



# WPHY143

## Physics 1B

MUIC Term 4 2019

*Macquarie University International College*

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### Disclaimer

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## General Information

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Credit points

3

Prerequisites

WPHY140

Corequisites

Co-badged status

Unit description

This unit, together with WPHY140, provides an overview of physics. This unit includes a broad range of topics suitable for engineering students or those majoring in any of the sciences. This unit begins with topics in classical physics: the physics of oscillations and wave motion, including sound waves, diffraction and the wave behaviour of light, leading to an introduction to geometrical and physical optics and the operation of some optical instruments. The unit then moves on to look at some of the theories of modern physics that influence the way that we view the natural world, and the fundamental laws that govern it. An introduction is given to molecular kinetic theory and the important universal laws of thermodynamics, the latter valid for everything from the boiling of a kettle to exploding black holes. Einstein's theory of special relativity and its counter-intuitive views on space and time, the uncertain world of quantum physics, and what the latter tells us about the structure of atoms and nuclei, conclude the unit. Regular guided laboratory work enables students to investigate the phenomena discussed in the lectures, using modern techniques in a well-equipped laboratory.

## 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:

Explain Physics concepts, within the topics listed in the unit guide, in terms of their underlying physical principles, and describe them in terms of concise mathematical models.

Analyse the description of a physical problem, be able to 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.

Analyse real-world problems, be able to develop physical problems based on this analysis, and interpret how numerical results relate to the physical world.

Record experimental data, display data graphically, analyse data, and present conclusions in a clear, concise, and systematic manner.

Identify sources of uncertainty in physical measurements, be able to propagate these uncertainties through calculations, and express results in a meaningful way.

Use discipline-specific terminology to communicate concepts and ideas relevant to this unit.

## General Assessment Information

### Requirements to Pass

In order to pass this unit a student must obtain a mark of 50 or more for the unit (i.e. obtain a passing grade P/CR/ D/ HD).

For further details about grading, please refer to [Schedule 1](#) of the [Assessment Policy](#).

**Students must also pass any hurdle assessments as stipulated in the Assessment Section of this Unit Guide.**

### Grading

The College will award common result grades as specified in [Schedule 1](#) of the [Assessment Policy](#).

Students will receive criteria and standards for specific assessment tasks, which will be aligned with the grading descriptors given in [Schedule 1](#).

The attainment (or otherwise) of learning outcomes for a unit of study will be reported by grade and mark which will correspond to the Schedule 1 and as outlined below.

Grade	Mark Range	Outcome	Description

HD	High Distinction	85-100	Pass	Provides consistent evidence of deep and critical understanding in relation to the learning outcomes. There is substantial originality, insight or creativity in identifying, generating and communicating competing arguments, perspectives or problem-solving approaches; critical evaluation of problems, their solutions and their implications; creativity in application as appropriate to the program.
D	Distinction	75-84	Pass	Provides evidence of integration and evaluation of critical ideas, principles and theories, distinctive insight and ability in applying relevant skills and concepts in relation to learning outcomes. There is demonstration of frequent originality or creativity in defining and analysing issues or problems and providing solutions; and the use of means of communication appropriate to the program and the audience.
CR	Credit	65-74	Pass	Provides evidence of learning that goes beyond replication of content knowledge or skills relevant to the learning outcomes. There is demonstration of substantial understanding of fundamental concepts in the field of study and the ability to apply these concepts in a variety of contexts; convincing argumentation with appropriate coherent justification; communication of ideas fluently and clearly in terms of the conventions of the program.
P	Pass	50-64	Pass	Provides sufficient evidence of the achievement of learning outcomes. There is demonstration of understanding and application of fundamental concepts of the program; routine argumentation with acceptable justification; communication of information and ideas adequately in terms of the conventions of the program. The learning attainment is considered satisfactory or adequate or competent or capable in relation to the specified outcomes.
F	Fail	0-49	Fail	Does not provide evidence of attainment of learning outcomes. There is missing or partial or superficial or faulty understanding and application of the fundamental concepts in the field of study; missing, undeveloped, inappropriate or confusing argumentation; incomplete, confusing or lacking communication of ideas in ways that give little attention to the conventions of the program.
FA	Fail		Did Not Attend	Student has failed for non-submission of an assessment task or non-attendance at a required assessment.
FH	Fail	49	Failed Hurdle	Student has obtained a raw mark over 50 yet failed all available attempts of at least one hurdle assessment (as described within Schedule 2 of the Assessment Policy).

Other grades (FW, I, IS, UD, UJ, UL) may be allocated where the student has withdrawn after the Census Date, not submitted or completed one or more components of the assessment, has been awarded a supplementary assessment, has applied for special consideration, or because of an unresolved matter such as allegations of academic misconduct. These grades are outlined in [Schedule 1](#) of the Assessment Policy.

### Where to find information about assessment

General assessment information (including the number and nature of assessments, due dates and weightings) has been provided in this unit guide.

Specific assessment information including assignment instructions, questions, marking criteria and rubrics as well as examples of relevant and related assessment tasks and responses will be available in the Assessment section on iLearn. For units that have final examinations, students may access past final exam papers using [MultiSearch](#).

## Student Responsibilities

As per the [Assessment Policy](#), students are responsible for their learning and are expected to:

- actively engage with assessment tasks, including carefully reading the guidance provided, understanding criteria, spending sufficient time on the task and submitting work on time;
- read, reflect and act on feedback provided;
- actively engage in activities designed to develop assessment literacy, including taking the initiative where appropriate (e.g. seeking clarification or advice, negotiating learning contracts, developing grading criteria and rubrics);
- provide constructive feedback on assessment processes and tasks through student feedback mechanisms (e.g. student surveys, suggestions for future offerings, student representation on committees);
- ensure that their work is their own; and
- be familiar with University policy and College procedures and act in accordance with those policy and procedures.

## Submission of Assessment Tasks

Assessments must be submitted in accordance with instructions provided in this Unit Guide and iLearn. Assessment tasks will not be marked unless they are submitted as required. Any tasks that are not submitted as required will be considered a non-submission and zero marks will be awarded for the task.

## Late Submissions and Penalties

Late submissions are possible but they will be penalised unless the student has been granted an approved extension (refer to the [Special Consideration Policy](#)). Late penalties will be calculated based on the marks allocated to the specific assessment task. The penalty for late submission is as follows:

- 5% of the total possible marks will be deducted if it is late by up to 30 minutes
- 10% of the total possible marks will be deducted if it is more than 30 minutes late and up to 24 hours late
- A further 10% of the total possible marks will be deducted for each 24-hour period up to 3 days (including weekends)
- 100% of the marks will be deducted after 3 days and zero marks will be awarded

Please note that online submissions are electronically tracked, and the electronic record of submission will be used to determine late penalties. This means that submitting your work even a few seconds after the allocated deadline will result in a late submission which will attract the penalty noted above. There is no flexibility with the applying of penalties as they must be applied fairly and consistently to all students. **It is your responsibility to allow sufficient time for**

**submission of your work and any uploading of documents so try to avoid submitting your work just prior to the deadline.**

Examples:

**If the assessment task is due on a Friday at 5.00pm**

Submission day/time	Deduction penalty
Before/at 5pm Friday	0%
After 5pm to 5.30pm Friday	5%
After 5.30pm Fri to 5.00pm Saturday	10%
After 5.00pm Sat to 5.00pm Sunday	20%
After 5.00pm Sun to 5.00pm Monday	30%
After 5.00pm Monday	100%

**If the assessment task is due on a Wednesday at 11.55pm**

Submission day/time	Deduction penalty
Before/at 11.55pm Wednesday	0%
After 11.55pm to 12.25 am Thursday	5%
After 12.25am Thurs to 11.55pm Thursday	10%
After 11.55pm Thurs to 11.55pm Friday	20%
After 11.55pm Fri to 11.55pm Saturday	30%
After 11.55pm Saturday	100%

Please see “In class assessment” section for further information on assessments that take place during class time.

