M1 Scheme of Work 2017/18

August 21, 2018

Specification	Learning Outcomes	Resources	Homework	Lesson
1. Mathematical Models in Mechanics The basic ideas of mathematical modelling as applied in Mechanics.	Students should be familiar with the terms: particle, lamina, rigid body, rod (light, uniform, non-uniform), inextensible string, smooth and rough surface, light smooth pulley, bead, wire, peg. Students should be familiar with the assumptions made in using these models.	Pearson Chapter 1	N/a	Briefly go over – shouldn't require a lesson
2. Kinematics of a particle moving in a straight Line Motion in a straight line with constant acceleration	Graphical solutions may be required, including displacement-time, velocity-time, speed-time and acceleration-time graphs. Knowledge and use of formulae for constant acceleration will be required. SUVAT equations and their use	Pearson Chapter 2 PPQ's	Ex: 2A, 2B, 2C, 2D, 2E PPQ's	Weeks 1 - 5

3. Dynamics of a particle moving in a straight line or plane The concept of a force. Newton's laws of motion. Simple applications including the motion of two connected particles. Momentum and impulse. The impulse-momentum principle. The principle of conservation of momentum applied to two particles colliding directly. Coefficient of friction.	Simple problems involving constant acceleration in scalar form or as a vector of the form ai + bj. Problems may include: (i) The motion of two connected particles moving in a straight line or under gravity when the forces on each particle are constant; problems involving smooth fixed pulleys and/or pegs may be set; (ii) Motion under a force which changes from one fixed value to another, e.g. a particle hitting the ground; (iii)Motion directly up or down a smooth or rough inclined plane. Knowledge of Newton's law of restitution is not required. Problems will be confined to those of a one-dimensional nature. An understanding of $F = \mu R$ when a	Pearson Chapter 3 PPQ's	Exercises from the book PPQ's	Weeks 7-12

4. Statics of a Particle Forces treated as vectors. Resolution of forces. Equilibrium of a particle under coplanar forces. Weight, normal reaction, tension and thrust, friction. Coefficient of friction.	Only simple cases of the application of the conditions for equilibrium to uncomplicated systems will be required. An understanding of $F \leq \mu R$ in a situation of equilibrium.	Pearson Chapter 4 PPQ's	Exercises from the book PPQ's	Weeks 13-14
5. Moments Moment of a force	Simple problems involving coplanar parallel forces acting on a body and conditions for equilibrium in such situations.	Pearson Chapter 5 PPQ's	PPQ's Exercises from the book	Week 15-18

6. Vectors Magnitude and direction of a vector. Resultant of vectors may also be required. Application of vectors to displacements, velocities, accelerations and forces in a plane.	Students may be required to resolve a vector into two components or use a vector diagram. Questions may be set involving the unit vectors i and j. Use of velocity = change of displacement/time in the case of constant velocity, and of acceleration = change of velocity/time in the case of constant acceleration, will be required.	Pearson Chapter 6 PPQ's	PPQ's Exercises from the book	Week 20-24

Mock Week Dates: Week 6, 13, 19 & 24