WPHY140

Physics 1A

MUIC Term 4 2016

Macquarie University International College

Contents

General Information

Unit convenor and teaching staff
Teacher
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Contact via Email

Credit points
3

Prerequisites

Corequisites
WMAT136

Co-badged status

Unit description
This unit covers some of the fundamental ideas in physics that are important in a broad range of engineering and science applications. Students will be introduced to some of the most basic laws and principles of physics that describe the motion, interactions of objects, measurement, and electric and magnetic phenomena. Because problem solving is paramount in physics and engineering, students will be required to integrate basic mathematics with the laws and principles of physics to solve elementary problems. Students will also learn measurement skills, teamwork, and data analysis skills in a well-equipped physics 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:

Students 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.

Students will be able to 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.

Students will be able to analyse real-world problems,be able to develop physical problems based on this analysis, and interpret how numerical results relate to the physical world.
Students will be able to record experimental data, display data graphically, analyse data, and present their conclusions in a clear, concise, and systematic manner.
Students will be able to identify sources of uncertainty in physical measurements, be able to propagate these uncertainties through calculations, and express results in a meaningful way.
Students will be able to use discipline specific terminology to communicate concepts and ideas relevant to this unit.

General Assessment Information

Grading

Students will receive a Standardised Numerical Grade (SNG) reflects the extent to which student attainment matches the descriptors as per the Macquarie University Grading Policy.. This unit will use the following grades which will be aligned with the listed numerical range:

- HD - High Distinction (85-100)
- D - Distinction (75-84)
- Cr - Credit (65-74)
- P - Pass (50-64)
- F - Fail (0-49)

Requirements to Pass

In order to pass this unit a student must:

- Pass the final examination or final assessment task
- Achieve a Standard Numerical Grade (SNG) of 50 or more in the unit
- Attend at least 80% of scheduled classes
- Attempt all assessment tasks in unit

For further details about grading, please refer to the Grading Policy.

Submission of Assessment Tasks

Assessments must be submitted following instructions provided in class. Assessment tasks which have not been submitted as required will not be marked. They will be considered a non-submission and zero marks will be awarded.

Turnitin

Turnitin compares electronically submitted papers to a database of academic publications, internet sources and other papers that have been submitted into the system to identify matching text. It then produces an Originality Report which identifies text taken from other sources,and generates a similarity percentage to judge whether plagiarism has occurred (see Academic Honesty section below).

Multiple submissions may be possible via Turnitin prior to the due date of an assessment and originality reports may be made available to students. In such cases they should be used to check work for plagiarism prior to a final submission.

Where there is a requirement for assessment tasks to be submitted through Turnitin,it is the student's responsibility to ensure that work is submitted correctly prior to the due date. Hard copies will not be accepted unless indicated otherwise by a teaching staff member. Records in Turnitin will be taken as records of submission. For assistance submitting through Turnitin, you may approach your teacher, lodge a OneHelp Ticket, refer to the IT help page or seek assistance from Student Connect.

Students should note that for a first time submission the Originality Report will be available immediately post submission but for any subsequent submissions it may take 24 hours or longer for the report to be generated. This may be after the due date so students should plan their submission carefully.

Missed Assessments

The University recognises that students may experience unexpected events and circumstances that adversely affect their academic performance in assessment activities, for example illness. In order to support students who have experienced a serious and unavoidable disruption, the University will provide affected students with an additional opportunity to demonstrate that they have met the learning outcomes of a unit. An additional opportunity provided under such circumstances is referred to as special consideration.

The Disruption to Studies Policy applies only to *serious and unavoidable* disruptions that arise after a study period has commenced. Students with a pre-existing disability/health condition or prolonged adverse circumstances may be eligible for ongoing assistance and support. Such support may be sought through Campus Wellbeing and Support Services.

Serious and Unavoidable Disruption The University classifies a disruption as **serious and unavoidable** if it:

- could not have reasonably been anticipated, avoided or guarded against by the student; and
- was beyond the student's control; and
- caused substantial disruption to the student’s capacity for effective study and/or completion of required work; and
- occurred during an event critical study period and was at least three (3) consecutive days duration, and / or
- prevented completion of a final examination.

