Course Objectives/Course Outline
Spokane Community College

Course Title: Introduction to Astronomy
Prefix and Course Number: ASTR& 101

Course Learning Outcomes:
By the end of this course, a student should be able to:

- Identify the reasons for cyclic patterns in the sky such as annual motion, daily motion and moon phrases.
- Apply Kepler's laws of planetary motion and Newton's laws of motion and gravity to the orbits of celestial objects.
- Observe how the interaction between light and matter produces spectral lines and use that observation to identify specific elements.
- Describe the solar nebula model and explain how the conservation laws of energy ande angular momentum apply to this model of solar system formation.
- Identify the factors that influence the atmospheres and surface features of terrestrial and Jovian planets.
- Describe the sun's magnetic field and observe how it drives the sunspot cycle and other magnetically produced phenomena in the solar atmosphere.
- Use the H-R diagram to differentiate between the evolutionary paths of low, medium and high mass stars.
- Identify the factors that cause the death of a star and explain how white dwarfs, neutron stars and black holes result from stellar death.
- Describe how galaxies form and the processes that produce the different types we see.
- Analyze the evidence for an expanding universe and relate that to the Big Bang theory.

Course Outline

I. Key Concepts and Historical Perspective
    A. Scale of the universe
    B. Patterns of motion in the sky
        1. Annual motion
        2. Daily motion
    C. Cycles
        1. Moon phases
        2. Seasons
    D. History of Astronomy
        1. Greek origins: geocentric cosmology
        2. Copernican Revolution: heliocentric cosmology

3. Kepler's laws of planetary motion
4. Newton's laws of motion and gravity

E. Properties of light and matter
1. Thermal radiation laws
2. Spectroscopy
3. Atomic structure
4. Doppler Effect
5. Telescopes

II. Solar System

A. Solar nebula model
1. Conservation laws
2. Condensation sequence
3. Extra-solar planets

B. Terrestrial and Jovian planets
1. Interior structure
2. Magnetic fields
3. Surface features
4. Atmospheres

C. Asteroids and comets

III. Stars

A. The Sun
1. Atmosphere layers
2. Magnetic activity cycle
3. Energy source

B. Stellar properties
1. Magnitude scale
2. Measuring distance
3. Luminosity, Temperature, Radius, Mass
4. Spectral classification
5. Binary stars
6. H-R Diagram

C. Stellar evolution
1. Star formation
2. Star clusters: open and globular
3. Age related stellar changes

D. Stellar death
1. Fates of low, medium and high mass stars
2. Novae, Supernovae
3. White dwarfs, Neutron stars, Black holes

IV. Galaxies and Cosmology
    A. Milky Way galaxy
        1. Structure
    B. Galaxies
        1. Formation
        2. Distances and distribution
    C. Dark matter
    D. Dark energy
    E. Expansion of universe
        1. Cosmological Principle
        2. Hubble’s Law
    F. Big Bang theory