AST 103L

Observational Astronomy

Spring 2016

Unique Number: 46865

Classroom: RLM 13.132

Class Time: 7PM - 9PM Wednesday

Instructor: Alan Sluder

Office: RLM 16.327 471-6858

Office Hours: 1-2PM Tuesday

Email: alsluder@astro.as.utexas.edu

Purpose

The point of this course is to understand the observations that astronomers make and how they are explained by theory.

Prerequisites

You should understand some basic astronomy and mathematics (algebra and how to use a scientific calculator).

Materials

You need a scientific calculator, or something that functions as one.

Grading

There will be one assignment for each week (N assignments total) and 100% of your grade is from these. All assignments are worth 100 points, and your final numerical grade is:

$$\text{final grade in percent} = \frac{P}{(N-1)100} \times 100\%$$

where P is your total number of points. The assignments will be done in class. The final letter grade is determined from:

Grading Scale	
Grade	Final Score
A	85-100%
B	70-84%
C	55-69%
D	40-54%
F	0-40%

Course Website

We will use Canvas as the course website. The syllabus and all worksheets will be posted there.

Academic Honesty

You are expected to fill out your worksheet yourself.

Attendance

Please notify me in advance if you are going to miss a lab.

Students with Disabilities

If you need academic accomodations, please contact 471-6259 (voice) or 232-2937 (video) as soon as possible. I will need an official letter outlining authorized accomodations.

Learning Objectives

By the end of the semester you should understand the following:

1. How astronomers use parallax to measure distances to nearby stars

2. The relation between distance, size, and how big something looks

3. The relation between distance, how bright something looks, and how bright something intrinsically is

4. How to determine the speed of an object by how it moves on the sky

5. The basic properties of light (wavelength, energy, mass, speed, polarization, intensity)

6. How to determine the chemical composition of a star/galaxy from its spectrum

7. How to determine the speed of a star/galaxy from its spectrum

8. How to calculate the age of the universe from measurements of the speed and distance of galaxies

9. What the apparent and absolute magnitude of an object means and how to derive these quantities from fundamental properties like temperature, radius, and distance

10. How to calculate time dilation, length contraction, and relative velocity in special relativity

11. How to calculate gravitational time dilation, gravitational redshift, and the Schwarzschild radius, Hawking temperature, luminosity, and lifetime of a black hole in general relativity

12. The basic properties of a planet's orbit around a star such as eccentricity, semimajor axis, period, distance and speed at periapsis, and distance and speed at apoapsis

13. How extrasolar planets are detected and their properties determined

14. How the temperature of a planet is determined by the temperature, radius, and distance to the star it orbits and the chemical composition of its atmosphere