Year 12EXT2 **Topic 4** **INTEGRATION** **Time: 2.5 Weeks**

Syllabus Content: Further integration C1
Outcomes: MEX12-1, MEX12-5, MEX12-7, MEX12-8

Student Outcomes:

› understands and uses different representations of numbers and functions to model, prove results and find solutions to problems in a variety of contexts MEX12-1

› applies techniques of integration to structured and unstructured problems MEX12-5

› applies various mathematical techniques and concepts to prove results, model and solve structured, unstructured and multi-step problems MEX12-7

› communicates and justifies abstract ideas and relationships using appropriate language, notation and logical argument MEX12-8

	Student is able to:	Implications, considerations and implementations	Resources
(i)	find and evaluate indefinite and definite integrals using the method of integration by substitution, where the substitution may or may not be given apply these techniques of integration to practical and theoretical situations	(A) The standard integrals (B) Algebraic manipulation (C) Substitution (D) Partial fractions (E) Quadratic in the denominator (F) Integration by parts (G) Trigonometric integrals (H) Reduction formulae (I) Miscellaneous integrals	
(ii)	integrate rational functions involving a quadratic denominator by completing the square or otherwise		
(iii)	decompose rational functions whose denominators have simple linear or quadratic factors, or a combination of both, into partial fractions		
(iv)	use partial fractions to integrate functions		
(v)	evaluate integrals using the method of integration by parts - develop the method for integration by parts, expressed as $\int uv'dx = uv - \int vu'dx$ or $\int u\frac{dv}{dx}dx = uv - \int v\frac{du}{dx}dx$, where u and v are both functions of x		

(vi)	derive and use recurrence relationships		
(vii)	apply these techniques of integration to practical and theoretical situations		