

SPRINGFIELD TECHNICAL COMMUNITY COLLEGE

**ACADEMIC AFFAIRS**

Course Number: PHYS 132 Department: Physics

Course Title: College Physics 2 Semester: Spring Year: 1997

**Objectives/Competencies**

<b>Course Objective</b>	<b>Competencies</b>
<p>1. Process Objectives. The process objective of this course is to have students be able to use the mathematics of physics to solve hypothetical problems presented in text form, and to model phenomena measured in laboratory. The topics and competencies required to meet this objective are listed on the right under “Competencies.” These topics are described in detail in standard physics texts. First course in series of three engineering course: MP 132, MP 232, and MP 337.</p>	<p>1. Physics Process Competencies. At the end of this course, students will be able to use the mathematics of physics to solve hypothetical problems presented in text form, and to model phenomena measured in laboratory. Mathematical models of the physical world are listed below:</p> <ul style="list-style-type: none"><li>a. Equations describing motion with constant acceleration</li><li>b. Conditions of static equilibrium</li><li>c. Vectors to describe force and motion</li><li>d. Vector products; scalar product and vector product</li><li>e. Projectile motion</li><li>f. Circular motion; centripetal acceleration</li><li>g. Newton’s laws of motion</li><li>h. Definition of work</li><li>i. Power</li><li>j. Kinetic energy and gravitational potential energy</li><li>k. Work – Energy theorem</li></ul>

Course Objective	Competencies
<p>2. Computational Tools for meeting Objectives. Physics students usually need some skill using computational tools like calculators and computers. This course assumes that students can use computational tools effectively when they ENTER the course so they can meet the physics course objectives outlined here.</p> <p>3. Mathematics. Physics courses often teach similar subject matter at different levels of sophistication. These levels are most clearly identified by the levels of mathematics used in particular courses. There are two important considerations concerning mathematics; the level of mathematical competency upon entering a physics course,</p>	<ul style="list-style-type: none"> <li>l. Conservation of energy</li> <li>m. Newton's law of gravitation</li> <li>n. Linear momentum</li> <li>o. Angular momentum</li> <li>p. The conservation of momentum</li> <li>q. Equations describing rotational motion</li> <li>r. Torque</li> <li>s. Simple harmonic motion; harmonic oscillator</li> <li>t. Coulomb's law</li> <li>u. Bohr Atom</li> </ul> <p>1. Computational Tools. This course assumes that students can use the following tools effectively when they ENTER this physics course.</p> <ul style="list-style-type: none"> <li>a. Scientific Calculator, basic functions (+ - x ÷ √)</li> <li>b. Scientific Calculator, trigonometric functions</li> <li>c. Scientific Calculator, statistical functions</li> <li>d. Scientific Calculator, exponents and logarithms</li> <li>e. Graphing Calculator</li> <li>f. Computer, spreadsheet and graphing</li> <li>g. Computer, programming</li> <li>h. Other</li> </ul> <p>1. Mathematics Competencies on Entry. In this physics course, students are presumed to be fluent in mathematics at the level of:</p> <ul style="list-style-type: none"> <li>a. Arithmetic; decimals and fractions</li> <li>b. Can use scientific calculator</li> </ul>

Course Objective	Competencies
<p>and the mathematical competency added during the course.</p> <p>Mathematics Objectives. An objective of this course is to have students be able to apply several standard mathematical techniques in the solution of physics problems. These competencies are listed on the right under “Competencies.”</p> <p>4. Laboratory Objectives. The objective of the laboratory is to give students hands-on experience with laws of nature and conventions of physics. The laboratory experience emphasizes measurement and mathematical modeling. The topics in physics covered in the laboratory generally support topics emphasized in class.</p>	<p>c. Algebra; equations, linear graphing  d. Trigonometry; sine, cosine and tangent  e. Differential calculus</p> <p>Mathematics Competencies. At the end of this course students will be able to use several standard mathematical techniques. These topics are described in detail in standard mathematics texts.</p> <p>a. Evaluate an equation by replacing the variables with numbers.  b. Solve equations in one unknown by applying the rules of algebra.  c. Use the equation for a straight line.  d. Solve quadratic equations.  e. Solve simultaneous equations.  f. Use the trigonometry of right triangles appropriately.  g. Solve problems using natural logarithms.  h. Differentiate polynomials in problem solving  i. Differentiate trigonometric functions in problem solving  j. Integrate polynomials in problem solving  k. Integrate trigonometric functions in problem solving</p> <p>1. Laboratory Competencies. At the end of the laboratory portion of this course, students will be able to:</p> <p>a. Follow instructions for laboratory procedures.  b. Make measurements and collect data.  c. Organize and present data as tables and graphs.</p>

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	<ul style="list-style-type: none"><li>d. Interpret graphs and statistical data.</li><li>e. Plot data on linear graph paper.</li><li>f. Relate experimental data to mathematical models.</li><li>g. Design experiments.</li><li>h. Work in teams.</li><li>i. Prepare a Lab Report.</li><li>j. Meet deadlines.</li></ul>