

# PHYSICS102: Basic Concepts of Physics

Science  
(15 points)

## Course Prescription

An introduction to the basic principles of physics. Key topics are the physical description of motion, electricity and magnetism. The course focuses on the science of everyday phenomena and the understanding of important physical concepts. This course will equip students with little prior knowledge of physics to succeed in PHYSICS 120 or 160.

## Course Overview

An introduction to the fundamental principles of physics that will equip students with little prior knowledge of physics to succeed in PHYSICS 120 (for students looking to embark on further physics study) or PHYSICS 160.

This course is algebra-based with an emphasis on regular mathematical problem-solving. NCEA Level 2 Mathematics or equivalent is recommended for sufficient preparation.

Key topics are the physical description of the motion of objects, waves, optics, electricity and magnetism. The course focuses on the science of everyday phenomena, the understanding of important physical concepts and their application.

This course includes weekly tutorials to assist students in mathematical problem solving, discussing applications of physics and with assignment problems. The tutorials form an important part of increasing your skill and confidence in applying your knowledge to solving physics problems.

Tutorials will involve individual and group-based problem-solving and discussions.

## Course Requirements

Restriction: PHYSICS 103

## Capabilities Developed in this Course

Capability 1: People and Place

Capability 3: Knowledge and Practice

- Capability 4: Critical Thinking  
 Capability 5: Solution Seeking  
 Capability 6: Communication  
 Capability 7: Collaboration  
 Capability 8: Ethics and Professionalism

Graduate Profile: [Bachelor of Science](#)

### Learning Outcomes

By the end of this course, students will be able to:

1. Apply the laws of physics taught in this course to algebra based problems. (Capability 3, 4 and 5)
2. Use standard physics and mathematical notation logically and correctly. (Capability 3, 6 and 8)
3. Explain the science of everyday phenomena using important physical concepts. (Capability 1, 3, 4, 6 and 7)
4. Contribute to group-based problem solving and discussions. (Capability 1, 3, 6, 7 and 8)
5. Take responsibility for individual learning by consulting available resources, reflecting and asking questions, seeking positive learning opportunities and taking action to overcome difficulties. (Capability 1, 5, 6, 7 and 8)

### Assessments

Assessment Type	Percentage	Classification
Assignments	24%	Individual Coursework
Test	20%	Individual Coursework
Final Exam	50%	Individual Examination
Tutorials	6%	Group & Individual Coursework
4 types	100%	

Assessment Type	Learning Outcome Addressed				
	1	2	3	4	5
Assignments	✓	✓	✓		✓
Test	✓	✓	✓		
Final Exam	✓	✓	✓		
Tutorials	✓	✓	✓	✓	✓

Tuākana Science is a multi-faceted programme for Māori and Pacific students providing topic specific tutorials, one-on-one sessions, test and exam preparation and more. Explore your options at

<https://www.auckland.ac.nz/en/science/study-with-us/pacific-in-our-faculty.html>

<https://www.auckland.ac.nz/en/science/study-with-us/maori-in-our-faculty.html>

For more information and to find contact details for the Physics Department Tuākana coordinator, please see:

<https://www.auckland.ac.nz/en/science/study-with-us/maori-and-pacific-at-the-faculty/tuakana-programme.html>

## Key Topics

- **Mechanics:** Kinematics, Projectile Motion, Newton's Laws and Applications (pulleys, inclined planes), Torque and Static Equilibrium, Hooke's Law, Simple Harmonic Motion, Conservation of Momentum, Work and Conservation of Energy.
- **Waves and Optics:** Mathematical Description of Waves, Superposition, Wave Intensity, Phase, Electromagnetic Waves, Standing Waves, Doppler Effect, Diffraction, Young's Interference, Reflection, Refraction, Snell's Law, Total Internal Reflection, Dispersion, Geometric Optics, Images in: Curved Mirrors, Single and Multiple Lens Systems.
- **Electricity and Magnetism:** Coulomb's Law, Electric Fields, Electric Potential, Current, Resistance, Electric Power, Circuits, Kirchhoff's Laws, Electromagnetism, Faraday's Law and Lenz's Law.

## Special Requirements

The Test will be held in-class during scheduled lecture time.

## Workload Expectations

This course is a standard 15-point summer school course and students are expected to spend 20 hours per week involved in each 15-point summer school course they are enrolled in.

For this course, a typical weekly workload includes:

- 6 hours of lectures
- A 2-hour tutorial
- 6 hours of reading and thinking about the content
- 6 hours of work on assignments and/or test preparation

## Delivery Mode

### Campus Experience

Attendance is expected at scheduled activities including tutorials to complete components of the course. Lectures will be available as recordings. Other learning activities including tutorials will not be available as recordings. The course will not include live online events including tutorials.

The activities for the course are scheduled as a standard weekly timetable.

