Curriculum Map Year 12

Topic Name	Term	Content / skills developed with link to NC / exam board subject content (if applicable)	Reflection on previous learning	Progress to future learning	Global Citizenship links	Qatar National Identity links
S1 Chapter 1: Mathematical models in probability and statistics	1	The basic ideas of mathematical modelling as applied in probability and statistics.	n/a	Understanding the step by step process of how mathematical models are made.	PRIDE values Prepare for challenge. Developing skills for the future	**Sustainability**: self esteem and participation **Sustainability**: responsibility and creativity
S1 Chapter 2: Representation and summary of data	1	• Using histograms, stem and leaf diagrams and box plots to compare distributions. • Back-to-back stem and leaf diagrams may be required. • Drawing of histograms, stem and leaf diagrams or box plots will not be the direct focus of examination questions. • Calculation of mean, mode and median, range and interquartile range will not be the direct focus of examination questions. • Data may be discrete, continuous, grouped or ungrouped. Understanding and use of coding. • Simple interpolation may be required. Interpretation of measures of location and dispersion. • Students may be asked to illustrate the location of outliers on a box plot. Any rule to identify outliers will be specified in the question.	Topics covered in iGCSE	Interpolation will be used throughout S1	PRIDE values Prepare for challenge. Developing skills for the future	**Sustainability**: self esteem and participation **Sustainability**: responsibility and creativity

S1 Chapter 3: Probability	1	• Understanding and use of: $P(A') = 1 - P(A)$ $P(A \cup B) = P(A) + P(B) - P(A \cap B)$ $P(A \cap B) = P(A)\,P(B\,|A)$ $P(B\,|\,A) = P(B)$ $P(A\,|\,B) = P(A)$ $P(A \cap B) = P(A)\,P(B)$ • Use of tree diagrams and Venn diagrams. Sampling with and without replacement.	• Topics covered in iGCSE • set notation developed	• Conditional probability	PRIDE values Prepare for challenge. Developing skills for the future	**Sustainability**: self esteem and participation **Sustainability**: responsibility and creativity
S1 Chapter 4: Correlation and regression	1	• Calculation of the equation of a linear regression line using the method of least squares. Students may be required to draw this regression line on a scatter diagram. • Use to make predictions within the range of values of the explanatory variable and the dangers of extrapolation. Derivations will not be required. Variables other than x and y may be used. Linear change of variable may be required. • Derivations and tests of significance will not be required.	n/a	Linked to distribution, chi squared.	PRIDE values Prepare for challenge. Developing skills for the future	**Sustainability**: self esteem and participation **Sustainability**: responsibility and creativity
S1 Chapter 5 Discrete random variables	1	Simple uses of the probability function $p(x)$ where $p(x) = P(X = x)$. Use of the cumulative distribution function: $$F(x_0) = P(X \leqslant x_0) = \sum_{x \leqslant x_0} p(x).$$ • Use of $E(X)$, $E(X^2)$ for calculating the variance of X. Knowledge and use of $E(aX + b) = aE(X) + b$ and $Var(aX + b) = a^2 Var(X)$ • The mean and variance of this distribution.	n/a	Linked to uniform distribution.	PRIDE values Prepare for challenge. Developing skills for the future	**Sustainability**: self esteem and participation **Sustainability**: responsibility and creativity
S1 Chapter 6: The Normal distribution	1	• Knowledge of the shape and the symmetry of the distribution is required. Knowledge of the probability density function is not	n/a	Distribution of weight, height, grades etc	PRIDE values	**Sustainability**: self esteem and participation

		required. Derivation of the mean, variance and cumulative distribution function is not required. Interpolation is not necessary. Questions may involve the solution of simultaneous equations.			Prepare for challenge. Developing skills for the future	**Sustainability**: responsibility and creativity
P1 Chapter 1: Laws of indices for all rational exponents	2	• 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. • Simple graph transformations of $y = f(x)$ as represented by $y = af(x)$, $y = f(x) + a$, $y = f(x + a)$, $y = f(ax)$.	• Topics covered in iGCSE	• Most topics to be further covered in P2, P3 and P4	PRIDE values Prepare for challenge. Developing skills for the future	**Sustainability**: self esteem and participation **Sustainability**: responsibility and creativity
P1 Chapter 2: Coordinate geometry in the (x, y) plane	2	• Equation of a straight line, including the forms $y - y1 = m(x - x1)$ and $ax + by + c = 0$.	• Topics covered in iGCSE	Most topics to be further covered in P2, P3 and P4	PRIDE values Prepare for challenge.	**Sustainability**: self esteem and participation

