

ASTRONOMY 25

STARS AND GALAXIES

FALL 2009

or

From Big Bang to Big Ego

COURSE INFORMATION SHEET

Instructor: S. Vincent Lloyd

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Office hours: Monday 2:00-3:00 pm,
Tuesday 2:00-2:30 pm
Wednesday 2:00-3:00 pm,
Thursday 2:00-3:00 pm,
Friday 2:00-3:30 pm.

Office location: Physics 117A, due north of the Humanities Building.

Tutor: Library 2nd floor, hours to be announced.

Dates: Tuesdays & Thursdays, Sept. 1 – Dec. 17.

Holidays: Thursday Nov. 26 (Thanksgiving Day).

Course Description

Greetings, Earthlings! You are about to embark on a journey into the depths of space and towards the beginning of time! Astronomy 25 is an introductory-level course which tells the story of the Universe from the Big Bang to the rise of life on Earth. The course has no astronomy, physics, or math prerequisites; however, knowledge of basic high school algebra is sometimes helpful.

Credit for the 3 units of Astronomy 25 is fully transferable to the California State University system. Credit is fully transferable to the U.C. system unless you also take Astronomy 20 (see a counselor if you have taken Astro 20 and are planning to transfer to a U.C.).

Course Objectives

The objective of Astronomy 25 is to give you an insight into the Earth's place in the cosmos. At the end of the course, you will be expected to be able to:

1. Judge whether a particular study is a science or a "pseudo-science" using the Scientific Method.
2. Explain the causes of seasonal variations in the length of the day, the direction of sunrise and sunset, and the amount of solar heating.
3. Diagram and explain the structure of the Sun. Explain the causes of surface features on the Sun.
4. Contrast the life history of a low-mass star with the life history of a high-mass star.
5. Describe the properties of space and time around a black hole.
6. Describe the structure and contents of the Milky Way Galaxy.
7. Compare and contrast the different kinds of galaxies.
8. Diagram the process of nuclear fusion, the energy source of stars.
9. Discuss the evidence for Dark Matter and Dark Energy.
10. Evaluate the significance of the major evidence in favor of the Big Bang theory.

Student Learning Objectives

By the end of the course, the student will be able to:

1. Determine whether a certain method is scientific or pseudo-scientific.
2. Estimate the temperature of a star by examining its spectrum.
3. Draw the path of a star across the sky, given its position and the observer's latitude.
4. Given a choice of stars, pick the star that is most likely to have a planet with life on it.
5. Describe 1) what an astronaut falling into a black hole would see and 2) what a distant observer would see looking at a spaceship falling into a black hole.

Required textbooks

Cosmic Perspective by Bennett et al.

Lecture Tutorials for Introductory Astronomy by Adams, Prather, and Slater.

Lloyd's Astronomy Reader by S. V. Lloyd

Additional materials: 5 Scantron No. 888 forms.

Library

Cosmic Perspective is on reserve in the library. For library hours, see www.elcamino.edu/library/

Attendance and Withdrawal

Attendance is encouraged but not mandatory. Keep in mind that coming to class *by itself* will *not* earn you a passing grade, while *not* coming to class makes it exceedingly difficult to pass the course. If you do miss a class, it is up to you to ask other students what you missed.

You *may* be dropped from the class if you miss 3 classes in a row without notifying the instructor, but you will not be automatically dropped. If you decide *not* to complete the course, it is *your* responsibility to drop the course on-line or at the admissions office (if it is before the last day to drop). Otherwise, you may end up with an "F" for this course on your transcript.

Important dates

Last day to drop and get a refund:

Friday, Sept. 11

Last day to drop without a "W"

Friday, Sept. 25

Last day to drop *with* a "W"

Friday, Nov. 20

A "W" (withdrawal) means that you attempted the course but did not complete it. If you stop attending after the "W" date you will receive an "F" for the course.

Grading

You will be graded on the following:

Oral Report. With a partner, you will make a 2-minute report to the class about a small member of the Universe: a star, star cluster, nebula, or galaxy. This is a 2-person report; you must have a partner. First you will prepare an outline and bring it to the instructor during office hour. Then your talk will be put on the schedule. Your outline will include:

I. **Introduction.** Explain why your object is interesting.

II **Body.** Here's where you tell where it is, how big it is, etc.

III **Conclusion.** Explain why your object is important. What does this object tell us about the Solar System?

The use of notes is not allowed during the talk. 50 points (10% of your course grade).

Projects. There will be two homework projects involving observation of the Sun and the Moon. Details will be discussed later. Each project is worth 50 points.

Homework. There will be 5 short homework assignments, 10 points each.

Tests. There will be 5 tests worth 75 points each (15% of your course grade). The tests will be on the following days: **Thu. Sept. 17, Thu. Oct. 8, Thu. Oct. 29, Tue. Nov. 24**, and **Thu. Dec. 17**. Bring a Scantron No. **888** for each test. During the test, you are allowed to use notes written on **one** 3x5 file card, written in your own hand.

The lowest test score will be dropped, so there is no penalty for missing one test.

If an emergency causes you to miss a second test, you may, at the instructor's discretion, be allowed to take an oral make-up exam. No make-up exams will be given the last week of the semester.

