

Northwest Arkansas Community College
(Science and Mathematics Division)

Discipline Code

ASTR

Course Number

2004

Course Title

Survey of the Universe

Catalog Description

A basic study of the solar system, stars, galaxies and the rest of the universe. Topics include physical science foundations, celestial motion, planets and planetary formation, stellar and galactic properties, stellar and galactic evolution and cosmology. Daytime and nighttime observing with telescopes and indoor exercises on selected topics will be included. Several night sessions are required. Three hours lecture and three hours lab weekly.

Prerequisites

Beginning Algebra (MATH 0053), or higher math or minimum placement scores for Intermediate Algebra (MATH 0103).

Credit Hours

4 credit hours

Contact hours

45 lecture contact hours; 45 lab contact hours

Load hours

5 load hours

Semesters Offered

Fall, Spring & Summer

ACTS Equivalent

PHSC 1204 Introduction to Astronomy

Grade Mode

A-F

Learning Outcomes

Students completing this course will:

- Define physics and astronomy terms essential to understanding planetary formation, stellar evolution, cosmology, space-time and gravity.

- Describe and calculate planetary motion, momentum and force including electromagnetism, gravity and solar flux.
- Interpret composition, structures, stellar and galactic features using remote sensing data equipment, images and computer simulations.
- Compare and contrast dynamics of the Earth, Sun and Moon to other astronomical bodies
- Integrate new knowledge and scientific reasoning into a framework useful to understanding problems facing the scientific community and society
- Use scientific reasoning to comprehend, evaluate and solve problems pertaining to course content.

General Education Outcomes Supported

- Students develop higher order thinking skills.
- Students can employ a variety of sources to locate, evaluate, and use information.
- Students can write clear, coherent, well-organized documents, which are substantially free of errors.

Standard Practices

Topics list

- Measuring positions of celestial objects
- Science and history of Astronomy
- Motion, energy and gravity (Newton's and Kepler's Laws)
- Light and matter
- Telescopes and optics
- Formation of the Solar System
- Earth Systems
- Planetary geology of Solar System objects
- Planetary atmospheres, Greenhouse effect and Jovian planet systems
- Other planetary objects and prospects for life in the Solar System or Universe
- Our Sun
- Properties of stars
- High- and low-mass stellar evolution
- Star birth and death
- Our galaxy
- Universe of galaxies
- Galaxy evolution
- Dark matter and dark energy
- Cosmology

Learning activities

- Courses must, at a minimum, cover the core learning outcomes for each topic. Faculty may add to these outcomes but may not omit any of them.
- Laboratory exercises should average between 2-3 hours a week and include phases of the Moon, Kepler's laws, examination of planets, moon and rings, low- and high-mass stars, along with galaxies and black holes.

Assessments

- Varied forms of assessment including, but not limited to, lab and lecture exams.
- A pretest and posttest assessment.

- A required information literacy assessment will be given with results submitted to the coordinator. Results will be used as part of the college's process to assess mastery of the general education outcomes.

Grading guidelines

- At least 50% of the class points need to be proctored either in person or using a video-monitoring system, where the student responds without referring to others or external resources.
- Lab activities/exams should comprise approximately 25% of the overall grade.

Revision Date

March 11, 2021