## Learning Resources

Course materials are made available in a learning and collaboration tool called Canvas which also includes reading lists and lecture recordings (where available).

Please remember that the recording of any class on a personal device requires the permission of the instructor.

### Coursebook:

- The PHYSICS 102 Coursebook is available free as a digital copy or purchased as a hard copy from UBIQ. This will be used in every lecture and contains course notes and example problems to be worked on in lectures.

### Free Online Textbook:

- College Physics (Openstax) - readings and extra problems will be given from this text.  
<https://openstax.org/details/college-physics>

### Drop-in tutoring:

- Daily drop-in tutoring will be available on some weekdays from Week 2 to Week 12 (excluding public holidays, mid-semester break, and the last day of the semester). More details will be updated on Canvas. This learning support supplements regular classes and lecturers' office hours.

## Student Feedback

During the course Class Representatives in each class can take feedback to the staff responsible for the course and staff-student consultative committees.

At the end of the course students will be invited to give feedback on the course and teaching through a tool called SET or Qualtrics. The lecturers and course co-ordinators will consider all feedback.

Your feedback helps to improve the course and its delivery for all students.

Tutorials contain more challenging problems and have an assessment weighting of 5%.

Coursebook has been updated with review problems and formula sheet.

## Academic Integrity

The University of Auckland will not tolerate cheating, or assisting others to cheat, and views cheating in coursework as a serious academic offence. The work that a student submits for grading must be the student's own work, reflecting their learning. Where work from other sources is used, it must be properly acknowledged and referenced. This requirement also applies to sources on the internet. A student's assessed work may be reviewed for potential plagiarism or other forms of academic misconduct, using computerised detection mechanisms.

## Class Representatives

Class representatives are students tasked with representing student issues to departments, faculties, and the

wider university. If you have a complaint about this course, please contact your class rep who will know how to raise it in the right channels. See your departmental noticeboard for contact details for your class reps.

### Copyright

The content and delivery of content in this course are protected by copyright. Material belonging to others may have been used in this course and copied by and solely for the educational purposes of the University under license.

You may copy the course content for the purposes of private study or research, but you may not upload onto any third party site, make a further copy or sell, alter or further reproduce or distribute any part of the course content to another person.

### Inclusive Learning

All students are asked to discuss any impairment related requirements privately, face to face and/or in written form with the course coordinator, lecturer or tutor.

Student Disability Services also provides support for students with a wide range of impairments, both visible and invisible, to succeed and excel at the University. For more information and contact details, please visit the [Student Disability Services' website](http://disability.auckland.ac.nz) <http://disability.auckland.ac.nz>

### Special Circumstances

If your ability to complete assessed coursework is affected by illness or other personal circumstances outside of your control, contact a member of teaching staff as soon as possible before the assessment is due.

If your personal circumstances significantly affect your performance, or preparation, for an exam or eligible written test, refer to the University's [aegrotat or compassionate consideration page](https://www.auckland.ac.nz/en/students/academic-information/exams-and-final-results/during-exams/aegrotat-and-compassionate-consideration.html) <https://www.auckland.ac.nz/en/students/academic-information/exams-and-final-results/during-exams/aegrotat-and-compassionate-consideration.html>.

This should be done as soon as possible and no later than seven days after the affected test or exam date.

### Learning Continuity

In the event of an unexpected disruption, we undertake to maintain the continuity and standard of teaching and learning in all your courses throughout the year. If there are unexpected disruptions the University has contingency plans to ensure that access to your course continues and course assessment continues to meet the principles of the University's assessment policy. Some adjustments may need to be made in emergencies. You will be kept fully informed by your course co-ordinator/director, and if disruption occurs you should refer to the university website for information about how to proceed.

The delivery mode may change depending on COVID restrictions. Any changes will be communicated through Canvas.

### Student Charter and Responsibilities

The Student Charter assumes and acknowledges that students are active participants in the learning process and that they have responsibilities to the institution and the international community of scholars. The University expects that students will act at all times in a way that demonstrates respect for the rights of other students and staff so that the learning environment is both safe and productive. For further information visit [Student Charter](https://www.auckland.ac.nz/en/students/forms-policies-and-guidelines/student-policies-and-guidelines/student-charter.html) <https://www.auckland.ac.nz/en/students/forms-policies-and-guidelines/student-policies-and-guidelines/student-charter.html>.

### Disclaimer

Elements of this outline may be subject to change. The latest information about the course will be available for enrolled students in Canvas.

In this course students may be asked to submit coursework assessments digitally. The University reserves the right to conduct scheduled tests and examinations for this course online or through the use of computers or other electronic devices. Where tests or examinations are conducted online remote invigilation arrangements may be used. In exceptional circumstances changes to elements of this course may be necessary at short notice. Students enrolled in this course will be informed of any such changes and the reasons for them, as soon as possible, through Canvas.