

**ASTRON 2 Course Outline as of Fall 2004****CATALOG INFORMATION**

Dept and Nbr: ASTRON 2 Title: STELLAR ASTRON &amp;LAB

Full Title: Stellar Astronomy with Laboratory

Last Reviewed: 6/28/2004

Units	Course Hours per Week		Nbr of Weeks		Course Hours Total	
Maximum	4.00	Lecture Scheduled	3.00	17.5	Lecture Scheduled	52.50
Minimum	4.00	Lab Scheduled	3.00	17.5	Lab Scheduled	52.50
		Contact DHR	0		Contact DHR	0
		Contact Total	6.00		Contact Total	105.00
		Non-contact DHR	0		Non-contact DHR	0

Total Out of Class Hours: 105.00

Total Student Learning Hours: 210.00

Title 5 Category: AA Degree Applicable

Grading: Grade or P/NP

Repeatability: 00 - Two Repeats if Grade was D, F, NC, or NP

Also Listed As:

Formerly:

**Catalog Description:**

Not open to students who have completed Astronomy 3. The techniques used to gather basic astronomical data. The observed properties of stars, stellar evolution, the interstellar medium, star clusters and galaxies. Laboratory includes astronomical spectroscopy, photometry, observations of binaries and variables, galaxy classification and stellar triangulation.

**Prerequisites/Corequisites:****Recommended Preparation:**

Eligibility for ENGL 100A or ENGL 100.

**Limits on Enrollment:****Schedule of Classes Information:**

Description: Techniques used to gather basic astronomical data. Lecture incl: the observed properties of stars & planets, stellar evolution, the interstellar medium, star clusters & galaxies. Lab incl: astronomical spectroscopy & photometry, observations of binaries & variables, galaxy classification & stellar triangulation. (Grade or P/NP)

Prerequisites/Corequisites:

Recommended: Eligibility for ENGL 100A or ENGL 100.

Limits on Enrollment:

Transfer Credit:

Repeatability: Two Repeats if Grade was D, F, NC, or NP

## **ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:**

<b>AS Degree:</b>	<b>Area</b>		<b>Effective:</b>	<b>Inactive:</b>
	C	Natural Sciences	Fall 1981	Fall 2004
<b>CSU GE:</b>	<b>Transfer Area</b>		<b>Effective:</b>	<b>Inactive:</b>
	B1	Physical Science	Fall 1981	Fall 2004
	B3	Laboratory Activity		
<b>IGETC:</b>	<b>Transfer Area</b>		<b>Effective:</b>	<b>Inactive:</b>
	5A	Physical Sciences	Fall 1981	Fall 2004
	5C	Fulfills Lab Requirement		
<b>CSU Transfer:</b>			<b>Effective:</b>	<b>Inactive:</b>
<b>UC Transfer:</b>			<b>Effective:</b>	<b>Inactive:</b>

**CID:**

**Certificate/Major Applicable:**

Not Certificate/Major Applicable

## **COURSE CONTENT**

### **Outcomes and Objectives:**

Provides the student with the theoretical, descriptive, methodological, and experimental framework required to successfully understand stellar astronomy and related physical concepts.

Students participating in this course will have the opportunity to learn and experience the natural processes that govern and shape our universe. They will be able to comprehend and demonstrate some knowledge of astronomy through lecture discussion, laboratory reports, written assignments and examination.

### **Topics and Scope:**

The course will include the following topics, visual aids and experimental laboratory exercises.

- I. Introduction
  - a. Film; UNIVERSE
  - b. Introductory chapter; "The Realm of Astronomy"
  - c. Cosmos I: THE SHORES OF THE COSMIC OCEAN
- II. Electromagnetic Radiation
  - a. The Electromagnetic Spectrum
  - b. The nature of Electromagnetic Radiation
  - c. Introduction to Star Charts
  - d. The Inverse Square Law
  - e. Geometric Optics

- f. Spectroscopy
- g. The Doppler Effect
- h. Film: THE DOPPLER EFFECT
- i. Cosmos VIII: TRAVELS IN SPACE AND TIME
- j. Radiation Laws
- III. Stellar Distances
  - a. Triangulation
  - b. Cosmos VII: THE BACKBONE OF NIGHT
- IV. Stellar Motions
  - a. Radial Velocity
  - b. Proper Motion
  - c. Film: THE MOTIONS OF STARS
- V. Measuring Starlight
  - a. The Magnitude Scale
  - b. Absolute Magnitude
  - c. Distance Modulus
  - d. Color Index
- VI. Stellar Spectra
  - a. The Spectral Sequence
  - b. Stellar Rotation
- VII. Binary Stars
  - a. Visual Binaries
  - b. Spectroscopic Binaries
  - c. Film: STAR SYSTEM XI URSAE MAJORIS
  - d. Eclipsing Binaries
  - e. Film: ALGOL: THE DEMON STAR
  - f. Astrometric Binaries
  - g. Film: SIRIUS AND THE WHITE DWARF
- VIII. Variable Stars
  - a. Cepheid Variables
  - b. W Virginis Stars
  - c. RR Lyrae Stars
- IX. The Hertzsprung-Russell Diagram
  - a. The H-R Diagram
  - b. Spectroscopic Parallax
- X. Stellar Structure and Evolution
  - a. Stellar Evolution
  - b. Lifetimes of Stars
  - c. Cosmos: IX: THE LIVES OF STARS
- XI. The Interstellar Medium
- XII. Star Clusters
  - a. Open Clusters
  - b. Globular Clusters
  - c. Main Sequence Fits
- XIII. The Galaxy
  - a. The Milky Way (Star Gauging)
  - b. The Galactic Center
- XIV. Other Galaxies
  - a. Classification of Galaxies
  - b. The Hubble Law
- XV. Cosmology
  - a. Cosmos: THE EDGE OF FOREVER

- b. The Hubble Law
- c. Film: A WHISPER FROM SPACE
- d. The Curvature of Space
- e. Cosmos XIII: WHO SPEAKS FOR EARTH?

**Assignment:**

Evaluation of student performance will be determined through examination and at least one of the following written assignments; Comprehensive research paper, analytic essay, book review, comprehensive laboratory reports, observational assignments, or extra credit reports. Each student will be required to master textbook and research material independently outside the class.

**Methods of Evaluation/Basis of Grade:**

**Writing:** Assessment tools that demonstrate writing skills and/or require students to select, organize and explain ideas in writing.

Written homework, Reading reports, Lab reports	Writing 10 - 25%
<b>Problem Solving:</b> Assessment tools, other than exams, that demonstrate competence in computational or non-computational problem solving skills.	
Lab reports, Quizzes, Exams	Problem solving 10 - 25%
<b>Skill Demonstrations:</b> All skill-based and physical demonstrations used for assessment purposes including skill performance exams.	
Class performances, Performance exams	Skill Demonstrations 0 - 15%
<b>Exams:</b> All forms of formal testing, other than skill performance exams.	
Multiple choice, True/false, Matching items	Exams 50 - 75%
<b>Other:</b> Includes any assessment tools that do not logically fit into the above categories.	
None	Other Category 0 - 0%

**Representative Textbooks and Materials:**

- "Universe", Wm. Kaufmann
- "Exploration of the Universe", G. Abell
- "The Dynamic Universe", T. Snow
- "Astronomy", M. Zeilik