

## EDEXCEL A Level Further Mathematics – Mechanics 1 Scheme of Work

Course teaching begins in September of Year 12.

The number of lessons stated is for teaching the unit. Allow more lessons for topic consolidation, assessment tests and revision informed by the test results.

**The duration of the course is approximately 48 lessons taught over 2 lessons a week.**

*Candidates must understand the significance of different modelling assumptions, and how they affect the calculations in a particular problem (Chapter 1)*

### **KINEMATICS (6 Lessons)**

<b>Topic</b>	<b>Syllabus</b>	<b>Text</b>	<b>Lessons</b>
Kinematics of Motion in a Straight Line	Use the formula $v = u + at$ and $s = (u + v)t/2$ for a particle moving in a straight line with constant acceleration	Ex 2A p9-10	<b>1</b>
	Use the formula $v^2 = u^2 + 2as$ , $s = ut + \frac{1}{2}at^2$ and $s = vt - \frac{1}{2}at^2$ for a particle moving in a straight line with constant acceleration	Ex 2B p15-17	<b>1</b>
	Use the formula for constant acceleration to model an object moving vertically in a straight line under gravity	Ex 2C p23-24	<b>1</b>
	Represent the motion of an object on a speed-time graph or a distance-time graph	Ex 2D p30-32	<b>1</b>
	Solve a range of problems involving Kinematics of motion	Mixed Ex 2E p32-35	<b>1-2</b>

#### **Assessment – Kinematics I**

## DYNAMICS (15 Lessons)

Topic	Syllabus	Text	Lessons
Newton's laws of motion	Use Newton's laws and the formula $F = ma$ to solve problems involving force and acceleration	Ex 3A p40-41	1
	Solve problems involving forces by drawing a diagram showing all the relevant forces and resolving in one or more directions as necessary	Ex 3B p44-45	1-2
	If a force is applied at an angle to the direction of motion, resolve it to find the component of the force that acts in the direction of motion	Ex 3C p47	1
	Calculate the magnitude of a frictional force using the coefficient of friction	Ex 3D p52	1
	Solve problems about a particle on an inclined plane by resolving the forces parallel and perpendicular to the plane	Ex 3E p55-56	1-2
	Solve problems involving connected particles by considering the particles separately.	Ex 3F p64-65	2-3
	Calculate the momentum of a particle and the impulse of a force	Ex 3G p67	1
	Solve problems involving collisions using the principle of conservation of momentum	Ex 3H p72-3	2
	Solve a variety of problems to gain a good understanding of fundamentals.	Mixed Ex 3I p73-78	2

**Assessment – Dynamics**

**STATICS OF A PARTICLE ( 8 Lessons)**

<b>Topic</b>	<b>Syllabus</b>	<b>Text</b>	<b>Lessons</b>
Equilibrium	Solve problems about particles in equilibrium by resolving the forces horizontally and vertically	Ex 4A p94-97	1
Additional forces	Know when to introduce additional forces on a diagram, such as weight, tension, thrust, normal reaction and friction	Ex 4B p101-103	2-3
Problems with no motion	Solve statics problems involving friction by using the relationship $f \leq \mu R$	Ex 4C p109-110	2
	Solve a variety of problems to gain a good understanding of statics of a particle.	Mixed Ex 4D p111-115	2
<b>Assessment – Statics of a particle</b>			

**MOMENTS ( 7 Lessons)**

<b>Topic</b>	<b>Syllabus</b>	<b>Text</b>	<b>Lessons</b>
Moments	Find a moment of a force acting on a body.	Ex 5A p118-119	1
Additional forces	Find the sum of the moments of a set of forces acting on a body.	Ex 5B p121-122	1
Equating moments	Solve problems about bodies resting in equilibrium by equating the clockwise and anticlockwise moments	Ex 5C p125-126	2
Non-uniform bodies	Solve problems about non-uniform bodies by finding or using the centre of mass	Ex 5D p128	1
Solve problems	Solve a variety of problems to gain a good understanding of moments	Mixed Ex 5E p128-31	2
<b>Assessment – Moments</b>			

## **VECTORS ( 12 LESSONS)**

<b>Topic</b>	<b>Syllabus</b>	<b>Text</b>	<b>Lessons</b>
Displacements	Use vectors to describe displacements	Ex 6A p135	1
Adding vectors	Add vectors and represent vectors using line segments	Ex 6B p138-140	1-2
	Describe vectors using I, j notation and solve problems with vectors written using this notation.	Ex 6C p141 AND Ex 6D p142-143	2
	Express the velocity of a particle as a vector	Ex 6E p144	1
	Solve problems involving velocity and time using vectors	Ex 6F p146-148	2
	Use vectors to solve problems about forces	Ex 6H p150	1
	Solve a variety of problems to gain a good understanding of vectors	Mixed Ex 6H p151-153	2-3

### **Assessment – Vectors**

### **ASSESSMENTS**

Students should complete an assessment test at the end of each unit of work. Marks for these assessments should be recorded on G4S as soon as they are complete.