

# Mechanics 1

## SCHEDULE 2018-2019 (NB: Will be updated regularly)

Updated: 01 January 2019

Date	Lecture	Self-study	
			To be handed in
24-Jul-18	<b>General information</b> <b>Chapter 1: Velocity and acceleration</b> 1.1 Motion with constant velocity: pp. 1–2 Example: 1.1.1, 1.1.2 Exercise 1A; Pr 1, 2, 5, 6  1.2 Graphs for constant velocity: pp. 2–4 Exercise 1A; Pr 8  1.3 Acceleration: pp. 4 – 5	Read: pp. 1-5 Examples: 1.1.1, 1.1.2, Exercise 1A: 3, 4, 7, 9 Exercise 1B: 3, 5,6	Exercise 1A: 3, 4, 7, 9 Exercise 1B: 3, 5,6  <b>Hand in on:</b> 31 July 2018
31-Jul-18	1.4 Equations for constant acceleration: pp. 5–8 Example: 1.4.1, 1.4.2 Exercise 1B; Pr 1, 2, 4, 7  1.5 More equations: pp. 8–11 Example: 1.5.1, 1.5.2 Exercise 1C; Pr 1, 3, 5, 12	Read: pp. 5-11  Examples: 1.4.1, 1.4.2  Example: 1.5.1, 1.5.2 Exercise 1C: 2, 4, 6, 7, 8, 10	Exercise 1C: 2, 4, 6, 7, 10  <b>Hand in on:</b> 07 August 2018
07-Aug-18	1.6 Multi-stage problems: pp. 11–13 Example: 1.6.1, 1.6.2, 1.6.3  1.7 Average velocity: pp. 14–16 Example: 1.7.1 Exercise 1D; Pr 1, 4, 9	Read: pp. 11-16  Examples: 1.6.1, 1.6.2, 1.6.3  Exercise 1D: 2, 3	Exercise 1D: 2, 3  <b>Hand in on:</b> 14 August 2018
14-Aug-18	Chapter 2: Force and motion 2.1 Newton's first law: pp. 19 – 20 2.2 Force and acceleration: pp. 20 – 22 Examples: 2.2.1, 2.2.2 2.3 Some other types of force: pp. 22 – 24  Exercise 2A: 2, 5, 11	Read: pp. 19-24  Examples: 2.2.1, 2.2.2, 2.3.1  Exercise 2A: 1, 3, 6, 12, 15	Exercise 2A: 1, 3, 12  <b>Hand in on:</b> 21 August 2018
21-Aug-18	2.4 Forces acting together: pp. 24 – 26 Examples: 2.4.1, 2.2.1  2.5 The particle model: pp. 27 – 28  Exercise 2B: 2, 11  Miscellaneous Ex., pp. 28-30: Pr 10, 11, 15	Read: pp. 24-27  Examples: 2.4.1, 2.4.2, 2.4.3, 2.4.4  Exercise 2B: 1, 7, 8, 9  Miscellaneous Ex., pp. 28-30: Pr 1, 13, 14	Exercise 2B: 1, 7 Miscellaneous Ex., pp. 28-30: Pr 1, 14  <b>Hand in on:</b> 28 August 2018
28-Aug-18	<b>Chapter 3: Vertical motion</b> 3.1 Acceleration due to gravity: pg. 30 3.2 Weight: pp. 32 – 36 3.3 Normal contact force: pp. 36 – 37 3.4 Mass and weight: pp. 38 – 41  Examples: 3.2.1- 3.2.4  Exercise 3A: 3, 8, 12, 14, 17	Read: pp. 31-34  Examples: 3.2.1- 3.2.4  Exercise 3A: 1, 2, 4, 10, 15	Exercise 3A: 4, 10, 15  <b>Hand in on:</b> 04 September 2018
04-Sep-18	<b>Chapter 4: Resolving forces</b> 4.1 Resolving horizontally and vertically: pp. 43 – 44 4.2 Forces at an angle: pp. 44 – 49  Examples: 4.2.1- 4.2.4 Exercise 4A: 1 (a), 4,8	Read: pp. 43-53  Examples: 4.2.1- 4.2.4 Examples: 4.4.1- 4.4.3  Exercise 4A: 1, 5 Exercise 4B: 3, 8, 13	Exercise 4A: 1 (b), (d), 5  Exercise 4B: 8, 16  <b>Hand in on:</b> 11 September 2018

