ASTRONOMY 11 (Daytime sections)
COURSE SYLLABUS

Course Description: Observational Astronomy (1 unit)
Meeting times: M-W: 2-3:20pm (CRN 40313).
Meeting times: T-Th: 11am-12:20pm (CRN 40314).
Note: students will be making some observations outside of class, and we will meet off-campus for an evening observing trip—see the class schedule.

Instructor: Barry Rice; brice@sierracollege.edu, 916-660-7942. Office: S204

Office Hours: To be announced on first day of class

Meeting Place: All labs meet in ST-2. For the Friday night observing assignment, meet in ST-2 at 6:15 pm to depart to an off-campus observing site.

Observing Trip: The observing trip is scheduled the dates indicated in the schedule if the weather conditions permit. Only students in Astronomy 11 may attend observing sessions. Your instructor will keep you updated on the status of the observing trip if it looks like the weather will not permit the trip.

Textbook and Materials:

Text: A-11 *Daytime Lab package and NightWatch (Dickenson, 4th Ed.)*
Maps: SC-001 and SC-002 star charts
Pencils (two colors) and erasers

Drop dates: If you decide to stop attending class, is your responsibility to drop the class—the instructor may drop any student who does not show up on the first day, or who has excessive absences.

Grading

1. The final grade in this class is based on total assigned points:
   A = 90% or more of total points assigned
   B = 80% or more, but less than 90%, of total points assigned
   C = 70% or more, but less than 80%, of total points assigned
   D = 60% or more, but less than 70%, of total points assigned
2. Each 1-day lab is worth 5 pts. Each 2-day lab is worth 10 pts. Labs grades are based upon the prelab (1 pt per day), and lab performance. You must attend class to earn points for the day or to hand in a lab. Late labs are worth zero points.
3. There will be one 10-pt quiz (closed book, individually completed), a 20-pt midterm (open book, solo/team completed), and a 40-pt final (open book, solo/team completed). See the semester schedule.
4. A Sundial Project will be completed (worth 20 pts) as noted on the schedule. No late sundials are accepted.
5. Our class will go on one observing trip on a Friday night. This trip is worth 20 pts. Obviously, we can only go observing if the sky is clear, so we have scheduled multiple possible dates. If none of the observing nights are clear, the 20-pt observing trip will not contribute to the assigned points in the gradebook. Attending the observing trip is not required to complete the class, but missing the trip will damage your grade. There is no alternative for the observing trip component of the class—consider this gravely, if you have a busy travel or work schedule.

General Instructor Expectations of Students: I expect each student to give their best effort in participating in class activities and accomplishing assigned tasks. I expect students to adhere to their behavior responsibilities as detailed in the *Sierra College Student Handbook*. Cheating, plagiarism, or any other forms of dishonesty are considered grounds for an immediate course grade of F and possible dismissal from Sierra College. Furthermore, drug usage and alcohol consumption during class is prohibited and may result in suspension from class and/or dismissal from Sierra College.

Student Expectations of Instructor: You can expect my best effort in teaching the principles of Astronomy. I hope to impart a sense of excitement in observing and studying the cosmos. I am very open to suggestions for topics you wish to discuss or improvements in the course content and/or presentation.

Student Safety: All students should be aware of the proper procedures under emergency conditions in the classroom or building. This awareness includes how and where to meet during an evacuation, and location and use of the building first aid kit, fire extinguishers, and phones.

Thank you for electing to take Astronomy 11. I hope you will learn much and enjoy the subject as much as I do.

Barry Rice

Course Student Learning Outcomes

1. Students will demonstrate their knowledge and skill in Observational Astronomy, showing that they can correlate the observable sky to events in the cosmos.
2. Students will explain their knowledge and skill in Celestial Navigation, evaluating the significance of important astronomical phenomena.
3. Students will operate a variety of Optical Systems, demonstrating proficiency in their use.
4. Students will relate core concepts in basic science to stellar astronomy, assessing the various factors that are important to stellar evolution.

Course Content Outline:

Familiarization with Day and Night Sky
Use of Planetarium as an Alternate Observing Environment
Use of Simple Measuring Devices, Significant Figures, Error, and Scientific Notation
Use of Small Telescopes and Binoculars
Optical Bench and Optical Parameters
Atlases and Star Maps
Use of a Computer to Make Star Maps and Collect Data
Study of the Moon
Study of the Planets
Study of the Sun and Solar Rotation
Study of Deep Sky Objects
Astrophotography
Measurement of the Speed of Light
Spectrometers and Stellar Chemistry
Computer Links with Remotely Operated Telescopes
Utilizing Telescopes with Digital Coordinate Systems
Statistical Study of Star Distributions
Planning an Observing Session
Study of Binary Stars
Sundial Project or other Special Project
*Only 2/3s of the course content listed is presented in any given semester due to sky and weather conditions.

