

# ST MARY'S COLLEGE



## INTRODUCTION

Physics is the study of how things work and why things happen in the way that they do.

If you study GCE physics you will not learn all the secrets of the universe but you may appreciate some of the mysteries a little better. There is even the chance that you may eventually contribute to questions!

Physics starts by asking questions about things which we can easily see and examine. Things such as why do apples fall from trees or why the sky is seen as blue?

Having asked questions about everyday events we go on to examine things at the very small, atomic level. This type of physics, known as quantum mechanics has completely altered our views of the universe!

We then turn our attention to the very large and ask about some of the most dramatic and amazing events in our universe. We look at the birth and death of stars, of how black holes are formed and try and understand the origins of space and time.



*Second year physics students studying A level problems during an academic tutorial session*

## AS LEVEL

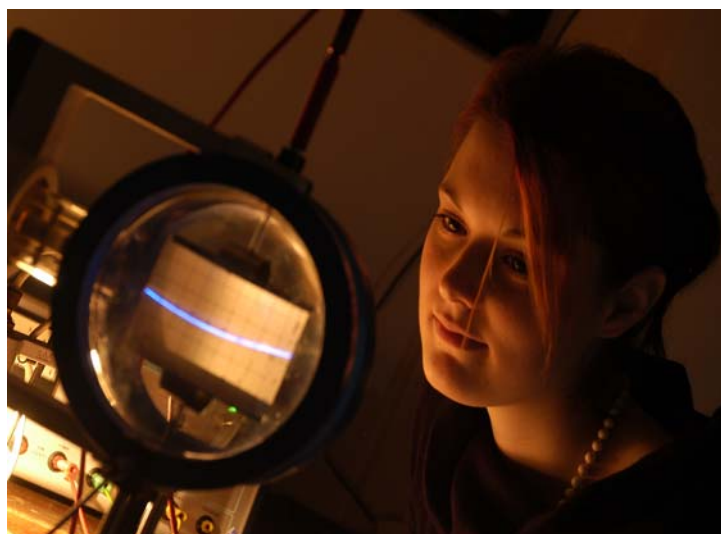
*In the physics department we follow the OCR exam board syllabus*

### **Content**

The AS course lasts one year and it made up of two theory modules plus a practical assessment:

- **Unit 1: Mechanics:**
  - kinematics, vectors, forces, energy
- **Unit 2: Electrons, waves and photons:**
  - electric current, waves, quantum physics
- **Unit 3: Investigation and Practical Skills:**
  - practical skills are assessed over the year

*Kim Quinn – a student who left St Mary’s a few years ago and has recently gained a First Class Honours degree in Physics from Nottingham University*



### **How is the course delivered?**

Lessons will consist of a mixture of theory and practical work.

You should expect to spend about 3 hours per week outside lessons, writing up practicals, answering questions, going over theory, etc.

In addition there are academic support sessions for all students where individual guidance is given.

The practical assessment consists of a series of investigations carried out over the course of the year. During certain investigations key skills are assessed by the teaching staff. The results of these assessments are then submitted to the exam board for approval

### **Entry requirements**

To follow advanced level Physics successfully students should have gained a minimum of two grade C, at higher tier, in appropriate science subjects.

It is expected that students will have studied Physics as a separate subject or will have followed the 'science and additional science' route.

Due to the mathematical nature of physics, a grade C or better in Mathematics is also required.

## ***How is it different from GCSE?***

An AS level in physics is **much more challenging** than science at the GCSE level. In addition, mathematics is used extensively.

At A level new ideas can be hard to grasp and so you may need to spend a lot of time and put a lot of effort in trying to understand them. Nearly all students will find some areas of the course difficult – however if you are willing to work hard and make use of the support offered by both the department and the college then there is usually a very positive outcome.

Experimental work can be new for many and often it will involve equipment and techniques which use computers, oscilloscopes and other types of specialised laboratory apparatus – much of which is not usually available in schools. Full training will be given in the safe and correct use of all equipment.

## ***How is the course assessed?***

Candidates are examined in two written units, plus practical work for the AS exam. The exams will be taken in January and June.

Practical skills are assessed both continually, as part of the course, and by a special exam which takes place in May. Assessment is carried out internally by the college.



*This picture shows a galaxy- each point is a star – and the galaxy contains around 100 billions such stars. It is an object in deep space, many light years away from us.*

## **A2 LEVEL**

### ***Content***

The A2 course consists of the following modules and lasts for one year.

A2 Physics is much more analytical and demanding than the AS course. It requires a deeper and more thorough understanding of basic physics and will assume a strong maths background.

- **Unit 4: Newtonian Mechanics**
  - circular motion, gravitation, thermal physics
- **Unit 5: Fields and Particles**
  - electric and magnetic fields, fundamental particles
- **Unit 6: Investigation and Practical Skills**
  - as with year one, a continuous programme of assessment

### ***How is the course delivered?***

The teaching methods used will be similar to those employed within the AS. However, it will be expected that students have developed as independent learners and thus be able to take more responsibility for their own learning.

### ***Entry requirements***

A pass grade in AS Physics.

Although it must be remembered that the second year courses are more difficult than the first so, if necessary, it may be advisable to resit first year modules in order to maximise the actual point score carried forward in the second year.

### ***How is the course assessed?***

Candidates are examined in two theory units for A2 including a common unit examining nuclear properties of matter. Exams are taken in January and June. The marks will be combined with the marks achieved for the AS and lead to a full A level qualification.

The practical skills are assessed both continually and by a special exam which takes place in May. Assessment is carried out internally by the college.

The individual scores from all exams are then added together and a final A level grade awarded.

## **EXTRA SUPPORT**

We recognise that physics is a very difficult and demanding subject and arrange to offer extra support outside of the normal timetabled lessons. This has proven invaluable in the past with students often gaining sufficient extra marks so as to substantially increase their grades.

## **EXTRA ACTIVITIES**

In addition to the standard lessons we try to arrange several trips each year where, for example, students attend university lectures on special topics. This year we went to Durham to learn more about the Large Hadron Collider at CERN – an experiment which promises to deliver some very important evidence about the nature of matter.

The department also takes part in the Schools Based Observatory whereby students can access a large, professional telescope based in the Canary Islands. This is a collaborative project run by a team based at the University of Liverpool.

Several second year students have also taken part in on-line research programmes designed to help astronomers gather and analyse real data about objects in deep space.

## **PROGRESSION FROM A LEVEL**

Physics is a qualification that can be used either as a subject within itself, or as a degree. GCE A level Physics is a valuable qualification for a wide range of degree courses and careers.

Scientific research, Engineering, the Armed Forces, Medicine and Computer science are just a few of the possibilities.

In addition, many other opportunities exist including non-science based careers such as Banking, Accountancy and the Civil Service. Recently, as forensic techniques have become more technical and form a critical component of prosecution, there has been a high level of demand from law firms for those with physics degrees to be retrained in order to enter a law career.

## **FURTHER INFORMATION**

***If you still have questions about studying A level physics or would like further information then please do not hesitate to get in contact..***

***Dr Neil Cavanagh – phone: 01642 814680***

**NOTES:**

**St Mary's College  
Saltersgill Avenue  
Middlesbrough  
TS4 3JP**

**Tel: (01642) 814680**

**[www.stmarys-sfc.ac.uk](http://www.stmarys-sfc.ac.uk)**

**Fax: (01642) 819624**