Required Syllabus Information – all must be included in the course syllabus

AST 101
Course Title: Planetary Astronomy w/Lab: SC1
Course Credits: 4
Course Description: Focuses on the history of astronomy, naked-eye sky observation, tools of the astronomer, contents of the solar system and life in the universe. Incorporates laboratory experience.

GT Pathways Requirements:

Guaranteed Transfer (GT) Pathways Course Statement:
The Colorado Commission on Higher Education has approved AST 101 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 http://highered.colorado.gov/academics/transfers/gtpathways/curriculum.html.

NATURAL & PHYSICAL SCIENCES (N&PS) CONTENT CRITERIA – GT-SC1

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.

COMPETENCIES & STUDENT LEARNING OUTCOMES FOR GT-SC1

Inquiry & Analysis:

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.

Quantitative Literacy:

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).

SYSTEM REQUIREMENTS:

REQUIRED COURSE LEARNING OUTCOMES

1. Recognize the distinctions between science, pseudoscience and non-science.
2. Describe the scientific method in detail.
3. Collect, organize, interpret and present data in a systematic manner, using charts, graphs, tables.
4. Analyze scientific data evidence and sources to support a theory/data critically.
5. Set up and solve problems using geometry, algebra, trigonometry and the metric system as required.
6. Describe the physical scale and timescale of the universe.
7. Apply the physics of gravity and motion as they apply to astronomy.
8. Discuss the basic properties of light and its uses in astronomy and cosmology.
9. Identify objects and classify types of objects visible in the night sky.
10. Relate the history of Astronomy as an example of the development of scientific process.
11. Relate processes of planetary atmospheres to observed atmospheric features in all planets and processes of planetary geology to observed features of terrestrial planets.
12. Describe the cause of moon phases and seasons.
13. Relate the observed motion of objects in the sky to the real motion of Earth-Moon-Sun-Star system.
14. Explain the current leading theory of planetary formation.
15. Characterize minor bodies of the solar system: asteroids, comets and dwarf planets.
16. Categorize space exploration missions.
17. Describe the current status of space exploration.
18. Breakdown current methods of exoplanet detection.
19. Appraise the current status of astronomers' understanding of the properties of known exoplanets.
20. Evaluate arguments about the possibility and prevalence of extraterrestrial life.

REQUIRED TOPICAL OUTLINE

I. Astronomy and the nature of science
    a. Scientific method
    b. Science vs pseudoscience
    c. History of astronomy as an example of science
II. Observing the sky
    a. Seasons
    b. Lunar phases/eclipses
    c. Celestial sphere
    d. Navigation and timekeeping
III. Our place in the universe
    a. Scale of space and time
    b. Earth's motion
IV. Physics of astronomy
    a. Kepler's laws
    b. Newton's laws
    c. Conservation laws
    d. Energy
    e. Nature of light and matter
V. Tools of the astronomer
    a. Telescopes and instruments
    b. Space exploration
VI. Contents of the solar system
    a. Solar system formation
    b. Planetary geology, atmospheres and moons
    c. Small bodies
VII. Life in the universe
    a. Exoplanets
    b. Astrobiology

CCCOnline Course Policies: http://www.ccconline.org/ccconline-course-policies/

Effective Implementation date: Spring 2018, 201830