**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 1  Chapter 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 and * Use standard results for and * Evaluate and simplify series of the form , where 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 |
| **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 -axis * 5.2 Volumes of revolution around the -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 -axis * Find the volume of revolution when a curve is rotated around the -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 |