PHYS1510

Engineering Physics

Session 1, In person-scheduled-weekday, North Ryde 2023

School of Mathematical and Physical Sciences

Contents

General Information

Unit convenor and teaching staff
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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

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. For this reason 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 session, in weeks 1-6, 8-12, you will be provided with a set of *problems* based on the previous 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 closely based on one of these assigned problems. These quizzes will be marked by your instructors and returned with feedback. This specific 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 (out of a possible 11) will contribute a total of 25% to your final mark. The quizzes are a hurdle requirement; you must complete at least 8 to a satisfactory level in order to be eligible to pass the unit overall.

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 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 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. 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.

Final Examination

Due: TBA - **see Examination Period Timetable**

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. A resource sheet 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* 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 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.

Assessment Tasks

Name	Weighting	Hurdle	Due
Quizzes	25%	Yes	Weekly, in timetabled SGTA
Midsession exam	10%	No	Week 7 in timetabled SGTA classes
Lab book	25%	Yes	Weekly for each timetabled lab class

Name	Weighting	Hurdle	Due
Final examination	40%	Yes	TBD - examination period

Quizzes

Assessment Type [1]: Quiz/Test
Indicative Time on Task [2]: 0 hours
Due: **Weekly, in timetabled SGTA**
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.

Midsession exam

Assessment Type [1]: Quiz/Test
Indicative Time on Task [2]: 10 hours
Due: **Week 7 in timetabled SGTA classes**
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 for each timetabled 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, 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: **TBD - 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.

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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 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

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/.

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: There are two laboratories used for 1000-level physics they are both in **14 SCO:**

- **14SCO Room 114** (Ground floor at the North-East corner of 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.

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.

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 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

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.