You will be given study guides that will detail what material you are responsible for on the tests. If you can answer all the questions on the study guide, you should do well on the test.

If you have a disability that affects your ability to take tests, contact the Special Resource Center well ahead of the test date to discuss special test-taking arrangements.

Extra credit and bonus credit.

Observatory Evening. You can get 25 points extra credit by coming to an Observatory Evening at the **ECC Observatory**. If you cannot attend one of the ECC events, you may instead go to one of the following science museums: the California Science Center (Exposition Park), Natural History Museum (Exposition Park), Santa Monica College (Friday evening only), or Tesson Planetarium (Santa Ana College). *Limit:* one visit for 25 points.

Griffith Observatory: You may visit the Griffith Observatory for an additional 25 points. Website: www.griffithobs.org. Closed Mondays. *Limit:* one visit for 25 points.

Rules for both Observatory Evening and Griffith Observatory:

- 1) Make your visit on or before **November 30**.
- 2) Write a 1-page report and explain 10 things you learned. Tell what you learned, not what you learned *about*. Example: *I learned that Venus looks like a crescent moon in the telescope.*
- 3) Attach proof of attendance **with a date on it**. (For Griffith Observatory, ask for a proof of attendance from the staff or attach a planetarium ticket. Or buy something.)
- 4) Turn your report in within **10 days** of your visit. No exceptions.

Grading Scale

<u>Grade points</u>		<u>Grading scale</u>		
Homework	50	90% and up:	A	450+
Oral report	50	75% - 89%:	B	375+
2 Projects	100	60% - 74%:	C	300+
4 of 5 tests	300	50% - 59%:	D	250+
Total	500	49% and down:	F	<250

Grading Policy

See www.elcamino.edu/admissions/grading.asp

Class Policies

Food and drink. Do not bring drinks other than water into the Planetarium.

Manners. Treat other students and the instructor with respect and courtesy. Do not talk while another student or the instructor is speaking.

Time deadlines. Assignments are considered late if they are given to the instructor after the day they are due. An assignment has to be handed to the instructor during class or office hour or slipped under his office door. Do not drop off assignments in the division office. Emailed assignments are not accepted. Late assignments may or may not be given partial credit at the instructor's discretion.

Incompletes in the course. An "incomplete" grade will not be given unless the student is prevented from finishing the course on time because of an extraordinary, unexpected circumstance. Students receiving an incomplete must be doing passing work up to that point. If such an occurrence happens, it is the student's responsibility to contact the instructor immediately to explain the situation and make arrangements to complete the course.

Students with disabilities. El Camino College has a tradition of providing access to education for students with disabilities. For further information, see the El Camino Catalog, Special Resource Center. Students with disabilities should inform the instructor especially if there are medical problems or learning disabilities. Accommodations may be provided as recommended by the Special Resource Center. See www.elcamino.edu/academics/src/

Academic integrity

The follow acts are considered dishonest and are not allowed:

On *homework assignments*, copying someone else's work, fabricating data, or reporting that you saw something that you didn't see. Copying someone else's homework is against the rules in the United States. So is letting someone else copy your work.

On *tests*, copying from another student's answer sheet or using notes other than those allowed by the instructor. Letting someone else copy your answers is also unethical.

Students who do any of these actions are subject to disciplinary action.

See El Camino College Catalog, Standards of Student Conduct.

Calendar of events on campus

See www.elcamino.edu/uportal/calendar/select_cal.aspx

<u>Grade record</u>	Points	Possible	Cumulative Points	Cumulative Possible
Test 1	_____	75	_____	75
Test 2	_____	75	_____	150
Project 1	_____	50	_____	200
Test 3	_____	75	_____	275
Test 4	_____	75	_____	350
Project 2	_____	50	_____	400
Test 5	_____	75	_____	475
<i>Subtract</i> lowest test	_____	75	_____	400
Homework	_____	50	_____	450
Oral Report	_____	50	_____	500
Extra credit	_____	50	_____	500

Topic Outline

#	Date	Topic
1	9/1	Orientation
2	9/3	Bad Astronomy
3	9/8	The Universe in space and time
4	9/10	The Celestial Sphere
5	9/15	Daily Motion of the Sky
6	9/17	Test 1
7	9/22	Great Discoveries 1 and 2
8	9/24	Great Discoveries 3 and 4
9	9/29	Great Discovery 5
10	10/1	The Big Bang Theory
11	10/6	The First Million Years
12	10/8	Test 2
13	10/13	The Scientific Method
14	10/15	The Annual Motion of the Sun; the Zodiac
15	10/20	Galaxies
16	10/22	Active galaxies; dark matter
17	10/27	The Milky Way
18	10/29	Test 3
19	11/3	The Seasons
20	11/5	The Speed of Light
21	11/10	Interstellar travel
22	11/12	Stars: distance & brightness
23	11/17	Stars: emission of light
24	11/19	Kinds of stars
25	11/24	Test 4
26	11/26	Thanksgiving Holiday–no class
27	12/1	Life histories of stars
28	12/3	The Sun
29	12/8	The lives and deaths of high-mass stars
30	12/10	Black holes
31	12/15	Cosmology: the fate of the Universe
32	12/17	Test 5