Course Prefix and Number: SCI155
Course Title: Integrated Sci I w/Lab: SC1
Course Credits: 4
Course Description: Examines the nature of energy and matter, their interactions and changes, and the application of fundamental concepts to the study of our natural world. These concepts will be explored in hands-on laboratory experiments. This course integrates the fundamental concepts and ideas about the nature of physics and chemistry with the natural world. This is a statewide Guaranteed Transfer course in the GT-SC1 category.

Guaranteed Transfer (GT) Pathways Course Statement:
The Colorado Commission on Higher Education has approved SCI155 for inclusion in the Guaranteed Transfer (GT) Pathways program in the GT- SC1 category. For transferring students, successful completion with a minimum C– grade guarantees transfer and application of credit in this GT Pathways category. For more information on the GT Pathways program, go to https://highered.colorado.gov/academics/transfers/gtpathways/curriculum.html.

GT-SC1: NATURAL & PHYSICAL SCIENCES CONTENT CRITERIA

Students should be able to:

1. The lecture content of a GT Pathways science course (GT-SC1):
    a. Develop foundational knowledge in specific field(s) of science.
    b. Develop an understanding of the nature and process of science.
    c. Demonstrate the ability to use scientific methodologies.
    d. Examine quantitative approaches to study natural phenomena.

2. The laboratory (either a combined lecture and laboratory, or a separate laboratory tied to a science lecture course) content of a GT Pathways science course (GT-SC1):
    a. Perform hands-on activities with demonstration and simulation components playing a secondary role.
    b. Engage in inquiry-based activities.
    c. Demonstrate the ability to use the scientific method.
    d. Obtain and interpret data, and communicate the results of inquiry.
    e. Demonstrate proper technique and safe practices.

GT-SC1 COMPETENCIES & STUDENT LEARNING OUTCOMES

Competency: Inquiry & Analysis:
Students should be able to:

4. **Select or Develop a Design Process**
    a. Select or develop elements of the methodology or theoretical framework to solve problems in a given discipline.
5. **Analyze and Interpret Evidence**
    a. Examine evidence to identify patterns, differences, similarities, limitations, and/or implications related to the focus.
    b. Utilize multiple representations to interpret the data.
6. **Draw Conclusions**
    a. State a conclusion based on findings.

Competency: Quantitative Literacy:
Students should be able to:

1. Interpret Information
    a. Explain information presented in mathematical forms (e.g., equations, graphs, diagrams, tables, words).
2. Represent Information
    a. Convert information into and between various mathematical forms (e.g., equations, graphs, diagrams, tables, words).

REQUIRED COURSE LEARNING OUTCOMES

1. Use appropriate tools and techniques to gather, process, and analyze data and to report information related to a scientific investigation.
2. Estimate future consequences implied in data gathered in the laboratory.
3. Interpret charts, tables, and/or graphs related to the concepts of motion and energy.
4. Demonstrate standard problem solving methods.
5. Read, analyze, and apply written material related to the study of physics and chemistry.
6. Develop essential writing and verbal communication skills.
7. Measure and calculate area, volume, force, energy, and heat.
8. Identify basic properties of motion and energy.
9. Create and test basic electrical circuits.
10. Identify the basic properties of waves and wave motion.
11. Describe the basic structure and properties of atoms.
12. Explain the periodic table and how the elements are arranged.
13. Differentiate between mixtures and compounds.
14. Interpret and write chemical formulas.
15. Explain identifying properties of acids and bases.
16. Discuss the concept of half-life and what makes an atom radioactive.
17. Outline the process of fission and how the energy released may be used in nuclear power plants.
18. Explain the processes of fision and fusion.

RECOMMENDED COURSE LEARNING OUTCOMES

1. Demonstrate the integration of physics and chemistry through applications to renewable energy.
2. Describe how polymers form and how polymers are used.

REQUIRED TOPICAL OUTLINE

I. Science as a way of knowing (scientific method)
II. Properties of motion
    a. Newton's Laws
    b. Linear motion
    c. Circular motion
III. Energy
    a. Kinetic energy
    b. Potential energy
    c. Thermal energy
IV. Heat
    a. Heat transfer
    b. Heat capacity
V. Electricity
    a. Voltage
    b. Current
    c. Resistance
    d. Power
VI. Waves
    a. Wave types
    b. Properties
VII. Atoms
    a. Structure
    b. Periodic properties
VIII. Macroscopic matter and its microscopic explanations
IX. Macroscopic interactions and microscopic explanations
X. Nuclear reactions

RECOMMENDED TOPICAL OUTLINE

I. Integrating physics and chemistry: renewable energy technologies
II. Polymers

Effective Implementation date: Spring 2018, 201830