SPRINGFIELD TECHNICAL COMMUNITY COLLEGE

ACADEMIC AFFAIRS

Course Number: PHYS 256 Department: Physics

Course Title: Optics and Image Recording Semester: Spring Year: 1997

Objectives/Competencies

Course Objective	Competencies
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. One semester course specializing in optics.	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: a. Fundamentals of wave motion b. Wave (physical) optics c. Lenses and ray tracing d. Planck quantization, photoelectric effect e. Bohr Atom f. Optical Density
2. Knowledge Objectives. The knowledge objective of this course is to have students be able to use scientific terminology necessary for solving hypothetical problems presented in text form, and explaining phenomena observed in laboratory. The knowledge required to meet these objectives is listed on the right under	1. Physics Knowledge Competencies. At the end of this course, students will be able to use scientific terminology necessary for solving hypothetical problems presented in text form, and explaining phenomena observed in laboratory. Systems describing phenomena of the

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"Competencies."	physical world are listed below. Standard physics texts explore these ideas in detail. a. History of Photography b. Electronic Structure of Atoms c. Ionic Bonding d. Diffraction e. Optical Spectra f. Color Temperature g. Light Sensitivity h. Exposure i. Development
3. 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.	1. Computational Tools. This course assumes that students can use the following tools effectively when they ENTER this physics course. a. Scientific Calculator, basic functions (+ - x ÷ √) b. Scientific Calculator, trigonometric functions c. Scientific Calculator, exponents and logarithms
4. 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, and the mathematical competency added during the course.	1. Mathematics Competencies on Entry. In this physics course, students are presumed to be fluent in mathematics at the level of: a. Math placement to level in catalog. b. Can use scientific calculator. c. Algebra; equations, linear graphing. Mathematics Competencies. At the end of this course

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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."	students will be able to use several standard mathematical techniques. These topics are described in detail in standard mathematics texts. a. Evaluate an equation by replacing the variables with numbers. b. Solve equations in one unknown by applying the rules of algebra.
5. 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.	1. Laboratory Competencies. At the end of the laboratory portion of this course, students will be able to: a. Follow instructions for laboratory procedures. b. Make measurements and collect data. c. Organize and present data as tables and graphs. d. Interpret graphs and statistical data. e. Plot data on linear graph paper. f. Plot data on semi-log graph paper. g. Relate experimental data to mathematical models. h. Work in teams. i. Prepare a Lab Report. j. Meet deadlines.