MATHEMATICS & FURTHER MATHEMATICS

Mathematics plays a vital role in many aspects of the modern world and in areas of our working life such as Business, Economics, Engineering, Management, Medicine and Computer Science. Advances in technology and the breaking down of traditional barriers between Arts and Sciences mean that mathematicians are in great demand. Science-based subjects such as Physics, Chemistry and Biology require some clear knowledge of results and processes which go beyond GCSE but the ability to apply secure mathematical thinking is highly regarded in many other disciplines.

The A-level Mathematics courses are designed to enable you to develop your mathematical knowledge and understanding in a way which increases your confidence in solving problems in the real world. Emphasis is placed upon the ability to reason logically, develop sound mathematical arguments and use Mathematics as an effective means of communication. These invaluable skills can be transferred to a wide range of contexts and situations. At this level - as well as its practical side - you can expect to discover and appreciate the aesthetic and creative aspects of Mathematics.

COURSE CONTENT

Exam Board: Edexcel
Mathematics is a very broad field of study and this is reflected in the various units which make up the syllabus.

Pure Mathematics involves the continued study of algebra, trigonometry and co-ordinate geometry but also introduces you to the exciting new areas of calculus, series, vectors and numerical methods.
Mechanics illustrates the applications of Mathematics to physical problems. Emphasis is placed on the ability to model a real problem mathematically, solve it and then interpret the resulting solution back in terms of the original problem.
Decision Mathematics involves the study of mathematical algorithms in the solution of certain practical problems and their use in decision making processes.
Statistics illustrates the application of the concepts of mathematical probability to the drawing of inferences from data. Again, emphasis is placed upon experimentation, modelling and the analysis of real data.

MATHEMATICS COURSE STRUCTURE

- AS and A-level Mathematics have 100% prescribed content, containing both pure and applied (no optional content).
- Mechanics and Statistics are part of the compulsory content for both AS and A-level Mathematics students.
- Both A-level and AS Mathematics have a 2:1 ratio of pure to applied content.
- All assessments will be linear, with 100% examination.
- AS and A-level Mathematics will be different qualifications; an AS qualification will not count towards an A-level.
- The A-level Mathematics qualification will follow a three-paper model, with defined content and calculator usage allowed in all three papers (each paper is a two-hour paper).
- The AS Paper 1 assesses the same content as the A-level Paper 1 but at an AS of difficulty.

A-level Mathematics assessment
Paper 1 – Pure Mathematics 1 (2 hours)
Paper 2 – Pure Mathematics 2 (2 hours)
Paper 3 – Statistics and Mechanics (2 hours)

AS Mathematics assessment
Paper 1 – Pure Mathematics (2 hours)
Paper 2 – Statistics and Mechanics (1 hour)

FURTHER MATHEMATICS COURSE STRUCTURE

Both AS and A-level Further Mathematics have a 50:50 split between compulsory and optional elements.
The Further Mathematics qualifications are structured to allow the best range of opportunities for students. The depth of study is clearly greater than that required for A-level Mathematics. In addition to the modelling and interpretative aspects of the subject, there is an emphasis on the structures and techniques, the ability to develop mathematical arguments, make logical deductions and manipulate mathematical expressions.

This course introduces key concepts and ideas central to Mathematics - e.g. complex numbers, hyperbolic functions, matrices - and allows you to study in more depth topics such as differential equations, series and

calculus techniques whilst gaining further insight into the applied side of Mathematics.

The course is particularly suitable for those who enjoy their Mathematics and wish to embrace the challenges it offers to extend them fully. Anyone wishing to study Mathematics further on leaving school is strongly advised to take this course.

The A-level Further Mathematics qualification follows a four-paper model.

A-level Further Mathematics assessment
Paper 1 – Further Pure Mathematics 1 (1.5 hours)
Paper 2 – Further Pure Mathematics 2 (1.5 hours)
Paper 3 – Further Mathematics Option 1 (1.5 hours)
Paper 4 – Further Mathematics Option 2 (1.5 hours)

AS Further Mathematics assessment
Paper 1 – Further Pure Mathematics (1.5 hours)
Paper 2 – Further Mathematics Option (1.5 hours)

The content of the AS Further Pure Mathematics Paper is aligned to Paper 1 of the A-level Further Mathematics but is assessed at AS standard.

Mathematics and Further Mathematics count as two of your subjects in Lower Sixth and an AS or A-level in Further Mathematics count as separate, additional qualifications. This is ideal preparation if you wish to undertake university studies in Mathematics, Engineering, Physics or Natural Science and many universities are keen to encourage more students to follow this highly respected option.

OTHER OPPORTUNITIES

All our Mathematics Sixth Formers are encouraged to take full advantage of opportunities to broaden their mathematical understanding and experience outside lessons.

As a department, we are proud of the support we are able to offer throughout the A-level course: staff are always willing to find time to help a student with a particular topic, to provide further explanations and to discuss any issues with revision, questions and exercises.
A-level students are strongly encouraged to read extensively around the subject and a selection of suitable books are offered throughout the course. Many of our girls have found this additional reading helpful when going for their university interviews.

We attend annually the one-day conference "Let Maths take you Further" with our Lower Sixth students: this has proved popular and valuable in helping them make informed decisions and in considering a future career.
All Mathematics Sixth Formers take part in the national Senior Mathematics Challenge. Many of our students gain an award in this contest which can be a valuable addition to a UCAS application.

ENTRY REQUIREMENTS

Girls wishing to study Mathematics in the Sixth Form are expected to have a good GCSE pass (grade 7 or above). If you wish to take Further Mathematics, you will normally be expected to have gained a grade 8 at GCSE.

DIFFERENCE BETWEEN GCSE & A-LEVEL

The subject is studied to a wider degree and to a greater depth than at GCSE level. The approach is more rigorous. Ultimate success depends upon the ability to understand concepts, solve problems independently and to use the language and notation of the subject correctly. There is a continued emphasis on the application of Mathematics but the approach is rather more analytical than at GCSE level.

Mastering and practising techniques which will be used in familiar and unfamiliar situations as well as building up methodically a thorough understanding of the principles involved are the key to a successful and rewarding completion of any Mathematics course.