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

Specialist Mathematics' major domains are Vectors and matrices, Real and complex numbers, Trigonometry, Statistics and Calculus.

Specialist Mathematics is designed for students who 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.

Students learn topics that 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.

Student learning experiences range from practising essential mathematical routines to developing procedural fluency, through to investigating scenarios, modelling the real world, solving problems and explaining reasoning.

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:

- select, recall and use facts, rules, definitions and procedures drawn from Vectors and matrices, Real and complex numbers, Trigonometry, Statistics and Calculus
- comprehend mathematical concepts and techniques drawn from Vectors and matrices, Real and complex numbers, Trigonometry, Statistics and Calculus
- communicate using mathematical, statistical and everyday language and conventions
- evaluate the reasonableness of solutions
- justify procedures and decisions, and prove propositions by explaining mathematical reasoning
- solve problems by applying mathematical concepts and techniques drawn from Vectors and matrices, Real and complex numbers, Trigonometry, Statistics and Calculus.

Delivery (mode, time requirements, lessons)

Students are expected to undertake independent study to complete tasks and assessment in accordance with the Work Rate Calendar. Students also have access to a one-hour scheduled lesson and a one-hour tutorial each week. Course materials can be accessed in 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, vectors and proof • Topic 1: Combinatorics • Topic 2: Vectors in the plane • Topic 3: Introduction to proof	**Complex numbers, trigonometry, functions and matrices** • Topic 1: Complex numbers 1 • Topic 2: Trigonometry and functions • Topic 3: Matrices	**Mathematical induction, and further vectors, matrices and complex numbers** • Topic 1: Proof by mathematical induction • Topic 2: Vectors and matrices • Topic 3: Complex numbers 2	**Further statistical and calculus inference** • Topic 1: Integration and applications of integration • Topic 2: Rates of change and differential equations • Topic 3: Statistical inference

Assessment

Formative assessment

Unit 1		Unit 2	
Problem Solving and Modelling Task		Examination	
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	15%
Summative internal assessment 2 (IA2): Examination	15%		
Summative external assessment (EA): 50% Examination			

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).

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