## Extensions

Extensions will only be granted as a result of a successful application for Special Consideration. To apply for an extension of time for submission of an assessment item, students must submit their application for Special Consideration via [ask.mq.edu.au](https://ask.mq.edu.au).

An **approved** extension will not incur late penalties. However, where a student has been granted an extension and submits late (i.e. after the stipulated due date following extension), late penalties will be applied as per the new due date. See the section “Late submission and penalties” above.

## Resubmissions

Students are responsible for ensuring that they make correct submissions. Following an initial submission, students may resubmit their work up to 3 days after the due date if, for example, they have submitted the incorrect document or forgotten to include information.

Resubmissions will be treated as late submissions and will be penalised. See the “Late submissions and penalties” section. After the third day, a record of submission will be made, and feedback will be provided on the new content, but the student will receive zero marks for the assessment task.

**In order to resubmit your work, you will need to contact your teacher and ask them to delete your original submission so that you can upload a new one. Teaching staff contact details have been provided in this unit guide.**

## Retention of Originals

It is the responsibility of the student to retain a copy of any work submitted. Students must produce these documents upon request. Copies should be retained until the end of the grade appeal period each term.

In the event that a student is asked to produce another copy of work submitted and is unable to do so, they may be awarded zero (0) for that particular assessment task.

Requests for original documentation will be sent to the student email address. Students must retain all original documentation for a six (6) month period and must supply original documents to the University within ten (10) working days of such a request being made.

## In-Class Assessments

Students must bring their Student ID Card to all assessment tasks, including in-class assessments, and produce this if requested. Students may be refused the opportunity to take an in-class assessment task when unable to show their student ID card.

When an assessment is to be held or submitted during a scheduled lesson, students must be ready to submit, present or sit the assessment task at the start of the lesson; however, not all assessments may commence at the beginning of a lesson. No additional time or adjustment will be made for late arriving students or students not ready to submit an assessment at the start of the lesson, and late penalties will apply.

For example, if a one-hour test or quiz is due to take place in a 2-hour lesson, the test or quiz

may start at any time in the first hour or at the start of the second hour, so students must be ready to take the test at the beginning of the lesson. No additional time will be given or adjustment made for students who arrive late. While they may still be permitted to take the test, depending on the task, the student will have only the remaining time to complete the task. Similarly, when an assessment task is due in a given lesson, late penalties may apply to a student who submits the task at the end of the lesson, depending on submission instructions for the task.

### **Revision Sessions**

When relevant, a revision session may be scheduled prior to the final examination. Revision sessions will usually be scheduled on Monday and/or Tuesday of Week 7. Details of the revision session will be provided in the teaching schedule section of the unit guide and reminders may be posted in iLearn. When revision sessions are available, students are strongly encouraged to attend.

### **Final Examinations**

The final examination period is Week 7. Examinations will usually be scheduled on Tuesday and Wednesday of Week 7; however, students must be available to take exams and submit assessments on any day of this week.

For unit specific details please refer to the Assessment section of this unit guide.

### **Final Examination Timetable**

The University will publish the [College Final Examination Timetable](#) at least 4 weeks before the commencement of the final examination period and students will be able to access their final examination schedule in Week 3 of the Term.

### **Final Examination Requirements**

Schedule 4 of the Assessment Policy explains what students are responsible for:

- checking the final examination timetable;
- knowing the examination location (including seat number allocation) and arriving at allocated examination venue on time;
- knowing the structure and format of the examination;
- adhering to the final examination timetable; and
- ensuring they are available for the full duration of the final examination period and supplementary examination period.

Details of the structure and format of the final examination paper will be made available to students via iLearn prior to the start of the final examination period. These details will include:

- a copy of the examination coversheet, giving the conditions under which the examination will be held
- information on the types of questions the examination will contain, and



- an indication of the unit content the paper may examine.

Students must follow directions given by the Final Examination Supervisor.

Students will be required to present their Macquarie University Campus Card as photographic proof of identity for the duration of the final examination and may be refused the opportunity to take a final examination if unable to show their student ID card.

Students are not permitted to:

- Enter a final examination venue once one hour from the time of commencement (excluding any reading time) has elapsed.
- Leave a final examination venue before one hour from the time of commencement (excluding any reading time) has elapsed.
- Leave a final examination venue during the last 15 minutes of the examination.
- Be readmitted to a final examination venue unless they were under approved supervision during the full period of their absence.
- Obtain, or attempt to obtain, assistance in undertaking or completing the final examination script.
- Receive, or attempt to receive, assistance in undertaking or completing the final examination script (unless an application for reasonable adjustment has been approved).
- Communicate in any way with another student once they have entered the final examination venue.

### Missed assessments and examinations

The [Special Consideration Policy](#) establishes the principles that support students seeking to notify the University when they experience short-term, unexpected, serious and unavoidable circumstances, which affect their performance in assessment. This Policy applies only to short-term, serious and unavoidable circumstances that arise after a study period has commenced, and where specific assessment task/s have been affected. Students with a pre-existing disability/health condition or prolonged adverse circumstances are advised to seek support from Campus Wellbeing and should also refer to the Student Disability Support Policy.

In order to support students who have experienced serious and unavoidable circumstances, the University will attempt to provide affected students with one (1) additional opportunity to demonstrate that they have met the learning outcomes of a unit or units. An additional opportunity provided under such circumstances is referred to as Special Consideration, and may be granted after careful evaluation of the supporting evidence.

Students are expected to plan their work so that they can meet assessment deadlines at the same time as other obligations which they may have, both inside and outside the University. Special Consideration will not be granted when students are unable to complete an assessment task due to planned or foreseeable absence (e.g. holidays, recreational activities or normal work commitments or changes).

All applications for Special Consideration must be substantiated by original, independent documentary evidence in the format and by the deadline prescribed in the Procedure.

Please refer to the [Special Consideration Policy](#) section under Policies and Procedures below.

### Supplementary Tests, Supplementary Examinations

When a student has been granted a supplementary test or examination as a result of an application for Special Consideration, they will be advised of the time, date and location for the supplementary task.

**Supplementary interim assessments** (i.e. assessments held during the term) will be held throughout the term and students who have been granted an opportunity to sit a supplementary exam will be informed of times and dates via ask.mq.edu.au.

**The supplementary final examination** period for formal, end-of-term examinations will be the fortnight following Week 7. Students who have requested special consideration for a final examination must be available to undertake examinations during the supplementary examination period.

No more than one (1) supplementary assessment will be offered to a student in each affected unit, so it is essential that the student makes themselves available for the alternative assessment activity. Please refer to the [Special Consideration Policy](#) for further details.

Results for supplementary final examinations may not be available for up to two weeks following the supplementary examination. Students in their final term of study who undertake supplementary final exams and students who apply for special consideration for a unit which is a prerequisite to another unit in their program should note that formal completion of their Program will not be possible until supplementary results are released, and this may impact on their ability to enrol in subsequent programs of study on time.

### Second Attempts at Hurdle Assessments

In cases where students have made a serious first attempt at a hurdle requirement but failed to meet it, they will be given one further opportunity to meet the hurdle requirement if their performance in the unit is otherwise satisfactory.

When a student is eligible for a **second attempt at a hurdle assessment**, this will typically be scheduled during the supplementary interim/final examination periods unless stipulated otherwise in the assessment section of the unit guide. Students awarded second attempts at hurdles will be notified via email so please ensure you are checking your student email regularly.

Any second attempt at a hurdle assessment will be marked on a pass/fail basis. This means the mark for the second attempt at the hurdle will be capped at the designated hurdle pass mark. For example:

A hurdle task is a multiple-choice quiz marked out of 50 marks with a pass of 50% for the hurdle (25/50) and a serious attempt is defined as 40-49% (20-24.5 marks).

