

PHYS 101 – 25S1

ENGINEERING PHYSICS A: MECHANICS, WAVES AND THERMAL PHYSICS

PHYS101 is a 15-point course that meets the Physics requirement for Engineering Intermediate, and is required to advance in Physics and Astronomy.

COURSE INFORMATION

Your first reference for all matters related to PHYS101 should be this document (the course outline) which is available on LEARN. You should also ensure that you read email announcements which are sent from LEARN and provide important extra information.

QUERIES, QUESTIONS, ISSUES

We aim to support your learning in as many ways as possible, and we provide weekly drop-in classes and helpdesks, in addition to tutorials and the independently run PALS sessions - see below for details on each of these. These should be the first places you look for support if you have questions about the *course material*.

If you have a problem with the laboratories or the tutorials, in the first instance you are expected to see Cliff Franklin or your tutor respectively (see labs and tutorials sections below). If you have questions about any other matter, such as administrative issues, the answers are almost certainly in this document, or on LEARN. Please also check course announcements and discussion forums on the LEARN pages (see LEARN section above) and ask general questions in those forums.

If you have checked the course outline **and** LEARN and you **still** have a query, we encourage you to email your question to:

physics101@canterbury.ac.nz

You should **include your student ID** and **make the subject line of your email informative** to ensure a prompt answer by the appropriate member of the teaching team. **All correspondence should be sent to this email address. Sending emails to the course lecturers directly will result in delayed responses. If you have not received an answer to your query in 3 working days please resend your message.**

We find that many enquiries relate to information provided in this document or on LEARN. With more than 600 students in the class such enquiries distract resources and attention from students who have genuine issues, and so they **may not be answered**.

CHECKLIST – things to do BEFORE the course starts

This is a summary of *initial* tasks, that you need to do before the first lecture. It is not a substitute for reading this document.

- Read the course outline (this document) carefully
- Explore LEARN and make sure your settings are chosen so that you are able to receive emailed announcements.
- Read through the week 1 Activities on LEARN, download the lecture notes, **and** do the required pre-reading.
- Purchase a red or green laboratory notebook from the University Bookshop.
- Download the first set of tutorial problems from the week 1 LEARN page and complete the problems to hand in at the first tutorial.

LEARN

This course will make extensive use web-based resources on LEARN (<http://www.LEARN.canterbury.ac.nz/>). All course announcements and handouts will be available on LEARN.

There is a separate ‘Section’ (i.e. page on LEARN) for each week of the course which describes the material to be covered and also provides a check list of work to be completed each week.

In order to receive important announcements, it is essential that you look at the LEARN site and look at your University email account regularly.

You should familiarise yourself with the layout of the LEARN site, and what each section contains. Start by looking at the News (announcements) on the homepage, then look at the Week 1 section to find out **what you need to do before the first lecture**, take a look at the tests and exams section to see what kinds of questions you will need to answer, and then look at ECHO where the lecture recordings are posted.

TEXTBOOK

The **required text** is Serway, Jewett, Wilson, Wilson and Rowlands, **Physics Vol 1. and Vol. 2 (2nd edition)** [Note that other editions are available, including the 1st edition by Serway, Jewett, Wilson and Wilson (SJW²)].

Some relevant but elementary sections of the text completed in NCEA level 3 (or equivalents) will not be covered. Chapters 1 and 2 are **assumed knowledge**. The chapters of the text **covered in PHYS 111 and/or NCEA level 3 and so are assumed in PHYS 101** are 3-6, 8, 15. Please look at the textbook and check that you are familiar with these sections: allow yourself study time to familiarize yourself with this material.

ABSENCES

If you are ill please stay away from in-person classes, please do the following:

Lectures and Drop-in classes:

Watch the lectures online when you are well enough, either via the live stream or via ECHO.

Tutorials:

If you only miss one or two tutorials you will not lose any marks as you are only required to complete 10 of the 12 tutorials. You therefore do not need to inform us about individual absences. If you miss more than two tutorials, email the PHYS101 email account and request an exemption for the missed tutorials.

If you are well enough to study, an **online tutorial is available for people who are self-isolating.**

Labs:

Email the PHYS101 account and request either an exemption or the chance to attend a lab session at an alternative date.

Please remember: when emailing physics101@canterbury.ac.nz make sure to use a descriptive subject line.

Tests and exams

If you are ill and **miss any assessment item worth more than 10% of the course mark** (i.e. a test or the exam) you should submit an application for special consideration. Details of this process are available at: <https://www.canterbury.ac.nz/study/study-support-info/study-related-topics/special-consideration/special-consideration-how-to-apply>

CLASSES

Lectures

	Lecture time	Location
Tuesday	09:00 – 10:00 or 14:00 – 15:00	Lecture Theatre C1 Lecture Theatre C1
Wednesday	09:00 – 10:00 or 14:00 – 15:00	Lecture Theatre C1 Lecture Theatre C1
Friday	09:00 – 10:00 or 14:00 – 15:00	Lecture Theatre C1 Lecture Theatre C1

All lectures will be live streamed via a link on ECHO, which is accessed inside LEARN. Look for the ECHO symbol at right – it should be in the top right of the PHYS101 LEARN page. Live streams are indicated by a green “live” symbol.



