

The Abbey School

Sixth Form



Mathematics – A Level and IB Diploma

Mathematics can sensibly be studied in combination with any other subject and is a particularly good complement to the Sciences, Economics or Geography. However, wherever your main interest may lie, if you are good at and enjoy Mathematics, it is worth considering pursuing the subject in the Sixth Form. The analytical and problem-solving techniques which are developed at this level are valued in many disciplines and are highly regarded by employers.

If you plan to do the IB Diploma, Mathematics is compulsory and there is a Mathematics course to suit all students.

The courses provide a well-balanced experience of Mathematics beyond GCSE and aim to develop a student's understanding of mathematics and mathematical processes in a way that promotes confidence and fosters enjoyment. The feeling of achievement that comes from finally solving what at first seems to be an intractable problem is unique to the subject, but comes only to those willing to try.

When girls were asked what makes The Abbey School Mathematics Department special, they highlighted

- Caring, approachable, helpful and enthusiastic staff
- Drop-In help sessions that are supportive and well used

Beyond Sixth Form

Mathematics develops students' analytical skills and is appropriate to a wide range of careers and science based courses at Higher Education level. It is held in universally high regard. Particularly relevant careers include Accountancy and Banking, Computing, Engineering, Science, Architecture and Business. The study of Mathematics develops critical thinking skills and the tools to analyse real problems.

A Level Mathematics

Syllabus Content

OCR Mathematics A

The emphasis in A Level Mathematics is on problem solving, reasoning and modelling. There is a requirement for the use of technology to permeate teaching and learning and a graphic display calculator is used extensively.

Pure mathematics will develop and extend GCSE skills. Algebra, functions, trigonometry, graphs, calculus, numerical methods and vector geometry are the main areas explored.

Mechanics will introduce Newton's Laws of Motion, forces, friction, equilibrium, kinematics, projectiles and moments.

Statistics will require the analysis of large data sets and a greater emphasis on interpretation of results. GCSE knowledge will be extended to probability theory, summary statistics, sampling, binomial distributions, normal distributions and hypothesis testing.

Assessment

Assessment is entirely through external examination and comprises three 2-hour calculator papers (Pure Mathematics, Pure Mathematics and Statistics, Pure Mathematics and Mechanics).

IB Mathematics

All courses were completely revised from September 2019

Syllabus Content

Mathematics Standard Level: Applications and Interpretations (AI SL) recognises the increasing role that mathematics and technology play in a diverse range of fields in a data-rich world. As such, it emphasizes the meaning of mathematics in context. It is a course designed to build confidence and encourage an appreciation in students who may need statistics in their future studies, or whose main interests lie outside the field of mathematics. The course makes extensive use of technology to allow students to explore and construct mathematical models. It is designed for those wishing to extend their GCSE to the wider skills of applying their knowledge and builds on the fundamental skills and knowledge acquired at GCSE. It would suit students who will be pursuing subjects such as Social Sciences, Humanities, Languages, Arts and those which involve the use of statistical and/or logical reasoning.

Mathematics Standard Level: Approaches and Analysis (AA SL) is a course designed for those students who are comfortable in the manipulation of algebraic expressions and enjoy the recognition of patterns and understand the mathematical generalization of these patterns. They should be confident about applying GCSE techniques correctly. The majority of these students will need good mathematical skills in other subject areas and a strong mathematical background for their university course but any student who is good at and enjoys mathematics will benefit from the AA SL course. It would suit students who will be pursuing subjects such as Chemistry and Economics.

Mathematics Higher Level: Approaches and Analysis (AA HL) is very demanding and aimed at those who have exhibited a high level of competence in applying GCSE Mathematics techniques correctly. Mathematics HL compares with that of A level Further Mathematics in difficulty. HL students will have strong algebraic skills and the ability to understand simple proof. They will be students who enjoy spending time with problems and get pleasure and satisfaction from solving challenging problems. Students considering taking the course should be guided by their GCSE Mathematics teacher. It would suit students who will be pursuing subjects such as Mathematics, Computer Science, Physics, Engineering and some Economics courses at University.

Assessment

The final grade awarded is assessed through an external examination of 2 papers (3 for HL) and an internally assessed, externally moderated, piece of coursework which comprises 20% of the final grade. The external examination is sat in May of UVI. All courses make use of a graphing display calculator. Both Mathematics SL AA and HL AA have one paper that is non-calculator whereas a calculator is required in both papers for Mathematics SL AI. For all courses, the internal assessment is an individual piece of work which is a mathematical exploration. The exploration will be supported through the development of a toolkit of mathematical skills for investigating, problem solving and modelling.

AS and A Level Further Mathematics

The Further Mathematics course requires a strong mathematical commitment on the part of the student and may only be studied in conjunction with A Level Mathematics.

The combined Mathematics and Further Mathematics course is taught in about 1½ times the allocation for Mathematics alone so material is covered at a faster pace. Students considering the double subject should be guided by their GCSE Mathematics teacher and should be someone who enjoys mathematics (you will be spending a lot of time doing practice outside class), who finds Mathematics comes very easily to them (you will be working at pace) and who has academic ability and diligence (you will be studying 4 A Level courses in LVI).

This course is a strongly recommended prerequisite to a university Mathematics course and students who have gone on to study Engineering, Materials Science, Physics, Chemistry, Computer Science and Economics have all commented on its usefulness.

Syllabus Content

OCR Further Mathematics B (MEI)

We offer a broad based mathematical experience for our further mathematicians. Students are taught in a separate group covering the A Level content in the Lower Sixth and are then given the option of taking AS Further Mathematics or A Level Further Mathematics in the Upper Sixth with Further topics taken from the following areas.

Core Pure (mandatory): A Level Mathematics topics are studied in greater depth and new topics are introduced and extended such as complex numbers, matrices, scalar products, proof by induction, hyperbolic functions, polar coordinates and differential equations.

Statistics (option): The statistics topics covered in A Level Mathematics are extended to modelling with various discrete random variables, expectation and variation, Chi squared tests, correlation and regression.

Modelling with Algorithms (option): This introduces new ways of thinking through the ideas of algorithms, networks, optimisation and linear programming.

Mechanics (option): The mechanics topics covered in A Level Mathematics are extended to work and energy, impulse and momentum, centres of mass and equilibrium of a rigid body.

Assessment

Assessment is entirely through external examination.

At AS this is through three, 1 hour 15-minute calculator papers (Core Pure and two options).

At A Level this is through a 2 hour 40-minute calculator paper (Core Pure) and three, 1 hour 15-minute calculator papers (three options).