In their first attempt, a student gets 45% in the quiz (22.5/50). The student will be granted a second attempt as they made a serious first attempt. If in the second attempt, the student scores 75% (37.5/50), the final mark that the student would receive for the hurdle assessment would be

50% for quiz (25/50) as this is the hurdle pass mark.

## **Accessing your Results**

Students will be able to view their results for internal assessments via the Grades section in [iLearn](#).

Marks for all assessment tasks will be released to students once marking has concluded.

Final results for the unit will be released at 00:01 on Thursday of Vacation Week. Students will be able to view their final result for the unit via [eStudent](#).

## **Calculating your GPA**

A Grade Point Average (GPA) is a calculation that reflects the overall grades of a student in a coursework program. Please refer to the [GPA Calculator](#).

## **Obtaining Feedback**

Teaching staff will provide students with feedback about their academic progress and performance in assessment tasks or a unit of study. When relevant, other staff such as Senior Teachers, Program Managers and members of the Student Administration and Services Team will provide feedback and advice to students about their performance in a program of study. Feedback may be provided to individual students, a group of students or a whole class and it may be written or verbal in nature.

Some examples of feedback include:

- Teaching staff member reviewing a draft submission and giving a student advice on how to improve their work before making a final submission
- Teaching staff member telling a class that they need to improve their editing of grammar in their recently submitted assignment
- Teaching staff member discussing progress of an individual student before census date to allow the student to decide whether they should remain enrolled in the unit
- Online feedback via announcements or forums, an online marking rubric or various iLearn activities employed in a unit. Please note that feedback on written assessments is usually provided via Feedback Studio in iLearn
- Written marks and comments on a marking sheet or essay
- Recorded voice comment in iLearn provided in response to an essay submitted online
- A student receiving advice that they should consider withdrawing from a unit because they have missed too many classes / too much work to be able to catch up or for other reasons

It is a student's responsibility to:

- attend sessions, be present and actively engaged during times when feedback is provided in scheduled class times

- organise an alternative time with the teacher so that they can receive their feedback if absent from an in-class feedback session due to unavoidable circumstances
- ensure that they have received sufficient feedback prior to their next assessment task and/or final assessment in the unit
- act promptly on feedback provided (e.g. incorporate advice provided into their work and study habits)

If you are unsure how or when feedback has been or will be provided, or you feel that feedback provided is not sufficient, you must approach relevant teaching or administrative staff and request additional feedback in a timely manner during the term and prior to any subsequent assessment task or the final assessment task for the unit. Claims that not enough feedback has been provided are not grounds for a grade appeal, especially when a student has not made any effort to approach staff about obtaining additional feedback in a timely manner. Students may seek general feedback about performance in a unit up to 6 months following results release.

If you have any problems contacting your teacher, you must seek help from administrative staff at the College reception (Ground level, 8 Sir Christopher Ondaatje Avenue).

### **Contacting Teaching Staff to Obtain Help**

Students may contact teaching staff at any time during the term by using the contact details provided in this Guide. Students should expect a response within 1-2 business days. Teaching staff are unable to accept assessment submissions via email; all assessments must be submitted as outlined in the Unit Guide.

For all University-related correspondence, students must use their official Macquarie University student email account, which may be accessed via the [Macquarie University Student Portal](#). Enquiries from personal email accounts will not be attended to.

### **Academic Integrity**

All members of the University community must abide by the principles of academic integrity as per the [Academic Integrity Policy](#). The fundamental principle is that all staff and students act with integrity in the creation, development, application and use of ideas and information. This means that:

- all academic work claimed as original must be the work of the person making the claim;
- all academic collaborations of any kind must be acknowledged;
- academic work must not be falsified in any way; and
- when the ideas of others are used, these ideas must be acknowledged appropriately.

All breaches of the [Academic Integrity Policy](#) are serious and penalties apply. Students should be aware that they may lose marks, fail an assessment task, fail a unit or even be excluded from the University for breaching the Academic Integrity Policy.

Unacceptable activities include, but are not limited to, the following academic (including learning and teaching and research) activities:

- Cheating: is any attempt to dishonestly give or obtain assistance from another person, material, or device in an academic task.
- Contract-cheating: is having another person or entity conceive, research or write material for an assignment and submitting the work as one's own, irrespective of whether the other person or entity was paid for the material.
- Collusion: is unauthorised collaboration in producing an academic exercise that is designated as an individual task.
- Deception: is providing false or misleading information to the University.
- Fabrication: is to forge or falsify any information or citation in an academic task or report false or misleading results or conclusions of any research.
- Impersonation: is pretending or assuming another person's identity or using a substitute person for the purposes of providing an advantage.
- Obstruction: is intentionally impeding or interfering with another person's academic activity.
- Plagiarism: is adopting or reproducing the work or ideas of another person, whether intentionally or not, and presenting this as one's own without clearly acknowledging the source of the work or ideas.
- Sabotage: is acting to prevent or hinder another person from completing an academic exercise to the best of their abilities including by making information or material unavailable to others or disrupting or interfering with an academic task, experiments, research or other academic activity of any other person.
- Self-plagiarism: is unacknowledged use of material you have previously published or submitted.

### Penalties for Plagiarism and Collusion

The University may commence applicable disciplinary procedures if a person breaches the Academic Integrity Policy.

If your work is found to be similar to another source and considered to include instances of plagiarism or collusion, you will be penalised.

**Plagiarism** is taking someone else's work or ideas and presenting them as your own, that is, without acknowledging where they came from originally.

**Collusion** takes place when a student copies work or ideas from another student with or without this student's consent to complete a task that is supposed to be done individually.

For example, if you were awarded 52/100 marks for an essay, which contained 30% similarity (i.e. 30% of the work was identified to be copied from another source), the 30% of the 100 marks allocated to the task (i.e. 30 marks) could be deducted as a penalty. The final score you would receive would be 22/100 marks.

Penalty calculations may vary by unit.

## Turnitin

To uphold principles of Academic Integrity, Macquarie University uses online anti-plagiarism software called [Turnitin](#). Turnitin compares electronically submitted papers to a database of academic publications, internet sources and other student papers that have been submitted to the system to identify matching text. It then produces an Originality Report which identifies text taken from other sources, and generates a similarity percentage.

All text-based assessments must be submitted through Turnitin as per instructions provided in the Unit Guide. It is the student's responsibility to ensure that work is submitted correctly prior to the due date. This includes verifying that correct files have been submitted as no special consideration will be given to students who have uploaded incorrect documents. No hard copies of assessments will be accepted and only Turnitin records will be taken as records of submission.

Multiple submissions may be possible via Turnitin prior to the final due date and time of an assessment task and originality reports may be made available to students to view and check their levels of similarity prior to making a final submission. Students are encouraged to use these reports to ensure that they do not breach the Academic Integrity Policy through high levels of similarity (plagiarism).

Students should note that the report on the initial submission will be immediate but on a second or subsequent submission it will take at least 24-36 hours for the similarity report to be generated. This may be after the due date, so students should plan any resubmissions carefully. If you have not planned your submission time carefully and note high levels of similarity in your work after the due date, you can still resubmit your work; however, a late penalty will apply. For instructions on how to resubmit your work, please see the "Resubmissions after the due date" section in this Unit Guide.

Teaching staff will use the originality report to judge whether plagiarism has occurred and whether penalties should apply for breaches of the Academic Integrity Policy. Any similar text identified by Turnitin will be considered carefully to see if it is indeed a breach of the Academic Integrity Policy.

There is no set percentage which indicates whether plagiarism has occurred; all identified matching text should be reconsidered carefully. If plagiarism has occurred or is suspected and resubmission is possible prior to the due date, students are advised to edit their work before making a final submission. Help may be sought from teaching staff and students may also access [research resources](#) provided by the library or [Learning Skills](#).

Please refer to these instructions on [how to submit your assignment through Turnitin](#) and to access similarity reports and feedback provided by teaching staff.

