



PHYS1210

Physics for Life Sciences

Session 2, In person-scheduled-weekday, North Ryde 2026

School of Mathematical and Physical Sciences

Contents

<u>General Information</u>	2
<u>Learning Outcomes</u>	3
<u>General Assessment Information</u>	3
<u>Assessment Tasks</u>	5
<u>Delivery and Resources</u>	7
<u>Policies and Procedures</u>	10
<u>Changes from Previous Offering</u>	11
<u>Changes since First Published</u>	12

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General Information

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all non-emergency inquiries

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Credit points

10

Prerequisites

HSC Mathematics Standard 2 Band 5 and above or Mathematics Advanced Band 3 and above or Extension 1 or Extension 2 Band E2 and above

Corequisites

Co-badged status

Unit description

This unit develops a conceptual and quantitative approach to key physics topics including: waves, light and sound; electricity; forces and motion; and thermodynamics, with illustrations of these topics using medical, biological and technological applications. It teaches students to apply their knowledge of science to solve problems; to think and reason logically and creatively; and to communicate effectively. Students will practice the basic techniques of physical measurement, data analysis and verification of theoretical models. Written communication skills for documenting laboratory work and problem-solving techniques are emphasised throughout the unit.

For students who do not meet the mathematics prerequisite, please contact your course authority for details of a suitable Bridging Course.

Learning in this unit enhances student understanding of global challenges identified by the United Nations Sustainable Development Goals ([UNSDGs](#)) Good Health and Well Being

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: demonstrate knowledge of foundational physics concepts, principles and theories, by predicting outcomes of 'thought experiments' (conceptual answers) and by calculating outcomes in specific physical situations (numerical answers).

ULO2: apply physics principles to solve real-world problems including those involving topics in the life sciences.

ULO3: use the tools, methodologies, language, conventions of physics to test and communicate ideas and explanations.

ULO4: collect experimental data with appropriate precision and uncertainties, using a range of measurement and data analysis tools, and interpret and report on your results.

ULO5: demonstrate foundational learning skills including active engagement in your learning process.

General Assessment Information

REQUIREMENTS TO PASS THE UNIT

To pass the unit you have to achieve the total sum at least 50 out 100 marks across all the assessments. There are **no** hurdle requirements.

Attendance and participation

As per [Assessment Policy](#) attendance is **not assessed or mandated**. Nonetheless, attendance and participation in all classes is very important for student success and is strongly encouraged. You will not be able to participate in the labs until you complete the safety training (scheduled at week 1). Analysis of the student performance from the past offerings indicate that you are likely to fail unless participating in at least 8 out of 13 SGTAs.

Late Assessment Submission and Penalties

None of the activities fall under this policy. All submission events occur in class.

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. *Problem Set*: If you experience circumstances or events that affect your ability to complete the written assessments in this unit *by the deadline*, please inform the convenor and submit a Special Consideration request through <https://connect.mq.edu.au> *Labs*: to catch up 1-3 missed labs no formal request is needed. Just fill the catch-up form on iLearn. If you miss more than three labs and wish to complete them you must apply for special consideration to be given additional opportunity(ies), subject to the lab availability.

ASSESSMENT TASKS

1. LABORATORY WORK (25%, estimated time on task = 10 hours outside of scheduled classes)

Laboratory work entails hands-on practical activities that are undertaken during scheduled laboratory classes. The first laboratory **[during week 1]** session will introduce you to the lab program and the skills you will develop. Attendance is mandatory – ***you cannot do subsequent lab sessions if you do not attend the introductory one.***

The next *eight* 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 final lab mark will be informed by individual lab contributions and the overall assessment of the lab book. Each individual report will be marked 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. To achieve full marks you would need to attend all lab sessions and achieve 20 points in all practical lab sessions. Your laboratory work accounts for 25% 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 (subject to availability), 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.

2. PROBLEM SET (25%, estimated time on task = 3 hours outside of scheduled classes)

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

Format: The Problem-based task will consist of 5-6 questions nearly identical to those presented at SGTAs during weeks 1-6. Duration: 80 min.

Conditions: Exam conditions, all the rules of the [Academic Integrity Policy](#) will be **strictly enforced**.

Purpose: Physics problem solving will assess your ability to solve physics problems and will provide a feedback on your skill level at the moment in time where the improvement is still possible. The final exam will include several similar problems.

Administration: It is recommended to sit the assessment task at the SGTA class to which you are registered. If you miss both assessment opportunities you must apply for special consideration to be given a chance to re-take the assessment later in the session.

3. FINAL EXAMINATION (50%, estimated time on task = 20 hours outside of scheduled classes)

A two-hour written examination will be held during the university exam period, covering all content from the unit.

