

# North Hennepin Community College

## PHYS 1060: The Solar System

### A. COURSE DESCRIPTION

Credits: 3

Lecture Hours/Week: \*.\*

Lab Hours/Week: \*.\*

OJT Hours/Week: \*.\*

Prerequisites: None

Corequisites: None

MnTC Goals: Goal 03 - Natural Science

This course provides an introduction to astronomy with emphasis on our Solar System. Topics include the origin, structure, and history of the Solar System; the properties of light; the function and use of telescopes, understanding the processes that have shaped the planets, their moons and ring systems; comets, asteroids and other space debris. Recent discoveries and current topics from the exploration of the Solar System are also discussed. This course includes a lab-like experience. (3 hours lecture; satisfies MnTC Goal Area 3)

**B. COURSE EFFECTIVE DATES:** 05/24/2010 - Present

### C. OUTLINE OF MAJOR CONTENT AREAS

1. The topics to be covered include a description of celestial motions and their causes, seasons and eclipses, a history of classical astronomy (with emphasis on the ideas and contributions of Ptolemy, Copernicus, Kepler, Galileo and Newton), telescopes, the origin of the Solar System, the Earth as a planet, comparative planetology within the Solar System, comparison of moons within the Solar System, asteroids, comets, meteors and meteorites.

#### **D. LEARNING OUTCOMES (General)**

1. Familiarity with the motion of the stars, planets, the Moon, the Sun, etc., both over the course of a single day as well as throughout the year. Ability to connect changes in daily and annual motions of the Sun to the reason the Earth has seasons.
2. Ability to compare and contrast evidence in support of the Ptolemaic and Copernican views of the universe.
3. Ability to discuss the contributions made by Tycho Brahe, Johannes Kepler, Galileo Galilei and Isaac Newton to our understanding of how the Solar System is structured and behaves; familiarity with the following physical laws and principles, and how they are related to such phenomena as the orbits of planets and moons, the tides, etc.: Kepler's law's of planetary motion; Newton's laws of motion and law of gravity.
4. Ability to compare and contrast the kinds of electromagnetic energy; familiarity with the various types of telescopes and their properties, including the uses of telescopes and any problems/difficulties associated with using each type of telescope.
5. Ability to discuss the various types of solar and lunar eclipses and how they occur; ability to describe and discuss the phases of the Moon.
6. Familiarity with important features of the interior, crust, and atmosphere of both the Earth and the Moon, and the major processes that shape or affect the surface of each.
7. Ability to compare and contrast the various theories for the formation of the Moon.
8. Knowledge of the various differences between the terrestrial planets and the Jovian planets of our Solar System, and an understanding of the factors responsible for these differences.
9. Ability to compare and contrast the various theories for the formation of the Solar System, and discuss the pieces of evidence in support of each theory.
10. Familiarity with a variety of the physical features and properties of each of the planets; ability to compare and contrast each planet to another, discussing any similarities and/or differences.
11. Familiarity with differences in the physical features and properties of the various moons in our Solar System and understanding of what causes these differences.
12. Knowledge of how and why a planet may be surrounded by a system of rings.
13. Familiarity with the location, behavior, and properties of dwarf planets, Kuiper-belt objects, asteroids, meteors, meteorites, and comets, and ability to discuss their role as parts of the Solar System.
14. Ability to describe and discuss the evidence for giant impacts, and the role they have played in the Solar System's history.
15. (The above items are course-specific learner outcomes, which also meet MnTC Goal 3, Competency a)
16. Analyze, interpret and make predictions regarding astronomical phenomena by applying appropriate scientific theories, principles, and concepts. (MnTC Goal 3, Competencies a and b; MnTC Goal Area 2, Competencies a, b, and c)
17. Demonstrate knowledge of how astronomy principles can be used to evaluate science- related societal issues. (MnTC Goal 3, Competency d; MnTC Goal Area 2, Competencies a, b, and c)

## **E. Minnesota Transfer Curriculum Goal Area(s) and Competencies**

### Goal 03 - Natural Science

1. Demonstrate understanding of scientific theories.
2. Formulate and test hypotheses by performing laboratory, simulation, or field experiments in at least two of the natural science disciplines. One of these experimental components should develop, in greater depth, students' laboratory experience in the collection of data, its statistical and graphical analysis, and an appreciation of its sources of error and uncertainty.
3. Evaluate societal issues from a natural science perspective, ask questions about the evidence presented, and make informed judgments about science-related topics and policies.

## **F. LEARNER OUTCOMES ASSESSMENT**

As noted on course syllabus

## **G. SPECIAL INFORMATION**

None noted