PHYS140

Physics IA

S1 Day 2017

Dept of Physics and Astronomy

Contents

General Information

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Credit points
3

Prerequisites (HSC Mathematics Band 4-6 or Extension 1 Band E2-E4 or Extension 2) or MATH130 or MATH123(HD)
Corequisites
Co-badged status
Unit description This unit, together with PHYS143, gives an overview of physics, which aims to discover and understand the fundamental laws of nature and use them to explain the phenomena that occur in the universe. This unit includes a broad range of topics suitable for engineering students or those majoring in any of the sciences. Students are introduced to the central topics of classical physics, the physics that describes what we observe in day-to-day life, namely the mechanical, electrical and magnetic behaviour of matter. Topics include: measurement and vectors; Newton's laws of motion; momentum and energy; gravitation; electric charge; electric field and potential; capacitance; simple direct-current circuits; the origin of magnetic fields; and electromagnetic induction. The language of physics is mathematics. Much of what physics has to say can be described using straightforward algebra and calculus from the HSC Mathematics course. This approach is taken. It gives a distinct advantage: a quantitative and usefully different perspective to topics than may be encountered in units of study in biology, chemistry or earth sciences. 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:

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.

General Assessment Information

If you apply for Disruption to Study for your final examination, you must make yourself available for the week of July 24 – 28, 2017. If you are not available at that time, there is no guarantee an additional examination time will be offered. Specific examination dates and times will be determined at a later date.

Assessment Tasks

Name	Weighting	Hurdle	Due
Quizzes	20%	Yes	In class
Laboratory sessions	20%	Yes	At the end of each lab
Mid-term exam	15%	No	At the end of the exam
Final exam	45%	Yes	At the end of the exam

Quizzes

Due: **In class**
Weighting: **20%**
This is a hurdle assessment task (see assessment policy for more information on hurdle assessment tasks)

In weeks 2-12, during your tutorial session, you will answer one or two questions presented as a quiz. The quiz questions will be based on material presented and discussed during the previous week's tutorial. The quiz is closed book. You will have 10 minutes to answer your quiz questions. These quizzes will be marked and returned with feedback. If you have missed your scheduled tutorial quiz, you may make a case to the Junior Convener to reschedule your quiz. He may approve it under certain circumstances.

Your best 7 quiz scores (out of a possible 11) will contribute a total of 20% to your final mark. *Satisfactory performance in quizzes is a hurdle requirement. You must obtain a mark of at least 40% in at least 7 out of the 11 scheduled quizzes to pass the unit. No additional quizzes will be offered for those who fail to meet this requirement.*

We require effective participation in tutorials, entailing a focused work effort and attendance for the full session. If you do not participate effectively in a given week, for example leaving the

tutorial early without extenuating circumstances, it will be grounds for receiving a score of zero for that week's quiz, and that quiz will then not count towards passing the hurdle requirement.

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.

Laboratory sessions

Due: **At the end of each lab**
Weighting: **20%**
This is a hurdle assessment task (see assessment policy for more information on hurdle assessment tasks)

Laboratory sessions commence in **week 1**. The first week's lab contains important rules and explanations, including concerning safety in the lab. This session **must be completed** in order to access the lab in following weeks.

Satisfactory completion of laboratories is a hurdle requirement. You **must** attend **all ten** laboratory sessions. You **must** obtain a mark of **at least 40%** for each of the laboratory sessions in order to pass the unit. If you miss a session or fail an activity, you must complete a "**Request to schedule a make-up laboratory session"** form that you can find on iLearn. Make-up lessons will be offered in the second week of semester break (ie the week commencing 24 April) and in week 13.

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 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.

Mid-term exam

Due: **At the end of the exam**
Weighting: **15%**

A mid-session exam will be held in the 9 am lecture time slot on Thursday the 13th of April i.e. the end of week 7 (note: Friday the 14th April is Good Friday and a holiday). This 50-minute exam will cover content from weeks 1-4 inclusive. Further details will be provided in lectures leading up to this date.

If you cannot attend the exam please let the Junior Convener know as soon as you can. If you cannot attend, or if you miss the exam due to sickness, there will be a catch up mid-session exam at a later date, advertised on iLearn (the make up exam is likely going to be towards the end of the mid-semester break). There will only be **one** mid-session exam make up opportunity.

