



MATHEMATICS AND FURTHER MATHS

Advanced General Certificate of Education (AS and A2)

WHY MATHEMATICS?

The opportunities for students of Mathematics, on completion of full-time education, are enormous. It complements and supports other courses, for example, Physics, Chemistry, Design Technology and Business Studies. Qualifications in Mathematics are acceptable as an entry to many different careers.

Mathematics students at Thomas Telford School are currently preparing to move into Higher Education courses and careers in the following fields:

Electronic Engineering	Research Chemistry	Computer Science
Pharmacy	Medicine	Forensic Science
Business Administration	Aeronautics	Accountancy
Mechanical Engineering	Civil Engineering	Actuarial Work

The Mathematics AGCE courses offered at Thomas Telford School are designed to provide academic and vocational experiences. They will prepare students for their choice in both the world of work and Higher Education.

Progression

A level Mathematics and Further Mathematics are required at the top universities to study Mathematics. Cambridge and Warwick Universities also require the Advanced Extension Award in Mathematics and / or Step Papers as part of their offers. These courses are offered to the most able mathematicians.

Mathematics A level is required and Further Mathematics is desirable for any engineering or Physics course at university.

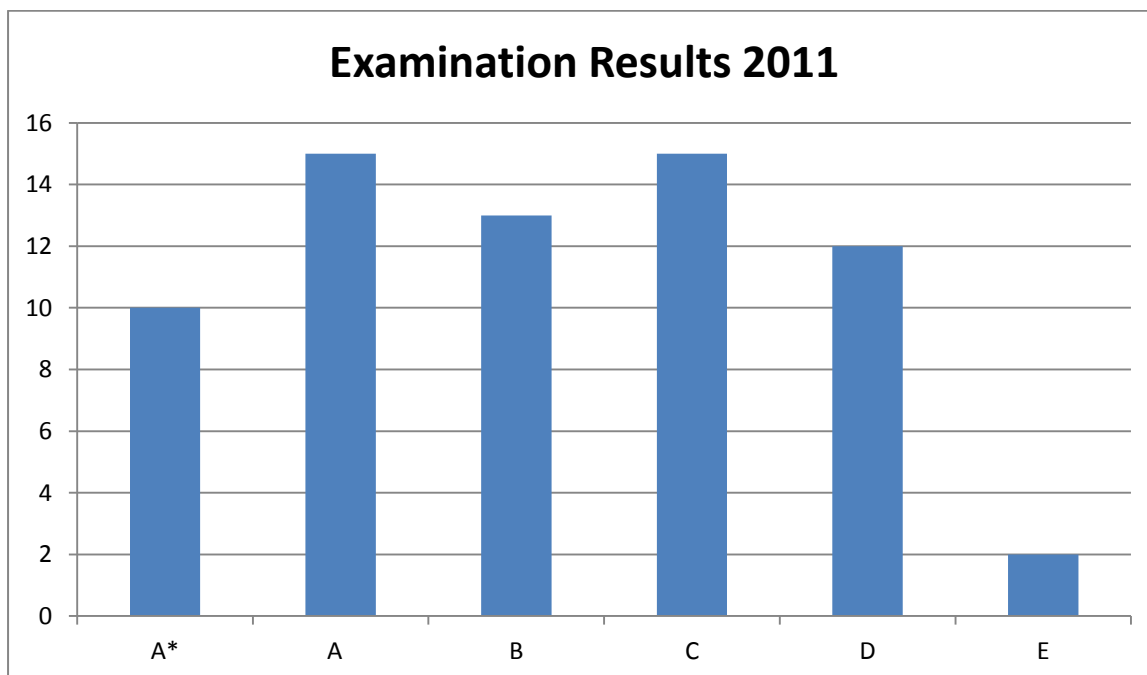
A level Mathematics is required to study Economics at university.

Trips

Students in the lower sixth go to Alton Towers, usually in the summer term, following examinations, to experience first hand Mechanics in action. The trip costs in the region of £25

SPECIFIC ENTRY REQUIREMENTS

- 6 GCSEs (Grades A* - C)
- Grade B in GCSE Mathematics (Higher Tier), having studied the higher course.



COURSE DETAILS

Mathematics OCR MEI Syllabus: 7895

You will study six Units as follows:

Core 1 - An Introduction to Advanced Mathematics (*Examination unit*)

In this unit you will recap GCSE algebra skills. You will then study coordinate geometry including the equations of circles and lines and extend your knowledge of polynomials and shapes of graphs. Finally you will study the language of mathematics.

Core 2 - Concepts for Advanced Mathematics (*Examination unit*)

Ever wondered how to calculate the gradient of a curve or the area underneath it? This unit introduces you to calculus and the uses of differentiation and integration. It will also give you the opportunity to extend your ability to manipulate trigonometric functions and identities.

Core 3 – Methods for Advanced Mathematics (*Examination Unit and Internally Assessed Coursework Task*)

How do you solve an equation of order 5? – This will be your coursework task. You will then further your calculus skills and look into exponential growth and decay.



Core 4 – Applications of Advanced Mathematics (*Examination Unit and Comprehension Paper*)

What is the vector equation of a plane? How do you expand brackets to a negative power? These are just two of the questions you will study during this unit. You will also look at waves and how to avoid another Tacoma Narrows Bridge disaster – those trigonometric curves are really important!

Statistics 1 (*Examination Unit*)

In this unit you will study the importance of statistics in the media by looking at day to day events through the eyes of a journalist for a fictional newspaper. How is data presented and what does it mean? How can a hypothesis be tested using probability?

Mechanics 1 (*Examination Unit*)

Ever wondered why your stomach feels strange in a fast moving lift? In this unit you will look at forces moving on bodies both still and in motion. You will also answer such questions as ‘what is the best angle to release a projectile at for maximum distance to be travelled?’

Further Mathematics OCR MEI Syllabus: 7896

You will study six Units as follows:

Further Pure 1 (*Examination Unit*)

What happens if you need to square root a negative number? You will meet a solution to this problem which opens up a whole new world of mathematics. You will also study matrices, vectors and proof.

Further Pure 2 (*Examination Unit*)

You will become very competent with a graphical calculator as you explore a range of curves and functions, McLaurin’s Theorem, the Taylor Expansion and the Cayley-Hamilton Theory.

Statistics 2 (*Examination Unit*)

How do you decide if a component is substandard? – Testing for quality control is covered by using the Binomial, Poisson and Normal distributions. You will also look in depth at the strength of a relationship between two variables.

Mechanics 2 (*Examination Unit*)

If you were in charge of a racing car and had to decide which tyres to use – depending on the weather – coefficients of friction would dictate your choice. In this unit you will look at coefficients of friction along with work, energy and power, centre of mass and moments.

Mechanics 3 (*Examination Unit*)

Why are cars more likely to skid going round corners than on straight roads? Someone is preparing for a bungee jump from a high bridge over a river – how do they calculate the length of the elastic rope so that they get wet but don’t crash into the river bed? Why do pendulums keep a steady tick tock in a grandfather clock? Mechanics 3 covers the theory behind circular motion, elastic strings and oscillations providing answers to these questions.



Differential Equations (*Examination Unit and Internally Assessed Coursework*)

Often mathematics makes assumptions about situations to make the calculations easier. What happens if we try to analyse the situations that are less tidy? The air resistance experienced by a parachutist is proportional to the square of the velocity and there comes a point where the air resistance balances out the force due to gravity and they fall at a steady speed. How is this speed calculated so they can be sure that they will all land safely?



Thomas Telford School

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