To be eligible for Special Consideration, a student must notify the University of a *serious and unavoidable* disruption within five (5) working days of the commencement of the disruption (Disruption to Studies notification). All Disruption to Studies notifications are to be made online via the University's Ask MQ system. A Disruption to Studies notification must be supported by documentary evidence.

In submitting a Disruption to Studies notification, a student is acknowledging that they may be required to undertake additional work. The time and date, deadline or format of any required extra assessible work as a result of a disruption to studies notification is not negotiable and in submitting a disruption to studies notification, a student is agreeing to make themselves available to complete any extra work as required.

Please refer to the Disruption to Studies Policy for further details.

Extensions & Late Submissions

To apply for an extension of time for submission of an assessment item, students must submit a Disruptions to Studies notification via ask.mq.edu.au.

Late submissions without an approved extension are possible but will be penalised at 20% per day up to 4 days (weekend inclusive). If a student submits an assessment task 5 or more days after the due date without grounds for special consideration (See Disruptions to Studies Policy) a record or submission will be made but the student will receive zero marks for the assessment task.

Final Examinations and Final Assessment Tasks

Final exams and final assessments will typically take place in Week 6 or Monday of Week 7. All students enrolled in a teaching session are expected to ensure they are available up until and including Monday of Week 7 to undertake examinations. Passing the final exam or final assessment task is a requirement to pass this unit.

Details of teaching session dates can be found on the Important Dates calendar. Due dated for assessments will be available in the unit guide and final examination timetables will be released to students prior to Week 5.

Planning for an exam is very important. All students should be familiar with the Exam Rules. In addition, students should refer to the below links for other important examination related information.

- Talk to your lecturer
- Revision tips
- What to bring with you
- What not to bring with you
- Where to get help
- Tips for Success

It is not uncommon for students to have two examinations in one day.

Conduct During Assessments and Examinations

Students must adhere to the Student Code of Conduct and Academic Honesty Policy at all times.

Students will be provided with instructions relating to conduct during in-class assessment tasks. For all examinations, students will be required to:

- provide photographic proof of identity for the duration of the examination. This must be visible at all times during the examination.
- leave mobile phones, electronic devices, bags, computers, notes, books and similar items outside a final examination venue or in a designated space
- ensure any water brought into the examination room is in a clear and unmarked bottle
- obey all instructions provided by an Examination Supervisor
- refrain from communicating in any way with another student once they have entered the examination venue.

Students are NOT permitted:

- into an examination venue once one hour from the time of commencement (excluding any reading time) has elapsed
- to leave an examination venue *before* one hour from the time of commencement (excluding any reading time) has elapsed
- to be readmitted to an examination venue unless they were under approved supervision during the full period of their absence
- to obtain or attempt to obtain assistance in undertaking or completing the examination script
- to receive or attempt to receive assistance in undertaking or completing the examination script.

Students should also ensure they follow all requirements of the Final Examination Policy.

Supplementary Examinations

Supplementary final examinations are held during the scheduled Supplementary Final exam Period. This may fall in Week 7 or within the first week of the subsequent teaching term. Results for supplementary exams 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 should note that formal completion of their Diploma Program will not be possible until supplementary results are released and this may impact on their ability to enrol in subsequent units or programs of study on time.

Retention of Originals

It is the responsibility of the student to retain a copy of any work submitted and produce another copy of all work submitted if requested. 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.

The University may request and retain the originals of any documentation or evidence submitted to support notifications of disruptions to studies. Requests for original documentation will be sent to the applicant's student email address within six (6) months of notification by the student. Students must retain all original documentation for the duration of this six (6) month period and must supply original documents to the University within ten (10) working days of such a request being made.

Contacting Teaching Staff and Obtaining Help and Feedback

Students may contact teaching staff at any time during the term by using the contact details provided in this guide.

For all university related correspondence, students are required to use their official Macquarie University student email account which may be accessed via the Macquarie University Student Portal. Inquiries from personal email accounts will not be attended to.

Students may seek additional feedback at any time during the term and general feedback about their performance in a unit up to 6 months following results release.

