COCONINO COMMUNITY COLLEGE
COURSE OUTLINE

Prepared by: Bruce Belman — Date: October 19, 1998
General Education Outcomes reviewed by: Bryan Bates — Date: March 23, 2001
Revised: Maxie Inigo — Date: Spring 2008
Revised: Kevin Mullins — Date: Feb. 19, 2009
Permanent Status

A. Identification:

1. Subject Area: Geology
2. Course Number: GLG 105
3. Course Title: Introduction to Planetary Science
4. Credit Hrs: 4
5. Catalog Description:

A survey of Solar System objects and their geologic evolution, surfaces, interiors, atmospheres, and processes, the methods used to study them, and the history of space exploration; weekly laboratory for data analysis and experiments; may include field trip(s). General Education: Physical and Biological Sciences. Three lecture. Three lab.

B. Course Goals:

Students will develop knowledge of the objects of our Solar System, their geologic evolution, surfaces, interiors, atmospheres, and processes. The students will also learn about the methods used to study the objects of our Solar System and how data is analyzed in a laboratory setting. Instructors are encouraged to arrange at least 1 weekend field experience.

C. Course Outcomes:

Students will:

1. Discuss the major theories and evidence regarding the processes responsible for the formation of the Sun, Solar System and related objects
2. Compare and contrast these ideas and evidence with current new discoveries germane to these topics
3. Describe the application of the scientific method and other critical thinking models to planetary objects, their exploration, as well as current limitations on Remote Sensing and space exploration technologies
4. Discuss past, present and future ideas, concepts, and approaches in Solar System exploration.
5. Describe the Electromagnetic Spectrum and its relationship to remote sensing, spectroscopy and image processing as it pertains to the exploration of the Solar System.
6 .Analyze data returned from spacecraft instrumentation and apply the results to interpreting the geologic, atmospheric, and physical properties of planets, satellites, asteroids and comets.
7. Recognize the basic geomorphology, geology and planetary processes of the Earth and, through extrapolation using Earth Analogs, compare and contrast the chemical composition and physical processes of the major bodies of our Solar System..
8. Describe and assess the current theories and processes explaining the formation of the Sun and the Solar System.
9. Discuss impact cratering, differentiation, tectonic, volcanism, hydrology, atmospherics, and aeolian driven of the major Solar System bodies. .
10. Employ the concept of crater counting used to date the Moon and collect data, build spreadsheets, plot data and calculate ages for other planetary surfaces
11. Recognize the terminology from astronomy, astrophysics, planetology and geology relevant to the study of planetary systems.
12. Describe and illustrate the physical relationships of the Earth/Moon system.
13. Describe the physiography, morphology, geology and atmospherics of the Terrestrial planets and their satellites.

14. Describe the physiography, morphology, geology and atmospherics of the Outer Gas Giant planets and their satellites.
15. Discuss and contrast the physical attributes and planetary significance of asteroids and comets.
16. Discuss the characteristics, importance and place that Pluto, the Kuiper Belt and the Oort Cloud have in the understanding of our Solar System.
17. Discuss and appraise `the current investigations and evidence regarding Exoplanets.

D. Course Outcomes Assessment:

Assessment will include:

1. Reading and research assignments of historic and current theories and evidence regarding planetary development. Short written and in class oral presentations are required.
2. Labs utilizing past and present planetary image data for interpretation and analysis.
3. Crater counting lab requires using established lunar age dating techniques to estimate age of other planetary surfaces.
4. Term paper covering topic germane to astronomy, planetary science, geology or other related field, agreed upon by student and instructor.

E. Course Content

Will include:

1. Introduction
    a. Objects in the Solar System
    b. The geologic approach
    c. Relevance of geomorphology
    d. Earth analogs
    e. Sources of data
2. Geologic exploration of the Solar System
    a. General planetary characteristics
    b. Pre-space-age planetology studies
    c. Lunar and planetary missions
    d. The Electromagnetic Spectrum
    e. Planetary Cartography
3. Planetary processes
    a. Differentiation
    b. Impact cratering
    c. Tectonics
    d. Volcanism
    e. Degradation
4. The Earth/Moon system
    a. Cultural significance, lunar phase associations, history of the Moon
    b. Tides, stability and faulting
    c. Theories of formation
    d. Geology
    e. Craters, crater counting and determination of surface ages

5. Terrestrial Planets
    a. Physiography
    b. Cratering, tectonics, atmospherics and hydrology
    c. Geologic history
    d. Satellites
    e. Missions past, present and future

8. Asteroids and comets
    a. Classification and composition
    b. Geologic significance
    c. Missions past, present and future

d. Asteroid impacts on Earth

9. The Outer Gas Giants
   a. Composition and formation
   b. Atmospherics
   c. Ring systems
   d. Satellite systems
   e. Missions past, present and future

10. Dwarf and Exoplanets
   a. Pluto/Charon system
   b. Keiper Belt
   c. Ooort Cloud
   d. Missions present and future