Assessment Tasks

Name	Weighting	Hurdle	Due	Groupwork/Individual	Short Extension	AI Approach
Lab book	25%	No	ongoing; make up-sessions must be completed by week 12	Individual and Group	No	Observed
Final examination	50%	No	during the official examination period	Individual	No	Observed
Problem set	25%	No	week 7 during SGTA	Individual	No	Observed

Lab book

Assessment Type ¹: Experiential task

Indicative Time on Task ²: 10 hours

Due: **ongoing; make up-sessions must be completed by week 12**

Weighting: **25%**

Groupwork/Individual: Individual and Group

Short extension ³: No

AI Approach: Observed

You will need to record all laboratory work, as well as any pre-lab preparation, in a laboratory notebook and submit your lab book to the teacher at the specified time. This task supports the development of core skills and techniques used in physics for the life sciences.

On successful completion you will be able to:

- collect experimental data with appropriate precision and uncertainties, using a range of measurement and data analysis tools, and interpret and report on your results.

Final examination

Assessment Type ¹: Examination

Indicative Time on Task ²: 20 hours

Due: **during the official examination period**

Weighting: **50%**

Groupwork/Individual: Individual

Short extension ³: No

AI Approach: Observed

The purpose of the Final Exam is for you to formally demonstrate the expertise you have gained in this unit. The exam may include any topic covered in the unit. It will be held during the University Final Examination period.

On successful completion you will be able to:

- demonstrate knowledge of foundational physics concepts, principles and theories, by predicting outcomes of 'thought experiments' (conceptual answers) and by calculating outcomes in specific physical situations (numerical answers).
- apply physics principles to solve real-world problems including those involving topics in the life sciences.
- use the tools, methodologies, language, conventions of physics to test and communicate ideas and explanations.
- collect experimental data with appropriate precision and uncertainties, using a range of measurement and data analysis tools, and interpret and report on your results.

Problem set

Assessment Type ¹: Problem-based task

Indicative Time on Task ²: 3 hours

Due: **week 7 during SGTA**

Weighting: **25%**

Groupwork/Individual: Individual

Short extension ³: No

AI Approach: Observed

This assessment reflects core disciplinary problem-solving practices in physics, where conceptual reasoning and quantitative analysis are used to predict outcomes in physical systems. You will complete SGTA-style problems to analyse situations, predict outcomes using foundational physics concepts, and calculate numerical results. Through this task, you will develop their ability to apply core physics principles and perform accurate conceptual and numerical reasoning.

On successful completion you will be able to:

- demonstrate knowledge of foundational physics concepts, principles and theories, by predicting outcomes of 'thought experiments' (conceptual answers) and by calculating outcomes in specific physical situations (numerical answers).
- apply physics principles to solve real-world problems including those involving topics in the life sciences.
- use the tools, methodologies, language, conventions of physics to test and communicate ideas and explanations.
- 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
- [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

CONTACTS

For all unit-related inquiries email phys1210@mq.edu.au. Do NOT use personal emails of the staff unless it is a major emergency.

WEEK 1

All activities start at week 1

STRUCTURE

Lectures 2h/week | SGTA 2h/week | Labs 2.5h/week All activities are in-person. The lectures will be recorded and available via iLearn. Additional video materials may be posted from time to time.

Required Text Introduction to Biological Physics for the Health and Life Sciences, 2nd Edition, 2019, ISBN: 978-1-118-93450-0 OR E-text, ISBN: 978-1-118-93448-7

Teaching Strategy

PHYS1210 consists of lectures, tutorials, laboratory sessions and assessment including tutorial quizzes, laboratory reports and formal exams. You should spend an average of 9-10 hours per week studying for this unit (indicative only). This time is inclusive of all scheduled learning.

1. LABORATORY WORK

Laboratory work entails hands-on practical activities that are undertaken during scheduled laboratory classes. The first laboratory session (**week 1**) will introduce you to the lab program and the skills you will develop. It also includes important 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. 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 do not attend the introductory one.***

The next *eight* 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.

2. SGTA

2h sessions happen weekly, **including week 1.**

Week 1 session will review the math that is necessary for this unit. Sessions for weeks 2-6 and 8-13 will practice the theoretical material from the previous weeks.

Quizzes are taken at the end of each SGTA. They will be marked. These marks are purely indicative, but the past experience makes them the best predictor of the final grade. All problems in the Problem Set and a majority of the tasks of the Final Examination will be based on the SGTA problems and quizzes.

