Maths Curriculum Summary

KS5 Curriculum Summary

Introduction

The Mathematics Department at The Judd is one of the largest and most successful departments within the school. Mathematics is an extremely popular subject, taken by more than eighty per cent of sixth formers at A Level of which a substantial number take Further Mathematics. The Department enjoys regular success with Oxbridge applications and many pupils distinguish themselves in National Mathematics competitions.

We wish to stimulate interest in, and enthusiasm for, the study of mathematics for its own sake so that students discover for themselves the richness and variety of the subject and the unique insight it provides into the nature of the world around them. This is not to overlook the development of the skills required for adult life, other subjects, and the passing of examinations but is intended to demonstrate our commitment to the fostering of a positive attitude to the subject. We also aim to provide students of varying abilities and interests the opportunity to achieve their full potential in the subject at an appropriate level and rate of progress. We would hope to foster a sense of the awe and wonder of mathematics and an appreciation of its power, beauty and elegance.

The content of the Mathematics A level has been fully specified by the Department for Education. The qualification is based around the overarching themes of:

- *Mathematical argument, language and proof*
- *Mathematical problem solving*
- *Mathematical modelling*

You will study a set Pure Maths syllabus, alongside the Mechanics and Statistics content. Teaching is split between two teachers with one focussing on pure and mechanics topics and one focussing on pure and statistics topics. As well as being able to present a reasoned and logical argument, you will be taught to make use of appropriate, current technology to solve problems. You will also be given the opportunity to work with a large data set, using statistical packages to explore, interpret and summarise this data throughout the Statistics part of the course.

The Further Mathematics A level will allow more breadth to your study, as well as increasing your appreciation for the beauty that lies deeply in the Pure branches of Mathematics, including complex numbers and differential equations. This specification will contain some options for the content covered which could allow for the study of further Mechanics, Statistics, Discrete or Pure Maths.

Exam board: EDEXCEL Mathematics (9MAO) and Edexcel Further Mathematics (9MA0)

We will be offering the opportunity to study for two separate qualifications in our department, an A level in Mathematics and an A Level in Further Mathematics. Students who take both qualifications end up with two full A levels and they can study for them as part of a 4 A level programme.

Non-Examination Assessment

All assessment is through externally created written examinations.

Year 12 - single A level

Topic	Principal resources
Surds and Indices	CGP Book, Collins A level book 1
Trigonometry	
Calculus	
Vectors	
Proof	
Functions	
Coordinate Geometry	
Polynomials	
Inequalities	
Exponentials and Logarithms	
Binomial Expansion	
Binomial Distribution	
Rational Functions	
MECHANICS	
Kinematics and Forces in 1D	
STATISTICS	
Statistical Diagrams	
Measures of central tendency and variation	CGP Book, Collins A level book 1
Probability	
Sampling	

Hypothesis testing (discrete data)	

Year 13 - single A level

Topic	Principal resources
Further Calculus	CGP Book, Collins A level book 2
Differential Equations	
Further Vectors and Applications	
Further Trigonometry	
Sequences	
Further Binomial Expansion	
Numerical Methods	
Parametric Equations	
MECHANICS	
Kinematics and Forces in 2D	
Projectile Motion	
Moments	
STATISTICS	
Conditional Probability	
Normal Distribution	
Hypothesis testing (continuous data)	

Year 12 - Further A level

Topic	Principal resources
Follows the year Single A level content outlined above	CGP Book, Collins A level book 1, Collins A level Book 2

Year 13 - Further A level

Topic	Principal resources
PURE	
Matrices	CUP Further Pure 1 - Chapter 1
Further vectors	CUP Further Pure 1 - Chapter 2
Applications of matrices	CUP Further Pure 1 - Chapter 3
Complex numbers	CUP Further Pure 1 - Chapter 4
Roots of polynomials	CUP Further Pure 1 - Chapter 5
Mathematical induction	CUP Further Pure 1 - Chapter 6
Series and induction	CUP Further Pure 2 - Chapter 1
Powers and roots of complex numbers	CUP Further Pure 2 - Chapter 2
Complex numbers and trigonometry	CUP Further Pure 2 - Chapter 3
Lines and planes in space	CUP Further Pure 2 - Chapter 4
Simultaneous equations and planes	CUP Further Pure 2 - Chapter 5
Applications of calculus	CUP Further Pure 2 - Chapter 6
Polar coordinates	CUP Further Pure 2 - Chapter 7
Differential equations	CUP Further Pure 2 - Chapter 8
Applications of differential equations	CUP Further Pure 2 - Chapter 9
MECHANICS	
Work, energy and power 1	CUP Further Mechanics - Chapter 1
Dimensional analysis	CUP Further Mechanics - Chapter 2
Momentum and collisions 1	CUP Further Mechanics - Chapter 3

Circular motion 1	CUP Further Mechanics - Chapter 4
Centres of mass 1	CUP Further Mechanics - Chapter 5
Work, energy and power 2	CUP Further Mechanics - Chapter 6
Linear motion under variable force	CUP Further Mechanics - Chapter 7
Momentum and collisions 2	CUP Further Mechanics - Chapter 8
Circular motion 2	CUP Further Mechanics - Chapter 9
Centres of mass 2	CUP Further Mechanics - Chapter 10
STATISTICS	
Counting principles and probability	CUP Further Statistics- Chapter 1
Discrete random variables	CUP Further Statistics- Chapter 2
Poisson distribution	CUP Further Statistics- Chapter 3
Non-parametric hypothesis tests	CUP Further Statistics- Chapter 4
Correlation and regression	CUP Further Statistics- Chapter 5
Chi-squared tests	CUP Further Statistics- Chapter 6
Continuous distributions	CUP Further Statistics- Chapter 7
Combining random variables	CUP Further Statistics- Chapter 8
Further hypothesis tests and confidence intervals	CUP Further Statistics- Chapter 9
ADDITIONAL PURE	
Sequences and series	CUP Further Additional Pure - Chapter 1
Number theory	CUP Further Additional Pure - Chapter 2
Groups	CUP Further Additional Pure - Chapter 3
Further vectors	CUP Further Additional Pure - Chapter 4
Surfaces and partial differentiation	CUP Further Additional Pure - Chapter 5
Further calculus	CUP Further Additional Pure - Chapter 6

DECISION	
Graphs and networks	CUP Further Decision - Chapter 2
Algorithms	CUP Further Decision - Chapter 3
Network algorithms	CUP Further Decision - Chapter 4
Decision making in project management	CUP Further Decision - Chapter 5
Graphical linear programming	CUP Further Decision - Chapter 6
The simplex algorithm	CUP Further Decision - Chapter 7
Game theory	CUP Further Decision - Chapter 8