

physics

A Level

Head of department: Jonathan Poole

Email: jpoole@esher.ac.uk

Exam board: AQA



What is this subject about?

Physics is about understanding how nature behaves from the smallest possible scale deep inside the atom to the largest conceivable distance stretching across the entire universe. You will discover how physicists use observations and measurements to devise theories and laws, which are then refined through further testing. You will examine the application of Physics to the development of a wide range of technologies.

What will I study over the two years?

The first year builds on topics already familiar to you. Electricity provides opportunities for practical work and the study of important technical applications. Mechanics and Materials develop your understanding of forces and energy and their effects on solids. The properties and applications of waves are examined. You will also venture into the more modern fields of Quantum Phenomena and particles, introducing you to the fundamental properties and nature of matter and radiation. Your investigative and practical skills will be developed through a variety of experimental activities.

The second year builds on the first year topics. Further work in Mechanics introduces circular and oscillatory motion. You will explore Gravitational, Electric and Magnetic fields and examine applications such as Capacitors. Nuclear Physics looks at the properties of unstable nuclei and how energy is obtained from the nucleus, while Thermal Physics investigates the thermal properties of materials, gases in particular. In addition there is an optional topic, in which you will study some of the applications of these fundamental principles. There is also further development of your investigative and practical skills.

How is the course assessed?

Assessment is by three written exam papers, each 2 hours long. The exam papers will contain multiple choice and extended written questions, which will assess your understanding of the course content including knowledge of specific core practicals.

What skills will I need and develop in this course?

You will need to have developed a good range of mathematical skills at GCSE, particularly in algebra, geometry, trigonometry and graph work. You will extend these skills and also learn to reason clearly, communicate ideas, interpret data and solve problems. You will also advance your ability to interpret, explain and evaluate the results of experimental activities.

What can the course lead to in terms of higher education and future careers?

When combined with Mathematics, Physics A Level will enable you to progress to Higher Education and careers in fields such as Physics, Astrophysics, Medical Physics, Geophysics, Space Science, Telecommunications, Engineering and Computer Science. Materials Science and Chemical Engineering are options if you study Chemistry in addition to Physics and Mathematics. Many financial institutions actively seek Physics graduates.

What are the formal entry requirements for this course?

A Level Physics is a strongly theory-based course that is assessed by exams and builds directly on GCSE work in Physics and Maths. You are most likely to succeed if you have an appropriate base of knowledge and a good track-record of success in exam based courses at GCSE overall.

In addition to the College's general entry criteria, you will need to achieve a minimum of:

- Grade 6's in GCSE Combined Science (or if you have taken triple science, 6 in GCSE Physics and similar in the other sciences)
- Grade 6 in GCSE Maths.

Additionally we would also expect you to have ideally averaged at least a grade 6 in your GCSEs overall. If you have not achieved at this level you will be much more likely to succeed on the BTEC Extended Certificate or Diploma in Applied Science. Merit on BTEC carries the same UCAS points as a C at A Level. Distinction carries the same UCAS points as an A.

Applied Science or Additional Applied Science or non-GCSE Science qualifications are not suitable as preparation for A Level study.

Are there alternative routes forward in Science?

To succeed with A Level Physics you need to be good at understanding and remembering a large body of knowledge, and applying it under exam conditions to solve unfamiliar problems. This is why ideally an average of least a grade 6 in your GCSEs is needed. If your GCSE track record is not in line with this but you wish to take science to a higher level you should look at our BTEC courses in Applied Science. These are assessed predominantly by coursework and you can check your thinking with your teachers as you go along.

The Extended Certificate is equivalent to one A Level and would give a sufficient base to enable progression to degrees in fields where science has a supporting role – fields such as Sports Science, Sports Therapy, Paramedics, Nursing, Radiography, and Equine Science – as well as to a range of scientifically orientated Foundation degrees. If you want to be able to go on to a wider range of more intensely scientific careers/degrees, you would need to take the Diploma course, which is the equivalent to two A Levels.

There is more detailed information about BTEC Applied Science on its own subject information sheet.

What extra support/enrichment activities are on offer?

All students are invited to attend a 'Physics In Action' day in London in the Autumn Term. We usually visit the National Physical Laboratory on its Open Day, as well as the Diamond Light Source in Oxfordshire. Small groups of students also attend occasional lectures at local universities. The department also runs an Astronomy Club, a Science Book Club to help with wider reading, a weekly Past Paper Club and a Physics Peer Mentoring scheme. Regular support clinics are also provided for any students experiencing difficulties.

Subject combination advice:

Physics is a mathematical science and the standard expectation is that students taking A Level Physics will also take A Level Mathematics as well.

To be able to study Physics, Engineering or Computer Science at the few, most highly selective universities you will need to take Further Mathematics alongside Physics and Mathematics. Please talk with the Mathematics Department staff to check your suitability to study Further Mathematics.