

Syllabus Content: APPLICATIONS OF CALCULUS TO MECHANICS MEX – M1**Outcomes: Modelling motion without resistance MEX – M1.2****Student Outcomes:**

- › uses mechanics to model and solve practical problems MEX12-6
- › applies various mathematical techniques and concepts to 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)	examine force, acceleration, action and reaction under constant and non-constant force		
(ii)	examine motion of a body under concurrent forces		
(iii)	consider and solve problems involving motion in a straight line with both constant and non-constant acceleration and derive and use the expressions $\frac{dv}{dt}$, $v\frac{dv}{dx}$ and $\frac{d}{dx}\left(\frac{1}{2}v^2\right)$ for acceleration		
(iv)	use Newton's laws to obtain equations of motion in situations involving motion other than projectile motion or simple harmonic motion	– use $F = m\ddot{x}$ where F is the force acting on a mass, m , with acceleration $\ddot{x}$	
(v)	describe mathematically the motion of particles in situations other than projectile motion and simple harmonic motion AAM	– interpret graphs of displacement-time and velocity-time to describe the motion of a particle, including the possible direction of a force which acts on the particle	
(vi)	derive and use the equations of motion of a particle travelling in a straight line with both constant and variable acceleration (ACMSM114) AAM		

