

### Course Outline

A Level in Mathematics consists of three externally examined papers. Students must complete all assessment in May/June in any single year.

### Course Structure

#### Paper 1 – Pure Mathematics 1 – 33.33%, 1 hour and a half

Content overview

Topic 1 – Proof

Topic 2 – Algebra and functions

Topic 3 – Coordinate geometry in the (x,y) plane

Topic 4 – Sequences and series

Topic 5 – Trigonometry

Topic 6 – Exponentials and logarithms

Topic 7 – Differentiation

Topic 8 – Integration

Topic 9 – Vectors

#### Paper 2 – Pure Mathematics 2 – 33.33%, 1 hour and a half

Content overview

Topic 1 – Proof

Topic 2 – Algebra and functions

Topic 3 – Coordinate geometry in the (x,y) plane

Topic 4 – Sequences and series

Topic 5 – Trigonometry

Topic 6 – Differentiation

Topic 7 – Integration

Topic 8 – Numerical methods

#### Paper 3 – Statistics and Mechanics – 33.33%, 1 hour and a half

Content overview

Section A: Statistics

Topic 1 – Statistical sampling

Topic 2 – Data presentation and interpretation

Topic 3 – Probability

Topic 4 – Statistical distributions

Topic 5 – Statistical hypothesis testing Section B: Mechanics

Topic 6 – Quantities and units in mechanics

Topic 7 – Kinematics

Topic 8 – Forces and Newton's Laws

Topic 9 – Moments

### Qualification aims and objectives

The aims and objectives of this qualification are to enable students to:

- understand mathematics and mathematical processes in ways that promote confidence, foster enjoyment and provide a strong foundation for progress to further study;
- extend their range of mathematical skills and techniques;
- understand coherence and progression in mathematics and how different areas of mathematics are connected;
- apply mathematics in other fields of study and be aware of the relevance of mathematics to the world of work and to situations in society in general;
- use their mathematical knowledge to make logical and reasoned decisions in solving problems, both within pure mathematics and in a variety of contexts, and communicate the mathematical rationale for these decisions clearly;
- reason logically and recognise incorrect reasoning;
- generalise mathematically;
- construct mathematical proofs;
- use their mathematical skills and techniques to solve challenging problems which require them to decide on the solution strategy;
- recognise when mathematics can be used to analyse and solve a problem in context;
- represent situations mathematically and understand the relationship between problems in context and mathematical models that may be applied to solve them;
- draw diagrams and sketch graphs to help explore mathematical situations and interpret solutions;
- make deductions and inferences and draw conclusions by using mathematical reasoning;
- interpret solutions and communicate their interpretation effectively in the context of the problem;
- read and comprehend mathematical arguments, including justifications of methods and formulae, and communicate their understanding;
- read and comprehend articles concerning applications of mathematics and communicate their understanding;
- use technology such as calculators and computers effectively, and recognise when such use may be inappropriate;
- take increasing responsibility for their own learning and the evaluation of their own mathematical development.