

Subject: Further Mathematics

Teachers: Mr Heighway
Rev Walters

Exam Board: OCR

NEWPORT GIRLS' HIGH SCHOOL

KS5 CURRICULUM OVERVIEW

Curriculum Intent & Organisation		
<p>The OCR A level further mathematics course is designed for students who are looking to study mathematics or mathematical related disciplines beyond A level. The course will encourage learning the knowledge and understanding of sophisticated mathematical ideas and techniques. With 50% of the course comprising of pure material and the other half made up of applied topics, this enables a good balance between breadth and depth of mathematical knowledge. The course will be taught in parallel to the mathematics A level.</p>		
Examination Information		Facilitating Subject?
Further mathematics examinations consist of four 1.5 hour papers: Further pure paper 1 and 2 plus Further Mechanics and Discrete.		Yes
Impact of Prior Learning from KS4		
<p>Studying the further mathematics A level requires strong algebra skills which are developed throughout the GCSE course. It is advantageous to have completed the further mathematics level 2 course (but not essential) as it covers more complex algebra and introduces topics such as matrices that feature heavily in the further mathematics A level.</p>		
Equipment Required for this course		
<ul style="list-style-type: none"> • Standard classroom stationery • Calculator that has an iterative function, statistical distributions and matrix calculations for example the Casio Classwiz FX-991EX • Own lined/squared paper 		
Curriculum Implementation – Areas of Focus Year 12		
Autumn Term	Spring Term	Summer Term
<ul style="list-style-type: none"> • Introduction to complex numbers • Matrices and transformations • Complex numbers and geometry • Motion in one dimension • Forces and Newton's laws of motion • Friction • Moments • Solving problems including set theory and permutations and combinations • Graphs and networks • Algorithms • Network algorithms 	<ul style="list-style-type: none"> • Roots of polynomials • Proof by induction • Matrices and their inverses • Vectors and 3D space • Critical path analysis • Linear programming • Game theory • Work/energy and power • Impulse and momentum • Dimensional analysis • Circular motion 	<ul style="list-style-type: none"> • Vectors • Matrices • Centre of mass • Motion in 2D/3D • Solving further problems

Subject: Further Mathematics

Teachers: Mr Heighway
Rev Walters

Exam Board: OCR

Curriculum Implementation – Areas of Focus Year 13		
Autumn Term	Spring Term	Summer Term
<ul style="list-style-type: none"> • Series and induction • Further calculus • Polar coordinates • Maclaurin series • Work-energy principle • Circular motion • Elasticity • Graphs and networks including Hamiltonian graphs • Complex algorithms • Network algorithms including travelling salesman problem 	<ul style="list-style-type: none"> • Hyperbolic functions • Applications of integration • First order differential equations • Second order differential equations • Volume of revolution • Centres of mass • Sliding and Toppling • Impulse and momentum • Critical path analysis including Gantt charts • Linear programming including the simplex algorithm • Game theory including Nash equilibrium 	<ul style="list-style-type: none"> • Revision
Impact / Outcomes		
<p>Learning will be assessed throughout the course by:</p> <ul style="list-style-type: none"> • Homework tasks marked using the NGHS marking policy • Topic assessments • Mock examinations during the spring term in year 12, the summer term in year 12 and the spring term in year 13. 		
Homework / Self Study		
<p>Homework comprises of a variety of exercise sheets, questions from text books, past examination questions and online worksheets completed on the 'integralmaths' website. Students are expected spend their self-study time completing tasks from in lesson, working through the tasks on 'integralmaths' and make use of the online tutorials.</p>		
Ways to support learning		
<p>To support the delivery of the course we currently have access to the websites 'integralmaths' and 'mymaths', these allow students to independently work through tutorials on all the topics as well as copious amounts of practice questions with complete solutions to assess themselves. There are weekly lunchtime support sessions with teachers.</p>		
Field Work / Extension / Enrichment Opportunities		
<p>In the first term they are entered into the senior mathematics challenge, plus there is also the opportunity to take part in the team mathematics challenge, where they get to compete against other schools. Over the last few years during the summer term students have been taken to mathematics courses run at the University of Warwick to help provide insight beyond the curriculum. Students are also provided with support with their mathematics university entrance tests such as TMUA, MAT and STEP.</p>		

Subject:	Further Mathematics
-----------------	---------------------

Teachers:	Mr Heighway Rev Walters
------------------	----------------------------

Exam Board:	OCR
--------------------	-----

Next Steps

A further mathematics A level is ideal for students looking to study mathematical related courses such as mathematics, computer science and engineering. This course improves the students' ability to solve complex problems, understand sophisticated mathematical techniques and communicate with logical reasoning which are skills looked on favourably by universities and employers.

For more information, contact Mr A Heighway