Miami Dade College

Course Description
PSC1121 | General Education Physical Science | 3 Credits

A study of the major concepts and principles from each of the following areas: physics, chemistry, and astronomy. Prerequisite: MAT1033.

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

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

Learning Outcomes:

- Computer / Technology Usage
- Critical Thinking
- Ethical Issues
- Numbers / Data: Understanding
- Social Responsibility

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

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

Learning Outcomes:

- Computer / Technology Usage
- Critical Thinking
- Ethical Issues
- Numbers / Data: Understanding
- Social Responsibility

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

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

Learning Outcomes:

- Computer / Technology Usage
- Critical Thinking
- Ethical Issues
- Numbers / Data: Understanding
- Social Responsibility

Competency 4:
The student will demonstrate knowledge of the concepts of temperature and heat by:
- Inter-converting among the Fahrenheit, Kelvin, and Celsius temperature scales.
- Differentiating between heat and temperature.
- Differentiating among conduction, convection, and radiation.
- Describing the three normal states of matter: solid, liquid, and gas.
- Discussing the effect that temperature change has on a state of matter.

Learning Outcomes:
- Numbers / Data: Understanding
- Critical Thinking
- Social Responsibility
- Ethical Issues
- Computer / Technology Usage

Competency 5:
The student will demonstrate knowledge of the concept of waves by:
- Identifying the properties of waves.
- Discussing reflection, refraction, and interference of waves.
- Discussing standing waves and resonance.
- Discussing the factors that affect the speed of a wave.

Learning Outcomes:
- Computer / Technology Usage
- Critical Thinking
- Ethical Issues
- Numbers / Data: Understanding
- Social Responsibility

Competency 6:
The student will demonstrate knowledge of basic concepts in electricity and magnetism by:
- Describing electrical forces between objects with positive and negative charges.
- Stating Ohm's Law and defining its related concepts.
- Discussing electrical energy transmission and heating effects as they relate to electric currents.
- Sketching the magnetic field produced by a bar magnet.
- Describing different sources of magnetic fields.

Learning Outcomes:
- Computer / Technology Usage
- Critical Thinking
- Ethical Issues
- Numbers / Data: Understanding
- Social Responsibility

Competency 7:
The student will demonstrate knowledge of the structure of the atom by:
- Identifying the three major subatomic particles and describing their general arrangement within the atom.
- Defining isotopes and determining how isotopes differ.
- Identifying the name and symbol of some common elements.

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

Learning Outcomes:

- Computer / Technology Usage
- Critical Thinking
- Ethical Issues
- Numbers / Data: Understanding
- Social Responsibility

Competency 8:

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

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

Learning Outcomes:

- Computer / Technology Usage
- Critical Thinking
- Ethical Issues
- Numbers / Data: Understanding
- Social Responsibility

Competency 9:

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

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

Learning Outcomes:

- Computer / Technology Usage
- Critical Thinking
- Ethical Issues
- Numbers / Data: Understanding
- Social Responsibility