Should you have questions about Turnitin or experience issues submitting through the system, you must inform your teacher immediately. If the issue is technical in nature, you may also lodge a [OneHelp](#) Ticket; please refer to the [IT help page](#).

## Submission of Drafts through Turnitin.



In some instances, students may be required to submit drafts of written work via Turnitin **prior to the due date of the assessment** task so that they can receive feedback prior to making a final submission. If the student does not make a final submission prior to the due date, their draft will be counted as the final submission or late penalties applied. **Missed Assessment:** Please refer to the missed assessment section above.

**Late Submissions:** Please refer to the late submission section above.

## Assessment Tasks

Name	Weighting	Hurdle	Due
<a href="#">Laboratory work</a>	20%	Yes	Weekly
<a href="#">Problem Sets</a>	10%	No	Week 2-6
<a href="#">Tests</a>	15%	No	Weeks 2, 5 and 6
<a href="#">Final Examination</a>	55%	No	MUIC Final Examination Period

### Laboratory work

Due: **Weekly**

Weighting: **20%**

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

The first week of MUIC physics labs will consist of a an introduction to the labs and a work health and safety session. **Although some students will have already completed this type of session as part of their WPHY140 studies, they will still need to participate in this session as a refresher. Therefore, this is compulsory for all students. No student will be allowed to start lab work until they have completed an introduction and work heath and safety lab session.** Students also need to check computer access in the physics lab during this time.

Students will be given in total 9 experiments to complete in the laboratory. **This assessment is a hurdle assessment task.** In order to pass this unit, students **must** attend and successfully complete **ALL** 9 experiments.

**If students arrive late by more than 15 minutes**, they will not be allowed to join into the lab activities. They will need to submit an application for **Special Consideration** and **if successful, will need to attend the make up labs offered in week 6.** There will only be two make-up lab sessions.

To be deemed to have successfully completed an experiment, students **must** obtain a mark of **at least 40%** for each of the laboratory sessions in order to pass the unit.

For a lab activity completion to be considered **a serious attempt**, the student must get a mark between 30 and 39%. A student whose work falls into this category will be given a second attempt at this lab activity later in the Term.

Students who do not meet this hurdle requirement will not pass the unit. Students are responsible for ensuring that they complete experiments as required during their registered laboratory sessions.

All laboratory work must be recorded directly into a laboratory notebook. More detailed instructions and advice will be provided in iLearn and in the laboratory. The laboratory notebook will be assessed by the teaching staff at the end of each lab session. The laboratory notebook stays with the laboratory throughout the semester.

For late submissions, please refer to late submissions section above.

Feedback will be provided in class.

On successful completion you will be able to:

- Explain Physics concepts, within the topics listed in the unit guide, in terms of their underlying physical principles, and describe them in terms of concise mathematical models.
- Analyse real-world problems, be able to develop physical problems based on this analysis, and interpret how numerical results relate to the physical world.
- Record experimental data, display data graphically, analyse data, and present conclusions in a clear, concise, and systematic manner.
- Identify sources of uncertainty in physical measurements, be able to propagate these uncertainties through calculations, and express results in a meaningful way.
- Use discipline-specific terminology to communicate concepts and ideas relevant to this unit.

## Problem Sets

Due: **Week 2-6**

Weighting: **10%**

Problem solving is at the heart of physics and engineering. During the term students will be provided with five problem sets, starting from Week 2. Problem sets are individual assessment tasks. More information about these problem sets and marking criteria will be provided in iLearn prior to the submission date.

**PDF scan of the problem sets 1-5 must be submitted in Turnitin on the days/times indicated below:**

Problem Set 1 - due on Week 2 Sunday, 11.55 pm

Problem Set 2 - due on Week 3 Sunday, 11.55 pm

Problem Set 3 - due on Week 4 Sunday, 11.55 pm

Problem Set 4 - due on Week 5 Sunday, 11.55 pm

Problem Set 5 - due on Week 6 Sunday, 11.55 pm



**Students must submit the hard copy of the problem sets in person in the next scheduled class time. The hard copy of Problem Set 5 must be submitted in the revision lesson on Monday Week 7.**

For late submissions, please refer to the late submission section included in this unit guide.

Feedback will be provided in class and marks in Gradebook.

On successful completion you will be able to:

- Explain Physics concepts, within the topics listed in the unit guide, in terms of their underlying physical principles, and describe them in terms of concise mathematical models.
- Analyse the description of a physical problem, be able to 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.
- Analyse real-world problems, be able to develop physical problems based on this analysis, and interpret how numerical results relate to the physical world.
- Identify sources of uncertainty in physical measurements, be able to propagate these uncertainties through calculations, and express results in a meaningful way.
- Use discipline-specific terminology to communicate concepts and ideas relevant to this unit.

## Tests

Due: **Weeks 2, 5 and 6**

Weighting: **15%**

Three tests will be given to students on Friday of Week 2, 5 and 6 in the scheduled class time. The tests are closed-book individual assessment tasks and are equally weighted (5% each). Further details will be provided in lessons leading up to each test.

Feedback will be provided in class and marks in Gradebook.

If students miss this assessment, they must refer to the Special Consideration Policy.

On successful completion you will be able to:

- Explain Physics concepts, within the topics listed in the unit guide, in terms of their underlying physical principles, and describe them in terms of concise mathematical models.
- Analyse the description of a physical problem, be able to 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.

- Analyse real-world problems, be able to develop physical problems based on this analysis, and interpret how numerical results relate to the physical world.
- Identify sources of uncertainty in physical measurements, be able to propagate these uncertainties through calculations, and express results in a meaningful way.
- Use discipline-specific terminology to communicate concepts and ideas relevant to this unit.

## Final Examination

Due: **MUIC Final Examination Period**

Weighting: **55%**

The final examination will be of 3 (three) hours plus 10 (ten) minutes reading time duration and will be held during the MUIC Final Examination period.

A resource sheet of relevant equations and physical constants will be provided with the final exam paper. Students are **not** allowed to bring any other reference materials such as the textbook or notes to the examination venue. Non-programmable calculators **without** text retrieval abilities, and calculators **without** “run”, “exe” or “calc” keys are permitted.

The final exam is an individual assessment task and it consists of short answer calculation questions that may examine any of the content contained within the unit.

Details of the structure and format of the final examination paper will be made available to students prior to the start of the final examination period.

The final examination period spans Monday to Wednesday of Week 7.

In cases where a student misses this assessment they must refer to the Special Consideration Policy.

On successful completion you will be able to:

- Explain Physics concepts, within the topics listed in the unit guide, in terms of their underlying physical principles, and describe them in terms of concise mathematical models.
- Analyse the description of a physical problem, be able to 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.
- Analyse real-world problems, be able to develop physical problems based on this analysis, and interpret how numerical results relate to the physical world.
- Identify sources of uncertainty in physical measurements, be able to propagate these uncertainties through calculations, and express results in a meaningful way.
- Use discipline-specific terminology to communicate concepts and ideas relevant to this unit.

## Delivery and Resources

### Term Dates & College Calendar

Details of key dates during the term can be found on the [Important Dates](#) calendar.

### Enrolment and Timetables

General timetable information is available via Macquarie University's [Timetable page](#).

Students will be able to enrol in units and register for classes via [eStudent](#) and also view their personal timetable. It is the student's responsibility to ensure that classes they have registered for do not clash.

Students are only permitted to attend classes in which they have registered via eStudent, unless they have written approval from the Student Services Manager. To seek approval, students must email [muic-elc.admin@mq.edu.au](mailto:muic-elc.admin@mq.edu.au) or speak to a member of the Student Administration and Services Team at The College Student Desk (Ground floor, 8 Sir Christopher Ondaatje Avenue). Approval will only be granted in exceptional circumstances.

The last day to enrol, add or change units is Tuesday of Week 1. Changing groups is not possible after the enrolment period has concluded.

