

Physics

Physics: Advanced Subsidiary Level (OCR H159) and Advanced Level (OCR H559)

Students will study the exciting, challenging and newly revamped AS and A level developed by the Institute of Physics entitled 'Advancing Physics'. It has had considerable financial input and academic support from industry and higher education. The course provides a distinctive structure within which students learn about fundamental physical concepts and about physics in technological settings. A primary aim of the course is to show how physics is practised and used today. Equally important, however, is to show the usefulness of the subject, and to illustrate the kind of impact which discoveries in physics have had on the way people live. A new emphasis is placed on making accurate and reliable experimental measurements and dealing with uncertainties in measurements.

The course is extensively resourced with up to date materials, including for each year:

- a full colour student's book;
- an integrated CD-ROM for the student, containing: extensive questions and answers for practice; a full A-Z glossary of A level physics; a course guide; physics models, computer tools, images and tables, revision aids and an easy to use search facilities.

These are supported by the *Advancing Physics* web site, where the student can find ideas about the course; access to relevant web sites for activities and links to careers and higher education.

AS-Level Physics Course (H159)

Physics in Action (Unit G491) provides a graduated path from GCSE into the AS course, showing a wide variety of ways in which physics is currently put to use:

Communication (PA1) is about electric circuits and sensors, waves as signals and about imaging, including some simple optics;

Designer materials (PA2) introduces properties of materials, how these depend on the structure of the material and how they help determine the choice of material for a given purpose.

Assessment is based on a 1 hour examination – 90 UMS marks.

Understanding Processes, Experimentation and Data Handling (Unit G492) is organised around different ways of understanding processes of change, the focus being on 'curiosity-driven' physics:

Waves and quantum behaviour (UP1) is mainly about superposition phenomena of waves, especially electromagnetic waves, with a brief account of the quantum behaviour of photons and electrons;

Space, time and motion (UP2) develops classical mechanics, including vectors.

Assessment is based on a 1 ¼ hour examination, including a section on an advance notice article about measuring techniques and data handling – 150 UMS marks.

Physics in Practice (Unit G493) consists of two pieces of coursework:

Quality of Measurement (PP1) allows students to carry out an experiment with particular attention to accuracy and reliability and requires them to deal with uncertainties;

Physics in Use (PP2) is a research task where the students choose a material, examine how its properties are affected by its structure and then present their work back to the class.

Internally marked and externally moderated – 60 UMS marks.

A-Level Physics Course (H559)

Rise and Fall of the Clockwork Universe (Unit G493) develops the grand conception of the world as a 'mathematical machine', which transformed western culture. Some of its limits are also shown.

Models and rules (RF1) covers the core physics of random decay and the decay of the charge on a capacitor, energy and momentum, the harmonic oscillator and circular orbits. The field model is developed through consideration of gravitational fields;

Matter in extremes (RF2) shows how theories of matter and atoms explain behaviour: covering the kinetic theory of gases, thermal behaviour of matter and the effect of temperature.

Assessment is based on a 1 ¼ hour examination – 90 UMS marks.

Field and Particle Pictures (Unit G494) introduces the modern picture of fields and particle interactions as fundamental mechanisms of nature.

Fields (FP1) covers ideas about electromagnetism, electric fields and potential;

Fundamental particles (FP2) is about atomic, nuclear and sub-nuclear structure, with attention to ionising radiation and risk.

Assessment is based on a 2 hour examination, including a section on an advance notice article about drawing Physics ideas together synoptically – 150 UMS marks.

Researching Physics (Unit G495) consists of two pieces of coursework:

Practical Investigation (RP1) allows students to investigate a practical problem related to an area or application of Physics which students prepare a report on and are expected to defend verbally;

Research Briefing (RP2) requires student to prepare a summary of an area of Physics by comparing, analysing, relating and evaluating various sources.

Internally marked and externally moderated – 60 UMS marks.