		• Conditions for two straight lines to be parallel or perpendicular to each other.			Developing skills for the future	**Sustainability**: responsibility and creativity
P1 Chapter 3: Trigonometry	2	• The sine and cosine rules, and the area of a triangle. • Radian measure, including use for arc length and area of sector. • Sine, cosine and tangent functions. Their graphs, symmetries and periodicity. •	• Topics covered in iGCSE	Most topics to be further covered in P2, P3 and P4	PRIDE values Prepare for challenge. Developing skills for the future	**Sustainability**: self esteem and participation **Sustainability**: responsibility and creativity
P1 Chapter 4: Differentiation	2	• 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.	• Topics covered in iGCSE	Most topics to be further covered in P2, P3 and P4	PRIDE values Prepare for challenge. Developing skills for the future	**Sustainability**: self esteem and participation **Sustainability**: responsibility and creativity
P1 Chapter 5: Integration	2	• Indefinite integration as the reverse of differentiation. • Integration of x^n and related sums, differences and constant multiples.	• n/a	Most topics to be further covered in P2, P3 and P4.	PRIDE values Prepare for challenge. Developing skills for the future	**Sustainability**: self esteem and participation **Sustainability**: responsibility and creativity
P2 Chapter 1: Proofs	3	• Proof by exhaustion and disproof by counter-example	• Topics covered in iGCSE	Most topics to be further covered in P3 and P4.		
P2 Chapter 2: Algebra and functions	3	• Simple algebraic division; use of the Factor Theorem and the Remainder Theorem.	• n/a	Most topics to be further covered in P3 and P4.	PRIDE values Prepare for challenge.	**Sustainability**: self esteem and participation **Sustainability**: responsibility and creativity

					Developing skills for the future	
P2 Chapter 3: Coordinate geometry in the (x, y) plane	3	• 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.	• Topics covered in iGCSE	Most topics to be further covered in P3 and P4.	PRIDE values Prepare for challenge. Developing skills for the future	**Sustainability**: self esteem and participation **Sustainability**: responsibility and creativity
P2 Chapter 4: Sequences and series	3	• Sequences, including those given by a formula for the nth term and those generated by a recurrence relation • 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. • Binomial expansion of $(a + bx)^n$ for positive integer n.	• Topics covered in iGCSE	Most topics to be further covered in P3 and P4.	PRIDE values Prepare for challenge. Developing skills for the future	**Sustainability**: self esteem and participation **Sustainability**: responsibility and creativity
P2 Chapter 5: Exponentials and logarithms	3	• $y = a^x$ and its graph • Laws of logarithms • The solution of equations of the form $a^x = b$.	• Topics covered in Further Pure iGCSE	Most topics to be further covered in P3 and P4.	PRIDE values Prepare for challenge. Developing skills for the future	**Sustainability**: self esteem and participation **Sustainability**: responsibility and creativity

P2 Chapter 6: Trigonometry	3	• Use of $\tan\theta = \sin\theta /\cos\theta$, and $\sin^2\theta + \cos^2\theta = 1$. • Solution of simple trigonometric equations in a given interval.	• Topics covered in Further Pure iGCSE	Most topics to be further covered in P3 and P4.	PRIDE values Prepare for challenge. Developing skills for the future	**Sustainability**: self esteem and participation **Sustainability**: responsibility and creativity
P2 Chapter 7: Differentiation	3	• Applications of differentiation to maxima and minima and stationary points, increasing and decreasing functions.	• Topics covered in Further Pure iGCSE	Most topics to be further covered in P3 and P4.	PRIDE values Prepare for challenge. Developing skills for the future	**Sustainability**: self esteem and participation **Sustainability**: responsibility and creativity
P2 Chapter 8: Integration	3	• 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.	• Topics covered in Further Pure iGCSE	Most topics to be further covered in P3 and P4.	PRIDE values Prepare for challenge. Developing skills for the future	**Sustainability**: self esteem and participation **Sustainability**: responsibility and creativity