### Guest Lecturer Presentations and Workshops

One or two Guest Lecturer presentations and/or workshops may be scheduled during the term. These sessions will take place outside of regular class time, usually in a lecture theatre on campus. In the session, a speaker (an expert or well-known academic in the field) will give a presentation on a particular topic related to the unit or field.

While attendance at guest lectures is not compulsory, and content covered is not examinable unless covered in regular classes, students are strongly encouraged to attend these sessions as they will:

- help them to engage with and broaden their understanding of the discipline;
- contextualise content covered in class by providing insights into recent research and workplace developments in the field;
- provide opportunities for networking; and
- provide experience of what lectures are like.

Specific details including time and venue for Guest Lecturer presentations and workshops will be posted in iLearn announcements and provided in class.

Recordings of these sessions may also be made available to students via iLearn.

### Attendance Requirements – All Students

All students are expected to attend 100% of scheduled class time.

Attendance will be monitored in each lesson & students will be able to see their current attendance percentage to date and potential attendance percentage for each unit they have

enrolled in via [iLearn](#).

- **Current Attendance Percentage** will reflect the percentage of classes a student has attended so far (based only on the lessons held to date).
- **Potential Attendance Percentage** will reflect the percentage of classes a student can potentially attend by the end of the term, taking into consideration lessons attended and assuming the student also attends all future lessons scheduled (based only on the total number of lessons in the Term).

When a student is present for a part of a lesson (for example arrives late, leaves early, leaves the class frequently, particularly for lengthy periods), the teacher reserves the right to mark a student absent for that part of the lesson.

### Public Holidays and Make-up Lessons

[In Term 4 there will be no public holidays](#)

### Technology Used and Required

- Access to internet (available on Campus using Macquarie [OneNet](#) and in designated 8SCO Self-Access Computer Laboratories);
- [iLab](#) - iLab is Macquarie University's personal computer laboratory on the Internet. It enables students to use the Microsoft Windows applications they require to do their university work from anywhere, anytime, on any device;
- Access to Macquarie University [Library catalogue \(MultiSearch\)](#); and
- Access to Microsoft Office Suite (available in 8SCO Self-Access Computer Laboratories and via [iLab](#)) software downloads page for full instructions.

### Bringing Your Own Device (BYOD)

Macquarie University is BYOD (Bring Your Own Device) friendly and encourages students to bring their Windows or Mac devices to use on campus and during classes.

In some classes in this unit, you will need to have access to a mobile device, Office applications (Word, Excel and PowerPoint) and an Internet Browser of your choice. If you do not have your own device and computer access is required in a particular lesson, you may be able to borrow a laptop to use for the duration of the lesson.

As a Macquarie University student, you are entitled to free access to the Microsoft Office Suite, which you can access through iLab. If you have problems with this, please contact OneHelp.

If you do bring your own device, you will need to ensure that it is sufficiently charged as access to power points may not be available in the classrooms.

### iLearn

[iLearn](#) is Macquarie's online learning management system and a principal teaching and learning resource which will be used throughout the term. Students must log in to iLearn at least 3 times

per week to access important information including:

- Announcements and News Forums - Teaching staff will communicate to the class using iLearn announcements. Announcements may also be emailed to students' Macquarie University email address, but students should also check the News Forum regularly;
- Attendance – current and potential attendance percentage for the Term;
- Unit Guide and staff contact details;
- Set unit readings available through [MultiSearch](#) (library);
- Lesson materials and recordings where available;
- Learning and teaching activities and resources, questions and solutions;
- Assessment instructions, questions, marking criteria and sample tasks;
- Assessment submission links such as Turnitin;
- Links to support materials and services available at the University; and
- Evaluation Surveys for the unit.

For any resource related iLearn questions contact your teacher. For any technical or support issues using iLearn, please contact the IT helpdesk (Ph. 02 9850 4357) or lodge a ticket using [OneHelp](#).

### Useful Study Resources

[StudyWise](#) is an iLearn resource created by the Learning Skills Unit. This resource is specifically designed to help you to manage your studies, strengthen your study techniques, write effective assignments and improve your English language proficiency. Once you enrol in StudyWise, you can access it from your iLearn course list under the category "Student Support".

[InfoWise](#) will help you improve your research skills by teaching you how to use MultiSearch, decode citations, identify key search terms and use advanced search techniques.

[Lib Guides](#) provide students with links to electronic sources and websites that are good starting points for research in different fields or disciplines.

[MultiSearch](#) will connect you to Macquarie University Library and allow you to search library resources, databases, unit readings and past exam papers.

Macquarie University Library has released a mobile device app called libMQ. The app allows students to easily access MyLibrary (be notified about loans, renewals, holds and fees owing), book a computer, Library floor maps, see new books lists and search MultiSearch.

It can be downloaded from either Google Play or the App store.

[Academic Language and Learning Workshops](#) are designed to help you with Study Skills, Assignment Writing, Referencing and Academic Language.

[Research resources](#) provide information about:

- [Researching for your assignments](#)
- How to [manage your references](#)

- [Referencing style guides](#)
- [Subject and research guides](#)

Numeracy Support is provided by the [Numeracy Centre](#). Students can attend these support classes on a drop-in basis as required.

[Studiosity](#) is a one-to-one personal study support service which may be made available via your iLearn unit. If available, you may use this service to get online study help and/or feedback on your assignment usually within 24 hours. If you are unsure whether this service is available in your unit or how to use this service, please check with your teacher. Please note that this is an external service and feedback provided is generic in nature (for example comments on grammar and cohesion) and may not be specific to the requirements of the task. If you require specific feedback on how your work aligns with the expectations of the unit or marking criteria, you should consult your teacher.

## Unit Schedule

Week	Course Material	Textbook Chapters and Assessment Due Dates	Laboratory/Practical Lesson Schedule
1	Introduction to mechanics of waves  Sound and hearing.	Chapters 16.1 to 16.13, and 17.1 to 17.6	Introductory lesson  Intro Lab session  Lab 1: Experiment
2	Sound and hearing continue.  Nature and propagation of light  Pre-census Feedback	Chapters 17.1 to 17.6, 17.8 to 17.10, 33.1 to 33.5, and 33.7 to 33.9  <b>Test 1 (Friday during lesson time)</b>  <b>Problem Set 1 due on Sunday, 11.55 pm (submit PDF Copy to Turnitin)</b>	Lab 2: Experiment  Lab 3: Experiment
3	Geometrical optics and optical instruments  Interference	Chapters 34.1 to 34.9, and 35.1 to 35.8  <b>Problem Set 1 Hard Copy to be submitted in class on Monday.</b>  <b>Problem Set 2 due on Sunday, 11.55 pm (submit PDF Copy to Turnitin)</b>	Lab 4: Experiment  Lab 5: Experiment
4	Diffraction  Temperature, heat, thermal properties of matter, and heat capacities	Chapters 36.1 to 36.5, 36.7, and 18.1 to 18.9  <b>Problem Set 2 Hard Copy to be submitted in class on Monday.</b>  <b>Problem Set 3 due on Sunday, 11.55 pm (submit PDF Copy to Turnitin)</b>	Lab 6: Experiment  Lab 7: Experiment

5	First law of thermodynamics, and heat capacities of ideal gases  Relativity	Chapters 18.10 to 18.12, 19.1 to 19.11, and 37.1 to 37.9  <b>Problem Set 3 Hard Copy to be submitted in class on Monday.</b>  <b>Test 2 (Friday, during lesson time)</b>  <b>Problem Set 4 due on Sunday, 11.55 pm (submit PDF Copy to Turnitin)</b>	Lab 8: Experiment  Lab 9: Experiment
6	Photons, electrons, atoms, the wave nature of particles, and nuclear physics	Chapters 38.1 to 38.6, 38.8, 39.8, 42.1 to 42.6, and 43.1 to 43.6  <b>Problem Set 4 Hard Copy to be submitted in class on Monday.</b>  <b>Test 3 (Friday, during lesson time)</b>  <b>Problem Set 5 due on Sunday, 11.55 pm (submit PDF Copy to Turnitin)</b>	Revision  Make-up labs for students with approved Special Considerations
7	<b>FINAL EXAM</b>	There will be a revision lesson on Monday.  <b>Problem Set 5 Hard Copy to be submitted in class on Monday during the revision lesson.</b>	The final examination period

## Learning and Teaching Activities

### Lessons

Lessons will include a mixture of learning and teaching activities. New content and topics will be presented in lessons, and students will be given problems, practice questions and other interactive activities to apply the knowledge and the skills gained in the lesson. Students will be required to take notes, complete set class tasks and engage in discussion and individual and group activities. In class, specific time may be dedicated to work on assessment tasks and students will be given guidance and feedback to complete these. Certain lessons may be dedicated to independent research and reading related to the unit whether in the classroom or in the lab.

