Croxley Danes School: Key Stage 5 Curriculum Map

Subject: Further Maths **Exam Board: Edexcel**

Key Concepts

Core Pure 1 (AS)	Core Pure 2 (A level)	Further Statistics (AS)	Further Statistics (A level)	Further Mechanics (AS)	Further Mechanics (A level)
Complex Numbers 1 Argand Diagrams Series Roots of Polynomials Matrices and Transformations Proof by induction Vectors Volumes of revolution 1	Complex Numbers 2 Series Methods in calculus Polar coordinates Hyperbolic functions Volumes of revolution 2 Methods in differential equations Modelling with differential equations	Discrete random variables Poisson distribution Geometric and Negative Binomial distributions Hypothesis testing	Central limit theorem Chi-squared tests Probability generating functions Quality of tests	Momentum and Impulse 1 Work, Energy and Power Elastic collision in one dimension	Momentum and Impulse 2 Elastic strings and springs Elastic collisions in two dimensions

What is the Croxley vision for this subject at Key Stage 5?

At Croxley Danes school, we aim to develop transferable skills applicable to a wide range of careers and degree subjects, for example developing confidence in problem solving, presentation skills and be methodical in their work. By the end of year 13 students will have developed independent study skills and should be able to apply knowledge to a wide range of mathematical problems. Students should be able to appreciate the links mathematics has with engineering, mechanics, business and sciences.

Curriculum Implementation:

Students have 8 hours a fortnight. Two different teachers will deliver the Core Pure, Further Statistics 1 and Further Mechanics 1. Students have assessed homework every four weeks to monitor progress. Students are expected to complete independent work to support topics covered in lessons. Students have half-termly assessments and intervention is put in place if needed through extra tuition or by providing extra learning resources. Teachers use a range of different methods to help students learn: textbook, powerpoints, video clips, paired/group work, a level maths past papers. Starters are used to practise using prior taught skills. The vast majority of work is differentiated to support/stretch students. Students are encouraged to attend maths intervention sessions for extra support when needed.

Key Stage 5 / **Year Group: 12**

	Autumn Term 1	Autumn Term 2	Spring Term 1	Spring Term 2	Summer Term 1	Summer Term 2
key concept	**Complex Numbers 1** **Argand Diagrams** **Series** **Matrices**	**Roots of Polynomials** **Linear Transformations** **Discrete Random Variables**	**Poisson Distribution** **Momentum and Impulse** **Proof by induction**	**Vectors** **Geometric and negative distributions** **Work, Energy and Power**	**Volumes of revolution** **Elastic strings and springs** **Hypothesis testing**	Revision for mock Trigonometry and Differentiation from the old Core 3 (required for Year 12 Further Maths).
Content: (Know what…)	**Multiplying complex numbers**, complex conjugation, solving quadratic, cubic and quartic equations. **Modulus and argument**, Loci and regions in argand diagrams. **Sum of natural numbers**, sums of squares and cubes. **Matrix** multiplication, determinates, inverting.	**Roots of quadratic**, cubic and quartic equations, Expressions relating to roots of polynomials Reflection, rotation, enlargements, stretching and inverse **linear transformations. Find the expected value** and the variance of a discrete random variable.	Use the **Poisson distribution** to model real-world situations. Momentum in one direction, Conservation of momentum Direct impact and Newton's law of restitution, direct collisions with a smooth plane, Loss of Kinetic energy, Successive direct impacts. Proving divisibility results and matrices.	Equation of line and plane, scalar product, perpendiculars. Calculate and use the mean and variance of geometric and negative binomial distributions. Work done, kinetic and potential energy, conservation of mechanical energy and the work-energy principle, power.	Volume of revolutions around the x and y axis, add/subtract volumes, modelling. Hooke's law and equilibrium problems and dynamics problem Problems involving elastic energy. Test of the mean of a Poisson distribution Finding critical regions of a Poisson and geometric distributions.	Trig Chapter 6 and 7 Core 3 · Sec, cot, cosec · Identities and equations Inverse · Addition formula · Double angle · Equations and identities using double angle · Solving trig problems · Factor Formula Differentiation from old Core 3 Chapter 8 · Chain/product/quotient rules

Homework/ Independent Learning	Assessed every 4 weeks and students are expected to complete set exercises from book Challenge questions at the end of each activity Exam questions	Assessed every 4 weeks and students are expected to complete set exercises from book Challenge questions at the end of each activity Exam questions	Assessed every 4 weeks and students are expected to complete set exercises from book Challenge questions at the end of each activity Exam questions	Assessed every 4 weeks and students are expected to complete set exercises from book Challenge questions at the end of each activity Exam questions	Assessed every 4 weeks and students are expected to complete set exercises from book Challenge questions at the end of each activity Exam questions	Assessed every 4 weeks and students are expected to complete set exercises from book Challenge questions at the end of each activity Exam questions
End of Half term assessment	Half term test	Mock	Half term test	Half term test	Half term test	Mock
Planned trips / Clubs / links	Maths challenge					
Key Stage 5 /	**Year Group: 13**					
	Autumn Term 1	**Autumn Term 2**	**Spring Term 1**	**Spring Term 2**	**Summer Term 1**	**Summer Term 2**
Key Concept	**Complex Numbers 2** **Series 2** **Hyperbolic functions**	**Elastic collisions in one dimension** **Central limit theorem.** **Chi-squared tests**	**Elastic collisions in two-dimension** **Polar coordinates** **Methods in calculus**	**Probability generating functions.** **Volumes of revolution** **Quality tests**	**Methods in differential equations.** **Modelling with differential equations**	Revision for exams
Content: **(Know what…)**	**Complex numbers: Exponential form**, multiplying and dividing, De Moivre's theorem, trig identities, sum of series, nth roots. **Methods of differences**, higher derivatives, Maclaurin series, compound functions. **Hyperbolic functions**, inverse functions, identities and equations, differentiating and	**Hooke's law** and equilibrium problems, and dynamics problems, Problems involving elastic energy. **Apply the central** limit theorem to approximate the sample mean of a random variable. **Apply the central limit** theorem to other distributions **Form hypothesis** about how well a distribution fit	**Oblique impact** with a fixed surface, successive oblique impacts, oblique impacts of smooth spheres. **Polar coordinates** and equations, sketching, area enclosed and tangents. **Improper integrals**, mean value, differentiating and integrating inverse trigonometric functions, integrating partial fractions	Use probability generating functions for standard distributions Revolutions around the x and y axis, parametrically defined curves and modelling. Type I and Type II errors using the normal distribution	First and second order differential equations, using boundary conditions. Modelling first order, simple, damped and forced harmonic motion, coupled first order simultaneous differential equations.	Revision for exams

	integrating.	as a model **Apply goodness** of fit tests to discrete data and to geometric distributions				
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End of Half term assessment	Half term test	Mock	Half term test	Half term test	Mock	Revision for exams
Planned trips / Clubs / links	Maths challenge					