

## Year 13 (A-Level) Course Plan

### Pure Maths Course

Chapter No	Topic	Subtopics
1	Algebraic Methods	1.1 Algebraic fractions and its operations
		1.2 Algebraic division and partial fractions
2	Functions and Graphs	2.1 Functions and mappings / inverse functions
		2.2 Modulus function and its graphs
		2.3 Solving equations and inequalities involving modulus
3	Sequence and Series	3.1 Arithmetic and Geometric sequence / series
		3.2 Sigma notation
		3.3 Recurrence relations
4	Binomial Expansion	4.1 Binomial expansion (when $n$ is any real number)
5	Radians	5.1 Arc length and area of a segment
		5.2 Small angle formula
6	Trigonometry	6.1 Trigonometric functions (sec $x$ , cosec $x$ and cot $x$ )
		6.2 Trigonometric identities
		6.3 Inverse trigonometric functions
		6.4 Addition formula
		6.5 Double-angle formula

		6.6 Proving trigonometric identities
		6.7 Solving trigonometric equations
		6.8 Modelling with trigonometric functions
7	Parametric Equation of a Curve	7.1 Introduction
		7.2 Relationship between parametric and cartesian equation
		7.3 Modelling with parametric equations
8	Differentiation	8.1 First principle to find derivatives
		8.2 Derivatives of trigonometric and algebraic functions
		8.3 Chain rule
		8.4 Product rule
		8.5 Quotient rule
		8.6 Parametric differentiation
		8.7 Implicit differentiation
		8.8 Rate of change
9	Numerical Methods	9.1 Location of roots
		9.2 Iteration and Newton–Raphson method
10	Integration	10.1 Standard integrals
		10.2 Integrating by recognition and trig identities
		10.3 Reverse chain rule
		10.4 Integration by substitution
		10.5 Integration by parts
		10.6 Partial fractions
		10.7 Finding area
		10.8 Solving differential equations
		10.9 Modelling
11	Vectors	11.1 3D coordinates and vectors
		11.2 Solving geometric problems
		11.3 Vectors related to mechanics

## Statistics Maths Course

Chapter No	Topic	Subtopics
1	Regression and Correlation	1.1 Exponential models
		1.2 Measuring correlation
		1.3 Hypothesis testing for zero correlation
2	Probability	2.1 Conditional probability
		2.2 Probability formula
3	Normal Distribution	3.1 Finding probabilities
		3.2 Inverse normal distribution
		3.3 Standard normal distribution
		3.4 Approximating binomial distribution
		3.5 Hypothesis testing with normal distribution

## Mechanics Maths Course

Chapter No	Topic	Subtopics
1	Moments	1.1 Moments and resultant moments
		1.2 Equilibrium of particle
2	Forces and Friction	2.1 Resolving forces
		2.2 Friction forces
3	Projectiles	3.1 Horizontal projection
		3.2 Projection at any angle
		3.3 Projectile motion formula
4	Application of Forces	4.1 Static particles and modelling
		4.2 Static rigid bodies
		4.3 Dynamics and inclined planes
		4.4 Connected particles
5	Vectors in Kinematics	5.1 Vector methods with projectiles

		5.2 Variable acceleration in one dimension
		5.3 Differentiating and integrating vectors