

COURSE OUTLINE

General Physical Science

Course Description

PS 100. General Physical Science. 5 credit hours. Prerequisite: High school Algebra or MA060 (or MA064, MA065, and MA066) with a C or better or diagnostic credit. This course will enable the student to gain a basic understanding of astronomy, meteorology, geology, chemistry and physics. There are three hours of lecture/presentation periods and three hours of laboratory time each week. The learning outcomes and competencies specified by the Kansas Core Outcomes Project for this course, as approved by the Kansas Board of Regents (Transfers as PSI1010).

Required Materials

For complete material(s) information, refer to <https://bookstore.butlercc.edu>

Online Materials

Word processing software capable of create RTF files

Graphical analysis software (Excel) capable of saving graphs

Butler-Assessed Outcomes

The intention is for the student to be able to do the following:

1. Use the scientist method for analyzing scientific materials.
2. Demonstrate basic math skills.
3. Apply scientific reasoning to real world problems.

Learning PACT Skills that will be developed and documented in this course

Through involvement in this course, the student will develop ability in the following PACT skill area(s):

Analytical Thinking Skills

- Critical thinking - Through the production of mathematical, graphical, experimental, and written assignments, the student will demonstrate scientific reasoning.

Communication skills

- Creation and delivery of messages – Through a variety of methods using either the internet and/or computer, the student will produce lab reports to express their findings.

Technology Skills

- General computer use - Through the production of electronic-facilitated research, preparing the graphs, and manipulation of data, the student will develop basic computer skills.

Major Summative Assessment Task(s)

These Butler-assessed Outcome(s) and Learning PACT skill(s) will be demonstrated by the following:

1. Completing the departmental comprehensive assessment (A-skill).
2. Writing a research paper on the phases of the moon (T-skill, C-skill).

Learning Units - Lecture

- I. Demonstrate knowledge of the method, techniques, and tools used in science
 - A. Describe the steps involved in the scientific method
 - B. Discuss the significance of the scientific method
 - C. Demonstrate competence in scientific measurements
 1. Significant figures and rounding
 2. Errors and uncertainty
 3. Area, volume and density
 - D. Read and interpret graphs, and construct graphs from data
 - E. Correctly use powers of ten notations
- II. Demonstrate knowledge of basic concepts in Astronomy
 - A. Explain the meaning and significance of the concept of Universal Gravitation
 - B. Describe the structure of the solar system
 - C. Explain the motions of the objects in the solar system, including the earth-moon system
 - D. Journalize the phases of the moon and write a moon log report
 - E. Identify major characteristic of each of the planets
- III. Demonstrate knowledge of major principles of chemistry
 - A. Develop and use the concept of the conservation mass
 - B. Describe the characteristics of three states of matter and explain changes
 - C. Differentiate between elements, compounds, and mixtures
 - D. Describe the structure of the atom including protons, electrons, and neutrons
 - E. Use the Periodic Law and the Periodic chart to identify and describe:
 1. Classes of elements
 2. Chemical families
 3. Atomic characteristics
 - F. Build simple compounds using appropriate nomenclature
 - G. Balance and interpret simple chemical reactions
- IV. Demonstrate knowledge of basic geological processes
 - A. Describe how the earth has been changed over time including:
 1. Geologic timeline
 2. Plate tectonics
 3. Earthquakes
 4. Volcanic activity
 5. Mountain building
 6. Glaciation
 - B. Differentiate between rocks and minerals
 - C. Describe the characteristics of three main types of rocks
 - D. Explain the rock cycle
 - E. Discuss the origin and significance of fossils

- V. Demonstrate knowledge about meteorological phenomena
 - A. Describe the causes of the seasons
 - B. Discuss the causes and effects of tornadoes/storms with emphasis on safety
 - C. Describe the major components of a weather map
- VI. Demonstrate knowledge of fundamental concepts of physics
 - A. Explain the process of thermal interactions
 - 1. Describe and differentiate heat and temperature
 - 2. Measure temperature and make conversions using various scales
 - 3. Describe and use heating and cooling curves
 - 4. Explain thermal transfer properties as they relate to everyday activities
 - B. Use the concepts of simple motion
 - C. Define linear motion
 - D. Graph data and use graphs in analyzing motion
 - E. Describe the motion of falling bodies and do mathematical calculations
 - F. Describe the process of simple projectile motion
 - G. Define and calculate kinetic, gravitational, potential and total energies
 - H. Explain some of the basic principles in electricity and magnetism
 - I. Describe static electricity and site examples
 - J. Calculate the cost of appliances in the home in terms of electrical use
 - K. Show basic properties of circuits using batteries and bulbs
 - L. Describe qualitatively and quantitatively the properties of Ohm's Law
 - M. Describe magnetism and the properties of magnetic fields
- VII. Reference literature sources to gather and summarize information in a written research paper (moon log)

Learning Units – Lab

- I. Make observations and measurements, handle data, calculate results, and draw conclusions from the observations and/or experimental data
- II. Communicate results through written laboratory reports
- III. Demonstrate safe work habits in the lab
- IV. Construct a graph and interpret graphical data

Learning Activities

Learning activities will be assigned to assist the student to achieve the intended learning outcome(s) through lecture, instructor-led class discussion, guest speakers, group activities, drills/skill practice, labs, and other activities at the discretion of the instructor. These activities may be either face-to-face or online.

Grade Determination

The student will be graded on learning activities and assessment tasks. Grade determinants may include the following: daily work, lab reports, research papers, quizzes, chapter or unit tests, comprehensive examinations, projects, presentations, class participation, and other methods of evaluation at the discretion of the instructor.