Secondary Form Mathematics Extended Part
Module 2 (Algebra and Calculus)

	PROGRAMME	REMARKS
1	Surds	1.1 rationalize the denominators of $\frac{k}{\sqrt{a} \pm \sqrt{b}}$
2	Mathematical Induction	2.1 principle of mathematical induction
3	Binomial Theorem	3.1 expand binomials with positive integral indices using the Binomial Theorem
4	More About Trigonometric Functions	4.1 concept of radian measure 4.2 find arc lengths and areas of sectors through radian measure 4.3 understand csc x, sec x and cot x and their graphs 4.4 understand trigonometric identities 4.5 understand compound angle formulae, double angle formulae for sinx, cosx and tanx, and product-to-sum and sum-to-product formulae for sinx and cosx
5	Introduction to e	5.1 recognize the definitions and notations of the number e and the natural logarithm
6	Limits	6.1 understand intuitive concept of the limit of a function 6.2 find the limit of a function
7	Differentiation	7.1 understand the concept of the derivative of a function 7.2 understand the addition rule, product rule, quotient rule, chain rule of differentiation 7.3 find the derivatives of functions involving algebraic functions, trigonometric functions, exponential functions, logarithmic functions 7.4 find the derivatives by implicit differentiation 7.5 find the second derivative of an explicit function
8	Applications of Differentiation	8.1 find the equations of tangents and normals to a curve 8.2 find maxima and minima 8.3 sketch curves of polynomial functions and rational functions 8.4 solve the problems relating to rate of change, maximum and minimum
9	Indefinite Integration	9.1 recognize the concept of indefinite intefration 9.2 understand the properties of indefinite integrals and use the integration formulae of algebraic functions, trigonometric functions, exponential functions to find the indefinite integrals 9.3 understand the applications of indefinite integrals in real life or mathematical contexts 9.4 use integration by substitution to find indefinite integrals 9.5 use trigonometric substitutions to find indefinite integrals involving $\sqrt{a^2 - x^2}$, $\sqrt{x^2 - a^2}$, $\sqrt{a^2 + x^2}$

		9.6 use integration by parts to find indefinite integrals
10	Definite Integration	10.1 recognize the concepts of definite integration 10.2 understand the properties of definite integration 10.3 find the definite integrals of algebraic functions, trigonometric functions, exponential functions 10.4 use integration by substitution to find definite integrals 10.5 use integration by parts to find definite integrals 10.6 understand the properties of definite integrals of even, odd and periodic functions
11	Applications of Definite Integration	11.1 understand the application of definite integrals in finding the area of a plane figure 11.2 understand the application of definite integrals in finding the volume of a solid of revolution about a coordinate axis or a line parallel to a coordinate axis
12	Determinants	12.1 recognize the concept and properties of determinants of order 2 and order 3
13	Matrices	13.1 understand the concept, operations and properties of matrices 13.2 understand the concept, operations and properties of inverses of square matrices of order 2 and order 3
14	System of Linear Equations	14.1 solve the system of linear equations of order 2 and order 3 by Cramer's rule, inverse matrices and Gaussian elimination
15	Introduction of vectors	15.1 understand the concepts of vectors and scalars 15.2 understand the operations and properties of vectors 15.3 understand the representation of a vector in the rectangular coordinate system
16	Scalar product and vector product	16.1 understand the definition and properties of the scalar product (dot product) of vectors 16.2 understand the definition and properties of the vector product (cross product) of vectors in $\mathbf{R}^3$
17	Applications of vectors	17.1 understand the applications of vectors
18	Inquiry and investigation	Through various learning activities, discover and construct knowledge, further improve the ability to inquire, communicate, reason and conceptualize mathematical concepts