

# PHY138Y Mechanics Curriculum - 2004

Class	Major Topics	Textbook Reference
1 Mon. Sept. 13	<ul style="list-style-type: none"> <li>• Introduction to PHY138: the structure of the course</li> <li>• Assumptions of classical physics</li> <li>• The role of everyday language and the language of mathematics</li> </ul>	None
2 Wed. Sept. 15	<ul style="list-style-type: none"> <li>• Units</li> <li>• Vectors</li> <li>• Dimensional analysis</li> <li>• Estimation</li> <li>• Coordinate systems</li> </ul>	Chapter 1 - <b>Introduction and Vectors</b> §1.1 - §1.5 §1.7  Note: we will discuss §1.6 in a later class.
3 Mon. Sept. 20	<ul style="list-style-type: none"> <li>• Scalars and Vectors</li> <li>• Vector addition and subtraction</li> <li>• Unit vectors</li> <li>• Modeling and Problem Solving</li> <li>• Speed, velocity, acceleration, distance, displacement.</li> <li>• Using derivatives</li> </ul>	§1.8 - §1.11 <hr/> Chapter 2 - <b>Motion in One Dimension</b> §2.1 - §2.2
4 Wed. Sept. 22	<ul style="list-style-type: none"> <li>• Velocity, acceleration continued</li> <li>• Freely falling bodies</li> <li>• Projectile motion</li> </ul>	§2.3 - §2.7 <hr/> Chapter 3 - <b>Motion in Two Dimensions</b> §3.1 - 3.3
5 Mon. Sept. 27	<ul style="list-style-type: none"> <li>• <b><i>Data and analysis of jumping frogs</i></b></li> <li>• Uniform circular motion</li> <li>• Tangential and Radial Acceleration</li> <li>• Newton's Laws of Motion</li> <li>• <b><i>Ballistocardiogram</i></b></li> </ul>	§3.4, §3.5 <hr/> Chapter 4 - <b>The Laws of Motion</b> §4.1 - §4.7

<p>6 Wed. Sept. 29</p>	<ul style="list-style-type: none"> <li>• Centripetal force</li> <li>• Nonuniform circular motion</li> <li>• Fundamental forces of nature</li> </ul>	<p>Chapter 5 - <b>More Applications of Newton's Laws</b> §5.2 - §5.3 §5.6</p>
<p>7 Mon. Oct. 4</p>	<ul style="list-style-type: none"> <li>• The gravitational field</li> <li>• Work</li> <li>• Scalar or dot product of 2 vectors</li> <li>• Introduction to the integral sign</li> <li>• Spring-mass system</li> </ul>	<p>§5.7</p> <hr/> <p>Chapter 6 - <b>Energy and Energy Transfer</b> §6.1 - §6.4</p>
<p>8 Wed. Oct. 6</p>	<ul style="list-style-type: none"> <li>• Kinetic energy and its conservation</li> <li>• <b>More about jumping frogs</b></li> <li>• Nonisolated systems</li> <li>• Extend concept of energy and its conservation to other forms</li> <li>• Power</li> <li>• <b>Basal metabolic rate</b></li> </ul>	<p>§6.5 - §6.6 §6.8</p>
<p>9 Wed. Oct, 13</p>	<ul style="list-style-type: none"> <li>• Potential energy, mechanical energy</li> <li>• Conservative and nonconservative forces</li> <li>• Conservative forces and potential energy</li> <li>• Potential energy for gravitational and electric forces</li> <li>• Equilibrium and energy diagrams</li> </ul>	<p>Chapter 7 - <b>Potential Energy</b> §7.1 - §7.7</p>
<p>10 Mon. Oct. 18</p>	<ul style="list-style-type: none"> <li>• Momentum and its conservation</li> <li>• Impulse</li> <li>• Collisions</li> <li>• <b>Damage caused to people in collisions</b></li> </ul>	<p>Chapter 8 - <b>Momentum and Collisions</b> §8.1 - §8.4</p>
<p>11 Wed. Oct. 20</p>	<ul style="list-style-type: none"> <li>• Angular speed and acceleration</li> <li>• Rotational kinematics</li> <li>• Rotational kinetic energy: the moment of inertia</li> </ul>	<p>Chapter 10 - <b>Rotational Motion</b> §10.1 - §10.4</p>

12 Mon. Oct. 25	<ul style="list-style-type: none"> <li>• Torque</li> <li>• Vector or cross product</li> <li>• Rigid bodies</li> </ul>	§10.5 - 10.7
13 Wed. Oct. 27	<ul style="list-style-type: none"> <li>• <b>Forces on the hip and femur</b></li> <li>• Angular momentum and its conservation</li> <li>• Rolling motion of rigid bodies</li> </ul>	§10.8 - §10.9 §10.11
14 Mon. Nov. 1	<ul style="list-style-type: none"> <li>• Review for the test</li> </ul>	All of the above
15 Wed. Nov. 3	<ul style="list-style-type: none"> <li>• Error analysis: a laboratory topic</li> </ul>	Nothing from the textbook, but we will discuss some of the material in §1.6 in a different way.

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