Recordings of each lecture will also be available via ECHO.

Note that the capacity of the lecture theatre is ~400, which is substantially fewer than the number of enrolments for this course. We thus have repeat lectures and you should allocate yourself to one of the two sessions on each day. However, if you arrive at the lecture theatre and it is full, head to the live stream instead or attend the other lecture.

Lecturers / topics

Adrian McDonald will teach the first four weeks of lectures, Simon Brown will teach the next five weeks, and Martin Allen will teach the last three weeks.

Mechanics and Conservation Principles	Prof. Adrian McDonald Von Haast 718 12 lectures
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Coordinate systems; vectors; projectile motion; circular motion; Newton’s Laws; friction; potential and kinetic energy; Conservation of energy and angular momentum; Moment of Inertia

Relevant text: Vol. 1 Chapter 2-10, 13, 14

Thermodynamics	Prof. Simon Brown Von Haast 618 15 lectures
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This part of the course focuses on developing a fundamental understanding of how engines work. Topics covered include: work, heat and temperature; first law of thermodynamics; transfer of heat; heat engines; 2nd law of thermodynamics; entropy.

Relevant text: Vol.1 Chapter 16-18, 19 – 22.

Electricity and Magnetism	Prof. Martin Allen Electrical Engineering Link Rm 303 9 lectures
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Electric Charge, Coloumb's Law, electric Fields, capacitors, metals, semiconductors, superconductors, magnetic fields and magnetic force. Electromagnetic induction and Faraday's Law.

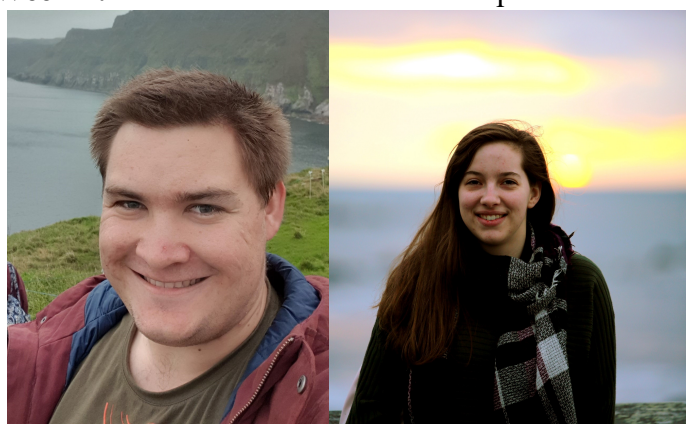
Relevant text: Vol. 2 Chapter 23, 25-27, 30-31.

Tutorials

Senior Tutors: Lachlan Campion and Rosemary Dorsey

PHYS 101 includes 12 tutorial sessions, **starting in Week 1**. Standard tutorials will be in person small group sessions. If you need help with your allocation please email physics101@canterbury.ac.nz.

A tutor will guide your approach to solutions of the problems. Your participation in tutorials is essential – you LEARN physics by solving problems – and it is important preparation for the test and exam. You will receive half of your mark for submitting homework questions (provided the week before the tutorial), the other half for participation in the tutorial which will be judged during a set of invigilated questions.



Any concern about tutorial grades should be taken up with your tutor initially. If you are still unsatisfied, you should contact the senior tutor or the course coordinator via physics101@canterbury.ac.nz.

Helpdesk Workshops

Tutors will be available several times a week (Wednesday 15:00-16:00 in A5 Lecture Theatre, Thursday 16:00-17:00 A4 Lecture Theatre) to help support student questions and provide support. They are there to help you, and we really hope you will make use of this opportunity to ask questions and personalized input.

You are welcome to discuss the weeks tutorial problems as well as the course material in general.

Drop-in classes

To supplement lectures, most weeks the Lecturer will also run an optional Drop-in class (Tuesday 17:00-18:00 in K1 Lecture Theatre unless announced on LEARN). The aim of the Drop-in class is to give you an opportunity to ask questions about the content from the previous week and get the lecturer to go through worked problems and previous tutorial examples. This is OPTIONAL, but please take this opportunity if you feel you need extra support. Each Drop-in class will start with a review of material.

Peer Assisted Learning Sessions

PALS is a peer-to-peer programme that brings students together in regular group study sessions which are aligned with a first-year course. These study sessions are led by PALS leaders who are past students of PHYS101.

PALS sessions follow a kaupapa of “helping you to help yourself” and supports students in their transition to university by providing them with skills to become independent learners. Students receive academic support in a relaxed and relatable environment, enabling them to develop new study skills and techniques to become confident independent learners. The focus is on general study advice including taking notes and revising for exams, as well as navigating resources such as Learn.

These sessions offer the opportunity to make connections with your classmates, revise through group study and to learn all the best study tips and tricks from a student who has already aced the course!

Laboratories

Supervisor: Cliff Franklin, RRSIC 322.

The course includes 6 laboratory sessions of 3 hours each. Labs are in person and start in week one or two dependent on your stream. There are a number of streams to choose from. **You will be allocated to a stream before the course starts.** If you have any queries on your allocation please see Cliff Franklin.