Assessment Tasks

Name	Weighting	Due
Assignments	10%	Lesson 2 of Week 4 and Week 6
Tests	15%	Lesson 2 Week 2, 4 and 5
Laboratory Work	20%	End of each Lab session
Final Examination	55%	MUIC final examination period

Assignments

Due: **Lesson 2 of Week 4 and Week 6**
Weighting: **10%**

Problem solving is at the heart of physics and engineering. From Week 1 to Week 6 students will be provided with a set of *assignment problems* based on the previous weeks' topics.

Students will be required to complete two assignments and submit them (handwritten) in Lesson 2 of Week 4 and Week 6 in person.

On successful completion you will be able to:

- Students 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.

- Students will be able to 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.
- Students will be able to analyse real-world problems,be able to develop physical problems based on this analysis, and interpret how numerical results relate to the physical world.
- Students will be able to identify sources of uncertainty in physical measurements, be able to propagate these uncertainties through calculations, and express results in a meaningful way.

Tests

Due: **Lesson 2 Week 2, 4 and 5**
Weighting: **15%**

Three tests will be given to students in Lesson 2 of Week 2, Week 4 and Week 5. Each test will be about 30 minutes long. The tests will cover the previous week's topics. Further details will be provided in lessons leading up to each tests.

On successful completion you will be able to:

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Laboratory Work

Due: **End of each Lab session**
Weighting: **20%**

The laboratory work is designed to introduce students to some of the basic skills and techniques that are used in experimental physical science, and forms an important component of their learning in WPHY140.

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 at the end of each lab session. The laboratory notebook stays with the laboratory throughout the semester.

The laboratory component of the unit is compulsory and all experiments must be successfully completed to pass the unit overall. Only under exceptional circumstances will extra catch up lab sessions be organised, students are responsible for ensuring that they complete all experiments as required during their registered laboratory class.

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- Students will be able to 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 three hours long and will cover all content from week 1 to week 6. The examination is closed book. A resource sheet of relevant equations and physical constants will be provided.

The use of calculators in examinations for this unit is permitted but calculators *with a full alphabet* on the keyboard are not allowed.

Final exams and final assessments will typically take place in Week 6 or Monday of Week 7. All students enrolled in a teaching session are expected to ensure they are available up until and

including Monday of Week 7 to undertake examinations. Passing the final exam or final assessment task is a requirement to pass this unit.

On successful completion you will be able to:

- Students 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.
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Delivery and Resources

Scheduled Class Time & Timetables

Weekly face to face contact for this unit will be 14 hours over three days consisting of 8 hours lessons and 6 hours of lab sessions (84 hours per term).

Students will be able to enrol in their classes and view their personal timetable via eStudent and may also view general timetable information via Macquarie University's Timetable page.

If any scheduled class falls on a public holiday a make-up lesson may be scheduled. Where appropriate, the instructor may instead organise an online make-up lesson which would require students to access online learning materials and/or complete activities outside of class rather than attending a make-up lesson. Scheduled make-up days will be announced in class and attendance will be taken taken for both for face to face and online make-up lessons.

Attendance Requirements - All students

All students are required to attend at least 80% of scheduled class time to pass this unit.

Attendance will be monitored in each lesson and students will be able to see their attendance records for a unit via iLearn.

Where a student is present for a part of a lesson (for example arrives late, leaves early, leaves the class frequently or for lengthy periods, engages in inappropriate or unrelated activities or does not participate actively in the majority of the lesson) the teacher reserves the right to mark a student absent for that part of the lesson.

Because of the intensive nature of this program, students should be aware that their attendance in this unit may fall below 80% relatively quickly.

In cases of unavoidable non-attendance due to illness or circumstances beyond control, students

should lodge a Disruption to Studies Notification via ask.mq.edu.au within 5 working days and supply relevant supporting documentation, even if they have not missed a formal assessment task. This will ensure that that appropriate records of unavoidable absences can be made.

