

**Course Objectives/Course Outline**  
**Spokane Community College**

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**Course Title:** Survey of Astronomy  
**Prefix and Course Number:** ASTR& 100

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**Course Learning Outcomes:**

**By the end of this course, a student should be able to:**

- Describe the history of humanity’s Earth-centered view of the universe, and explain how that progressed to a sun-centered view.
- Identify the reasons for cyclic patterns in the sky such as annual motion, daily motion and moon phases.
- Describe the solar nebula model of solar system formation.
- Identify the factors that caused the terrestrial planets to be so different from the Jovian planets.
- Analyze the evidence for extra-solar atmosphere.
- Identify the process of energy generation within the sun and other stars.
- Use the H-R diagram to differentiate between the evolutionary paths of low, medium and high mass stars.
- 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. Introduction to Astronomy

A. History of Astronomy

1. Celestial sphere model
2. Greek influence on geocentrism
3. Copernicus
4. Galileo’s telescopic observations
5. Kepler’s laws of planetary motion
6. Newton’s laws of motion and gravity

B. Cycles in the sky

1. Daily motion
2. Annual motion
3. Precession
4. Planetary motion
5. Moon phases
6. Seasons

C. Properties of light and matter

1. Thermal radiation laws
2. Spectroscopy
3. Atomic structure
4. Doppler Effect

II. Solar System

A. Solar nebula model

1. Conservation of energy and angular momentum
2. Temperature dependence of condensation
3. Radioactive dating technique

B. Terrestrial planets and Earth's moon

1. Differentiation
2. Surface features
3. Atmospheres
4. Spacecraft missions

C. Jovian planets and moons

1. Internal structure
2. Magnetic fields
3. Weather patterns
4. Spacecraft missions

D. Asteroids and comets

E. Extra-solar planets

1. Methods of detection
2. Survey of results

III. Stars

A. The Sun

1. Atmosphere layers
2. Magnetic activity cycle
3. Energy source

B. Stellar properties

1. Magnitude scale
2. Stellar parallax
3. Luminosity, Temperature, Radius, Mass
4. Spectral classification
5. H-R Diagram

C. Binary stars

1. Visual
2. Spectroscopic
3. Eclipsing

D. Stellar evolution

1. Star formation
  2. Nebulae and open clusters
  3. Main sequence stage
- E. 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. Disk
  2. Halo
  3. Globular clusters
  4. Black hole in nucleus
- B. Galaxies
1. Formation and evolution
  2. Determining distances
  3. Large scale distribution
- C. Dark matter and dark energy
- D. Expansion of universe
1. Cosmological Principle
  2. Hubble's Law
- E. Big Bang theory
1. Predictions
  2. Observational evidence