### Active Participation

Students will be required to not only attend but also actively participate in lessons. Active participation entails: • active engagement in class activities; • contribution to class discussions by asking and answering questions; • coming to class prepared and having completed required pre-readings and activities; • completion of set class and homework activities; • collaboration with other students; and • adhering to Macquarie University's Student Codes of Conduct.

### Laboratory

Laboratory lessons will be held during the 6 weeks of the term; each lesson will be three hours long. During these students will engage in practical exercises to further their understanding of the physics concepts discussed in other lessons and to develop their skills at measurement, analysis and verification of physical models.



## Policies and Procedures

Macquarie University policies and procedures are accessible from [Policy Central](https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central) (<https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central>). 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](#)
- [Grade Appeal Policy](#)
- [Complaint Management Procedure for Students and Members of the Public](#)
- [Special Consideration Policy](#) (**Note:** *The Special Consideration Policy is effective from 4 December 2017 and replaces the Disruption to Studies Policy.*)

Undergraduate students seeking more policy resources can visit the [Student Policy Gateway](https://students.mq.edu.au/support/study/student-policy-gateway) (<https://students.mq.edu.au/support/study/student-policy-gateway>). It is your one-stop-shop for the key policies you need to know about throughout your undergraduate student journey.

If you would like to see all the policies relevant to Learning and Teaching visit [Policy Central](https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central) (<https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central>).

## Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: <https://students.mq.edu.au/study/getting-started/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](https://ask.mq.edu.au) or if you are a Global MBA student contact [globalmba.support@mq.edu.au](mailto:globalmba.support@mq.edu.au)

## Academic Integrity

Using the work or ideas of another person, whether intentionally or not, and presenting them as your own without clear acknowledgement of the source is called [Plagiarism](#).

Macquarie University promotes awareness of information ethics through its [Academic Integrity Policy](#). This means that:

- all academic work claimed as original must be the work of the person making the claim;
- all academic collaborations of any kind must be acknowledged;



- academic work must not be falsified in any way; and
- when the ideas of others are used, these ideas must be acknowledged appropriately.

All breaches of the [Academic Integrity Policy](#) are serious and penalties apply. Students should be aware that they may fail an assessment task, a unit or even be excluded from the University for breaching the Academic Integrity Policy.

## Assessment Policy

Students should familiarise themselves with their responsibilities under the [Assessment Policy](#), and notably [Schedule 4](#) (Final Examination Requirements).

## Final Examination Script Viewings

A student may request to view their final examination script once results have been released but scripts remain the property of Macquarie University.

Students should view their final examination paper prior to submitting a grade appeal, if this is relevant to their case. The viewing will be conducted in a secure location under supervision.

To request a final examination script viewing, please email [muic-elc.admin@mq.edu.au](mailto:muic-elc.admin@mq.edu.au) and write 'script viewing' in the subject heading.

Scripts may be reviewed for up to 6 months following the results release date for the relevant Term.

## Grade Appeals

A student who has been awarded a final grade for a unit has the right to appeal that grade as outlined in the [Grade Appeal Policy](#). Grade appeals apply to the final mark and the grade a student receives for a unit of study. They do not apply to results received for individual assessment tasks.

Grade appeals must be submitted via [ask.mq.edu.au](https://ask.mq.edu.au) within 20 working days from the published result date for the relevant unit. Before submitting a Grade Appeal, please ensure that you read the [Grade Appeal Policy](#) and note valid grounds for appeals.

Students are expected to seek feedback on individual assessment tasks prior to the award of a final grade. Students also have the right to request generic feedback from the teaching staff on their overall performance in the unit, including in a final examination. This can be done at any time in the six month period starting from the day on which the final grade of the relevant unit is published.

## Course Progression

The College closely monitors students' academic progress as per the [Progression Policy](#) for Programs delivered by Macquarie University International College.

To maintain satisfactory academic progress, a student must successfully complete (pass) 50% or more of their enrolled units in a Term of study and meet any other requirements to pass listed in the Unit Guide.

Students who fail to make satisfactory academic progress will be classified as "at risk" and will be notified in writing. At-risk students may be required to undergo academic counselling, undertake certain initiatives or have conditions placed upon their enrolment to help them make satisfactory progress.

Students must also pass 50% or more of the units in two or more terms in order to meet Minimum Rate of Progress (MRP) requirements. A student is deemed not to be making Minimum Rate of Progress if they fail more than 50% of their enrolled units in two consecutive Terms of study, or if they have failed more than 50% of their units after studying two or more terms.

Any domestic student who has been identified as not meeting MRP requirements will be issued with a Notice of Intention to Exclude letter and may subsequently be excluded from the program.

Any international student who has been identified as not meeting MRP will be subject to exclusion from the program and be issued with a Notice of Intention to Report letter and may subsequently be reported to the Department of Home Affairs for not meeting visa requirements. International students must comply with the [Progression Policy](#) of the College in order to meet the conditions of their visa.

## Student Support

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

## Learning Skills

Learning Skills ([mq.edu.au/learningskills](http://mq.edu.au/learningskills)) provides academic writing resources and study strategies to improve your marks and take control of your study.

- [Workshops](#)
- [StudyWise](#)
- [Academic Integrity Module for Students](#)
- [Ask a Learning Adviser](#)

## Student Services and Support

Students with a disability are encouraged to contact the [Disability Service](#) who can provide appropriate help with any issues that arise during their studies.

## Student Enquiries

For all student enquiries, visit Student Connect at [ask.mq.edu.au](http://ask.mq.edu.au)

If you are a Global MBA student contact [globalmba.support@mq.edu.au](mailto:globalmba.support@mq.edu.au)

## IT Help

For help with University computer systems and technology, visit [http://www.mq.edu.au/about\\_us/offices\\_and\\_units/information\\_technology/help/](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.

## Graduate Capabilities

### Creative and Innovative

Our graduates will also be capable of creative thinking and of creating knowledge. They will be imaginative and open to experience and capable of innovation at work and in the community. We want them to be engaged in applying their critical, creative thinking.

This graduate capability is supported by:

#### Assessment tasks

- Laboratory work
- Problem Sets
- Tests
- Final Examination

#### Learning and teaching activities

- Students will be required to not only attend but also actively participate in lessons. Active participation entails:
  - active engagement in class activities;
  - contribution to class discussions by asking and answering questions;
  - coming to class prepared and having completed required pre-readings and activities;
  - completion of set class and homework activities;
  - collaboration with other students; and
  - adhering to Macquarie University's Student Codes of Conduct.

### Capable of Professional and Personal Judgement and Initiative

We want our graduates to have emotional intelligence and sound interpersonal skills and to demonstrate discernment and common sense in their professional and personal judgement. They will exercise initiative as needed. They will be capable of risk assessment, and be able to handle ambiguity and complexity, enabling them to be adaptable in diverse and changing environments.

This graduate capability is supported by:

#### Learning outcomes

- Analyse the description of a physical problem, be able to 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.
- Analyse real-world problems, be able to develop physical problems based on this analysis, and interpret how numerical results relate to the physical world.