For further information on attendance, please refer to the Attendance and Study Load Policy.

iLearn

iLearn is Macquarie's online learning management system and a principal resource which will be used throughout the term. Students should access iLearn at least 3 times per week as it will contain important information including:

- Announcements - Teaching staff will communicate to the class using iLearn announcements.
- A link to the unit guide for the unit and staff contact details
- Lecture notes and recordings where available
- Learning and teaching activities and resources
- Assessment information
- Tutorial questions and solutions
- Assessment submission tools such as Turnitin
- Other relevant material

For any technical or support issues using iLearn, please contact the IT helpdesk (Ph. 02 9850 4357) or lodge a ticket using OneHelp.

Required and Recommended Texts and/or Materials

Required Text

Fundamentals of Physics, by Halliday, Resnick, and Walker, extended 10th edition (with Wiley Plus). A used copy is fine, as is the 9th, 8th or 7th edition if students accept that number references to lesson and assignment questions will require conversion.

The content of the unit is based on the following chapters of the textbook, "Fundamentals of Physics" by Halliday, Resnick, & Walker:

• Mechanics (Weeks 1-3): Chapters 1-13, 15 (Extended 10th edition)

• Electricity and Magnetism (Weeks 4-6): Chapters 21-30 (Extended 10th edition).

An electronic version of the textbook is available from the publisher- check their web site (www.wileydirect.com.au) or the Internet.

Additional reading materials will be provided to the students throughout the semester. This will be provided in hard copy or placed in iLearn.

Required Resources

A copy of the WPHY140 Laboratory Manual should be purchased from the Co-op notes bookshop before the laboratory sessions begin. But, the manual might be available on iLearn.

Technology

Making use of slides, videos or other audio visual resources outside class time is not equivalent to attending face-to-face lessons; these resources are good for review and revision but they are no substitute for lessons.

The use of calculators in the laboratory lessons, when completing tests or assignments, and in the final examination for this unit is usually necessary. Calculators *with a full alphabet* on the keyboard, or text retrieval capabilities are **not** allowed in the tests and the final examination. Please double check with your teacher whether your calculator is suitable prior to the final examination.

Technology Used and Required

- Access to internet (Available on Campus using Macquarie OneNet)
- Access to iLearn
- Access to Macquarie University Library catalogue
- Access to Microsoft Office Word and Excel (available in Labs)

Study material is hosted on the iLearn webpage for the unit http://ilearn.mq.edu.au

Students are also encouraged to sign up to the Wiley Plus website to make use of the extended learning resources available there - including interactive problem solving resources. Instructions will be provided in lessons.

Lessons

Lesson times - See the unit guide in iLearn and the timetable.

This unit consists of three different formal types of activity:

1. Lessons in which new material is presented, discussed and illustrated by examples and demonstrations.

Attending lessons is an important part of studying physics because it allows students to gain an insight into the subject matter that reading a textbook alone cannot provide. The lessons can explain the concepts from several points of view, can point out and explain the most important aspects of the material and, very importantly, can illustrate the relationships and connections between the different concepts that are studied in WPHY140 – no subject in physics stands on its own.

2. Practical lessons in which examples illustrating the material are presented for discussion and problem solving methods are practiced.

3. 3-hour laboratory lessons, in which students will develop skills in making measurements of physical phenomena and in the interpretation of collected data. **Laboratory lessons are compulsory and students who do not attend all laboratory lessons will be deemed to not have met the learning outcomes of the unit and will therefore receive a failing grade.**

There will be three tests in this unit.

Outside face-to-face lesson times, **students should aim to spend an average of 12 hours per week understanding the course material and working on assigned problems.** Students are free to discuss the assigned problems with classmates as this is a good way to learn and understand the concepts involved. It is by applying knowledge learned from lessons and textbooks to solve problems that students are best able to test and develop their skills and understanding of the course material.