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.

Final exam

Due: **At the end of the exam**
Weighting: **45%**
This is a hurdle assessment task (see assessment policy for more information on hurdle assessment tasks)

You are expected to present yourself for examination at the time and place designated in the University Examination Timetable (a link will be posted on iLearn).

The final examination will be three hours long and will cover all content in the unit, with an emphasis on that in weeks 5-13. 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, in accordance with the Science Faculty's policy, calculators *with a full alphabet* on the keyboard are not allowed.

The final examination is a hurdle requirement. You must obtain a mark of at least 40% to pass

the unit. If your mark in the final examination is between 30% and 39% inclusive then you will be a given a second and final chance to attain the required level of performance.

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.

Delivery and Resources

General Information

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

Asking for help

A number of people can assist students while they undertake PHYS140. For any inquiry please use this e-mail address:

phys140@mq.edu.au

instead of using people's personal e-mails. This will insure that the best answer to your question is obtained.

Unit textbook and textbook resources

The textbook for this unit is "Fundamentals of Physics" by Halliday, Resnick, & Walker, Extended 10th edition. It is essential that you obtain a copy (digital or physical) of this text book as we will be following it closely and you will find it an invaluable resource while working on 'assigned problems' in PHYS140.

Print versions of the textbook are available from the CoOp bookshop (hard- and soft-cover) and digital options are available through http://au.wiley.com/WileyCDA/WileyTitle/productCd-EHEP002531.html .

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 lectures.

Technology

Audio recordings and copies of slides from lectures will be available in iLearn through the Echo360 system. By virtue of the activities that occur in a physics lecture (demonstrations, problem solving) making use of these resources is not equivalent to attending. These resources are good for review and revision.

The use of calculators in the laboratory classes, when completing quizzes, in the in-session exam and in the final examination for this unit is usually necessary. In accordance with the Science Faculty's policy, calculators *with a full alphabet* on the keyboard are not allowed in the quizzes, in-session exam or the final examination.

Personal electronic devices such as smart phones, tablets, or laptops will be used for self assessment quizzes and other learning enhancement classroom activities.

Lectures, tutorials and laboratory sessions

This unit consists of three different formal types of activity:

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

Attending lectures is an important part of studying physics since it allows you to gain an insight into the subject matter that reading the textbook alone cannot provide. The lecturers 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 PHYS140 – no subject in physics stands on its own.

2. Weekly tutorials

In tutorials examples illustrating the material are presented for discussion (with fellow classmates and tutors) and problem solving methods are practiced. Tutorials in weeks 2-13 will include a 10 minute quiz, based on one of the assigned problems issued the previous week. Tutorials form an important learning component of PHYS140 and are therefore compulsory. **We require effective participation in tutorials, entailing a focused work effort and attendance for the full session. If you do not participate effectively in a given week, for example leaving the tutorial early without extenuating circumstances, it will be grounds for receiving a score of zero for that week's quiz, and that quiz will then not count towards passing the hurdle requirement.**

3. Laboratory sessions

During laboratory sessions you will develop skills in making measurements of physical phenomena and in the interpretation of collected data. **Laboratory classes are compulsory and students who do not attend all laboratory classes will be deemed to have failed to satisfactorily meet the learning outcomes of the unit and will therefore receive a failing grade.**

Lecture and tutorial times - See more detailed unit guide provided in iLearn or your timetable.

Peer Assisted Learning (PAL)

Peer Assisted Learning (PAL) in PHYS140 offers students additional resource to gain some practice in problem-solving, in small classes led by second- or third-year students. Several PAL sessions will be offered, with class times and locations announced via iLearn and in lectures in Week 3. Participation in PAL is on a voluntary basis, but you are strongly encouraged to join the classes.

Unit Schedule

Lectures:

A more detailed week-by-week schedule will be placed on iLearn. The unit is taught in two halves:

• Mechanics, Prof. Orsola De Marco, Weeks 1-7: Chapters 1-13, 15 (Extended 10th edition)

• Electricity and Magnetism, Prof Judith Dawes, Weeks 8-13: Chapters 21-30 (Extended 10th edition)

Lecture times are on Thursday at 9-10AM and on Friday at 12-1PM and at 4-5PM.

