

Specialist Mathematics

General senior subject

General

Recommendation

A High Achievement (B) in Year 10 Mathematics or a Sound Achievement (C) in Year 10 Extension Mathematics.

Rationale

The major domains of mathematical knowledge in Specialist Mathematics are Vectors and matrices, Real and complex numbers, Trigonometry, Statistics and Calculus. Topics are developed systematically, with increasing levels of sophistication, complexity and connection, building on functions, calculus, statistics from Mathematical Methods, while vectors, complex numbers and matrices are introduced. Functions and calculus are essential for creating models of the physical world. Statistics are used to describe and analyse phenomena involving probability, uncertainty and variation. Matrices, complex numbers and vectors are essential tools for explaining abstract or complex relationships that occur in scientific and technological endeavours.

Students who undertake Specialist Mathematics will develop confidence in their mathematical knowledge and ability and gain a positive view of themselves as mathematics learners. They will gain an appreciation of the true nature of mathematics, its beauty and its power.

Pathways

A course of study in Specialist Mathematics can establish a basis for further education and employment in the fields of science, all branches of mathematics and statistics, computer science, medicine, engineering, finance and economics.

Objectives

By the conclusion of the course of study, students will:

- recall mathematical knowledge
- use mathematical knowledge
- communicate mathematical knowledge
- evaluate the reasonableness of solutions
- justify procedures and decisions
- solve mathematical problems.

Delivery (mode, time requirements, lessons)

Each week, students participate in three one-hour live lessons conducted through Microsoft Teams. In addition to these sessions, they are expected to engage in independent study to complete tasks and assessments aligned with the Work Rate Calendar. All course materials are available via the learning management system

Student requirements

- Computer, access to email, scanner and internet, telephone and USB headset with microphone, exercise book and a protractor.
- Graphics Calculator (preferably Casio FXCG70AU or later)

Structure

Specialist Mathematics is to be undertaken in conjunction with, or on completion of, Mathematical Methods.

Unit 1	Unit 2	Unit 3	Unit 4
Combinatorics, proof, vectors and matrices Combinatorics Introduction to proof Vectors in the plane Algebra of vectors in two dimensions Matrices	Complex numbers, further proof, trigonometry, functions and transformations Complex numbers Complex arithmetic and algebra Circle and geometric proofs Trigonometry and functions Matrices and transformations	Further complex numbers, proof, vectors and matrices Further complex numbers Mathematical induction and trigonometric proofs Vectors in two and three dimensions Vector calculus Further matrices	Further calculus and statistical inference Integration techniques Applications of integral calculus Rates of change and differential equations Modelling motion Statistical inference

Assessment

Formative assessment

Unit 1		Unit 2	
Problem Solving and Modelling Task		Examination	
Examination			
An average of C or higher for both pieces of assessment for QCE credit	1 credit	An average of C or higher for both pieces of assessment for QCE credit	1 credit

Summative assessment

Unit 3		Unit 4	
Summative internal assessment 1 (IA1): • Problem-solving and modelling task	20%	Summative internal assessment 3 (IA3): • Examination — short response	15%
Summative internal assessment 2 (IA2): • Examination — short response	15%		
Summative external assessment (EA): 50% • Examination — combination response			

In Units 3 and 4 students complete four summative assessments. The results from each of the assessments are added together to provide a subject score out of 100. Students will also receive an overall subject result (A–E).

Disclaimer All of the above information is accurate at the time of publication.