Curriculum Map Year 13

Topic Name	Term	Content / skills developed with link to NC / exam board subject content (if applicable)	Reflection on previous learning	Progress to future learning	Global Citizenship links	Qatar National Identity links
M1 Chapter 1: Mathematical models in mechanics	1	The basic ideas of mathematical modelling as applied in Mechanics.	n/a	Understanding the step by step process of how mathematical models are made in mechanics.	PRIDE values Prepare for challenge. Developing skills for the future	**Sustainability**: self esteem and participation **Sustainability**: responsibility and creativity
M1 Chapter 2: Vectors in mechanics	1	• Magnitude and direction of a vector. Resultant of vectors may also be required. • Application of vectors to displacements, velocities, accelerations and forces in a plane.	Topics covered in iGCSE	Further explored in the M1	PRIDE values Prepare for challenge. Developing skills for the future	**Sustainability**: self esteem and participation **Sustainability**: responsibility and creativity
M1 Chapter 3: Kinematics of a particle moving in a straight line	1	• Graphical solutions may be required, including displacement-time, velocity-time, speed-time and acceleration-time graphs. Knowledge and use of formulae for constant acceleration will be required.	Basic SUVAT equations	Further explored in M1	PRIDE values Prepare for challenge. Developing skills for the future	**Sustainability**: self esteem and participation **Sustainability**: responsibility and creativity
M1 Chapter 4: Dynamics of a particle moving in a straight line or plane	1	• The concept of a force. Newton's laws of motion. • Simple applications including the motion of two connected particles. • The impulse-momentum principle. The principle of conservation of momentum applied to two particles colliding directly. • Coefficient of friction.	n/a	Coefficient of friction used throughout M1	PRIDE values Prepare for challenge. Developing skills for the future	**Sustainability**: self esteem and participation **Sustainability**: responsibility and creativity
M1 Chapter 5 Statics of a particle	1	• Forces treated as vectors. Resolution of forces.	n/a	Linked to properties of vectors	PRIDE values	**Sustainability**: self esteem

		• Equilibrium of a particle under coplanar forces. Weight, normal reaction, tension and thrust, friction. • Coefficient of friction during equilibrium.			Prepare for challenge. Developing skills for the future	and participation **Sustainability**: responsibility and creativity
M1 Chapter 6: Moments	1	• Simple problems involving coplanar parallel forces acting on a body and conditions for equilibrium in such situations.	n/a	n/a	PRIDE values Prepare for challenge. Developing skills for the future	**Sustainability**: self esteem and participation **Sustainability**: responsibility and creativity
P3 Chapter 1: Algebra and functions	2	• Simplification of rational expressions including factorising and cancelling, and algebraic division. • Definition of a function. Domain and range of functions. Composition of functions. Inverse functions and their graphs. • The modulus of functions • Combination of graphical transformation of functions.	Topics covered in iGCSE and Further Pure iGCSE	Linked to algebraic division	PRIDE values Prepare for challenge. Developing skills for the future	**Sustainability**: self esteem and participation **Sustainability**: responsibility and creativity
P3 Chapter 2: Trigonometry	2	• Knowledge of secant, cosecant and cotangent and of arcsin, arccos and arctan. Their relationships to sine, cosine and tangent. Understanding of their graphs and appropriate restricted domains. • Knowledge and use of $\sec^2 \theta = 1 + \tan^2 \theta$ and $\operatorname{cosec}^2 \theta = 1 + \cot^2 \theta$ • Double angle formulae $\sin (A \pm B)$, $\cos(A \pm B)$ and $\tan (A \pm B)$ and of expressions for $a \cos \theta + b \sin \theta$ in the equivalent forms of $r \cos(\theta \pm a)$ or $r\sin (\theta \pm a)$.	n/a	Most topics to be further covered in P4	PRIDE values Prepare for challenge. Developing skills for the future	**Sustainability**: self esteem and participation **Sustainability**: responsibility and creativity