3 Topics covered in lectures (+ weeks+texbook chapters).

[Some changes in assigned/recommended sections may occur]

WEEK 1 Kinematics (Chapter 1) 1.1 Introduction 1.2 Distance and Displacement 1.3 Speed and Velocity 1.4 Acceleration 1.5 Average Velocity or Speed 1.6 Change in Displacement Under Constant Acceleration 1.7 The Acceleration Due to Gravity

WEEK 2 Forces and Newton's Laws of Motion (Chapter 2) 2.2 The Concept of Force 2.2 Newton's Laws of Motion 2.3 Kinds of Force 2.4 Newtonian Gravity 2.5 Fictitious Forces Forces and Newton's Laws of Motion (Chapter 2) 3.2 Description of Circular Motion 3.3 Circular Velocity and Acceleration 3.4 Centripetal Force 3.5 Sources of Centripetal Force

WEEK 3 Rotation (Chapter 3) 3.2 Description of circular motion 3.3 Angular velocity, acceleration 3.5 Centripetal force **Rotational Statics (Chapter 4)** 4.2 Equilibrium 4.3 Torque 4.4 The Principle of Moments

WEEK 4 Energy (Chapter 5) 5.2 What is Energy? 5.3 Work 5.4 Kinetic Energy 5.5 Potential Energy 5.6 Conservative Forces 5.7 Conservation of Total Energy 5.8 Power **Momentum (Chapter 6)** 6.1 Introduction 6.2 Linear Momentum 6.3 Newton's Laws and Momentum 6.4 Collisions 6.5 Elastic Collisions

WEEK 5 Fluids (Chapters 11, 12, 14) 11.2 Pressure 11.3 Density 11.4 Pascal's Principle 11.5 Measurement of Pressure 11.6 Pressure and the Human Body 12.2 The Buoyant Force 14.1-14.2 Fluid Dynamics of Non-viscous Fluids 14.3 The Equation of Continuity 14.4 Bernoulli's Equation

WEEK 6 Heat (Chapters 17, 19, 21) 17.2 Thermal Equilibrium 17.3 Measuring Temperature 19.2 Phase Changes 19.3 Temperature Changes 19.4 Energy Conservation 21.2 Heat Transfer: Conduction 21.3 Convection

WEEK 7/1 Thermodynamics (Chapters 22, 24) 22.2 The First Law 22.3 Energy and the Body 24.2 The Second Law of Thermodynamics 24.3 Entropy 24.4 Heat Engines

WEEK 7/2 -WEEK 8 Electricity (Chapters 26, 27, 28) 26.2 Charge 26.3 Conductors and Insulators 26.4 Charging of Objects 27.2 Coulomb's Law 27.3 Superposition of Electric Forces 27.5 The Electric Field 28.3 Electrical Potential 28.4 Electrical Potential and Work 28.7 The Heart and ECG

WEEK 9 Currents and Circuits (Chapter 30) 30.2 Electric Current 30.4 Direct Versus Alternating Current 30.5 Circuits and Circuit Diagrams 30.6 Power Sources 30.7 Resistance and Ohm's Law 30.8 Resistors and Resistivity 30.11 Resistors in Series and Parallel 30.12 Power Dissipation 30.14 Electric Shock Hazards 30.15 Electricity in Cells Magnetism (enreachment)

WEEK 10 Waves and Sound (Chapters 8, 9) 8.1-8.2 Nature of waves 10 8.3 Frequency, Wavelength, and Speed 8.4 The Form of the Wave 8.5 Types of Wave 8.6 Superposition and Interference 8.7 Beats 8.8 Reflection 8.9 Standing Waves 8.10 Waves and Energy 9.2 Sound Waves in Media 9.3 Pitch and Loudness 9.5 The Ear 9.6 The Doppler Effect

WEEK 11 Light (Chapter 32, 33, 34) 32.2 Electromagnetic Waves 32.3 Reflection 32.4 Refraction 32.5 Dispersion 33.1 Geometric Optics 33.2 Ray Diagrams 33.3-33.4 Mirrors 33.6 Lenses 34.1-34.9 The eye and vision Wave optics (Chapter 35) 35.2 Superposition and Interference 21.4 Radiation

WEEK 12 Atoms and Atomic Physics (Chapter 38) 38.2 Parts of the Atom 38.4 The Bohr Model of the Atom 38.6 Quantum Mechanics Nuclear Physics (Chapters 39, 40, 41, 42, 43) 39.2 Nuclei and Isotopes 39.5 Nuclear Decay and Stability 40.2 Nuclear Decay Processes 40.3 Activity and Half-Life 42.3 Dose and Dose Equivalent*

WEEK 13 REVISION

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.

- [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

Links with topics in chiro and biomed sciences are added to the lectures. GAMSAT-style problems are introduced to quizzes/SGTA.

Changes since First Published

Date	Description
21/07/2026	correction of the staff duties

Unit information based on version 2026.03 of the [Handbook](#)