



Satit Prasarnmit International Programme

Curriculum Pathway Academic Year 2023-2024 Department: Mathematics

Department Details	Assessment Types
Subject: Further Mathematics Head of Department: Jack Bradshaw Head of Department Email: jack.br@spip.in.th Subject Teachers: Jack Bradshaw, Pooja Kumar, Tafil Hussain	Assessment Type 1: Class Assignments
	Assessment Type 2: Unit Tests
	Assessment Type 3: Homework @ (www.myimaths.com)/worksheets
	Assessment Type 4: End of Term Exams
	Assessment Type 5: End of Year Exam.

Year	Term	Unit(s) of Work	Core Knowledge & Concepts
NOTE: Students who have opted to take CIE Further Maths (9231) will study CIE Mathematics (9709) and complete the full A-level in Y12, before continuing to study CIE Further Maths (9231) in Y13, either as an AS-level or as a full A-level (AS + A2) subject option.			
13 A Level	1	(AS) Further Pure 1 Mechanics (A2) Further Pure 2 Statistics	<ul style="list-style-type: none">Students learn how to manipulate expressions involving the roots of quadratic, cubic, and quartic polynomials, and how to plot rational functions with a particular focus on asymptotes and quantities that tend towards infinityStudents learn how to use and manipulate (infinite) series summationsStudents learn what is meant by a matrix, how to find its determinant and inverse (for 2x2 and 3x3 matrices), and how they relate to graph transformationsStudents learn how to calculate projectile motion in 2DStudents learn how to calculate moments and centre of mass for rods and laminas, and therefore determine equilibrium of extended objectsStudents will learn the equations of circular motion and how they're applied to particles moving in horizontal and vertical circlesStudents will develop their knowledge of complex numbers, using Euler's relation and de Moivre's theorem to relate complex numbers and trigonometric functionsStudents will be able to solve first and second order ordinary differential equations using general solutions, particular solutions, auxiliary equations, and substitutionStudents will become familiar with the hyperbolic functions and their relationship to the exponential functionStudents learn how to interpret results of continuous random distributions and calculate key features, such as the expectation valueStudents will use t-tests in hypothesis testing and analyse confidence intervalsStudents will learn how to use the chi-squared measure to assess goodness of fit for discrete and continuous distributionsStudents will learn what is meant by a probability generating function, how to find their mean and expectation values, and how to extend them to multivariable problems
	2	(AS) Further Pure 1 Mechanics	<ul style="list-style-type: none">Students will learn how to convert between cartesian and polar coordinates, and calculate areas between polar functions and the pole (origin)Students will learn how to use 3D vectors to write equations of lines and planes, and how to calculate the vector productStudents will learn the inductive proof process and be introduced to formal proof, which is the basis of all higher level mathematicsStudents will explore Hooke's law which describes elasticity describing it in terms of force and potential energyStudents will develop their knowledge of momentum by including oblique collisions in their linear conservation of momentum calculations

		(A2) Further Pure 2 Statistics	<ul style="list-style-type: none">• Students will develop their knowledge of matrices, using them to solve for eigenvalues and using basic diagonalisation strategies• Students will learn how to differentiate and integrate more advanced functions (e.g. hyperbolic and inverse hyperbolic functions)• Students will learn how to use the chi-squared measure to assess goodness of fit for discrete and continuous distributions• Students will learn what is meant by a probability generating function, how to find their mean and expectation values, and how to extend them to multivariable problems
	3	Revision and exam preparations	<ul style="list-style-type: none">• Students will have study leave for their external CIE exams.