ASTRONOMY 386 SYLLABUS

This syllabus is intended to provide the student with a rough layout of course scope and sequence. Topics and activities may be modified to meet the needs of the class.

Unit 1: Measurements in Astronomy

Big Questions:

- How do we quantify motion on an Astronomical scale?
- How does the flow of energy affect our Universe?
- How does Physics explain the movement of objects in space?

Learning Objectives:

- Describe differences in position between objects
- Describe the energy that an object has (kinetic & potential) and what consequences the object's energy has
- Describe Force and Momentum and what affect one has on the other
- Quantify the gravitational force massive objects exert on each other
- Describe the properties of objects moving in circular motion under the influence of gravity

Unit 2: Telescopes

Big Questions:

- How do we observe our Universe?
- What type of observations can we make with the naked eye?
- How can we see things in the sky that aren't visible to the naked eye?
- What tools do professional astronomers use to explore our Universe?

Learning Objectives:

- Describe the celestial sphere and use of angular measure
- Describe the reason and purpose for using binoculars and telescopes in astronomy
- Explain the importance of aperture
- Calculate the magnification of a telescope using focal lengths
- Explain the differences between types of telescopes
- Explain the purpose and use of professional scientific telescopes

Unit 3: Star Formation

Big Questions:

- How did our star, the Sun, form?
- What are the stages of evolution for our star?
- Do other stars evolve in a similar way?

Learning Objectives:

- Explain how our Sun and planets formed
- Explain the evolution of the Sun from Protostar to Main Sequence Star
- Describe the properties and makeup of the Sun
- Describe the affect that the Sun has on the Earth
- Explain how the Sun converts mass into energy
- Explain the purpose and use of professional scientific telescopes

Unit 4: Electromagnetic Radiation

Big Questions:

- What is Light?
- How does studying light let us learn about our Universe?

Learning Objectives:

- Explain the differences among different wavelength EM radiation
- Determine the temperature of objects via blackbody radiation
- Explain the differences between emission and absorption spectral lines
- Explain the cause of Doppler shifting in spectral lines
- Calculate energy requirements for electron energy transitions in atoms

Unit 5: The Solar System

Big Questions:

- How did our solar system form?
- What is the reason for the differences among planets?
- What is the relationship between the Earth, Moon, and Sun?
- How has mankind explored our solar system?

Learning Objectives:

- Explain the formation and makeup of the solar system
- Describe why the Earth/Moon/Sun relationship is critical to life on Earth
- Explain why the planets are different, why some are rocky and others are gaseous
- Describe mankind's advances in space exploration (manned and unmanned)

Unit 6: Stellar Death

Big Questions:

- What happens to stars after their main sequence life?
- What is left behind after a star dies?

Learning Objectives:

- Compare and contrast the deaths of low, medium, and high mass stars
- Describe the mechanisms that lead to the end of a star's lifetime
- Differentiate between the different types of Supernova
- Describe the remnants left behind by the star
- Determine what will happen to our Sun at the end of its life

Unit 7: Cosmology

Big Questions:

- What is the makeup of the Milky Way Galaxy?
- How are galaxies in the Universe different from each other?
- How do we determine how far away galaxies are?
- How do we know how old the Universe is?

Learning Objectives:

- Describe the makeup of our galaxy and how we know what it is like
- Describe different classifications of galaxies and their properties
- Calculate the distances to other galaxies
- Determine the age of the Universe
- Speculate on the origins, boundaries, and end to the Universe