ASTR G100: INTRODUCTION TO ASTRONOMY

Item	Value
Curriculum Committee Approval Date	12/04/2018
Top Code	191100 - Astronomy
Units	3 Total Units
Hours	54 Total Hours (Lecture Hours 54)
Total Outside of Class Hours	0
Course Credit Status	Credit: Degree Applicable (D)
Material Fee	Yes
Basic Skills	Not Basic Skills (N)
Repeatable	No
Grading Policy	Standard Letter (S)
Local General Education (GE)	• GWC Physical Universe*** (GB1)
California General Education Transfer Curriculum (Cal-GETC)	• Cal-GETC 5A Physical Science (5A)
Intersegmental General Education Transfer Curriculum (IGETC)	• IGETC 5A Physical Science (5A)
California State University General Education Breadth (CSU GE-Breadth)	• CSU B1 Physical Science (B1)

Course Description

This course provides an introduction to the models and nomenclature of modern astronomy, which includes the solar system, the Milky Way, and the universe. The historical development of the science of astronomy is emphasized. A survey of the methods of astronomical observation is also presented. Transfer Credit: CSU; UC.

Course Level Student Learning Outcome(s)

1. Course Outcomes
2. demonstrate an understanding of the historical aspects involved in the development of astronomy.
3. recognize the proper application of scientific method.
4. distinguish the various instruments used in modern astronomy, and explain how data is collected and analyzed.
5. classify (or categorize?) the various aspects of planetary, stellar and galactic properties into their respective operational framework.
6. explain the various evolutionary models concerning stars, galaxies and the universe.

Course Objectives

- 1. Indicate the scale of the universe, its size and age, and where we fit in.
- 2. Explain how basic sky phenomena, including seasons and the phases of the Moon, are tied to the broader cosmos.
- 3. Describe the features of a science and how it differs from a nonscience.
- 4. Provide a basic explanation of the laws of motion, the crucial conservation laws of angular momentum and energy, and the universal law of gravitation.
- 5. Give a basic explanation of the properties of light and matter, spectra, and telescopes.
- 6. Explain the features of our solar system and how it formed.
- 7. Detail the defining and distinguishing characteristics of the terrestrial planets, jovian planets, and the small bodies of our solar system.
- 8. Explain the techniques used to detect planets around other stars, the properties of extrasolar planets, and how other planetary systems were formed.
- 9. Describe the composition of the Sun and the process by which it generates light.
- 10. List the important properties of stars, how these properties are measured, and how stars are classified according to their properties.
- 11. Explain the life-cycles of both low- and high-mass stars.
- 12. Detail the end-points in the life-cycles of stars (white dwarfs, neutron stars, and black holes) and their properties.
- 13. Describe the evolution and properties of the Milky Way.
- 14. Explain the properties and evolution of galaxies other than the Milky Way.
- 15. Give an overview of the Big Bang theory and the evidence supporting it.
- 16. Describe the natures of dark matter and dark energy, the role of dark matter in galaxy formation, and the implications of dark energy for the fate of the universe.

Lecture Content

Historical Introduction Scientific Method Ancient and Greek Astronomy Classical Period to Issac Newton The Solar System Earth and Moon Planets Asteroids and Comets Evolution of Solar System The Sun Data Collection in Astronomy Light and Matter Telescopes Stars Properties Distance Measurements Binaries Variables Final Stellar States Evolution The Interstellar States Galaxies The Milky Way The Big Bang Relativistic Models Alternative Models The Early Universe

Method(s) of Instruction

- Lecture (02)
- DE Live Online Lecture (02S)
- DE Online Lecture (02X)

Reading Assignments

Textbook and syllabus.

Writing Assignments

Provide a written interpretation of astronomical data. Explain, in writing, the specific discoveries of the scientists important to the development of astronomy.

Out-of-class Assignments

Problem sets, online homework, and written reports.

Demonstration of Critical Thinking

Synthesis of astronomy information into a coherent framework for further analysis and thought. Application of astronomical models to unusual or novel situations.

Required Writing, Problem Solving, Skills Demonstration

Demonstarte an ability to correlate and interpret astronomical data. Recognize the names of the scientists important to the development of astronomy and explain, in writing, the specifics of their discoveries.

Eligible Disciplines

Astronomy: See physics/astronomy Masters degree required. Physics/Astronomy: Masters degree in physics, astronomy, or astrophysics OR bachelors degree in physics or astronomy AND masters degree in engineering, mathematics, meteorology, or geophysics OR the equivalent. Masters degree required.

Textbooks Resources

1. Required Bennet, J., Donahue, M., Schneider, N., Voit, M.. The Essential Cosmic Perspective, 8 ed. Pearson, 2017 2. Required Prather, E., Slater, T., Adams, J., Brissenden, G.. Lecture-Tutorials for Introductory Astronomy, 3 ed. Pearson, 2013 Rationale: This text contains collaborative learning, inquiry-based activities useful for an introductory astronomy course. Based on education research, these activities lead to deeper, more complete student understanding through a series of structured questions that prompt students to use reasoning to identify and correct their misconceptions.