## Assessment tasks

- Laboratory work
- Problem Sets
- Final Examination

## Learning and teaching activities

- Laboratory lessons will be held during the 6 weeks of the term; each lesson will be three hours long. During these students will engage in practical exercises to further their understanding of the physics concepts discussed in other lessons and to develop their skills at measurement, analysis and verification of physical models.

## Commitment to Continuous Learning

Our graduates will have enquiring minds and a literate curiosity which will lead them to pursue knowledge for its own sake. They will continue to pursue learning in their careers and as they participate in the world. They will be capable of reflecting on their experiences and relationships with others and the environment, learning from them, and growing - personally, professionally and socially.

This graduate capability is supported by:

## Assessment task

- Tests

## Learning and teaching activity

- Lessons will include a mixture of learning and teaching activities. New content and topics will be presented in lessons, and students will be given problems, practice questions and other interactive activities to apply the knowledge and the skills gained in the lesson. Students will be required to take notes, complete set class tasks and engage in discussion and individual and group activities. In class, specific time may be dedicated to work on assessment tasks and students will be given guidance and feedback to complete these. Certain lessons may be dedicated to independent research and reading related to the unit whether in the classroom or in the lab.
- Students will be required to not only attend but also actively participate in lessons. Active participation entails:
  - active engagement in class activities;
  - contribution to class discussions by asking and answering questions;
  - coming to class prepared and having completed required pre-readings and activities;
  - completion of set class and homework activities;
  - collaboration with other students; and
  - adhering to Macquarie University's Student Codes of Conduct.
- Laboratory lessons will be held during the 6 weeks of the term; each lesson will be three

hours long. During these students will engage in practical exercises to further their understanding of the physics concepts discussed in other lessons and to develop their skills at measurement, analysis and verification of physical models.

## Discipline Specific Knowledge and Skills

Our graduates will take with them the intellectual development, depth and breadth of knowledge, scholarly understanding, and specific subject content in their chosen fields to make them competent and confident in their subject or profession. They will be able to demonstrate, where relevant, professional technical competence and meet professional standards. They will be able to articulate the structure of knowledge of their discipline, be able to adapt discipline-specific knowledge to novel situations, and be able to contribute from their discipline to inter-disciplinary solutions to problems.

This graduate capability is supported by:

### Learning outcomes

- Explain Physics concepts, within the topics listed in the unit guide, in terms of their underlying physical principles, and describe them in terms of concise mathematical models.
- Analyse the description of a physical problem, be able to 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.
- Record experimental data, display data graphically, analyse data, and present conclusions in a clear, concise, and systematic manner.
- Identify sources of uncertainty in physical measurements, be able to propagate these uncertainties through calculations, and express results in a meaningful way.
- Use discipline-specific terminology to communicate concepts and ideas relevant to this unit.

### Assessment tasks

- Laboratory work
- Problem Sets
- Tests
- Final Examination

### Learning and teaching activities

- Lessons will include a mixture of learning and teaching activities. New content and topics will be presented in lessons, and students will be given problems, practice questions and other interactive activities to apply the knowledge and the skills gained in the lesson.

Students will be required to take notes, complete set class tasks and engage in discussion and individual and group activities. In class, specific time may be dedicated to work on assessment tasks and students will be given guidance and feedback to complete these. Certain lessons may be dedicated to independent research and reading related to the unit whether in the classroom or in the lab.

- Laboratory lessons will be held during the 6 weeks of the term; each lesson will be three hours long. During these students will engage in practical exercises to further their understanding of the physics concepts discussed in other lessons and to develop their skills at measurement, analysis and verification of physical models.

## Critical, Analytical and Integrative Thinking

We want our graduates to be capable of reasoning, questioning and analysing, and to integrate and synthesise learning and knowledge from a range of sources and environments; to be able to critique constraints, assumptions and limitations; to be able to think independently and systemically in relation to scholarly activity, in the workplace, and in the world. We want them to have a level of scientific and information technology literacy.

This graduate capability is supported by:

### Learning outcomes

- Record experimental data, display data graphically, analyse data, and present conclusions in a clear, concise, and systematic manner.
- Identify sources of uncertainty in physical measurements, be able to propagate these uncertainties through calculations, and express results in a meaningful way.

### Assessment tasks

- Laboratory work
- Problem Sets
- Tests
- Final Examination

### Learning and teaching activities

- Lessons will include a mixture of learning and teaching activities. New content and topics will be presented in lessons, and students will be given problems, practice questions and other interactive activities to apply the knowledge and the skills gained in the lesson. Students will be required to take notes, complete set class tasks and engage in discussion and individual and group activities. In class, specific time may be dedicated to work on assessment tasks and students will be given guidance and feedback to complete these. Certain lessons may be dedicated to independent research and reading

related to the unit whether in the classroom or in the lab.

- Students will be required to not only attend but also actively participate in lessons. Active participation entails: • active engagement in class activities; • contribution to class discussions by asking and answering questions; • coming to class prepared and having completed required pre-readings and activities; • completion of set class and homework activities; • collaboration with other students; and • adhering to Macquarie University's Student Codes of Conduct.
- Laboratory lessons will be held during the 6 weeks of the term; each lesson will be three hours long. During these students will engage in practical exercises to further their understanding of the physics concepts discussed in other lessons and to develop their skills at measurement, analysis and verification of physical models.

## Problem Solving and Research Capability

Our graduates should be capable of researching; of analysing, and interpreting and assessing data and information in various forms; of drawing connections across fields of knowledge; and they should be able to relate their knowledge to complex situations at work or in the world, in order to diagnose and solve problems. We want them to have the confidence to take the initiative in doing so, within an awareness of their own limitations.

This graduate capability is supported by:

### Learning outcomes

- Explain Physics concepts, within the topics listed in the unit guide, in terms of their underlying physical principles, and describe them in terms of concise mathematical models.
- Analyse the description of a physical problem, be able to 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.
- Analyse real-world problems, be able to develop physical problems based on this analysis, and interpret how numerical results relate to the physical world.
- Record experimental data, display data graphically, analyse data, and present conclusions in a clear, concise, and systematic manner.

### Assessment tasks

- Laboratory work
- Problem Sets
- Tests
- Final Examination



## Learning and teaching activities

- Lessons will include a mixture of learning and teaching activities. New content and topics will be presented in lessons, and students will be given problems, practice questions and other interactive activities to apply the knowledge and the skills gained in the lesson. Students will be required to take notes, complete set class tasks and engage in discussion and individual and group activities. In class, specific time may be dedicated to work on assessment tasks and students will be given guidance and feedback to complete these. Certain lessons may be dedicated to independent research and reading related to the unit whether in the classroom or in the lab.
- Students will be required to not only attend but also actively participate in lessons. Active participation entails:
  - active engagement in class activities;
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  - coming to class prepared and having completed required pre-readings and activities;
  - completion of set class and homework activities;
  - collaboration with other students; and
  - adhering to Macquarie University's Student Codes of Conduct.
- Laboratory lessons will be held during the 6 weeks of the term; each lesson will be three hours long. During these students will engage in practical exercises to further their understanding of the physics concepts discussed in other lessons and to develop their skills at measurement, analysis and verification of physical models.

## Effective Communication

We want to develop in our students the ability to communicate and convey their views in forms effective with different audiences. We want our graduates to take with them the capability to read, listen, question, gather and evaluate information resources in a variety of formats, assess, write clearly, speak effectively, and to use visual communication and communication technologies as appropriate.

This graduate capability is supported by:

## Learning outcomes

- Explain Physics concepts, within the topics listed in the unit guide, in terms of their underlying physical principles, and describe them in terms of concise mathematical models.
- Analyse the description of a physical problem, be able to 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.
- Analyse real-world problems, be able to develop physical problems based on this analysis, and interpret how numerical results relate to the physical world.



- Record experimental data, display data graphically, analyse data, and present conclusions in a clear, concise, and systematic manner.
- Use discipline-specific terminology to communicate concepts and ideas relevant to this unit.

