hours long and will cover all content of the unit (Weeks 1-12). The examination is closed book. Resource sheets of relevant equations and

physical constants will be provided.

The use of calculators in examinations for this unit is permitted, but calculators *with a full alphabet keyboard or text storage facility* are not allowed.

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.

Assessment Tasks

Name	Weighting	Hurdle	Due
Midsession exam	10%	No	week 7 SGTA
Lab book	25%	Yes	Weekly during lab sessions
Final examination	40%	Yes	Final examination period
Quizzes	25%	Yes	Weekly during SGTA classes

Midsession exam

Assessment Type ¹: Quiz/Test

Indicative Time on Task ²: 10 hours

Due: **week 7 SGTA**

Weighting: **10%**

Short exam on the content from the first half of the unit, taken during an SGTA session.

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.

Lab book

Assessment Type ¹: Lab book

Indicative Time on Task ²: 10 hours

Due: **Weekly during lab sessions**

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, including any pre-lab work.

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: 20 hours

Due: **Final 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 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.

Quizzes

Assessment Type ¹: Quiz/Test

Indicative Time on Task ²: 0 hours

Due: **Weekly during SGTA classes**

Weighting: **25%**

This is a hurdle assessment task (see [assessment policy](#) for more information on hurdle assessment tasks)

Short quizzes taken during the weekly SGTAs.

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.
- perform physical measurements, record experimental data, display data graphically, analyse data, and draw written conclusions in a clear, concise, and systematic manner.
- demonstrate foundational learning skills including active engagement in your learning process.

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

All classes (lectures, SGTAs, and labs) commence in week 1 of the session on campus.

Textbook

We will make close use of *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.

Special Consideration

The [Special Consideration Policy](#) aims to support students who have been impacted by short-term circumstances or events that are serious, unavoidable and significantly disruptive, and which may affect their performance in assessment. Your best 8 SGTA quiz marks will count for the assessment, so if you miss 1 or 2 SGTAs you do not need to apply for Special Consideration.

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.

Location: The two laboratories for 1000-level physics are both in **14 SCO**:

- **14SCO Room 114** (Ground floor at the North-East corner of the building)
- **14SCO 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. Labs are scheduled for on-campus delivery only.

Attend all your Lab classes: To pass the unit you need to demonstrate ongoing development of skills in all of the lab classes. If you miss a weekly practical class due to a serious unavoidable and significant disruption contact your convener ASAP as you may be able to attend another class that week.

COVID-19

For the latest information on the University's response to COVID-19, please refer to the following website: <https://www.mq.edu.au/about/coronavirus-faqs>.

Policies and Procedures

Macquarie University policies and procedures are accessible from [Policy Central](#) (<https://policies.mq.edu.au>).

[s.mq.edu.au](https://www.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 ask.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/>

The Writing Centre

[The Writing Centre](#) 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](#)

The [Numeracy Centre](#) provides one-on-one help with mathematics skills with hand-picked tutors, and it also offers workshops on topics of general relevance. See the website for the schedule of tutors and opening hours.

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 [AskMQ](#), 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

We value student feedback to be able to continually improve the way we offer our units. As such we encourage students to provide constructive feedback via student surveys, directly to the teaching staff, or via other mechanisms.

A foundational skills quiz has been added to the unit to enable students to self-assess their preparation for the unit in the early weeks of the session. Some modifications of the content and teaching approach have been made, seeking to increase student engagement. Clarification of Special consideration has been added.