11-Sep-18	4.3 Some useful trigonometry: pg. 50 4.4 Revolving in other directions: pp. 50 – 56  Examples: 4.4.1, 4.4.3 Exercise 4B: 2, 5, 8  Miscellaneous Ex. 4, pp. 56-59: Pr 6, 12 2, 3, 10, 11		
18-Sep-18	Tutorial		
25-Sep-18	<b>Sport Prize giving – no class</b>		
Holiday			
09-Oct-18	<b>Revision</b>		
16-Oct-18	<b>CLASS TEST</b>		
23-Oct-18	<b>No Class</b>		
School exams and Holiday			
15-Jan-19	<b>Work through class test</b>		
22-Jan-19	<b>Chapter 5: Friction</b> 5.1 Basic properties of frictional forces: pp. 60 – 62  Example 5.1.1, 5.1.2  5.2 Limiting friction: pp. 62 – 64  5.3 Some experiments: pp. 64 – 65  Exercise 5A: 13, 2	Read: pp. 60-66  Examples: 5.1.1- 5.3.2  Exercise 5A: 1, 2, 3, 7, 9, 11	Exercise 5A: 1, 3, 7, 11  <b>Hand in on:</b> 29-Jan-19
29-Jan-19	<b>Chapter 5 continue</b> 5.4 Friction and motion: pp. 66 – 68  Example 5.5.1  5.5 Problems involving friction: pp. 68 – 73  Exercise 5B: 2  Miscellaneous Ex. 5: Pr 1, 9, 3, 15	Read: pp. 66-71  Examples: 5.5.2, 5.5.3  Exercise 5B: 1, 8, 14	Exercise 5B: 1, 8, 14  <b>Hand in on:</b> 05-Feb-19
05-Feb-19	<b>Chapter 6: Motion due to gravity</b> 6.1 Objects falling from height: pp. 76 – 78; Example 6.1.1, 6.1.2  Exercise 6A: 4  6.2 Objects projected upwards: pp. 78 – 82; Example 6.2.1, 6.2.2  Exercise 6B: 11  6.3 Motion on a sloping plane: pp. 82 – 84; Example 6.3.1  6.4 Vertical motion air resistance: pp. 84 – 86; Example 6.4.1  Miscellaneous Ex. 6: Pr 2	Read: pp. 77-86 Note: pay special attention to pp. 79-80  Work through all the example problems.	Exercise 6A: 5  Exercise 6B: 15  Exercise 6C: 4  <b>Hand in on:</b> 12-Feb-19
12-Feb-19	<b>Chapter 7: Newton's third law</b> 7.1 Forces in pairs: pp. 94 – 96  7.2 Calculations using Newton's 3 <sup>rd</sup> law: pp. 97 – 101  Example 7.2.1, 7.2.2 Exercise 7A: 5	Read: pp. 94-111  Work through all the example problems	Exercise 7A: 1, 8  Exercise 7B: 1 (b), (c), 3

	<p>7.3 Strings, ropes, chains and cables: pp. 102 – 103 Example 7.3.1</p> <p>7.4 Pegs and pulleys: pp. 103 – 108</p> <p>Example 7.4.1</p> <p>Exercise 7B: 1 (a)</p> <p>Example 7.4.2</p> <p>7.6 Internal and external forces: pp. 108 – 112</p>		<p>Miscellaneous Ex. 7: Pr 2, 13</p> <p><b>Hand in on:</b> 19-Feb-19</p>
19-Feb-19	<p>Chapter 8: Work, energy and power</p> <p>8.1 The work-energy equation: pp. 117 – 118</p> <p>Example 8.1.1</p> <p>8.2 Some generalisations: pp. 118 – 120</p> <p>Example 8.2.1, 8.2.2</p> <p>8.3 Motion around curved paths: pp. 120 – 121</p> <p>Exercise 8A: 6</p> <p>Miscellaneous Ex. 8: Pr 1</p> <p>8.4 Power: pp. 122 – 123</p>	Work through Examples 7.6.1, 7.6.2	<p>Miscellaneous Ex. 7: Pr 2, 13</p> <p>Exercise 8A: 5,</p> <p><b>Hand in on:</b> 26-Feb-19</p>
26-Feb-19	<p>8.5 Power, force and velocity: pp. 123- 126</p> <p>Example 8.5.1, 8.5.2</p> <p>Exercise 8B: 4</p> <p><b>Chapter 9: Potential energy</b></p> <p>9.1 Another expression for work: pp. 129 – 130</p> <p>Example 9.1.1</p> <p>9.2 Three problems with one answer: pp. 130 – 132</p> <p>9.3 Conservative and non-conservative forces: pg. 132</p> <p>9.4 The conservation for energy: pp. 132 – 136</p> <p>Example 9.4.1</p>	NB: Read through chapters 8 and 9	<p>Exercise 8B: 1, 3</p> <p>Exercise 9A: 8, 13</p> <p><b>Hand in on:</b> 05-Mar-19</p>
05-Mar-19	<p>9.5 Application to systems of connected objects: pp. 136 – 137</p> <p>9.6 Including non-conservative forces in the equation: pp. 138 – 140</p> <p>Miscellaneous Ex. 9: Nr. 2</p> <p><b>Chapter 10: Force as a vector quantity</b></p> <p>10.1 Combining forces geometrically: pp. 144 – 146</p> <p>Example 10.1.1</p>		
12-Mar-19	<p><b>10.2 Splitting forces into components: pp. 146 – 152</b></p> <p>Example 10.2.1</p> <p>Exercise 10A: 2, 6</p>		

	<p>10.3 Combining forces by perpendicular components: pp. 152 – 155</p> <p>Example 10.3.1, 10.3.2</p> <p>10.4 Using algebraic notation: pp. 155 – 157 10.5 Equilibrium: pp. 157 – 164</p> <p>Example 10.5.1</p> <p>Miscellaneous Ex. 10: Nr 19, 12</p>		
<b>School holiday</b>			
02-Apr-19	<p><b>Chapter 11: General motion in a straight line</b></p> <p>11.1 Velocity and acceleration: pp. 168 – 170</p> <p>Example 11.1.1</p> <p>11.2 Displacement and velocity: pp. 170 – 175</p> <p>Example 11.2.1</p> <p>11.3 The reverse problem: pp. 175 – 177 11.4 The constant acceleration problem: pp. 177 – 181</p> <p>Miscellaneous Ex. 11: Nr 1, 4, 6</p>		
09-Apr-19	<b>Revision</b>		
17-Apr-18	<b>Revision</b>		
24-Apr-18	<b>Revision</b>		