Physics
A Level

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Exam Board: AQA specification A

What is this subject about?
Physics helps us to understand nature 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.

For the AS level you will study:
The AS year builds on topics already familiar to you. Electricity provides opportunities for practical work and looks into 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 Particle Physics and Quantum Phenomena where you will be introduced to the fundamental properties and nature of matter and radiation. Your investigative and practical skills will be developed through a variety of experimental activities.

For the A2 level you will study:
The A2 year builds on the ideas encountered in AS Physics. 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 the optional topic 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?
Over the two years, externally marked assessment of investigative and practical skills is worth 20% and written examinations are worth 80%.

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 the fields of 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 advance your ability to interpret, explain and evaluate the results of experimental activities.

Subject combination advice:
Physics is a mathematical science and students are expected to take A level Mathematics with Mechanics alongside A level Physics.

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. National evidence suggests it is difficult to succeed unless you have an appropriate base of knowledge and a good track-record of success in exam based courses at GCSE. We will be flexible to particular individual circumstances where this is appropriate. However to ensure you have a reasonable chance of success our recommendation is at least **BB in GCSE Science and Additional Science (or B in GCSE Physics with other sciences at C grade or better) together with B in GCSE Maths**. 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?
If you are headed towards Science or Engineering but are finding it tough going to achieve GCSEs at the level we recommend, you should be looking at Applied A level or BTEC/OCR National in Science or Engineering courses as well. These courses provide well established routes to university and employment. The difference is that they are assessed by coursework and you can check your work with your teachers as you go along. You don't have to solve problems under exam conditions at the end relying on memory work. At Esher we offer these courses in Health & Social Care, Media, Sports & Leisure and Art & Design. Larger colleges offer these courses in Science, Engineering, Construction and ICT as well. However these are popular courses and fill up quickly. You need to apply for them now to have a place on one of them should you need it when you get your GCSE results.

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 often enter a team for the Surrey Problem-Solving Challenge and small groups of students attend occasional lectures at local universities. In the college's "Wider Skills Week" at the end of the AS year, we arrange a visit to the Physics Department of the University of Surrey and to the Science Museum. Extension activities include the opportunity for a small group of students to attend a Particle Physics Masterclass and lunchtime sessions in college on advanced topics chosen by the students. Regular support clinics are provided for any students experiencing difficulties.

Should I take Further Mathematics A level with Physics and Mathematics?
To be able to study Physics, Engineering or Computer Studies at a highly selective university you will need to take Further Mathematics alongside Physics and Mathematics. Please talk with Mathematics department staff to check your suitability to study Further Mathematics.

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