

Astronomy 101 Laboratory

Fall 2009 - Schedule

(including pre-lab reading assignments)

Aug 26	Lab 01	Constellations and Observatory Tour (Telescopic Observing Lab (13) assigned) To teach students about constellations and sky motions (using the Planetarium) and to familiarize students with the Observatory. (Astro 101 Textbook chapter 2.1, A-31-34)
Sep 02	Lab 02	Early Astronomical Measurements (Moon Observing Lab (12) assigned) Students need to learn how early astronomers made measurements. Important aspects of making scientific measurements are covered. Contains information vital to understanding Kepler's laws. Ideas about parallax are included. (Astro 101 Textbook, pp 29-30, 50-51)
Sep 09		SPECIAL LECTURE -- No lab -- REMEMBER TO WORK ON THE TAKE-HOME LABS!
Sep 16	Lab 03	Kepler's Laws and the Orbits of Planets With a basic background in measurement, students are ready to explore an empirical model of planetary orbits. Computer simulations allow the physical model of gravity and Kepler's empirical model to be used together. (Astro 101 Textbook, pp 66-69)
Sep 23	Lab 04	Building an Astronomical Telescope Building a telescope shows how lenses are used to construct a telescope, and investigates the properties of the images formed. (Astro 101 Textbook, pp 128-129)
Sep 23	Lab 01	Constellation Observing Quiz (Lab 01) to be completed by this date
Sep 30	Lab 05	Mapping Planetary Surfaces. In this activity we use modern spacecraft-based images of planetary surfaces to learn how planetary scientists study the history of a planet's surface. (Astro 101 Textbook, Chapter 7)
Oct 07	Lab 06	Measuring the Mass of Jupiter Here we have the opportunity to review all of the previous topics by combining them into a single activity. Using a computer simulation, we observe Jupiter through a telescope. We measure the angular separation of Jupiter's moons from Jupiter at various times and use this information to measure the period and size of the various orbits. We then use Newton's version of Kepler's third law to find the mass of Jupiter. (Astro 101 Textbook, pp 98-100, 8.2)
Oct 14		-- No lab -- REMEMBER TO WORK ON THE TAKE-HOME LABS!

Oct 21	Lab 07A	Astronomical Observing with the SARA Telescope Students will learn how basic astronomical images are handled and will also prepare an observing plan for remote use of the SARA Telescope in Arizona.
Oct 21/22	Lab 07B	Astronomical Observing with the SARA Telescope (To be scheduled)
Oct 28	Lab 08	Classification of Stellar Spectra and the Sizes of Stars Students learn to classify stellar spectra. Stellar spectra, photometry, distance determination, and a simple stellar model are combined to figure out the sizes of a few stars. (Astro 101 Textbook, 11.1)
Oct 29	Lab 07B	Astronomical Observing with the SARA Telescope (Back-up date -- To be scheduled if needed)
Nov 04	Lab 07B	Astronomical Observing with the SARA Telescope (Back-up date -- To be scheduled if needed)
Nov 04	Lab 09	Photometry of the Pleiades. Students use a computer simulation to observe the visual magnitude and color of stars in the Pleiades. These are used to construct a Hertzsprung-Russell diagram and find the distance to the cluster. The age of the cluster can also be determined. (Astro 101 Textbook, 11.2 – 11.3)
Nov 11		-- No lab -- REMEMBER TO WORK ON THE TAKE-HOME LABS!
Nov 18	Lab 10	Astronomical Data Reduction and Analysis Students will “reduce” and analyze their images obtained in previous weeks with the SARA telescope. This lab demonstrates how astronomers use images to obtain information about astronomical objects.
Nov 25		-- Thanksgiving Recess --
Dec 02	Lab 11	Hubble’s Law and the Expansion of the Universe Students’ use a computer simulation to measure the cosmological redshift in several clusters of galaxies. These are used to find the Hubble constant and examine the expansion of the universe. (Astro 101 Textbook pp 419-425)
Dec 09	Lab 12	Moon Observing Lab (Lab 12) due in ASTR 101 lecture
Dec 09	Lab 13	Telescopic Observing Lab (Lab 13) due in ASTR 101 lecture
Dec 09	MU Lab (6:30-9:00pm)	Evolved Stars Research (only for those with excused absences) Students work with observational data from Prof. Hrivnak’s research on evolved stars to determine if the observations are consistent with the properties of a proto-planetary nebula. The lab involves determining the color and spectral energy distribution of a star and classifying its spectrum. (Astro 101 Textbook, pp 343-345)