Minnesota State University Moorhead

AST 410: Astrophysics

A. COURSE DESCRIPTION

Credits: 3

Lecture Hours/Week: 3

Lab Hours/Week: 0

OJT Hours/Week: *.*

Prerequisites: None

Corequisites: None

MnTC Goals: None

A review of the modern physical and mathematical modeling of stellar structure and evolution (including nuclear processes and nucleosynthesis), stellar remnants (such as white dwarfs, neutron stars, and black holes), and the interstellar medium and galaxies. In-depth topics will vary depending on the interests of instructor and/or participants.

B. COURSE EFFECTIVE DATES: 03/10/2021 - Present

C. OUTLINE OF MAJOR CONTENT AREAS

1. The properties of astronomical objects and how they are determined.
2. The nature of astronomical telescopes, both at optical and non-optical wavelengths.
3. The nature of light and how it is used to determine the properties, notably motion and composition, of astronomical objects.
4. Modern models for stellar interiors including the equations of stellar structure.
5. Stellar evolution theory including evidence for various aspects of stellar evolution.
6. The nature of stellar remnants such as white dwarfs, neutron stars, and black holes.
7. The nature of the interstellar medium and the role it plays in the evolution of stars.
8. The nature of galaxies and the evidence for dark matter in galaxies.

D. LEARNING OUTCOMES (General)

1. Understand how to determine the basic physical properties of stars including luminosity, radius, and mass.
2. Develop an understanding of light and its interactions with matter in order to analyze astronomical data including optical and non-optical imaging and basic spectroscopy.
3. Explain the theoretical understanding of stellar interiors, specifically in terms of the equations of stellar structure.
4. Explain stellar evolution, not only the theoretical underpinnings for the understanding of how stars evolve, but also where the evidence for various states of their evolution comes from.

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

None

F. LEARNER OUTCOMES ASSESSMENT

As noted on course syllabus

G. SPECIAL INFORMATION

None noted