## **YEAR 12 - MATHEMATICS**

## **HSC Topic 14 – Differential Equations**

## **MATHEMATICS EXTENSION 1**

LEARNING PLAN			
Learning Intentions Student is able to:	Learning Experiences Implications, considerations and implementations:	Success Criteria I can:	Resources
recognise that an equation involving a derivative is called a differential equation		recognise and write differential differential equations	
recognise that solutions to differential equations are functions and that these solutions may not be unique		understand that differential equation solutions are functions and that these solutions may not be unique	
sketch the graph of a particular solution given a direction field and initial conditions	<ul> <li>form a direction field (slope field) from simple first-order differential equations</li> <li>recognise the shape of a direction field from several alternatives given the form of a differential equation, and vice versa</li> <li>sketch several possible solution curves on a given direction field</li> </ul>	sketch graphs of differential equation solutions	GeoGebra – Slope field plotter  Desmos – Slope field generator

solve simple first-order differential equations	<ul> <li>solve differential equations of the form dy/dx = f(x)</li> <li>solve differential equations of the form dy/dx = g(y)</li> <li>solve differential equations of the form dy/dx = f(x)g(y) using separation of variables</li> </ul>	recognise and solve a variety of first-order differential equations	
recognise the features of a     first-order linear differential     equation and that exponential     growth and decay models are     first-order linear differential     equations, with known solutions		model growth and decay using first order differential equations and complete relevant calutations to determine unknown values	
model and solve differential equations including to the logistic equation that will arise in situations where rates are involved, for example in chemistry, biology and economics		use diffenetial equations to model rates of change in real life appliactions	

Fetablished	Goals(Syllabus	Outcomes).
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ME12-1, ME12-4, ME12-6, ME12-7	
Estimated Time: 1.5 weeks (9 lessons)	

ASSESSMENT		
Performance Tasks: (Linked to Essential Questions)	Other Evidence:	