

Physics

Exam board: OCR Physics A

Specification no: H156 (AS) / H556 (A Level)

Link to the Specification:

<https://www.ocr.org.uk/qualifications/as-and-a-level/physics-a-h156-h556-from-2015/specification-at-a-glance/>



Content: A-level Physics

| Module | Assessment | Content |
|-------------------|--|---|
| Modelling Physics | <p><u>Exam: 2 hr 15min</u> A mix of multi choice and short answer questions from modules 1, 2, 3 and 5.</p> <p>37% of A Level grade</p> | <p>Year 12 Module 1 – Development of practical skills in physics</p> <ul style="list-style-type: none"> Measuring Graphing and processing of data Uncertainty calculations <p>Module 2 – Foundations of physics</p> <ul style="list-style-type: none"> Units Scalar and vectors <p>Module 3 - Forces and Motion</p> <ul style="list-style-type: none"> Motion Forces in action Work, energy and power Materials Laws of motion |
| Exploring physics | <p><u>Exam: 1 hr 30min</u> A mix of multi choice and short answer questions from modules 1, 2, 4 and 6.</p> <p>37% of A Level grade</p> | <p>Module 4 - Electrons, waves and photons</p> <ul style="list-style-type: none"> Charge and current Energy, power and resistance Electric circuits Waves Quantum physics <p>Year 13 Module 5 – Newtonian world and astrophysics</p> <ul style="list-style-type: none"> Thermal Physics Ideal gases Circular motion Oscillations Gravitational fields Stars Cosmology |
| Unified physics | <p><u>Exam: 1 hr 30min</u> A mix of short answer and extended response questions from all the modules.</p> <p>26% of A Level grade</p> | <p>Module 6 – Particles and medical physics</p> <ul style="list-style-type: none"> Capacitance Electric Fields Magnetic fields Particle physics Radioactivity Nuclear Physics Medical Imaging |

For the content and assessment for AS-level Physics please refer to the specification online.

Course Delivery:

A-level Physics is both a practical and theoretical subject and a number of analytical, practical and computational skills need to be developed during the course. The concepts that you are taught are often related to real life examples. Teaching incorporates demonstrations, practical work, research, computer modelling and problem solving.

Course Content:

Physicists are problem solvers and studying A-Level Physics will introduce you to new and interesting ways of thinking about the world. At its heart, A-Level Physics is about helping you develop the skills needed to investigate relationships and analyse models to better understand why things happen.

To achieve this goal, the course covers the essential knowledge and understanding in the main 5 areas of Physics:

- Forces and motion
- Electrical circuits
- Waves
- Fields
- Quantum Physics and Stars

In the Forces and motion topics we develop the skills to mathematically model the movement of objects and examine the effect that forces have on them.

Electrical circuits continues the work done in GCSE to make sure you are confident in not only analysing circuits but also building them. This concludes with a study of capacitors where we look at ways to store and release energy quickly. This gives us the means to power the huge particle accelerators vital in the search for new and interesting sub-atomic particles.

Mechanical and electromagnetic waves are studied during the waves topics in year 12. If you want to know how guitars and flutes make such beautiful sounds, the answers are found here when we study standing waves and harmonics.

Gravitational, electric, and magnetic fields are the focus of the fields topic and help us to understand why charges repel, gravity pulls you down and why there is no such thing as a free lunch when it comes to making energy (google Lenz's law for a sneak peek).

Of course, most of the above is generally classified as classical physics, but to understand the world completely we need to delve into the quantum world. Here we look at Einstein's photoelectric effect, wave particle duality, hadrons, leptons, quarks and then finally examining the most famous equation in the world, $E=mc^2$.

Entry requirements:

65 in two science subjects including 6 in Physics if done separately. 6 in Maths.

You do not need to do A-Level Maths to study physics. However, if you want to go on and study Physics or Engineering at University, A-Level Maths is generally a requirement.

Resources:

Dedicated Physics textbook and online platform with revision and support materials.

Skills & personal qualities required / developed by course:

To be a good physicist you need to have the passion to want to understand and the willingness to use mathematics to describe the patterns you see. It is important that you are comfortable sharing and discussing ideas as a class, even if you are not sure, so that the whole group can work towards an answer together. Physics is not only interesting, but also highly marketable. With an A-level in Physics you have proved that you possess a wide range of key skills, exactly what employers and universities are looking for. A-level Physics covers a wide range of transferable skills – from the use of IT in data-logging experiments; to the numerical skills that are the bedrock of the subject, essential in problem-solving and in practical work; to skill in written expression needed to write explanations.

Recommended reading:

Black Holes Wormholes and Time Machines
In Search of Schrodinger's Cat
Physics for Future Presidents
Five Equations that Changed the World
Institute of Physics

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