P3 Chapter 3: Exponentials and logarithms	2	- The function e^x and its graph - The function ln x and its graph; ln x as the inverse function of e^x. - Use logarithmic graphs to estimate parameters in relationships of the form $y = ax^n$ and $y = kb^x$.	Topics covered in iGCSE like basic exponential graphs and the idea of asymptotes.	Most topics to be further covered in P4.	PRIDE values Prepare for challenge. Developing skills for the future	**Sustainability**: self esteem and participation **Sustainability**: responsibility and creativity
P3 Chapter 4: Differentiation	2	- The derivative of exponential and trigonometric functions, and their sums and differences. - Differentiation using the product rule, the quotient rule and the chain rule. - Using dx/dy - Understand and use exponential growth and decay.	Topics covered in P1 and P2.	The new differentiation methods will be used in P4.	PRIDE values Prepare for challenge. Developing skills for the future	**Sustainability**: self esteem and participation **Sustainability**: responsibility and creativity
P3 Chapter 5: Integration	2	- The integration of exponential and trigonometric functions, and their sums and differences. - Integration by recognition of known derivatives.	n/a	The new integration methods will be used in P4.	PRIDE values Prepare for challenge. Developing skills for the future	**Sustainability**: self esteem and participation **Sustainability**: responsibility and creativity
P3 Chapter 6: Numerical methods	3	- Location of roots of f(x) = 0 by considering changes of sign of f(x) in an interval of x in which f(x) is continuous. - Approximate solution of equations using simple iterative methods, including recurrence relations.	n/a	n/a	PRIDE values Prepare for challenge. Developing skills for the future	**Sustainability**: self esteem and participation **Sustainability**: responsibility and creativity
P4 Chapter 1: Proofs	3	Proof by contradiction	In iGCSE and AS the idea of algebraic proofs was introduced.	Links to proof by induction, if studying further maths.	PRIDE values Prepare for challenge.	**Sustainability**: self esteem and participation

					Developing skills for the future	**Sustainability**: responsibility and creativity
P4 Chapter 2: Algebra and functions	3	• Decompose rational functions into partial fractions (denominators not more complicated than repeated linear terms).	Topics covered in AS	n/a	PRIDE values Prepare for challenge. Developing skills for the future	**Sustainability**: self esteem and participation **Sustainability**: responsibility and creativity
P4 Chapter 3: Coordinate geometry	3	• Parametric equations of curves and conversion between cartesian and parametric forms.	n/a	n/a	PRIDE values Prepare for challenge. Developing skills for the future	**Sustainability**: self esteem and participation **Sustainability**: responsibility and creativity
P4 Chapter 4: Binomial expansion	3	• Binomial Series for any rational n.	Topics covered in Further Pure iGCSE and AS Mathematics.	n/a	PRIDE values Prepare for challenge. Developing skills for the future	**Sustainability**: self esteem and participation **Sustainability**: responsibility and creativity
P4 Chapter 5: Differentiation	3	• Differentiation of simple functions defined implicitly or parametrically. • Formation of simple differential equations. • Formation of simple differential equations.	• Topics covered in AS mathematics	Second order differential equations in further maths	PRIDE values Prepare for challenge. Developing skills for the future	**Sustainability**: self esteem and participation **Sustainability**: responsibility and creativity
P4 Chapter 6: Integration	3	• Volume of revolutions • Simple cases of integration by substitution and integration by parts.	• n/a	n/a	PRIDE values	**Sustainability**: self esteem and participation

		Understand these methods as the reverse processes of the chain and product rules respectively. • Simple cases of integration using partial fractions. • Analytical solution of simple first order differential equations with separable variables. • separable variables. General and particular solutions will be required. • Use integration to find the area under a curve given its parametric equations.			Prepare for challenge. Developing skills for the future	**Sustainability**: responsibility and creativity
P4 Chapter 7: Vectors	3	• Vectors in two and three dimensions • Algebraic operations of vector addition and multiplication by scalars, and their geometrical interpretations • Magnitude of vector • Position vectors • Distance between two points • Vector equations of lines • The scalar product. Its use for calculating the angle between two lines	• Topics covered in iGCSE and M1	n/a	PRIDE values Prepare for challenge. Developing skills for the future	**Sustainability**: self esteem and participation **Sustainability**: responsibility and creativity