## **Assessment tasks**

- Laboratory work
- Problem Sets
- Tests
- Final Examination

## **Learning and teaching activities**

- Students will be required to not only attend but also actively participate in lessons. Active participation entails:
  - active engagement in class activities;
  - contribution to class discussions by asking and answering questions;
  - coming to class prepared and having completed required pre-readings and activities;
  - completion of set class and homework activities;
  - collaboration with other students; and
  - adhering to Macquarie University's Student Codes of Conduct.
- Laboratory lessons will be held during the 6 weeks of the term; each lesson will be three hours long. During these students will engage in practical exercises to further their understanding of the physics concepts discussed in other lessons and to develop their skills at measurement, analysis and verification of physical models.

## **Engaged and Ethical Local and Global citizens**

As local citizens our graduates will be aware of indigenous perspectives and of the nation's historical context. They will be engaged with the challenges of contemporary society and with knowledge and ideas. We want our graduates to have respect for diversity, to be open-minded, sensitive to others and inclusive, and to be open to other cultures and perspectives: they should have a level of cultural literacy. Our graduates should be aware of disadvantage and social justice, and be willing to participate to help create a wiser and better society.

This graduate capability is supported by:

## **Learning outcome**

- Analyse real-world problems, be able to develop physical problems based on this analysis, and interpret how numerical results relate to the physical world.

## **Assessment tasks**

- Laboratory work
- Problem Sets

- Tests
- Final Examination

## **Learning and teaching activities**

- Lessons will include a mixture of learning and teaching activities. New content and topics will be presented in lessons, and students will be given problems, practice questions and other interactive activities to apply the knowledge and the skills gained in the lesson. Students will be required to take notes, complete set class tasks and engage in discussion and individual and group activities. In class, specific time may be dedicated to work on assessment tasks and students will be given guidance and feedback to complete these. Certain lessons may be dedicated to independent research and reading related to the unit whether in the classroom or in the lab.

## **Socially and Environmentally Active and Responsible**

We want our graduates to be aware of and have respect for self and others; to be able to work with others as a leader and a team player; to have a sense of connectedness with others and country; and to have a sense of mutual obligation. Our graduates should be informed and active participants in moving society towards sustainability.

This graduate capability is supported by:

## **Learning outcome**

- Analyse real-world problems, be able to develop physical problems based on this analysis, and interpret how numerical results relate to the physical world.

## **Assessment tasks**

- Laboratory work
- Problem Sets
- Tests
- Final Examination

## **Learning and teaching activities**

- Lessons will include a mixture of learning and teaching activities. New content and topics will be presented in lessons, and students will be given problems, practice questions and other interactive activities to apply the knowledge and the skills gained in the lesson. Students will be required to take notes, complete set class tasks and engage in discussion and individual and group activities. In class, specific time may be dedicated to work on assessment tasks and students will be given guidance and feedback to complete these. Certain lessons may be dedicated to independent research and reading

related to the unit whether in the classroom or in the lab.

## Changes from Previous Offering

The deadline for some of the problem sets have changed.

## Course Contact Hours

Weekly face-to-face contact for this unit will be 16 hours (96 hours per term).

There will be 7 lessons per week consisting of 5 theory lessons (10 hours) and 2 workshops in the physics laboratory (6 hours).

## Laboratory Details

### Laboratory Requirements

The laboratory component is considered an essential component of learning and so counts for an appreciable percentage of the final assessment (20%).

**The laboratory work is designed to introduce students to some of the basic skills and techniques that are used in experimental physical science. Some of the activities in the laboratory may not relate directly to textbook material. This is because the laboratory activities are intended not only to illustrate physical concepts but also to introduce students to some techniques of measurement.**

By providing students with instructional material in the form of the Laboratory Notes manual, together with help from the laboratory demonstrators, the laboratory work has been designed to be completed solely at the labs. The lab work is advantageous for students to become familiar with a topic in an experimental situation before they discuss it in face-to-face lessons. That is often the case in real life! All the information students need for each experiment is contained in the Laboratory Manual and in the Pre-lab work (exercises to be completed **before** students attend the lab sessions). There is no need to spend a long time outside the laboratory hours in preparation; however, a quick read through the lab notes beforehand will allow students to make better use of their time in the laboratory.

### Location of the 100-level Physics Laboratory

The laboratory is located on the ground floor of building E7B, at the NE corner (room 114). Entry is from the courtyard at the opposite end to the main staircase.

### What to Bring

Prior to attending the lab sessions, students will need to study the content of the relevant Physics IB Laboratory Notes which are available online in [iLearn](#). Students must also complete the relevant Pre-lab work.

Students are also required to buy and use a standard "science book" (with ruled and graph pages, not spiral bound). ALL LABORATORY WORK MUST BE RECORDED DIRECTLY INTO THE LABORATORY NOTEBOOK. Loose sheets of paper must not be used. If students feel that their notes are incomprehensible or untidy, they may rewrite a more legible report in the same

book and simply cross out the original notes.

Both these items (the laboratory notebook and manual) should be brought by students to the first lab session.

### Laboratory Attendance Requirements

Students are required to attend every scheduled laboratory session. If students miss a session without a written explanation, then they will **not** be considered to have made a serious attempt at the laboratory component of the unit. Each time students attend the laboratory they must sign in and out (legibly) in the attendance book.

If students miss a laboratory session, they **must lodge a Special consideration** request, they can start this process at [ask.mq.edu.au](https://ask.mq.edu.au). If the Special consideration is granted, the students will need to attend the supplementary lab sessions available during week 6 (no more than two make-up labs will be offered).

### How to use a Laboratory Notebook

More details are on page (ii) of the Laboratory Notes manual.

The notebook should show students' collected data and the calculations and graphs resulting from the data. At the end of each section, students must summarise the findings and answer any questions posed in the guiding notes.

At the completion of each laboratory session, students must show their books to the laboratory supervisor who will check them and collect them for marking. The marker (the lab supervisor or one of the laboratory demonstrators) will be checking the students' books to see whether they have kept a satisfactory record of what they have done and what they have concluded. The marked notebooks will be available at the start of the subsequent scheduled laboratory. Students must check their books for comments from the markers as this will help them to refine the laboratory technique (and increase the laboratory mark). The **notebook** will be kept in the laboratory, and **must not be removed** from the laboratory at any time; this includes any previously filled notebook.

### Laboratory Assessment

Details of the laboratory assessment will be outlined in the first lab session.

### Laboratory Safety

Students are required to follow all safety guidelines given in the lab manual, and as outlined by their lab supervisor in the workplace and safety session delivered during the introductory lab session. **Food and drink cannot be taken into the laboratory and students without suitable covered footwear will be refused admission.**

### Laboratory Schedule

Introduction to laboratories start in the first week of the term. The schedule of labs is posted in the lab and on the WPHY143 iLearn page. Students must attend the laboratory session in which they are enrolled.

## Unit Specific Texts and Materials

The following texts have been prescribed for this unit.

### Required Textbook:

Halliday, Resnick, and Walker, 2014, Fundamentals of Physics, extended 10th edition (with Wiley Plus).

The content of the unit is based on the following chapters of the textbook:

- Waves: Chapters 16 and 17
- Light: Chapters 33 to 36
- Heat and Thermodynamics: Chapters 18 to 19
- Relativity: Chapter 37
- Atomic and Quantum Physics: Chapters 38 to 39
- Nuclear Physics: Chapter 42 to 43

Texts will be available for purchase from the [Co-Op Bookshop](#) located in the C7A MUSE Building - 18 Wally's Walk, Phone: 8986 4000.

All students should ensure that they have access to the prescribed text(s) from the start of the Term as failure to do so could jeopardise their academic progress in this unit.

Other editions or formats of the above resource(s) may be acceptable, but you must students must consult teaching staff prior to purchasing these.

### Required Resources

A copy of the WPHY143 Laboratory Manual is available on [iLearn](#).