

# Minnesota State University Moorhead

## AST 324: Life and Death in the Universe

### A. COURSE DESCRIPTION

Credits: 3

Lecture Hours/Week: 3

Lab Hours/Week: \*.\*

OJT Hours/Week: \*.\*

Prerequisites: None

Corequisites: None

MnTC Goals: Goal 03 - Natural Science

The last century will be remembered in small part as a time when humans finally started scientifically addressing the most fundamental questions about the universe: "How did the Universe begin," "How did life on Earth begin and how might it end," and "Is there anyone out there?" Students will address these issues by reviewing our current scientific understanding of the Big Bang, the origins of life on Earth, the Evolution of Life, and the possible origins of intelligent life elsewhere. The class will be cross disciplinary with heavy emphasis on astronomy, planetary geology, biology and some history. In addition to in-lecture coursework, lab activities are used to provide students the opportunity to plan, design and execute their own investigations of these scientific concepts. MnTC Goal 3.

**B. COURSE EFFECTIVE DATES:** 10/07/2013 - Present

### C. OUTLINE OF MAJOR CONTENT AREAS

### D. LEARNING OUTCOMES (General)

1. Understand a wide variety of the questions related to understanding the evolution of life in the universe. These include understanding the origin of the elements, the chemical nature of life, the conditions of the early Earth, the geological evolution of planets, the biological evolution of life and the changes in stars as they age.
2. Understand how life might end in terms of the "death of a planet." The "Deaths" we will consider include technological death, death by stellar evolution, death by astronomical catastrophe (nearby supernova, gamma ray burst, etc.) or the death of the Universe as a whole.
3. Understand how someone can believe that the universe may be teeming with life, but be absolutely certain there is no significant evidence that extraterrestrials are visiting Earth.
4. Understand how using the "language of mathematics" it may be possible to communicate with other intelligent life forms that share few (if any) cultural or biological similarities to us.
5. Understand what exactly a scientific idea is and how one goes about evaluating a scientifically valid argument. To accomplish this, we will review basic logically fallacies one can make while presenting an argument.

## **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. Communicate their experimental findings, analyses, and interpretations both orally and in writing.
4. 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