Unit Schedule

Week	Course Material	Reading/ Assignments/ Tests	Laboratory/ Practical Lesson Schedule
1	Measurement, motion along a straight line, and acceleration. Scalar and vector quantities, scalar product, vector product, and motion in 2 and 3 dimensions.	Chapters 1 to 4	Introductory Practical Lesson Lab 1: Unit 1 Digital Oscilloscope Assignment 1 released
2	Force, Newton's laws, friction, and uniform circular motion. Kinetic energy, potential energy, work, power, and energy conservation.	Chapters 5 to 8 Test 1	Lab 2: Unit 2 Electronic Circuits Lab 3: Experiment
3	Centre of mass, linear momentum, linear momentum of systems of particles, collision, impulse, conservation of momentum. Rotation, kinetic energy of rotation. Rotation, torque, and angular momentum. Oscillations, simple harmonic motion, and resonance.	Chapters 9 to 11, and 15	Lab 4: Experiment Lab 5: Experiment

4	Equilibrium, elasticity, and gravitation. Electric charge, coulomb's law, and electric fields.	Chapters 12 to 13, and 21 to 22 Due date of Assignment 1 Test 2	Lab 6: Experiment Lab 7: Experiment Assignment 2 released
5	Electric fields, Gauss' law, and Electric Potential. Capacitance, currents, and resistance, and circuits.	Chapters 22 to 24 Test 3	Lab 8: Experiment Lab 9: Experiment
6	Magnetic fields, magnetic fields due to currents. Induction and inductance.	Chapters 25 to 30 Due date of Assignment 2	Revision Lesson
	FINAL EXAM Final exams and final assessments will typically take place in Week 6 or Monday of Week 7. All students enrolled in a teaching session are expected to ensure they are available up until and including Monday of Week 7 to undertake examinations. Passing the final exam or final assessment task is a requirement to pass this unit.		

Policies and Procedures

Macquarie University policies and procedures are accessible from Policy Central. Students should be aware of the following policies in particular with regard to Learning and Teaching:

Academic Honesty Policy http://mq.edu.au/policy/docs/academic_honesty/policy.html

New Assessment Policy in effect from Session 2 2016 http://mq.edu.au/policy/docs/assessment/policy_2016.html. For more information visit http://students.mq.edu.au/events/2016/07/19/new_assessment_policy_in_place_from_session_2/

Assessment Policy prior to Session 2 2016 http://mq.edu.au/policy/docs/assessment/policy.html

Grading Policy prior to Session 2 2016 http://mq.edu.au/policy/docs/grading/policy.html

Grade Appeal Policy http://mq.edu.au/policy/docs/gradeappeal/policy.html

Complaint Management Procedure for Students and Members of the Public http://www.mq.edu.au/policy/docs/complaint_management/procedure.html

Disruption to Studies Policy http://www.mq.edu.au/policy/docs/disruption_studies/policy.html *The Disruption to Studies Policy is effective from March 3 2014 and replaces the Special Consideration Policy.*

In addition, a number of other policies can be found in the Learning and Teaching Category of 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/support/student_conduct/

Results

Results shown in *iLearn*, 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.

Academic Honesty

The nature of scholarly endeavour, dependent as it is on the work of others, binds all members of the University community to abide by the principles of academic honesty. Its 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 is the work of the author making the claim
- all academic collaborations are acknowledged
- academic work is not falsified in any way
- when the ideas of others are used, these ideas are acknowledged appropriately.

Further information on the academic honesty can be found in the Macquarie University Academic Honesty Policy at http://www.mq.edu.au/policy/docs/academic_honesty/policy.html

Final Examination Script Viewings and 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 Standardised Numerical Grade (SNG) a student receives for a unit of study. They do not apply to results received for individual assessment tasks.

A student is expected to seek feedback on individual assessment tasks prior to the award of a final grade. In particular, a student is expected to view their final examination paper in advance of submitting a grade appeal, if this is relevant to their case. To request a final examination script viewing, please lodge a ticket via ask.mq.edu.au. Script viewings must be lodged between results release date of the relevant teaching Term (00.01 am Friday Week 7) and midnight Tuesday Week 1 of the subsequent teaching Term (5 day period). Requests outside this window will not be considered.

Grade appeals must be submitted via 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 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 Foundation 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 50% or more of their enrolled units in a study Term. To successfully complete a unit, students must meet the requirements to pass as listed in the unit guide, obtain a passing grade **and** fulfil attendance requirements.

