

CUYAMACA COLLEGE OFFICIAL COURSE OUTLINE

ASTRONOMY 110 – DESCRIPTIVE ASTRONOMY

3 hours lecture, 3 units

Catalog Description

Covers the development of modern astronomy and its techniques. Emphasis on the vocabulary of astronomy and the current understanding of our solar system, stellar evolution, our galaxy, and the structure of the universe.

Prerequisite

None

Course Objectives

Students will be able to:

- 1) Recognize and comprehend the following terms: planet, moon, comet, meteoroid, constellation, Celestial Sphere, precession, seasons, astronomical unit, parsec, light-year
- 2) Compare and contrast synodic and sidereal time
- 3) Describe and explain the phases of the moon and how the Earth, Moon and Sun are positioned
- 4) Describe the structure of the Solar System
- 5) Analyze and evaluate the relationship between photons, atomic structure and spectral lines
- 6) Use the Hertzsprung-Russell diagram to explain the evolution of a star
- 7) Analyze and explain how stars evolve
- 8) Compare and contrast absolute and apparent magnitude
- 9) Analyze and evaluate parallax and distance indicators
- 10) Investigate and delineate the structure of the Universe as observed
- 11) Identify and evaluate the structure of the Universe as predicted by the Big Bang Theory
- 12) Explore and evaluate a topic in astronomy by using the Internet and/or library

Special Materials Required of Student

None

Minimum Instructional Facilities

Lecture room with writing board, VCR/monitor, projection screen, demonstration equipment

Course Content

- 1) Celestial Sphere, motion of the Sun and planets
- 2) Phases of the Moon, lunar and solar eclipses
- 3) Origin of modern astronomy
- 4) Telescopes
- 5) How atoms generate spectra
- 6) The Sun
- 7) Determining the physical properties of stars
- 8) Binary star systems
- 9) Interstellar medium
- 10) Formation of stars
- 11) Stellar evolution
- 12) Stellar deaths
- 13) Neutron stars and black holes
- 14) The Milky Way Galaxy
- 15) Measuring the properties of galaxies
- 16) Peculiar galaxies
- 17) Cosmology (Big Bang Theory)
- 18) Origin of the Solar System
- 19) The geology of Earth

- 20) The Moon and Mercury
- 21) Venus and Mars
- 22) Jupiter and Saturn
- 23) Uranus, Neptune and Pluto
- 24) Meteoroids, asteroids and comets
- 25) Life in the Universe (optional)

Method of Instruction

- 1) Integrated lecture, demonstration and discussion
- 2) Small, large group discussion
- 3) In-class activities and independent homework, research projects
- 4) Instructional slides, video presentations
- 5) Auxiliary use of study groups, peer tutoring and/or instructional office hours

Method of Evaluation

A grading system will be established by the instructor and implemented uniformly. Grades will be based on demonstrated proficiency in subject matter determined by multiple measurements for evaluation, one of which must be essay exams, skills demonstration or, where appropriate, mathematical problem solving.

- 1) Participation
- 2) Homework
- 3) Research paper
- 4) Quizzes, exams, final exam

Texts and References

- 1) Required (example): Seeds. Foundations of Astronomy. 4th edition, 1998.
- 2) Supplemental: At discretion of instructor

Exit Skills

Students having successfully completed this course exit with the following skills, competencies and/or knowledge:

- 1) Define and use the following terms: planet, moon, comet, meteoroid, constellation, Celestial Sphere, precession, seasons, astronomical unit, parsec, light-year
- 2) Use the inverse square law as it applies to light and gravity to calculate distance, mass and intensity
- 3) Use synodic and sidereal time
- 4) Identify the phases of the moon and to use the to predict them time of sunrise and sunset
- 5) Compare and contrast solar and lunar eclipses
- 6) Diagram the structure of the sun
- 7) Describe how the sun generates energy
- 8) Diagram the structure of the solar system
- 9) Analyze how astronomers obtain information about stars, what information can be obtained and how the information is used
- 10) Explain the relationship between photons, atomic structure and spectral lines
- 11) Discuss stellar distances by using absolute and apparent magnitude and parallax
- 12) Construct a Hertzsprung-Russell diagram and to use it to analyze the evolution of stars
- 13) Compare and contrast stellar evolution models for different mass stars
- 14) Discuss galactic distances by using various distance indicators
- 15) Diagram the structure of galaxies
- 16) Compare and contrast the classification of galaxies
- 17) Evaluate models of the structure and evolution of the Universe