Mathematics and Further Mathematics

A level

What will I study and how will I be assessed?

A level Mathematics and Further Mathematics are both linear qualifications and you will sit all your examinations at the end of the Upper Sixth. If you opt for both courses, you will cover the entire content of the Mathematics course during the Lower Sixth, and the Further Mathematics course in the Upper Sixth. Alternatively, you could choose to take an AS in Further Mathematics at the end of the Upper Sixth.

A level Further Maths is a requirement for pursuing maths and engineering at top universities. We also offer a course in AS Further Mathematics that extends beyond the A level course covering roughly half of the additional content in A level Further Mathematics. This is highly valued by university admission tutors for courses that include lots of mathematics.

The Mathematics course will cover:

Pure Mathematics

Mathematical argument, problem-solving, proof, algebra, graphs, sequences, logarithms, trigonometry, calculus, functions, numerical methods, vectors and differential equations.

Statistics

Working with a large data set to make inferences about the underlying population, probability calculations using the binomial distribution, normal distribution and statistical hypothesis testing. It is expected that statistical study will be enhanced by an appropriate use of technology.

Mechanics

Kinematics, working with forces and Newton's Laws, motion under gravity, friction and moments.

Many of the above topics will be introduced in the Lower Sixth, and then studied in greater depth in the Upper Sixth alongside the higher-level ideas.

Assessment will be in the form of three written papers covering Pure Mathematics with Mechanics, Pure Mathematics with Statistics and Pure Mathematics with Comprehension.

The Further Mathematics course will cover:

Core Pure

A level Mathematics Pure topics are taught in greater depth while also introducing new topics such as matrices, complex numbers, polar coordinates and hyperbolic functions.

Statistics

The A level statistics ideas are further developed and expanded to include discrete and continuous random variables, bivariate data, regression and correlation.

Mechanics

The A level knowledge of kinematics and forces is extended to explore physical systems and dimensional analysis including work, energy, power, impulse, momentum and centres of mass.

Extra Pure

This minor unit explores four different areas of Pure Mathematics: Groups, Recurrence relations, Matrices and Multivariable calculus.

Assessment will be in the form of three of four written papers depending on the exact major and minor units studied.

A level/IB

Studying Mathematics in the Sixth Form is essential for further studies in the subject, and for many other courses such as engineering, science, economics and computing. A surprisingly large number of careers expect you to have studied Mathematics in the Sixth Form, eg accountancy, actuarial work, banking, financial services, architecture, sciences and medicine. It is also becoming increasingly important in areas like business management, economics, psychology and marketing. Mathematics shows an employer that you possess a significant level of logical thinking and problem-solving ability, which is highly valued in careers such as law.

Both A level and IB students have options of taking Mathematics courses at different levels. This key decision needs to be based on research and discussion with your teachers.

Entry requirements

IB standard level:
A minimum of a grade 5 at IGCSE/GCSE Mathematics is required.

A level Mathematics:
You should achieve a minimum of a grade 7 in IGCSE/GCSE Mathematics; ideally you should be aiming for a grade 8/9.

A level Further Mathematics and IB higher level: Grade 8/9 at IGCSE/GCSE and you need to be especially confident with your algebra topics; ideally you should be aiming for a grade 9.

IB

What will I study and learn?

IB standard level Mathematics: Applications and Interpretation
This route is designed for students who enjoy describing the real world and solving practical problems using mathematics, and are interested in harnessing the power of technology alongside exploring mathematical models, and enjoy the more practical side of mathematics.

As well as developing number, algebra, functions, geometry and trigonometry, statistics and probability, the course introduces calculus. The focus is on applications of the mathematics that you learn, such as in business or finance, performing practical data analysis, making use of technology including graphical calculators and spreadsheets.

IB higher level Mathematics: Analysis and Approaches
This route is for students who wish to pursue studies in mathematics at university or subjects that have a large mathematical content such as engineering.

It is for those who enjoy developing mathematical arguments, problem-solving and exploring real and abstract applications, with and without technology. The course will develop your mathematical knowledge and skills across a variety of different areas. There is greater emphasis on learning mathematics than on its applications, but it will support your use of mathematics in other subjects within the IB and at university.

The course begins by covering number, algebra, functions, geometry and trigonometry, statistics and probability and introducing calculus, but then develops mathematical skills to a deep level; it is therefore a particularly demanding course. It takes several topics such as calculus, proof, complex numbers, trigonometry, vectors, series and convergence to a very high degree, some of which is beyond A level. It is essential preparation for studying mathematics or engineering at most universities.

How will I be assessed?
There are two elements to the assessment for the IB course:

External Assessment (80%)

SL: Two written papers.
HL: Three written papers, one of which is non-calculator.

You will be expected to make optimum use of graphic display calculators for problem-solving in all the calculator papers.

Coursework (20%)

Both the higher level and standard level courses will require an Independent Exploration worth 20%. This is assessed internally with a sample being moderated externally.

Want to know more?

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Exam Board:
www.ocr.org.uk
(OCR MEI Syllabus B)
www.ibo.org

"BGS has an excellent Maths department who offer one-to-one support as well as multiple help sessions throughout the week to help you to improve your ability. I love the challenge of this course: it keeps me on my toes and the content is very stimulating.

Max Grant, OB 2020
Courses: Chemistry, Biology, Mathematics and Further Mathematics