PHYS143

Physics IB

S2 Day 2018

Dept of Physics and Astronomy

Contents

Disclaimer

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General Information

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By appointment

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By appointment

Credit points
3

Prerequisites
PHYS140

Corequisites

Co-badged status

Unit description
This unit, together with PHYS140, 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:

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 start to acquire the skills required to investigate real-world problems, and interpret how numerical data and predictions relate to the physical world.

Assessment Tasks

Name	Weighting	Hurdle	Due
Tutorial Quiz	30%	No	during each tutorial class
Laboratory sessions	30%	Yes	During each lab class
Final exam	40%	Yes	Exam Period
Weekly tutorial participation	0%	Yes	Full tutorial each week

Tutorial Quiz

Due: **during each tutorial class**
Weighting: **30%**

There will be a marked quiz of approximately 20 minutes duration in each tutorial from week 1 to week 13. Typically the tests will comprise questions based on material covered in lectures and tutorials. The quiz is closed book. The Quiz in week 1 is for practice and will not be marked. The other quizzes will be marked and returned to you, and will contribute to your marks for the unit. If you have missed your scheduled tutorial quiz, due to unavoidable circumstances, you should apply for special consideration. There will be no quizzes in Week 8, due to the public holiday on Monday 1 October.

Please bring a suitable (non-programmable) scientific calculator to all tutorials. Mobile phones may not be used.The mid-semester and final exams will also require the use of scientific calculators.

We require effective participation in tutorials, entailing a focused work effort and attendance for the full session. Students who arrrive late may not qualify to take the quiz. See below.

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 start to acquire the skills required to investigate real-world problems, and interpret how numerical data and predictions relate to the physical world.

Laboratory sessions

Due: **During each lab class**
Weighting: **30%**
This is a hurdle assessment task (see assessment policy for more information on hurdle assessment tasks)

NOTE: Laboratory sessions commence in **week 1**. 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. The **first lab session is in week 1** and includes work health and safety information. Students will also be assigned to lab groups and computer access will be checked. It needs to be attended by all students regardless of whether this is their first Physics unit or not. It will be a little bit shorter than the other sessions, but attendance is absolutely mandatory – you can't do subsequent lab sessions if they don't attend the introductory one. The **next 9 lab sessions** involve experimental work and will be assessed. **You must obtain a mark of at least 40% for each of the laboratory sessions in order to pass the unit.**

Preparation is required for each of the lab sessions 2-10. You will find the **Prelab activities** in the Laboratory Resources section of iLearn. Your prelab work will account for some of the marks for each laboratory session.

If you miss a session or fail to to achieve at least 40% for any lab session, you must complete a **"Request to schedule a Catch-up laboratory session"** form, which can also be found on iLearn. Read below for full details about catch up classes and when they are scheduled. **No more than 3 catch ups are allowed for missed labs/lab hurdles**, except where Special Consideration has been approved.

Laboratory catch-up classes will be held at the following times:

Mid-semester break: Monday 17th Sept at 10am–1pm, Tuesday 18th Sept at 10am–1pm, Wednesday 26th Sept at 10am–1pm, Thursday 27th Sept at 10am–1pm.

Week 13: Monday 5th Nov at 9-12am, Tuesday 6th Nov at 9-12am, Wednesday 7th Nov at 9-12am, Thursday 8th Nov at 9-12am.

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- 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.
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Final exam

Due: **Exam Period**
Weighting: **40%**
This is a hurdle assessment task (see assessment policy for more information on hurdle assessment tasks)

You are expected to present yourself for examination at the time and place designated in the University Examination Timetable (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% in the final exam to be eligible to pass the unit. If your mark in the final examination is between 30% and 39% inclusive, you will be a given a second and final chance to attain the required level of performance. The mark awarded for the second exam towards your final unit mark will be capped at 40%*

If you receive special consideration for the final exam, a supplementary exam will be scheduled in the interval between the regular exam period and the start of the next session. By making a special consideration application for the final exam you are declaring yourself available for a resit during the supplementary examination period and will not be eligible for a second special consideration approval based on pre-existing commitments. Please ensure you are familiar with the policy prior to submitting an application. You can check the supplementary exam information page on FSE101 in iLearn (bit.ly/FSESupp) for dates, and approved applicants will receive an individual notification one week prior to the exam with the exact date and time of their supplementary examination.

