



Mathematics Department: Yearly Overview Plan

Year 12 IAL Core Mathematics 12 (Edexcel) *(two-thirds of AS)*

<u>Unit</u>	<u>Learning Outcomes</u> <i>Students will learn...</i>	<u>Real World Application</u>	<u>Assessment Methods</u>
1. P1-Algebra and functions	<ul style="list-style-type: none"> Laws of indices for all rational exponents. Use and manipulation of surds. Quadratic functions and their graphs. The discriminant of a quadratic function. Completing the square. Solution of quadratic equations. Solve simultaneous equations; analytical solution by substitution. Interpret linear and quadratic inequalities graphically. Represent linear and quadratic inequalities graphically. Solutions of linear and quadratic inequalities. Algebraic manipulation of polynomials, including expanding brackets and collecting like terms, factorisation. Graphs of functions; sketching curves defined by simple equations. Geometrical interpretation of algebraic solution of equations. Use of intersection points of graphs of functions to solve equations. Knowledge of the effect of simple transformations on the graph of $y = f(x)$ as represented by $y = af(x)$, $y = f(x) + a$, $y = f(x - a)$, $y = f(ax)$. 		<p>Students will have regular assessments using Tailored assessments created from Core 1 and Core 2 past papers questions in different formats throughout the year to consistently assess which grade they are working at from A-E.</p> <p>Formative assessment Ongoing Classwork, homework, past paper questions</p> <p>Summative assessment Term 1 Pure 1 Assessment 1- w.b. 29th September Pure 1 Mock 1- w.b. 10th November Pure 1 Mock 2 - w.b. 1st December</p> <p>Statistics 1 Assessment 1- w.b. 8th December</p> <p>Term 2 <u>Pure 1 External Examination 8th January</u></p> <p>- Pure 2 Assessment 1- w.b. 23rd February - Statistics 1 Mock 1 - w.b. 8th March</p> <p>Term 3</p> <p>- Statistics 1 Mock 2 w.b. 19th April - Pure 2 Mock 1 w.b. 26th April</p> <p><u>Pure 1 Resit Examination 13th May</u> <u>Pure 2 Examination 20th May</u> <u>Statistics 1 Examination 4th June</u></p>
2. P1-Coordinate geometry	<ul style="list-style-type: none"> Equation of a straight line, including the forms $y - y_1 = m(x - x_1)$ and $ax + by + c = 0$. Conditions for two straight lines to be parallel or perpendicular to each other. 		
3. P1-Trigonometry	<ul style="list-style-type: none"> The sine and cosine rules, and the area of a triangle in the form $\frac{1}{2} ab \sin C$. 		

	<ul style="list-style-type: none"> • Radian measure, including use for arc length and area of sector. • Sine, cosine and tangent functions. Their graphs, symmetries and periodicity. 		
4. P1- Differentiation	<ul style="list-style-type: none"> • The derivative of $f(x)$ as the gradient of the tangent to the graph of $y = f(x)$ at a point; the gradient of the tangent as a limit; interpretation as a rate of change; second order derivatives. • Differentiation of x^n, and related sums, differences and constant multiples. • Applications of differentiation to gradients, tangents and normals. 		
5. P1-Integration	<ul style="list-style-type: none"> • Indefinite integration as the reverse of differentiation. • Integration of x^n and related sums, differences and constant multiples. 		
Year 12 IAL Pure 2 (Edexcel) <i>(one-third of AS year)</i>			
6. P2-Proof	<ul style="list-style-type: none"> • Understand and use the structure of mathematical proof, proceeding from given assumptions through a series of logical steps to a conclusion; use methods of proof stated below: • Proof by exhaustion • Disproof by counter example. 		
7. P2- Algebra and Function	<ul style="list-style-type: none"> • Simple algebraic division; use of the Factor Theorem and the Remainder Theorem. 		
8. P2- Co-Ordinate Geometry	<ul style="list-style-type: none"> • Coordinate geometry of the circle using the equation of a circle in the form $(x - a)^2 + (y - b)^2 = r^2$ and including use of the following circle properties: • (i) the angle in a semicircle is a right angle; • (ii) the perpendicular from the centre to a chord bisects the chord; • (iii) the perpendicularity of radius and tangent. 		

9. P2-Sequences and Series	<ul style="list-style-type: none"> Sequences, including those given by a formula for the nth term and those generated by a simple relation of the $x_{n+1} = f(x_n)$ Understand and work with arithmetic sequences and series, including the formula for the nth term and the sum of a finite arithmetic series; the sum of the first n natural numbers. Increasing sequences, decreasing sequences and periodic sequences. Understand and work with geometric sequences and series, including the formulae for the nth term and the sum of a finite geometric series; the sum to infinity of a convergent geometric series, including the use of $r < 1$. Binomial expansion of $(a + bx)^n$ for positive integer n. 		
10. P2-Exponentials and Logs	<ul style="list-style-type: none"> $y = ax$ and its graph. Laws of logarithms. The solution of equations of the form $ax = b$. 		
11. P2-Trigonometry	<ul style="list-style-type: none"> Knowledge and use of $\sin\theta / \cos\theta = \tan\theta$ and $\sin^2\theta + \cos^2\theta = 1$ Solution of simple trigonometric equations in a given interval. 		
12. P2-Differentiation	<ul style="list-style-type: none"> Applications of differentiation to maxima and minima and stationary points, increasing and decreasing functions. 		
13. P2-Integration	<ul style="list-style-type: none"> Evaluation of definite integrals. Interpretation of the definite integral as the area under a curve. Approximation of area under a curve using the trapezium rule. 		

Year 12 IAL Statistics 1 (Edexcel) *(one-third of AS year)*

<u>Unit</u>	<u>Learning Outcomes</u> <i>Students will learn...</i>	<u>Real World Application</u>	
14. Mathematical models in probability and statistics	<ul style="list-style-type: none"> • <i>The basic ideas of mathematical modelling as applied in probability and statistics.</i> 		
15. Representation and summary of data	<ul style="list-style-type: none"> • <i>Histograms, stem and leaf diagrams, box plots.</i> • <i>Measures of location — mean, median, mode.</i> • <i>Measures of dispersion — variance, standard deviation, range and interpercentile ranges.</i> • <i>Skewness. Concepts of outliers.</i> 		
16. Probability	<ul style="list-style-type: none"> • <i>Elementary probability.</i> • <i>Sample space. Exclusive and complementary events. Conditional probability.</i> • <i>Independence of two events.</i> • <i>Sum and product laws.</i> 		
17. Correlation and regression	<ul style="list-style-type: none"> • <i>Scatter diagrams. Linear regression.</i> • <i>Explanatory (independent) and response (dependent) variables. Applications and interpretations.</i> • <i>The product moment correlation coefficient, its use, interpretation and limitations.</i> 		
18. Discrete random variables	<ul style="list-style-type: none"> • <i>The concept of a discrete random variable.</i> • <i>The probability function and the cumulative distribution function for a discrete random variable.</i> • <i>Mean and variance of a discrete random variable.</i> • <i>The discrete uniform distribution.</i> 		
19. Normal Distribution	<ul style="list-style-type: none"> • <i>The Normal distribution including the mean, variance and use of tables of the cumulative distribution function.</i> 		