

# North Hennepin Community College

## PHYS 1070: Concepts of the Stars and Universe

### 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 an emphasis on stars and galaxies. Topics include understanding the Sun as a star; revealing the messages hidden in starlight; stellar birth, maturation, and death; black holes, white dwarfs, pulsars, quasars, and supernova explosions; the Milky Way and other galaxies; the origin and the fate of the universe. Current topics and discoveries from stellar astronomy and cosmology are also discussed. This course includes a lab-like experience. (3 hours lecture; meets MnTC Goal Area 3 requirements)

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

### C. OUTLINE OF MAJOR CONTENT AREAS

1. The topics to be covered include the Sun as a star, light and electromagnetic waves, the features, origins and use of different types of astronomical spectra, the Doppler effect and its uses in astronomy, measuring the characteristics and properties of stars, classifying stars, binary star system, stellar evolution, the Milky Way Galaxy, types of galaxies and their characteristics, origin, and evolution, an introduction to cosmology and its implications for the fate of the universe.

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

1. Knowledge of the characteristics/properties/processes associated with the Sun, and how these can be related to those of other stars.
2. Knowledge of the properties and characteristics of light; ability to explain how atoms produce light; ability to describe how various types of light spectra are produced, and how these spectra are used in astronomy.
3. Knowledge of how stars can be classified on the basis of such properties as luminosity, spectral class, mass, temperature, etc. and how these properties are determined.; knowledge of the Hertzsprung-Russell diagram and how it can be used to discuss compare the various classes of stars.
4. The ability to describe and explain the events, physical processes, and stages involved in the formation, maturation, and death of stars.
5. Knowledge of the characteristics and properties of galaxies, and how these are determined.
6. Familiarity with the overall characteristics of the universe, and how the models of cosmology used to explain these features; demonstrate understanding of how the Hubble Law, Big Bang, Inflationary Theory, the cosmic microwave background, dark matter and dark energy play a role in explaining the formation and evolution of the universe.
7. (The above items are course-specific learner outcomes, which also meet MnTC Goal 3, Competency a)
8. 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)
9. 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