Administrative Unit: Science
Course Prefix and Number: CHEM 108
Course Title: Physical Science Survey
Number of: Credit Hours: 3 Lecture Hours: 3 Laboratory Hours: 0
Catalog Description: Examination of the physical world and its basic underlying scientific principles. Cross-listed as PHYS 108. G.E.
Prerequisite(s)/Corequisite(s): MATH 106 or instructor’s permission.


Course Objectives:
• To describe the common features of the physical sciences as a whole and the subfields of physics, chemistry, and astronomy.
• To outline and apply the major laws governing physics and chemistry.
• To describe the major characteristics of the Earth-Moon system, the solar system, and the Universe.

Measurable Learning Outcomes
• Explain the scientific method.
• Define measurement and units of measurement and perform unit conversions.
• State Newton’s three laws of motion, and solve problems involving all three.
• State the three laws of thermodynamics and solve problems involving heat transfer.
• Describe the kinetic theory of gases and solve change-of-state problems for ideal gases.
• Explain the structure of the atom and use the periodic table of elements to predict properties of elements.
• Predict the stability of atomic nuclei and describe fission and fusion reactions.
• Name chemical compounds.
• State and apply the laws of chemical combination and the mole concept.
• Differentiate between ionic and molecular compounds.
• Balance chemical equations.
• Describe the facts that influence rates of chemical reactions.
• Predict simple acid-base and combustion reactions.
• Describe composition and structure of the solar system.
• Explain Kepler’s laws of planetary motion.
• Specify position using latitude and longitude, and determine the local time at different locations.
• Describe the motions of the Earth and how these give rise to the solar day and the seasons.
• Describe the properties of the Moon and its phases.
• Describe the structure of stars, their classification, and other components of the Universe.
• Explain Hubble’s law and the Big Bang theory of the cosmos.

Topical Outline (major areas of coverage):
• Measurement
• Motion
• Force and Motion
• Work and Energy
• Temperature and Heat
• Atomic Physics
• Nuclear Physics
• The Chemical Elements
• Chemical Bonding
• The Solar System
• Place and Time
• The Moon
• The Universe

Recommended maximum class size for this course: 35

Library Resources: Online databases are available at http://www.ccis.edu/offices/library/resources.asp. You may access them from off-campus using your eServices login and password when prompted.

Prepared by: Frank Somer

Date: December 2, 2005

NOTE: The intention of the master syllabus is to provide an outline of the contents of this course, as specified by the faculty of Columbia College, regardless of who teaches the course, when it is taught or where it is taught. Faculty members teaching this course for Columbia College are expected to facilitate learning pursuant to the course objectives and cover the subjects listed in the topical outline. However, instructors are also encouraged to cover additional topics of interest so long as those topics are relevant to the course’s subject. The master syllabus is, therefore, prescriptive in nature but also allows for a diversity of individual approaches to course material.

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