COURSE SYLLABUS

Tunxis Community College

Education That Works For a Lifetime

Course Title:	Introduction to Astronomy	**Date submitted:**	November 2017 (17-61)
Department:	Mathematics and Science		
Curriculum:	Science		

Course Descriptors: Make certain that the course descriptors are consistent with college and Board of Trustees policies, and the current course numbering system.

Course Code: (eg. ACC 101)	AST*111
Course Type:	X

A: Clinical B: Lab D: Distance Learning I: Individual/Independent L: Lecture N: M: Seminar Internship P: Practicum U: Studio X: Combined Lecture/Lab Y: Combined Lecture/ Clinical/Lab Z: Combined Lecture/Studio

Elective Type:	G/LAS/S

E: English FA: Fine Arts FL: Foreign Language G: General HI: History HU: Humanities LAS: Liberal Arts & Sciences M: Math S: Science SS: Social Science

Credit Hours:	4
Developmental: (yes/no)	No
Contact Hours: Lecture:	3
Clinical:	0
Lab:	2
Studio	0
Other:	0
TOTAL:	5
Class Maximum:	20
Semesters Offered:	F/Sp

Prerequisites:

C- or better in Pre-Algebra and Elementary Algebra (MAT*085), Introductory Algebra (MAT*094), or Elementary Algebra Foundations (MAT*095), or placement into any credit-level mathematics course.

Corequisites:

None

Other Requirements:

Scientific calculator, graphing tools, protractor, compass, technology skills

Catalog Course Description:

Descriptive overview of the origin and evolution of the universe; historical evolution of our earth and moon and other planets and satellites in our solar system. Understanding our sun and basic concepts of nuclear processes fueling the sun and other stars in the Milky Way as well as distant galaxies; and study of cosmology. Descriptive and historical principles are emphasized. Lecture and laboratory.

Topical Outline: List course content in outline format.

Lecture:

1. Introduction
   a. the nighttime sky and an overview of the solar system
   b. the distance scale of the universe
2. Kepler's and Newton's Laws
   a. astronomical perspective from the Greeks through the laws of planetary motion developed by Kepler and Newton
3. Light and Telescopes
   a. nature of light, atoms, and the electromagnetic spectrum
   b. wave and particle nature of light
   c. types and uses of telescopes
4. Earth and Moon
   a. earth as a planet

	b. exploration of the moon and lunar geography 5. Inner Planets a. properties and structure of the planets, Mercury, Venus, and Mars 6. Outer Planets a. perspective of Jupiter, Saturn, and the three other outer planets b. comets, meteoroids, and asteroids c. Halley's comet 7. Sun a. sunspots, corona, and physical structure of the sun b. solar nuclear fusion c. theories of the origin of the solar system 8. Stars a. positions, magnitudes, and classification of stars b. stellar spectra c. h-r diagram 9. Structure and Evolution of Stars a. energy of the stars b. stellar ages 10. Life Cycles of Stars a. evolution of stars from dust clouds to main sequence stars, red giants, dwarfs, and the black hole 11. The Milky Way a. structure and organization of the galaxy 12. Formation and Evolution of the Galaxy a. stellar populations in the galaxy b. cosmic distance scale c. nebulae 13. Cosmic Perspective a. distribution of galaxies, redshifts, and quasars b. universal expansion of the universe 14. Cosmology a. introduction to relativity: the structure of the universe and theories of the past and future of the universe Laboratory: 1. Astronomical coordinates 2. Optics and telescopes 3. Electromagnetic radiation 4. Moon and eclipses 5. Planets and curtate orbits 6. Orbital rotation of Saturn 7. Sun and sunspots 8. Stellar distances 9. Stellar motions 10. Stellar spectra 11. Binary stars 12. Variable stars 13. Hertzsprung-Russell diagram 14. Galaxies and the Hubble constant 15. Star party All laboratory sessions will include observations as weather and viewing conditions permit.
Outcomes:	**Upon successful completion of this course, the student will be able to do the following:** 1. diagram the relative position between the earth, moon, and sun in the explanation of eclipses and the yearly seasons

Describe measurable skills or knowledge that students should be able to demonstrate as evidence that they have mastered the course content.	2. explain the development of astronomical ideas from the Babylonians to the space age 3. describe the organization of the solar system including the planets, comets, and asteroids 4. identify major constellations on the celestial sphere 5. explain light as a particle and a wave effect 6. compare atomic energy levels to astronomical and laboratory spectra 7. recognize Kepler's laws of planetary motion and Newton's laws of motion 8. describe the overall features of the sun as a typical star 9. demonstrate an understanding of stars as nuclear furnaces and classify stars on the Main Sequence 10. describe theories of the formation of the solar system, stars and galaxies 11. explain the relationship between parallax and parsec as a cosmic yardstick 12. recognize the significance of relativity in explaining the origin, structure, and future of the universe
	PROGRAM: *(Numbering reflects Program Outcomes as they appear in the college catalog)* N/A
	COMPETENCY FULFILLED: Scientific Knowledge & Understanding (SCKX) OR Scientific Reasoning (SCRX)
Evaluation: List how the above outcomes will be assessed.	**Assessment will be based on the following criteria:** written quizzes oral observational quizzes examinations brief papers laboratory reports
Instructional Resources: List library (e.g. books, journals, on-line resources), technological (e.g. Smartboard, software), and other resources (e.g. equipment, supplies, facilities) required and desired to teach this course.	**Required:** Compass, protractor, simple drafting supplies, scientific calculator, telescope **Desired:** Compass, protractor, simple drafting supplies, scientific calculator, telescope
Textbook(s)	Freedman, *Universe*, 6th ed.; Freeman Hoff and Wilkerson, *Contemporary Activities in Astronomy*, 3rd ed. Kendall/Hunt 2007