Year 12
Further Mathematics

Year Calendar Plan		
Dates	**Lesson Focus**	**Assessment/Revision**
Term 1	Core Pure AS Unit 1: Complex Numbers • Introduction of complex numbers, basic manipulation; • Complex conjugate, division and solving polynomial equations; • Argand diagrams; • Modulus and argument; • Loci; Core Pure AS Unit 4: Series • Sums of series; Core Pure AS Unit 5: Algebra and Functions • Roots of polynomial equations; • Formation of polynomial equations Core Pure AS Unit 6: Proof by Induction • Proof by mathematical induction;	Assignments 1-4 PC1
Term 2	Core Pure Unit 2 a - c: Matrices • Matrix addition, subtraction and multiplication; • Inverse of 2 × 2 and 3 × 3 matrices; • Simultaneous Equations • Linear transformations. Core Pure AS Unit 2d: Matrices • Matrix addition, subtraction and multiplication; • Inverse of 2 × 2 and 3 × 3 matrices; • Simultaneous Equations • Linear transformations. Further Statistics 1 unit 3: Geometric Progression • Geometric Progression • Hypothesis Testing • Finding Critical Values	Assignments 5-8 PC2
Term 3	Core Pure AS Unit 7: Vectors • Vector and Cartesian equations of a line and a plane • Scalar product; • Problems involving points, lines and planes. Core Pure AS Unit 8: Calculus • Volumes of revolution. Further Mechanics 1 Unit 1: Momentum and Impulse (Part 1) • Volumes of revolution. • Momentum and impulse; impulse-momentum principle; • conservation of momentum applied to collisions; jerking string problems. Further Mechanics 1 Unit 4: Momentum and Impulse (Part 2) • Momentum as a vector (i, j problems) Impulse-momentum principle in vector form.	Assignments 9-12 PC3
Term 4	Further Mechanics 1 Unit 2: Work, Energy and Power • Work, kinetic energy; derivation of units and formulae; • Potential energy, work-energy principle, conservation of mechanical energy, problem solving; • Power; derivation of units and formula. Further Mechanics 1 Unit 5: Elastic Strings and Springs and Elastic Energy • Hooke's law and definition of modulus of elasticity; • Derivation of elastic potential energy formula; Problem solving: equilibrium and using the work-energy principle. Further Mechanics 1 Unit 3: Elastic Collisions in One Dimension • Direct impact of elastic spheres. Newton's law of restitution; • Loss of kinetic energy due to impact; Further Mechanics 1 Unit 6a: Elastic Collisions in Two Dimensions • Problem solving (including 'successive' impacts). • Oblique impact of a smooth sphere with a fixed surface. • Successive oblique impacts of a sphere with smooth plane surfaces. Further Mechanics 1 Unit 6a: Elastic Collisions in Two Dimensions • Oblique impact of two smooth spheres of equal radius Further Mechanics 1 Unit 6b: Elastic Collisions in Two Dimensions	Assignments 13-16 PC4
Term 5	Further Statistics 1 Unit 2: Discrete Probability Distributions • Mean and Variance of Discrete Probability distributions Further Statistics 1 Unit 1 & 3: Poisson and Binomial Distribution • The Poisson Distribution • Mean and Variance of binomial and poisson distribution • Poisson as an approximation to binomial Further Statistics 1 Unit 4 & 8: Chi Squared Tests • Chi Squared Tests	Assignments 17-20 PC5
Term 6	Core Pure Unit 1: Complex Numbers (Part 1) • Know and use $z = re^{i\theta} = r(\cos\theta + i\sin\theta)$; • De Moivre's theorem; • The nth roots of $z = re^{i\theta}$ and complex roots of unity. Core Pure Unit 2: Hyperbolic Functions • sinh x, cosh x, tanh x and their inverses.	Assignments 21-23 PC6