Laboratory sessions:

Each student will attend 10, 3-hour long laboratory sessions, starting in week 1.

Tutorials:

Each student will attend 13, 1-hour long tutorials, starting in week 1.

Learning and Teaching Activities

Lectures

Three hours of lectures per week are provided where a lecturer explains the material, gives examples in the form of movies, practical problems, demos, and engages the classroom with dynamic quizzes (not marked) written using software such as "Kahoot!". Lectures are recorded, but listening to the recording and reading the book is not a good substitute to attending lectures.

Tutorial

Each student will attend one hour a week of tutorial class. Tutorials are group activities, comprising approximately 20 students and one tutor. Four tutorial questions pertaining material discussed in the lectures of the previous week, are provided and are discussed and solved in a group setting. During tutorial time in weeks 2-12 each student answers one 10-minute quiz question based on material discussed in the tutorial the previous week. This question is assessed (see Assessment). During the first week's tutorial, since there is no material already discussed in class, questions based on HSC maths and very simple physics will be discussed and a quiz completed, but not marked. This is so as to explain the format of both tutorial and quiz.

Laboratory

Ten three-hour laboratory classes will be held during the semester. The first is an introductory session. It is held in Week 1, and no pre-lab work is required. It includes important safety information and therefore attendance is mandatory. Students can't attend their 2nd laboratory session until they have completed the first. During the laboratory sessions students will engage in practical exercises to develop their experimental skills and to further their understanding of the physics concepts. These 10 sessions are assessed and are also a "hurdle". Please see assessment part of this Unit Guide.

Peer assisted learning (PAL)

Peer Assisted Learning (PAL) in PHYS140 offers students additional practice in problem-solving, in small classes led by second- or third-year students. Several PAL sessions will be offered, with class times and locations announced via ilearn and in lectures in Week 3. Participation in PAL is on a voluntary basis, but you are strongly encouraged to join the classes.

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

Assessment Policy http://mq.edu.au/policy/docs/assessment/policy_2016.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 (in effect until Dec 4th, 2017): http://www.mq.edu.au/policy/docs/disruption_studies/policy.html

Special Consideration Policy (in effect from Dec 4th, 2017): https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policies/special-consideration

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.

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 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.

Assessment tasks

- Laboratory sessions
- Mid-term exam
- Final exam

Learning and teaching activities

- Three hours of lectures per week are provided where a lecturer explains the material, gives examples in the form of movies, practical problems, demos, and engages the classroom with dynamic quizzes (not marked) written using software such as "Kahoot!". Lectures are recorded, but listening to the recording and reading the book is not a good substitute to attending lectures.
- Each student will attend one hour a week of tutorial class. Tutorials are group activities, comprising approximately 20 students and one tutor. Four tutorial questions pertaining material discussed in the lectures of the previous week, are provided and are discussed and solved in a group setting. During tutorial time in weeks 2-12 each student answers one 10-minute quiz question based on material discussed in the tutorial the previous week. This question is assessed (see Assessment). During the first week's tutorial, since there is no material already discussed in class, questions based on HSC maths and very simple physics will be discussed and a quiz completed, but not marked. This is so as to explain the format of both tutorial and quiz.
- Ten three-hour laboratory classes will be held during the semester. The first is an introductory session. It is held in Week 1, and no pre-lab work is required. It includes important safety information and therefore attendance is mandatory. Students can’t attend their 2nd laboratory session until they have completed the first. During the laboratory sessions students will engage in practical exercises to develop their experimental skills and to further their understanding of the physics concepts. These 10 sessions are assessed and are also a "hurdle". Please see assessment part of this Unit Guide.
- Peer Assisted Learning (PAL) in PHYS140 offers students additional practice in problem-solving, in small classes led by second- or third-year students. Several PAL sessions will be offered, with class times and locations announced via ilearn and in lectures in Week 3. Participation in PAL is on a voluntary basis, but you are strongly encouraged to join the classes.

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

- 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 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.

