SPRINGFIELD TECHNICAL COMMUNITY COLLEGE

# ACADEMIC AFFAIRS

Course Number: PHYS 300 Department: Physics

Course Title: Radiological Physics Semester: Spring Year: 1999

## Objectives/Competencies

| Course Objective | Competencies |
|---|---|
| The basic objectives for this course are listed below. Additional objectives may be expected as outlined in the syllabus or presented in other course material.<br><br>1. Process Objectives: The process objective of this curse 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 optics and competencies required to meet this objective are listed on the right under "Competencies." These topics are described in detail in standard physics texts. | The basic competencies for this course are listed below. Additional competencies may be expected as outlined in the syllabus or presented in other course material.<br><br>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:<br>1. Newton's Second Law of Motion.<br>2. Definition of work.<br>3. Kinetic energy and gravitational potential energy.<br>4. Conservation of energy.<br>5. Conservation of momentum<br>6. Temperature and heat.<br>7. Fundamentals of wave motion.<br>8. Ohm's Law<br>9. A.C. Circuits. |

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|---|---|
| | 10. Elements of solid-state physics.<br>11. Coulomb's Law<br>12. Magnetism.<br>13. Biot-Savart Law Wave Equation<br>14. Planck quantization, photoelectric effect.<br>15. Bohr Atom<br>16. Compton effect.<br>17. Pair production.<br>18. Two dimensional spectra. |
| 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 "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 physical world are listed below. Standard physics texts explore these ideas in detail.<br>1. Radiation Detection<br>2. Ionization<br>3. Spectra, x-ray, gamma ray, and composite.<br>4. Electronic structure of atoms (in general).<br>5. Tertiary bonding.<br>6. Photoelectric effect.<br>7. Compton effect.<br>8. Pair production. |
| 3. Computational Tools for meeting Objectives: Physics students usually need some skill using computational tools | This course assumes that students can use the following tools effectively when they enter this physics course: |

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|---|---|
| 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. A scientific calculator is required.<br>2. Scientific calculator, basic functions (+,-, x, ✓). |
| 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. In this physics course, students are presumed to be fluent in mathematics at the level of:<br>a. Math placement - MM 099<br>b. Arithmetic: decimals and fractions.<br>c. Can use scientific calculator.<br>d. Algebra: equations, linear graphing. |
| 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 topics are emphasized in class. | 1. Follow instructions for laboratory procedures.<br>2. Make measurements and collect data.<br>3. Organize and present data as tables and graphs.<br>4. Interpret graphs and statistical data.<br>5. Plot data on linear graph paper.<br>6. Use exponents and logarithms.<br>7. Work in teams.<br>8. Prepare a lab report.<br>9. Meeting deadlines. |