If you are given a second opportunity to sit the final examination as a result of failing to meet the minimum mark required, you will be offered that chance during the same supplementary examination period and will be notified of the exact day and time after the publication of final results for the 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.
- 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.

Weekly tutorial participation

Due: **Full tutorial each week**
Weighting: **0%**
This is a hurdle assessment task (see assessment policy for more information on hurdle assessment tasks)

Students must participate meaningfully and actively in at least 9 tutorials, including submitting the quiz for that tutorial and completing the Group evaluation of participation and tutorial effectiveness each week.

The tutorial material will complement material that was presented in lectures, and students should prepare for tutorials by attending the lectures or watching them online, The tutorial materials will be made available on ilearn in advance and you are recommended to attempt the questions and read the textbook in preparation for the tutorials.

There will be no tutorials in Week 8, due to the public holiday on Monday 1 October.

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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- 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 start to acquire the skills required to investigate real-world problems, and interpret how numerical data and predictions 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 PHYS143. For any inquiry please use this e-mail address:

PHYS143@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 textbook, as we will be following it closely and you will find it an invaluable resource while working on 'assigned problems' in PHYS143.

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 practised. Tutorials in weeks 2-5 and 7-13 will include a 15 minute quiz, based on the earlier questions in that tutorial and the lecture material from 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 arriving late or leaving the tutorial early without extenuating circumstances, it will be grounds for receiving a score of zero for that week's quiz.**

3. Laboratory sessions

The laboratory component is an essential component of your studies and so counts for an appreciable fraction of your final assessment (20%). You will be introduced to some of the basic skills and techniques required of practicing physicists, scientists and engineers. **You will be issued with a Laboratory Notebook in week 1,** provided with instructional material in the form of **Laboratory Notes** which can be found in the Laboratory Resources section of iLearn, and assisted in the laboratory by a team of demonstrators. For each laboratory session, except in week 1, you are required to complete some preparatory work (**Pre-Lab**) before attending your nominated Lab session. To figure out which Prelab to do, please consult the **Laboratory Schedule** on iLearn.

Location: The laboratory is located on the **ground floor of building 14 SCO (formerly E7B), room 114 (**NorthEast corner of building).

Laboratory Safety: You are required to follow all safety guidelines given in the first Lab session, your lab notes, and the lab staff. Food and drink cannot be consumed and students without suitable covered footwear will be refused admission.

Unit Schedule

Lectures:

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

Magnetic Fields and Induction, Waves, Sound and Light: taught by Dr Cormac Purcell in Weeks 1-6: Chapters 16, 17, 32-36 of Fundamentals of Physics (Extended 10th edition)

Heat & Thermodynamics, Modern Physics: taught by Prof Helen Pask in weeks 7-13. Chapters 18-19, 37-38, 42-43 of Fundamentals of Physics (Extended 10th edition)

Lecture times are Monday 12-1 and Thursday 11-12.

Laboratory sessions:

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

Tutorials:

Each student will attend 13, 2-hour long tutorials, starting in week 1.

Learning and Teaching Activities

Lectures

Two hours of lectures per week are provided where a lecturer explains the material, gives examples in the form of movies, practical problems, demos, and may engage the classroom with dynamic quizzes (not marked). Lectures are recorded, but listening to the recording and reading the book is not a good substitute to attending lectures. Due to a public holiday on Monday 1st October, there will be no Monday lecture in week 8. The Thursday lecture is not affected.

Tutorial

Each student will attend a two-hour tutorial class each week. Important concepts will be reinforced, and a selection of tutorial questions pertaining to material already presented in lectures is provided and are discussed and solved in a group setting. Towards the end of the tutorial, students will take a 20 minute quiz for which marks are awarded. Due to a public holiday on Monday 1st October, there will be no tutorials in Week 8.

Laboratory sessions

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 prelab work is required. Students will be given a lab book, computer access and important safety information and therefore attendance is mandatory. Students can't attend their 2nd Laboratory session until they have completed the first. During the remaining laboratory sessions students will engage in practical exercises to develop their experimental skills and to further their understanding of the physics concepts.

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). 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). 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).

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 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.
- 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 start to acquire the skills required to investigate real-world problems, and interpret how numerical data and predictions relate to the physical world.

