

## Physics T

**Physics investigates the fundamental nature of the physical universe. This mathematical science provides students with the opportunity to make quantifiable predictions about the natural world, and test these through rigorous experimental investigations.**

### Rationale

*Why would you do this course?*

A study of physics develops high levels of analytical and critical thinking which are applicable across a wide range of technologically based careers. It provides a strong basis for tertiary studies requiring data analysis.

Beyond the classroom, this subject offers you:

- STEM Camp
- Excursions to the ANU (e.g. nuclear department)
- Guest speakers
- iFly excursion
- ICAS Competition
- ANU Science Extension Day

### Learner dispositions

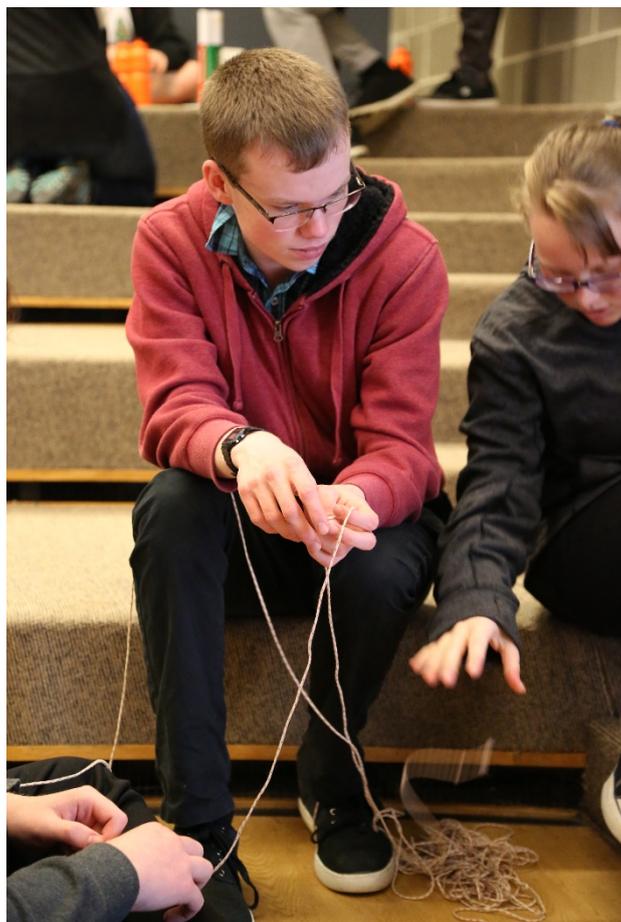
*Who usually studies this course?*

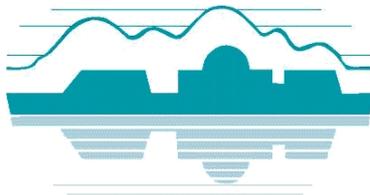
Learners who would study this course usually enjoy understanding the world around them. They are interested in hands-on experiments with projectile launchers, model cars, electrical circuits or light boxes. They could also like the mathematical side of science and enjoy modelling equations and engage with theoretical concepts. Students who study physics will often go on to study analytical subjects at university. They must be willing to do work outside of class and are developing effective study routines.

### Readiness

*What courses or previous experience would make a student ready to study this course?*

You are ready to study this subject if you have studied maths and science in high school. A student in Level 1 Year 10 Science and Maths, or at least a B average in Level 2 Year 10 Science and Maths would be ready for senior secondary physics. You are also ready to study physics if you have the determination and resilience to push yourself when concepts become difficult, and study outside of class on a regular basis.





## Content and Assessment Overview

In Year 11, students further investigate energy, motion and forces, building on the ideas introduced in the F–10 Australian Curriculum: Science. Across all units, students use science inquiry skills to design, conduct and analyse safe and effective investigations. They communicate methods and findings using qualitative and quantitative representations in appropriate modes and genres.

### Unit breakdown and Course Pattern

**Year 11:** Units 1 and 2

**Year 12:** Units 3 and 4

#### Unit 1: Linear Motion and Waves

Students master understanding of Newton's Laws of Motion, transfer of energy and the wave model, understand how scientific models and theories have developed and are applied to technological improvements. Students use science inquiry skills to design, conduct and analyse investigations, use algebraic and graphical representations, and communicate physics understanding using qualitative and quantitative representations in appropriate modes and genres.

#### Unit 2: Thermal, Nuclear and Electrical

Students master an understanding of how the kinetic particle model and thermodynamics concepts describe and explain heating processes, understand how the nuclear model of the atom explains radioactivity, fission, fusion and the properties of radioactive nuclides and understand how charge is involved in the transfer and transformation of energy in electrical circuits.

#### Unit 3: Gravity and Electromagnetism

In Year 12 students are introduced to more complex models that enable them to describe, explain and predict a wider range of phenomena. They develop understanding of motion in gravitational, electric and magnetic fields and the relationship between them. Students understand how models and theories have developed over time, including how associated technologies interact with a variety of considerations.



#### Unit 4: Revolutions in Modern Physics

Students finish their physics major with an investigation into how shortcomings in existing theories led to modern developments in physics. This includes the space-time continuum and special relativity, the quantum theory of light and matter, and how the Standard Model explains the nature of and interaction between the fundamental particles.

#### Types of assessment items

- Exams
- Practical laboratories
- Practical reports
- Research reports
- Posters
- Oral presentations



For more information, visit the BSSS website, speak to the SLC of **Science/PE**, or visit the LTC website:

[http://www.ltc.act.edu.au/Learning/unit\\_outlines](http://www.ltc.act.edu.au/Learning/unit_outlines)

