**A Level Further Maths, Core Pure Year 1**

**Exam Board: Edexcel**

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| **Term**  | **INTENT** | **IMPLEMENTATION** | **IMPACT**  |
| **Substantive Knowledge**This is the specific, factual content for the topic, which should be connected into a careful sequence of learning. | **Disciplinary Knowledge (Skills)**This is the action taken within a particular topic in order to gain substantive knowledge. | **Assessment opportunities**What assessments will be used to measure student progress?Evidence of how well students have learned the intended content. |
| **Autumn Term****1A****Year 12** | Year 1 A level content  | See A level Curriculum Map |  |
| **Autumn Term****1B****Year 12**  | Year 1 A level content | See A level Curriculum Map |  |
| **Spring Term****2A****Year 12** | Year 2 A level content | See A level Curriculum Map |  |
| **Spring Term****2B****Year 12** | Year 2 A level content | See A level Curriculum Map |  |
| **Summer Term****3A****Year 12** | Core Pure 1Chapter 1: Complex Numbers* + 1.1 Imaginary and complex numbers
	+ 1.2 Multiplying complex numbers
	+ 1.3 Complex conjugation
	+ 1.4 Roots of Quadratic equations
	+ 1.5 Solving cubic and quartic equations

Chapter 2: Argand Diagrams* 2.1 Argand diagrams
* 2.2 Modulus and argument
* 2.3 Modulus-argument form of complex numbers
* 2.4 Loci in the Argand diagram
* 2.5 Regions in the Argand diagram

Chapter 3: Series* 3.1 Sums of natural numbers
* 3.2 Sums of squares and cubes

Chapter 6: Matrices* 6.1 Introduction to matrices
* 6.2 Matrix multiplication
* 6.3 Determinants
* 6.4 Inverting a 2 x 2 matrix
* 6.5 Inverting a 3 x 3 matrix
* 6.6 Solving systems of equations using matrices

Chapter 7: Linear Transformations* 7.1 Linear transformations in two dimensions
* 7.2 Reflections and rotations
* 7.3 Enlargements and stretches
* 7.4 Successive transformations
* 7.5 Linear transformations in three dimensions
* 7.6 The inverse of a linear transformation
 | Chapter 1: Complex numbers* Understand and use the definitions of imaginary and complex numbers
* Add and subtract complex numbers
* Understand the definition of a complex conjugate
* Divide complex numbers
* Solve quadratic equations that have complex roots
* Solve cubic or quartic equations that have complex roots

Chapter 2: Argand diagrams* Show complex numbers on an Argand diagram
* Find the modulus and argument of a complex number
* Write a complex number in modulus-argument form
* Represent loci on an Argand diagram
* Represent regions on an Argand diagram

Chapter 3: Series* Use standard results for $\sum\_{r=1}^{n}1$ and $\sum\_{r=1}^{n}r$
* Use standard results for $\sum\_{r=1}^{n}r^{2}$ and $\sum\_{r=1}^{n}r^{3}$
* Evaluate and simplify series of the form $\sum\_{r=1}^{n}f\left(r\right)$, where $f\left(r\right)$ is linear, quadratic or cubic

Chapter 6: Matrices* Understand the concept of a matrix
* Define the zero and identity matrices
* Add and subtract matrices
* Multiply a matrix by a scalar
* Multiply matrices
* Calculate the determinant of a matrix
* Find the inverse of a matrix
* Use matrices to solve systems of equations
* Interpret simultaneous equations geometrically

Chapter 7: Linear transformations* Understand the properties of linear transformations and represent them using matrices
* Perform reflections and rotations using matrices
* Carry out enlargements and stretches using matrices
* Find the coordinates of invariant points and the equations of invariant lines
* Carry out successive transformations using matrix products
* Understand linear transformations in three dimensions
* Use inverse matrices to reverse linear transformations
 | * In class teacher assessment through Q&A
* End of chapter mini test (with peer marking)
* Chapter revision exercise via textbook
* End of term review exercises via textbook
* End of term formal mixed chapter assessment
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| **Summer Term****3B****Year**  | Chapter 4: Roots of polynomials* 4.1 Roots of a quadratic equation
* 4.2 Roots of a cubic equation
* 4.3 Roots of a quartic equation
* 4.4 Expressions relating to the roots of a polynomial
* 4.5 Linear transformations of roots

Chapter 5: Volumes of revolution* 5.1 Volumes of revolution around the $x $ -axis
* 5.2 Volumes of revolution around the $y $ -axis
* 5.3 Adding and subtracting volumes
* 5.4 Modelling with volumes of revolution

Chapter 8: Proof by induction* 8.1 Proof by mathematical induction
* 8.2 Proving divisibility results
* 8.3 Proving statements involving matrices

Chapter 9: Vectors* 9.1 Equation of a line in three dimensions
* 9.2 Equation of a plane in three dimensions
* 9.3 Scalar product
* 9.4 Calculating angles between lines and planes
* 9.5 Points of intersection
* 9.6 Finding perpendiculars
 | Chapter 4: Roots of polynomials* Derive and use the relationships between the roots of a quadratic equation
* Derive and use the relationships between the roots of a cubic equation
* Derive and use the relationships between the roots of a quartic equation
* Evaluate expressions relating to the roots of polynomials
* Find the equation of a polynomial whose roots are a linear transformation of the roots of a given polynomial

Chapter 5: Volumes of revolution* Find the volume of revolution when a curve is rotated around the $x $-axis
* Find the volume of revolution when a curve is rotated around the $y $-axis
* Find more complicated volumes of revolution
* Model real life objects using volumes of revolution

Chapter 8: Proof by induction* Understand the principle of proof by mathematical induction and prove results about sums of series
* Prove results about divisibility using induction
* Prove results about matrices using induction

Chapter 9: Vectors* Understand and use the vector and Cartesian forms of the equation of straight line in three dimensions
* Understand and use the vector and Cartesian forms of the equation of a plane
* Calculate the scalar product for two 3D vectors
* Calculate the angle between two vectors, two lines, a line and a plane, or two planes
* Understand and use the scalar product form of the equation of a plane
* Determine whether two lines meet and determine the point of intersection
* Calculate the perpendicular distance between two lines, a point and a line, or a point and a plane
 | * In class teacher assessment through Q&A
* End of chapter mini test (with peer marking)
* Chapter revision exercise via textbook
* End of term review exercises via textbook
* End of term formal mixed chapter assessment
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