

Miami-Dade Community College
PSC 1121 – General Education Physical Science

Course Description: A study of the major concepts and principles from each of the following areas: physics, chemistry, and astronomy.

This course is for non-science majors and is primarily designed for elementary and middle school education majors.

3 credits

Prerequisites: Math 1033

Course Competencies:

Competency 1: The student will demonstrate knowledge of the nature of science and several aspects of its history by

- a) Summarizing the steps involved in the scientific method and how this method is used to solve problems.
- b) Differentiating between a scientific theory and law.
- c) Comparing and contrasting the metric system of measurement to the American system.
- d) Understanding that the natural world is complex and that scientists study the world by using simplified systems (models).
- e) Understanding that the scientific method is based on a cause and effect relationship that is repeatable and consistent.
- f) Drawing reasonable conclusions from observations and data.
- g) Describing significant contributions made by individuals that have explained the very nature of science.

Competency 2. The student will demonstrate knowledge and application of the concepts of motion by

- a) Applying the definitions of the fundamental quantities of motion -- position, distance, speed, and acceleration.
- b) Describing the different types of motion including one dimensional and two dimensional motion (straight line, projectile, circular)
- c) Explaining and giving examples of Newton's three laws of motion.
- d) Describing and applying the concepts of mass, inertia, weight, and gravity.

Competency 3: The student will demonstrate knowledge of the concepts of energy and work by

- a) Defining and relating work and energy.

- b) Differentiating between kinetic and potential energy.
- c) Describing the work done by a constant force.
- d) Stating and applying the law of conservation of energy.
- e) Identifying different types of energy.
- f) Describing some of the processes of energy transformation.
- g) Understanding that the Sun supplies heat and light energy to the Earth.
- h) Discussing the sources and environmental impact of non-renewable and renewable energy sources.

Competency 4: The student will demonstrate knowledge of the concepts of temperature and heat by

- a) Inter-converting among the Fahrenheit, Kelvin, and Celsius temperature scales.
- b) Differentiating between heat and temperature.
- c) Differentiating among conduction, convection and radiation.
- d) Describing the three normal states of matter: solid, liquid and gas.
- e) Discussing the effect that temperature change has upon a state of matter.

Competency 5: The student will demonstrate knowledge of the concept of waves by

- a) Identifying the properties of waves.
- b) Discussing reflection, refraction, and interference of waves.
- c) Discussing standing waves and resonance.
- d) Discussing the factors that affect the speed of a wave.

Competency 6: The student will demonstrate knowledge of basic concepts in electricity and magnetism by

- a) Describing electrical forces between objects with positive and negative charges.
- b) Stating Ohm's Law and define its related concepts.
- c) Discussing electrical energy transmission and heating effects as they relate to electric currents.
- d) Sketching the magnetic field produced by a bar magnet.
- e) Describing different sources of magnetic fields.

Competency 7: The student will demonstrate knowledge of the structure of the atom by

- a) Identifying the three major subatomic particles and describing their general arrangement within the atom.
- b) Defining isotopes and determining how isotopes differ.
- c) Identifying the name and symbol of some common elements.

- d) Defining radioactivity and differentiating among various types of nuclear radiation.
- e) Recognizing the relationship that exists between mass and energy.

Competency 8: The student will demonstrate knowledge of the nature of matter, its properties and interactions by

- a) Identifying, differentiating among, and giving examples of some of the properties of different classes of matter.
- b) Using the Periodic Table to classify elements and describing their properties.
- c) Explaining the difference among atoms, ions, and molecules and discussing the relationship that exists between a chemical formula and the elements that are present.
- d) Predicting the formula of the ionic compound formed by the combination of ions.
- e) Describing ionic and covalent bonds.
- f) Distinguishing between physical and chemical properties and changes of matter.
- g) Identifying the components of a solution and classifying solutions based on solute concentration.
- h) Comparing and contrasting acids and bases.

Competency 9: The student will demonstrate knowledge of the processes that shape the universe by

- a) Describing the formation, nature and characteristics of stars and the galaxies.
- b) Describing the Sun, its characteristics, its energy source, and its effects upon life on Earth.
- c) Discussing the organization and structure of our solar system and its planets.
- d) Explaining the causes of the phases of the moon and causes of solar and lunar eclipses.
- e) Relating the seasons of the year with the position and tilt of the Earth relative to the sun.