Assessment tasks

- Laboratory sessions
- Weekly tutorial participation

Learning and teaching activities

- Two hours of lectures per week are provided where a lecturer explains the material, gives examples in the form of movies, practical problems, demos, and may engage the classroom with dynamic quizzes (not marked). Lectures are recorded, but listening to the recording and reading the book is not a good substitute to attending lectures. Due to a public holiday on Monday 1st October, there will be no Monday lecture in week 8. The

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- 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 prelab work is required. Students will be given a lab book, computer access and important safety information and therefore attendance is mandatory. Students can't attend their 2nd Laboratory session until they have completed the first. During the remaining laboratory sessions students will engage in practical exercises to develop their experimental skills and to further their understanding of the physics concepts.

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.
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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.

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Learning outcomes

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- Each student will attend a two-hour tutorial class each week. Important concepts will be reinforced, and a selection of tutorial questions pertaining to material already presented in lectures is provided and are discussed and solved in a group setting. Towards the end of the tutorial, students will take a 20 minute quiz for which marks are awarded. Due to a public holiday on Monday 1st October, there will be no tutorials in Week 8.
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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

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Assessment tasks

- Tutorial Quiz
- Laboratory sessions
- Final exam
- Weekly tutorial participation

Learning and teaching activities

- Two hours of lectures per week are provided where a lecturer explains the material, gives examples in the form of movies, practical problems, demos, and may engage the classroom with dynamic quizzes (not marked). Lectures are recorded, but listening to the recording and reading the book is not a good substitute to attending lectures. Due to a public holiday on Monday 1st October, there will be no Monday lecture in week 8. The Thursday lecture is not affected.
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understanding of the physics concepts.

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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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

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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.
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- Weekly tutorial participation

Learning and teaching activities

- Two hours of lectures per week are provided where a lecturer explains the material, gives examples in the form of movies, practical problems, demos, and may engage the classroom with dynamic quizzes (not marked). Lectures are recorded, but listening to the recording and reading the book is not a good substitute to attending lectures. Due to a public holiday on Monday 1st October, there will be no Monday lecture in week 8. The Thursday lecture is not affected.
- Each student will attend a two-hour tutorial class each week. Important concepts will be reinforced, and a selection of tutorial questions pertaining to material already presented in lectures is provided and are discussed and solved in a group setting. Towards the end of the tutorial, students will take a 20 minute quiz for which marks are awarded. Due to a public holiday on Monday 1st October, there will be no tutorials in Week 8.
- 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 prelab work is required. Students will be given a lab book, computer access and important safety information and therefore attendance is mandatory. Students can't attend their 2nd Laboratory session until they have completed the first. During the remaining laboratory sessions students will engage in practical exercises to develop their experimental skills and to further their understanding of the physics concepts.

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 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
- Final exam
- Weekly tutorial participation

Learning and teaching activities

- Two hours of lectures per week are provided where a lecturer explains the material, gives examples in the form of movies, practical problems, demos, and may engage the classroom with dynamic quizzes (not marked). Lectures are recorded, but listening to the recording and reading the book is not a good substitute to attending lectures. Due to a public holiday on Monday 1st October, there will be no Monday lecture in week 8. The Thursday lecture is not affected.
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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 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 tasks

- Laboratory sessions
- Weekly tutorial participation

Learning and teaching activities

- Two hours of lectures per week are provided where a lecturer explains the material, gives examples in the form of movies, practical problems, demos, and may engage the classroom with dynamic quizzes (not marked). Lectures are recorded, but listening to the recording and reading the book is not a good substitute to attending lectures. Due to a public holiday on Monday 1st October, there will be no Monday lecture in week 8. The Thursday lecture is not affected.
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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.

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 tasks

- Laboratory sessions
- Weekly tutorial participation

Learning and teaching activities

- Two hours of lectures per week are provided where a lecturer explains the material, gives examples in the form of movies, practical problems, demos, and may engage the classroom with dynamic quizzes (not marked). Lectures are recorded, but listening to the recording and reading the book is not a good substitute to attending lectures. Due to a public holiday on Monday 1st October, there will be no Monday lecture in week 8. The Thursday lecture is not affected.
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Changes since First Published

Date	Description
01/08/2018	Clarifications of the policy for hurdle examinations.