Assessment task

- Laboratory sessions

Learning and teaching activity

- Three hours of lectures per week are provided where a lecturer explains the material, gives examples in the form of movies, practical problems, demos, and engages the classroom with dynamic quizzes (not marked) written using software such as "Kahoot!". Lectures are recorded, but listening to the recording and reading the book is not a good substitute to attending lectures.
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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 outcomes

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- 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 tasks

- Laboratory sessions
- Mid-term exam
- Final exam

Learning and teaching activities

- Three hours of lectures per week are provided where a lecturer explains the material, gives examples in the form of movies, practical problems, demos, and engages the classroom with dynamic quizzes (not marked) written using software such as "Kahoot!". Lectures are recorded, but listening to the recording and reading the book is not a good substitute to attending lectures.
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and solved in a group setting. During tutorial time in weeks 2-12 each student answers one 10-minute quiz question based on material discussed in the tutorial the previous week. This question is assessed (see Assessment). During the first week's tutorial, since there is no material already discussed in class, questions based on HSC maths and very simple physics will be discussed and a quiz completed, but not marked. This is so as to explain the format of both tutorial and quiz.

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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

- 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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Assessment tasks

- Quizzes
- Laboratory sessions
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Learning and teaching activities

- Three hours of lectures per week are provided where a lecturer explains the material, gives examples in the form of movies, practical problems, demos, and engages the classroom with dynamic quizzes (not marked) written using software such as "Kahoot!". Lectures are recorded, but listening to the recording and reading the book is not a good substitute to attending lectures.
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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

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- Quizzes
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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 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.
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Assessment tasks

- Quizzes
- Laboratory sessions
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- Final exam

Learning and teaching activities

- Three hours of lectures per week are provided where a lecturer explains the material, gives examples in the form of movies, practical problems, demos, and engages the classroom with dynamic quizzes (not marked) written using software such as "Kahoot!". Lectures are recorded, but listening to the recording and reading the book is not a good substitute to attending lectures.
- Each student will attend one hour a week of tutorial class. Tutorials are group activities, comprising approximately 20 students and one tutor. Four tutorial questions pertaining material discussed in the lectures of the previous week, are provided and are discussed and solved in a group setting. During tutorial time in weeks 2-12 each student answers one 10-minute quiz question based on material discussed in the tutorial the previous week. This question is assessed (see Assessment). During the first week's tutorial, since there is no material already discussed in class, questions based on HSC maths and very simple physics will be discussed and a quiz completed, but not marked. This is so as to explain the format of both tutorial and quiz.
- Ten three-hour laboratory classes will be held during the semester. The first is an introductory session. It is held in Week 1, and no pre-lab work is required. It includes important safety information and therefore attendance is mandatory. Students can’t attend their 2nd laboratory session until they have completed the first. During the

laboratory sessions students will engage in practical exercises to develop their experimental skills and to further their understanding of the physics concepts. These 10 sessions are assessed and are also a "hurdle". Please see assessment part of this Unit Guide.

- Peer Assisted Learning (PAL) in PHYS140 offers students additional practice in problem-solving, in small classes led by second- or third-year students. Several PAL sessions will be offered, with class times and locations announced via ilearn and in lectures in Week 3. Participation in PAL is on a voluntary basis, but you are strongly encouraged to join the classes.

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 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

- Laboratory sessions
- Mid-term exam
- Final exam

Learning and teaching activities

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gives examples in the form of movies, practical problems, demos, and engages the classroom with dynamic quizzes (not marked) written using software such as "Kahoot!". Lectures are recorded, but listening to the recording and reading the book is not a good substitute to attending lectures.

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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 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 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 sessions

Learning and teaching activity

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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.

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Learning outcomes

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Changes from Previous Offering

1. Hurdles were introduced

2. Small adjustments to the assessment - small shifts in the number and intensity of assessable tasks

3. New lecturers

4. Compulsory tutorials

5. PAL sessions offered

6. Improvement and small modification to laboratory approach and style

Graduate capabilities

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.

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.
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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

- Tutorial quizzes
- Mid-session Exam
- Laboratory Work
- Final Examination

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 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.

Assessment tasks

- Tutorial quizzes
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- Final Examination

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This graduate capability is supported by:

Learning outcome

- Students will be able to record experimental data, display data graphically, analyse data, and present their conclusions in a clear, concise, and systematic manner.

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

- 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.
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Assessment tasks

- Tutorial quizzes
- Laboratory Work
- Final Examination

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

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Assessment tasks

- Tutorial quizzes
- Mid-session Exam
- 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

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