



Key Stage: 5

Subject: Further Mathematics A2

Aims of the subject:

- To develop mathematical knowledge and skills which encourage confidence and provide satisfaction and enthusiasm
- To apply the work developed in core lessons to Newtonian Mechanics problems
- To develop an understanding of mathematical principles and an appreciation of the subject of mathematics as logical and coherent
- To acquire a range of mathematical skills which could be applied in the context of everyday situations and across other subjects
- To develop the ability to analyse problems logically, recognise when and how a situation may be represented mathematically and select an appropriate method to solve the problem
- To secure the mathematical background necessary for further study in this or related subjects

A-Level Examination Board: AQA

Assessment Overview: Each paper is 1.5 hours long. The weighting of each of the 3 modules is $16\frac{2}{3}\%$ of overall total.

Course	What will I study?	Assessment
A2	<p>Year 12 Term 3: Further Pure 2</p> <ul style="list-style-type: none"> ➤ Complex Numbers ➤ Roots of Polynomial Equations <p>Year 13 Term 1: Further Pure 2</p> <ul style="list-style-type: none"> ➤ Summation of Finite Series ➤ De Moivre's Theorem and its Applications <p>• Mechanics 2 Half Term 1 of A2:</p> <ul style="list-style-type: none"> ➤ Moments and Equilibrium ➤ Centres of Mass of Laminas and Frameworks 	<p>Formal Tests:</p> <ul style="list-style-type: none"> ➤ Complex Numbers ➤ Roots of Polynomial Equations <p>Formal Tests:</p> <ul style="list-style-type: none"> ➤ Summation of Finite Series ➤ De Moivre's Theorem and its Applications <p><u>Half Term 1 of A2:</u> Centres of Mass/Moments and Equilibrium</p>

	<p>Half Term 2 of A2:</p> <ul style="list-style-type: none"> ➤ Mechanical energy, work and power including Hooke's Law and Elastic potential energy ➤ Variable resistance forces <p>• Mechanics 3</p> <ul style="list-style-type: none"> ➤ Dimensional Analysis ➤ Momentum and Collisions in One Dimension ➤ Momentum and Collisions in Two Dimensions <p>Term 2:</p> <p>• Further Pure 2</p> <ul style="list-style-type: none"> ➤ Inverse Trigonometrical Functions ➤ Hyperbolic Functions ➤ Arc Length and Area of Surface of Revolution <p>• Mechanics 2</p> <p>Half Term 3 of A2:</p> <ul style="list-style-type: none"> ➤ Circular Motion ➤ Circular Motion with variable speed <p>Half Term 4 of A2:</p> <ul style="list-style-type: none"> ➤ Variable acceleration in 2 and 3 dimensions ➤ Application of differential equations in mechanics <p>Term 3:</p> <ul style="list-style-type: none"> • Further Pure 2 • Mechanics 2 • Mechanics 3 <ul style="list-style-type: none"> ➤ Revision 	<p><u>Half Term 2 of A2:</u></p> <p>Work and Energy 1 (Kinetic and Potential Energy; Use of Work-Energy Equation; Principle of Conservation of Energy)</p> <p>Work and Energy 2 (Hooke's Law, Elastic Potential Energy, Power)</p> <p>Formal Tests:</p> <ul style="list-style-type: none"> ➤ Inverse Trigonometric Functions ➤ Hyperbolic Functions ➤ Arc Length and Area of Surface of Revolution <p><u>Half Term 3 of A2:</u></p> <p>Horizontal and Vertical Circular Motion</p> <p><u>Half Term 4 of A2:</u></p> <p>Variable acceleration/Differential Equations Mock M2 exam</p> <p>External exams:</p> <p>FP2 : 22nd June 2018 M2 : 25th June 2018 M3 : 6th June 2018</p>
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Enrichment opportunities

<http://www.furthermaths.org.uk/students>

<http://nrich.maths.org/8652>

<http://www.examsolutions.net/maths-revision/syllabuses/AQA/period-1/specification.php>

Throughout the course, examples are given of the use of mechanics in the real world. Students are encouraged to look for applications of Newtonian Mechanics in the media and technical press (for example, New Civil Engineer).

Suggestions for wider reading

- 'Further Pure FP3' by Mark Rowland (OUP)
- 'Further Pure Mathematics' by Bostock, Chandler and Rourke (Stanley Thornes)
- 'A2 Further Pure Mathematics' (Third edition) by Heard, Martin, Murphy (Hodder Murray)
- 'Advanced Problems in Mathematics' by S.T.C. Siklos (1996 and 2003)

These are selections of STEP-like problems complete with discussion and full solutions. They cover Core, Statistics and Mechanics problems. (STEP is the examination normally used as a basis for conditional offers to Cambridge and other top universities.) The problems are different from most A-level questions, being much longer ('multi-step' is the current terminology) and sometimes covering material from apparently unconnected areas of mathematics. They are more like the sort of problems that you encounter in a university mathematics course, although they are based on the syllabuses of school mathematics.

Advancing Maths for AQA (1st Editions): Mechanics M1 to M6 (Cambridge)

Textbook: Advancing Maths for AQA 2nd Edition: Mechanics 2 ISBN 0-435-51337-0

A First Course in Mechanics Mary Lunn (OUP, 1991)

A bridge between the sort of mechanics you meet at A-level and the sort you are going to meet at university; not just a bridge, but also a good bit of road on the far side.

Further Mechanics by Brian Jefferson and Tony Beadsworth (Oxford)