The laboratory work complements the lecture material. Some experiments introduce you to particular experimental techniques. Others illustrate lecture topics. **Laboratory attendance is compulsory and satisfactory performance in the laboratory work is required to pass the course as a whole.**



Before attending this first session, purchase a red or green laboratory notebook from the University Book Shop. If you already have one from a previous course you can use that, as long as it is less than half full. Lab manuals are provided at the first lab, free of charge by the school. Bring your manual and your notebook to the introductory laboratory session.

If you are **unable to attend** in person because you are self-isolating due to illness, you should email the PHYS101 email account and request either an exemption or the chance to attend a lab session at an alternative time/date.

10% of the course credit is based on checkpoint marks assessed by the demonstrators for your laboratory notes which will be marked during your session.

Lab exemption: An exemption for the lab component of the course will be granted to students on request, to those students who have passed the laboratory component of an identical or comparable course. Since laboratory work is designed to reinforce the lecture content as well as teach practical skills, exempted students are encouraged to participate in any labs from which they feel they could benefit. Laboratory course credit can only be used to gain one consequent exemption.

ASSESSMENT

Course credit

A satisfactory performance in the laboratory, tutorials and homework are required for a passing grade in this course.

- 10% Tutorials. Marks will be assigned for BOTH *active* participation in your tutorial stream judged by answering invigilated questions AND submission of assigned homework questions. The maximum grade can be achieved for participation in 10 out of the 12 sessions.
- 30% Term Tests (15% each)
 - Test A on Thursday 20th March at 1900-2000 (Week 5 of the semester)
 - Test B on Thursday 8th May at 1900-2000 (Week 9 of the semester)
- 10% Laboratory. Marks will be assigned based on lab book checkpoint marking/laboratory participation
- 50% Final examination.

Satisfactory performance in the laboratory work (greater than 50%) and a 40% mark in the final exam are required to pass the course. If your score in the exam improves on your average test mark, the exam will count for 80% of your grade.

Final examination

The final examination will be an in person exam: date/time/place to be advised. It tests your grasp of the lectures, problems completed in tutorials, and reading material. Previous years exam and test papers are downloadable from the library website and are available (in many cases with numerical answers) on LEARN in the 'Tests and Exams' folder.

The exam will count 50% toward your final mark in the course, unless your score in the exam improves on your average test mark, the exam will then count for 80% of your grade.

You will need a calculator for the exam and for the tests. **Calculators need to be of an approved type and you must ensure it has the appropriate sticker** – for details see <https://www.canterbury.ac.nz/study/examinations/exam-instructions/> for up to date information on time and place for calculator checks.

Term tests

There will be two Term tests. These tests will take place in person, in the evening and be 60 minutes long, and will each be worth 15% of the course grade. The key goal of these tests is to provide you with feedback on the status of your understanding. Further information will be given in lectures.

If you are unable to sit a test or exam due to exceptional circumstances, see the absences section above.

GENERAL INFORMATION

The department has general policies that apply to all courses regarding such matters as Dishonest Practice, Allowed types of calculators, Marks and Grades boundaries, Late Work, Academic Liaison, Assistance for Students with Disabilities, Reconsideration of Grades, Aegrotat Applications, Missing of Tests etc. For details click on the following link:

[General Course Information](#)

Expectations and requirements of student participation in physics and astronomy courses

An important principle operating in all our courses is

LEARNING THROUGH ACTIVE PARTICIPATION.

This means that you must be prepared to attend all the lectures, laboratories and tutorials and attempt all the homework assignments and tests.

Reading, homework and study

You will get as much out of this (or any) course as you put in to it. **Here are some ways you can best help yourself.**

- **Reading.** *Read* the relevant part of the text before each lecture. (A reading and problem list will be circulated.) You will understand and enjoy it more, and LEARN much faster.
- **Problem-solving.** Nothing teaches more thoroughly than solving problems. *Attempt* the set work, especially the homework, as well as past exams, and go over it with your tutor.
- **Study.** *Work over* your lecture notes with the text and problems. *Write a digest* of your notes, summarizing key points in your own way on one sheet of paper for each lecture. These summaries are invaluable in problem solving, in laboratories and in revising.

Required preparation for this course

The course is for students who have a good level of physics and mathematics preparation. Students who do not have 14 NCEA credits in *both* level three physics *and* maths with calculus (or equivalent) are required to do PHYS111 before attempting PHYS101.

Generative AI Usage

The following shall apply for *all assessments in this course*, except where a lecturer has specifically stated otherwise *in written instructions for an assessment*.

Use Prohibited for Specified Reasons: Generative AI tools must not be used within this assessment due to specific considerations, which will be clearly communicated to students.

Generative AI Tools Cannot Be Used for This Assessment

In this assessment, you are strictly prohibited from using generative artificial intelligence (AI) to generate any materials or content related to the assessment. This is because *students are expected to solve problems and demonstrate knowledge and understanding without the assistance of AI*. The use of AI-generated content is not permitted and may be considered a breach of academic integrity. Please ensure that all work submitted is the result of your own human knowledge, skills, and efforts.