# COURSE OUTLINE

## PHYS-106

## Earth and Space Science

### 4 Semester Hours

### Science Core Course

# HOWARD COMMUNITY COLLEGE

## Description

This is a course designed for non-science majors which is a general survey of basic earth science and astronomy topics. This course will enable the student to learn basic concepts of soils, groundwater, weather and the hydrological cycle, urban geology, rocks and minerals, historical geology, plate tectonics, scale of the solar system, historical astronomy, basic motions of the earth plus celestial bodies, constellation identification, planet evolution and characteristics, space satellites, telescopes, the sun, stellar properties and evolution, and galaxies and cosmology. In the laboratory, the student will develop skill with basic equipment, laboratory techniques and procedures plus investigative skills to solve science-related problems. Field work will involve investigation of geology sites, constellation identification, and trips to local museums/planetariums. (3 hours lecture, 3 hours lab)

## Statement on General Education and Liberal Learning

A liberal education prepares students to lead ethical, productive, and creative lives and to understand how the pursuit of lifelong learning and critical thinking fosters good citizenship. General education courses form the core of a liberal education within the higher education curriculum and provide a coherent intellectual experience for all students by introducing the fundamental concepts and methods of inquiry in the areas of mathematics, the physical and natural sciences, the social sciences, the arts and the humanities, and composition. This course is part of the general education core experience at Howard Community College.

## Overall Course Objectives

Upon completion of this course, the student will be able to:

1. Develop hands-on lab and demonstration activities that enable discovery learning and the development of science process skills.
2. Develop a teaching strategy to address their students' alternate conceptions (misconceptions).
3. Discuss contemporary topics in earth/space science such as life in the universe, U.S. space program, etc., found in newspapers, magazine articles, and internet sites.
4. Discuss chemical and physical properties used to identify rocks.
5. Demonstrate simplified, inexpensive lab materials/equipment preparation.
6. Develop activities for local astronomy (e.g. planetarium and night sky observation) and geology (e.g. rock quarry) field trip sites through visitations.
7. Develop a earth/space science lesson plan.
8. Integrate and implement effective microcomputer technology in the curriculum.

## Major Topics

I. Soils and Groundwater
   - A. Origin, Types, and Properties
   - B. Field Sampling
   - C. Field Trip to Savage Run Park

II. Weather: Hydrological Cycle
III. Urban Geology
    A. Analysis of Building Materials
    B. Optional Field Trip to Historical Ellicott City
IV. Introduction to Rocks and Minerals
    A. Classification and Identification
    B. Beach Sands
    C. Field Trip to Woodstock Dome
V. Historical Geology
    A. Plate Tectonics
    B. Field Trip to Smithsonian Museum of Natural History
VI. Overview of Astronomy
    A. Terminology
    B. Scale of Solar System and Universe
    C. Astronomy vs. Astrology
VII. Historical Astronomy and Scientific Models
VIII. Basic Motions in Astronomy and Related Phenomena
    A. Earth (e.g. Day & Night, Seasons, Time, etc.)
    B. Moon (e.g. Phases)
    C. Planets (e.g. Retrograde Motion)
    D. Stars (e.g. Doppler Effect, Parallax, etc.)
IX. Night Sky Celestial Body Identification
    A. Constellations of Major Stars
    B. Planets
    C. Other, e.g. Nebula, Meteors, Variable Stars, etc.
    D. Field Trip to Patapsco Middle School Planetarium
    E. Evening Skywatch
X. Solar System Objects
    A. Planet's evolution, characteristics, and geology including moons
    B. The Moon
    C. Comets, Asteriods and Meteorites
    D. Space satellites and man-made debris
    E. Solar System Evolution
    F. NASA at Goddard Field Trip including tour, Teacher Resource Center and Speaker on Planetary Geology
XI. Light and the Electromagnetic Spectrum
XII. Telescopes
    A. Light Telescopes
    B. Radio and other Invisible Radiation Telescopes
XIII. The Sun: Its Characteristics and Evolution
XIV. Stellar Properties and Evolution
XV. Brief Introduction to Galaxies and Cosmology
XVI. Class Project Presentations by Teachers

## Course Requirements

Grading/exams: Grading procedures will be determined by the individual faculty member but will be calculated on the basis of homework and exams. This course will include a final comprehensive exam.
Writing: Specific writing assignments will be determined by the individual faculty members but will include a critique and written homework and exam assignments.

## Other Course Information

This course is a Science core course, a Science elective and an Arts and Sciences elective.