Students who fail to make Satisfactory Academic Progress will be classified as "at risk" and will be notified in writing. At-risk student 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 2 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 subjects after studying two or more terms.

Any domestic student who has been identified as not meeting Minimum Rate of Progress requirements will be issued with an 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 issued with an Intention to Report letter and may subsequently be reported to the Department of Immigration and Border Protection (DIBP) for not meeting visa requirement and be subject to exclusion from the program. International students must comply with the MUIC Progress Policy 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) 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

IT Help

For help with University computer systems and technology, visit http://www.mq.edu.au/about_us/offices_and_units/information_technology/help/.

When using the University's IT, you must adhere to the Acceptable Use of IT Resources Policy. The policy applies to all who connect to the MQ network including students.

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:

Learning outcomes

- Students 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.
- Students will be able to 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.
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Assessment tasks

- Assignments
- Tests
- Laboratory Work
- Final Examination

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

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- Students will be able to use discipline specific terminology to communicate concepts and ideas relevant to this unit.

Assessment tasks

- Assignments
- Tests
- Laboratory Work
- Final Examination

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:

Learning outcome

- Students will be able to 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 task

- Laboratory Work

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.

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- Tests
- Laboratory Work
- Final Examination

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

- Students 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.
- Students will be able to 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.
- Students will be able to analyse real-world problems,be able to develop physical problems based on this analysis, and interpret how numerical results relate to the physical world.
- Students will be able to identify sources of uncertainty in physical measurements, be able to propagate these uncertainties through calculations, and express results in a meaningful way.

Assessment tasks

- Assignments
- Tests
- Laboratory Work
- Final Examination

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

- Students 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.
- Students will be able to 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.
- Students will be able to analyse real-world problems,be able to develop physical problems based on this analysis, and interpret how numerical results relate to the physical world.
- Students will be able to record experimental data, display data graphically, analyse data, and present their conclusions in a clear, concise, and systematic manner.
- Students will be able to identify sources of uncertainty in physical measurements, be able to propagate these uncertainties through calculations, and express results in a meaningful way.

Assessment tasks

- Assignments
- Tests
- Laboratory Work
- Final Examination

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

- Students 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.

- Students will be able to 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.
- Students will be able to identify sources of uncertainty in physical measurements, be able to propagate these uncertainties through calculations, and express results in a meaningful way.
- Students will be able to use discipline specific terminology to communicate concepts and ideas relevant to this unit.

Assessment tasks

- Laboratory Work
- Final Examination

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:

Assessment task

- Laboratory Work

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:

Assessment task

- Laboratory Work

Laboratory Details

Laboratory Requirements

The laboratory component is considered an essential component of learning and so counts for an appreciable fraction 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 the 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.

This work is designed to be carried out independently of the textbook material - although some of these topics will be discussed in class. 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 tackled independently of the textbook material. Indeed there is some advantage in becoming familiar with a topic in an experimental situation before students meet it in other lessons. That is often the case in real life! All the information students need for each experiment is contained in the Laboratory Manual. 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 North East corner (Room 114). Entry is from the courtyard at the opposite end to the main staircase.

What to Bring

Students will need to bring a copy of the Physics IA Laboratory Notes, which are available from the Coop Bookshop (or via iLearn).

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 students 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 with students to the first lab session.

Laboratory Attendance Requirements

Students are required to attend all rostered laboratory lessons. If a student miss more than one session without a written explanation then he or she will not be considered to have satisfactorily completed the laboratory component of the unit. Each time students attend the laboratory they must sign in and out (legibly) in the attendance book.

If a student miss a laboratory session and wish to lodge a "disruption to studies" request then he or she can start this process at ask.mq.edu.au. Students will require a medical certificate or other form of evidence to complete this process.

How to use the 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 lesson students must show their books to the laboratory supervisor who will check them and collect them for marking. The marker (one of the laboratory demonstrators) will be checking their books to see whether students 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 next 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 lesson.

Laboratory Safety

Students are required to follow all safety guidelines given in the lab manual, and as outlined by their lab supervisor. **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 WPHY140 iLearn page. Students must attend their nominated laboratory lessons .