

## PHYS 141 – Introductory Mechanics

<b>Designation:</b>	Required
<b>2009-10 catalog description:</b>	A first course in Newtonian mechanics; introduces freshman-level students to the statics and dynamics of point particles, rigid bodies, and fluids. 4 credits.
<b>Prerequisite(s):</b>	MATH 124 or MATH 125; Concurrent registration, MATH 129. Credit will be allowed for only one of the following sequences of courses; PHYS 102-103-181-182, 131-132-181-182, 141-142-241-242, 151-152-251-252.
<b>Textbook(s) and/or other materials:</b>	<ul style="list-style-type: none"><li>• Sears and Zemansky's University Physics, 12th Edition (Vol. 1) by H. D. Young &amp; R. A. Freedman (Pearson Addison-Wesley)</li><li>• Physics 141 Lab Manual (available at ASUA Bookstore)</li></ul>
<b>Course learning outcomes:</b>	A calculus-based introduction to simple motions, mechanical Energy and fluids.
<b>Topics covered:</b>	<ul style="list-style-type: none"><li>• Dimensional analysis: one dimensional motion and acceleration</li><li>• Vectors; two-dimensional motion; projectile motion</li><li>• Circular motion (kinematics); moving reference frames.</li><li>• Newton's Laws and applications.</li><li>• Circular motion (dynamics)</li><li>• Work; kinetic energy; potential energy</li><li>• Conservation of momentum</li><li>• One and two dimensional collisions: center of mass</li><li>• Motion of a system of particles.</li><li>• Angular velocity and acceleration.</li><li>• Moments of inertia; torque; rotational energy and rolling motion.</li><li>• Angular momentum; conservation of angular momentum.</li><li>• Statics</li><li>• Simple harmonic oscillator; pendulums.</li><li>• Damped and forced oscillators.</li><li>• Newton's Law of Gravity</li><li>• Kepler's Law</li><li>• Gravitational energy.</li><li>• Fluid statics; fluid dynamics.</li><li>• Traveling waves; standing waves; sound.</li></ul>
<b>Class/laboratory schedule:</b>	Three 50-minute classes and one 2-hour 50-minute lab session per week.
<b>Contribution to criterion 5 (curriculum):</b>	Math and basic science: 4 units Engineering topics: 0 General education: 0 Other: 0
<b>Relationship to program outcomes:</b>	<b><u>Department Inputs Data</u></b>

**Person preparing syllabus and  
date:**

K.C. Hsieh, Fall 2009