



## **A level Further Mathematics**

### **Who is this course for?**

This course is for you if you are confident of achieving very well at GCSE maths, gaining a grade A or A\*.

This course is designed for students who really enjoy Mathematics and want to widen their experience. It is designed to both deepen and broaden their Mathematical knowledge.

In particular, the course is highly suitable for students who wish to study Mathematics at University, or who envisage a career which has a large Mathematical content.

The course is designed to develop a wide range of ideas alongside A or AS level Mathematics.

### **What are the entry criteria?**

You need to have at least a grade A in maths at GCSE and a mean GCSE score of 5.5. At enrolment you will be given a test to complete. Students who pass this are accepted onto the course.

## **The Maths department at Wyke Sixth Form College**

We're based in four dedicated rooms in the Wilson building. Between us we have 71 years of teaching experience, 47 of which is in sixth form colleges.

We have degrees from Lancaster, Imperial College, York and Hull.

We all enjoy teaching maths, some have always been teachers, and others have taken a less direct route. One of us used to be a Chartered Civil Engineer; one of us has a PhD; one of us is an experienced examiner for AQA A level Maths. We also have a Qualified Subject Learning Coach within the department (a national initiative).

Sally is in charge of the department, Peter looks after the second year (A2) course, Jael looks after students who need to re-sit their GCSE Maths and Lorraine manages the teams we put in for the UK Maths Challenges. We all teach students at all levels of maths.

We're not just mathematicians though: Between us we enjoy cross-stitch, card-making, photography, cycling, walking and visiting art galleries.

See if you can find out which of us;

1. Doesn't accept that Marathon is now Snickers, or Opal Fruits are now Starburst.
2. Gets annoyed with 7 written as 7.

3. Is the Chair of a local branch of an international charity.
4. Has South Africa as their favourite holiday.

## Exam Board

AQA

## Course Details

The A level course lasts for 2 years with the AS level taken at the end of the first year.

Students receive between 4 and 5 hours of tuition each week and additional work is done out of lesson, some of this using “MyMaths”, some producing worked solutions to exam-type questions.

The course develops understanding of:

- The fundamental theories and concepts of Mathematics
- The practical applications of Mathematics to other areas
- Logical problem solving

The A level course is split into 6 units. Each is tested by a 1½ hour written examination and the units are equally weighted. The first exam (Mechanics or Statistics) is in January.

There are 4 Pure Mathematics units which introduce ideas such as complex numbers, matrices and differential equations, and which also expand the algebraic and calculus work of A and AS level Mathematics.

Students will also study Applied Mathematics units, with the possibility of studying Advanced Statistics, Advanced Mechanics or a second Decision Mathematics unit.

### AS Level

Three units are needed to achieve an AS level, these are completed during the first year; one compulsory Pure Maths unit and two Applied Maths units.

The Pure Math unit introduces ideas such as complex numbers and matrices, building on the Algebra and Trigonometry from GCSE, and AS Level. While many of the ideas you will meet in pure maths are interesting in their own right, they also serve as an important foundation for other branches of maths, especially mechanics and statistics.

The units we offer are reviewed regularly to meet the needs of our students.

Currently in the first year students take a second Decision Maths unit (in addition to the one covered in AS Maths) and they also take Mechanics or Statistics as their applied unit. In decision mathematics you will learn how to solve problems involving networks, systems, planning and resource allocation. You will study a range of methods, or algorithms, which enable such problems to be tackled. The ideas have many important applications in such different problems as the design of circuits on microchips to the scheduling of tasks required to build a new supermarket.

### A2 Level

Three units are studied in the second year. These are selected from three more Pure Maths units, and two applied units – either Mechanics or Statistics.

- Further Pure Maths takes further ideas such as complex numbers and matrices introduced at AS and introduces ideas such as differential equations. It also expands the algebraic and calculus work of A and AS level Mathematics.
- Mechanics includes work on forces and Newton's laws of motion and applies Mathematical modelling to simple problems.
- Statistics builds on work on averages and probabilities from GCSE and introduces topics such as probability distributions and correlation.

## How the course is delivered

This year the AS groups each have one teacher for all their lessons. At the start of the year the A2 is shared between two teachers who each teach one of the modules. The teaching of the third module is then shared between the two teachers.

Lessons include a variety of group, paired and individual work, resources you will draw on include text books, exam questions and jigsaw / domino / card matching activities.

Support outside lessons is available, both informally and formally. Regular "maths clinic" sessions are run during the college week and all of the department are available for support at lunchtime and at the end of the day.

## Departmental Enrichment

The Maths Department offers three main enrichment activities:

The Senior Maths Challenge is offered to all AS Further Maths students and consists of 25 multiple choice questions.

The Team Challenge involves a team of four students competing against other schools and colleges in a variety of tasks. Last year the Wyke team won the local competition and went to London to compete in the national final.

The Advanced Extension Award is designed to challenge the top 10% of students and is offered to A2 students who have a grade A in AS Maths.

## Student success

In 2011 only one of our students achieved below grade D at A2, with one half achieving a grade A or A\*.

In the last year students with a Further Maths A Level from Wyke went on to Universities from Glasgow to Bath, most starting courses in Maths, Physics or Engineering.

Last year a student (Robert Rouse) from Kelvin Hall School applied himself consistently well from the beginning and achieved a grade A\* in Further Maths. He is now at Imperial College studying Maths.

Sarah Holich (from Wolfreton) is now studying physics in Salford having gained a grade B in Further Maths at Wyke.

## What does this course lead to?

Having a qualification in Further Mathematics in addition to your A or AS level Mathematics will give you an advantage in a great variety of career options.

The greater experience of the sophisticated algebraic, statistical and mechanical ideas will increase your ability to succeed in Higher Education courses which make use of this level of Mathematics.

These courses or careers include:

- economics
- engineering
- physics
- computing
- information and communication technology.

## What can I do now that would help prepare me for this course?

Students who have taken GCSE maths early may find they need to review what they have learnt at GCSE through the summer, maths skills need to be kept in use. Many Further Maths students enjoy extending their knowledge of maths and there are many ways of doing this including;

Use of websites such as

[www.nrich.co.uk](http://www.nrich.co.uk)

[www.furthermaths.org.uk](http://www.furthermaths.org.uk)

Reading books such as

“Alex’s Adventures in Numberland” by Alex Bellos

“The music of primes” by Marcus DeSautoy

“Fermat’s Last Theorem” by Simon Singh

“A Mathematician’s Apology” by GH Hardy

“Littlewood’s Miscellany” edited by Bells Bollobas

“The Man Who Loved Only Numbers” by Paul Hoffman