INTRODUCTION

Further Mathematics develops (and is dependent on) the study of pure and applied mathematics begun at A Level Mathematics. It is intended for those with a particular interest in and aptitude for the subject, and is recommended for those who intend to study Mathematics at University. Those with an interest in engineering, physics, computer science and natural sciences will also find the course particularly useful.

All students wishing to study Further Mathematics will also be required to choose Mathematics which they will study alongside the Further Mathematics course. They will explore a wider range of pure mathematical topics along with some further mechanics and discrete mathematics.

The following subject titles will be offered:
- A Level Mathematics with AS Level Further Mathematics
- A Level Mathematics with A Level Further Mathematics

AIM

The AS and A Level subjects listed above are intended to encourage students to:
- develop their understanding of mathematics and mathematical processes in a way that promotes confidence and fosters enjoyment;
- develop abilities to reason logically and recognise incorrect reasoning, to generalise and to construct mathematical proofs;
- extend their range of mathematical skills and techniques and use them in more difficult, unstructured problems;
- develop an understanding of coherence and progression in mathematics and of how different areas of mathematics can be connected;
- recognise how a situation may be represented mathematically and understand the relationship between 'real world' problems and standard and other mathematical models and how these can be refined and improved;
- use mathematics as an effective means of communication;
- acquire the skills needed to use technology, such as calculators, effectively and recognise when such use may be inappropriate and be aware of limitations;
- develop an awareness of the relevance of mathematics to other fields of study, to the world of work and to society in general;
- take increasing responsibility for their own learning and evaluation of their own mathematical development.

COURSE CONTENT

AS Level (Stand-alone AS Exam)	Advanced Level (Decoupled Exam)
Pure Maths – Learners will extend and deepen their knowledge of proof, algebra, functions, calculus and vectors studied in AS and A level Mathematics. They will broaden their knowledge into other areas of pure mathematics with complex numbers and matrices. Discrete – Discrete mathematics is the part of mathematics dedicated to the study of discrete objects. Learners will study pure mathematical structures and techniques, and their application to solving real-world problems of existence, construction, enumeration and optimisation. Areas studied include counting, graphs and networks, algorithms, critical path analysis, linear programming, and game theory. Mechanics – Learners extend their knowledge of particles, kinematics and forces from A level Mathematics. The area covers dimensional analysis, work, energy, power, impulse, momentum and circular motion.	All the content studied at AS in more depth plus additional content including: Pure Maths – differential equations, polar coordinates and hyperbolic functions Discrete – Hamiltonian and planar graphs, the simplex algorithm and the Nash equilibrium Mechanics – the application of vectors across the topics, centres of mass and variable force
AS ASSESSMENT	**A2 ASSESSMENT**
3 x 1 hour 15 minute exams exams	4 x 1.5 hour exams
Paper 1 – Pure Paper 2 – Mechanics Paper 3 - Discrete	Paper 1 – Pure Mathematics Paper 2 – Pure Mathematics Paper 3 – Mechanics Paper 4 - Discrete

SUBJECT ENRICHMENT

UKMT Senior Maths Challenge; UKMT Senior Maths Team Challenge; Maths Inspiration visit; Cipher Challenge; Problem Solving Club.

SUBJECT SPECIFIC ENTRY REQUIREMENTS

Specific entry requirements: Grade 8 in Maths GCSE.

WHERE NEXT?

This course can lead to a variety of higher education and career opportunities including: Mathematics, Statistics, Accounting, Engineering, Architecture, Medicine, Economics, Physics, Veterinary Sciences, Natural Sciences.

STUDENT SUPPORT

Students have support available through dedicated KS5 Workshops during two lunchtimes every week. This support is provided by an experienced Mathematics Key Stage 5 teacher. Pupils can come for support with homework, extra private study or may be directed there by their teacher as a result of areas of concern identified from recent assessments.

Students will sit regular assessments aimed at highlighting areas for improvement therefore developing their mathematical skills and providing a focus for independent study.

The school also has a subscription to online textbooks and Integral (integralmaths.org) offering students skills practice, tasks and exam style questions to support their independent study and progress.

Enrichment is provided to develop skills required for TMUA, MAT and STEP to support students who are applying to study mathematical related courses at a higher level.