Student Performance Outcomes:

Through assigned tasks, hands-on activities, computer-simulated exercise, classroom/online discussions, and quizzes/exams, students will:*
Identify from 18 constellations;
Identify and describe the properties of 24 stars;
Locate and describe 20 "deep sky objects" including star clusters, galaxies, nebula, multiple star systems;
Locate planets in the night sky utilizing digital computer software;
Make computations making proper use of significant figures;
Make computations utilizing scientific notation;
Make computations utilizing calculators and digital computers;
Determine the phase of the moon and predict its location on a star map via a computer;
Explain why there are seasons;
Properly set up a small telescope for observations of the night sky;
Compute the magnification power of a telescope;
Compute the light gathering of a variety of telescopes;
Compute the resolving power of a variety of telescopes;
Prepare an observing scenario using a small telescope, binoculars, or unaided eye;
Take pictures of celestial objects using a 35mm camera or Charged Coupled Device in conjunction with a digital computer;
Identify and sketch lunar surface features using a small telescope;
Identify and sketch planetary features using a small telescope;
Observe and sketch the moons of Jupiter;
Use a computer to predict the orientation of the Jovian satellites;
Calculate the orbit/pathway for a spacecraft voyage to another planet using Kepler's laws;
Use a reticle magnifier to measure features on astronomical photographs;
Read a vernier scale;
Use a spectrometer to measure and interpret emission lines and identify chemical elements;
Use a telescopic spectrometer to identify absorption lines;
Classify stellar spectra by observation of absorption lines;
Locate and observe binary star systems utilizing a filar micrometer;
Make an observation of a star's light using a photoelectric photometer;
Plot a light curve and explain the nature an eclipsing binary system;
Properly set up a telescope to safely observe the sun;
Find celestial objects utilizing a celestial atlas;
Demonstrate proper use of SC-001 (Equatorial Region) and SC-002 (North Circumpolar Region) star maps;
Describe how to utilize a digital computer to generate a star map of selected regions of the sky;
Explain how to utilize a computer to link with remote telescopes to collect astronomical data;
Use an optical bench to determine optical parameters for mirrors and lenses;
Use an oscilloscope and laser to determine the speed of light; and
Construct and explain the operation of a sundial.
*Only 1/3 of the listed outcomes are presented in any given semester due to sky and weather

ASTRONOMY 11—Daytime
DRAFT SCHEDULE

--WEEK-- *--DATE--*	*--MONDAY--* *--WEDNESDAY--*	*--TUESDAY--* *--THURSDAY--*	*OBSERVING*	*NOTES*
Week 1 22-26 Jan	Enrollment Lab 10	Enrollment Lab 10		--- ---
Week 2 29 Jan-2 Feb	Lab 41 Lab 11	Lab 41 Lab 11		--- ---
Week 3 5-9 Feb	Lab 12 Lab 42	Lab 12 Lab 42		--- ---
Week 4 12-16 Feb	Lab 13 Lab 13	Lab 13 Lab 13		--- ---
Week 5 19-23 Feb	---Holiday--- Lab 51	Lab 31 Lab 31		--- ---
Week 6 26 Feb-2 Mar	Lab 53/Lab 31 Lab 53/Lab 31	Lab 53/Lab 51 Lab 53/Lab 51		Lab 53 if clear; both prelabs due Lab 53 if first day was cloudy
Week 7 5-9 Mar	Lab 31/ **Quiz** Lab 22	Lab 22/ **Quiz** Lab 22	M-W class trip #1	Closed book quiz, no partners Bring Lab 51 on observing trip
Week 8 12-16 Mar	Lab 22 Lab 32	Lab 32 Lab 32	T-Th class trip #1	--- Bring Lab 51 on observing trip
Week 9 19-23 Mar	Lab 32 **Midterm**	**Midterm** --no class--		Open notes, partially team effort
26-30 Mar	Spring Break	Spring Break		--- ---
Week 10 2-6 Apr	Lab 33 Lab 33	Lab 33 Lab 33	Fall-back observing #1	--- Bring Lab 51 on observing trip
Week 11 9-13 Apr	Lab 35 Lab 35	Lab 35 Lab 35	Fall-back observing #2	--- Bring Lab 51 on observing trip
Week 12 16-20 Apr	Lab 54 intro Lab 21	Lab 54 intro Lab 21	Fall-back observing #3	Extra credit Lab 61discussed Bring Lab 51 on observing trip
Week 13 23-27 Apr	Lab 36 Lab 36	Lab 36 Lab 36		--- ---
Week 14 30 Apr-4 May	Lab 37 Lab 38/Lab 52	Lab 37 Lab 38/Lab 52		Lab 52 will replace Lab 38 if we went observing
Week 15 7-11 May	Lab 54/Sundial day Final prep	Lab 54/Sundial day Final prep		Extra Credit is due the first day Final Prep handed out in class
Week 16 14-18 May	**Final Exam** ---	**Final Exam** ---		Open notes, partially team effort ---

Notes on Observing Days

When you go observing, bring a pencil, Lab 51, something to write on, and lots of warm clothes.

The M-W class will first attempt to go observing on the Friday scheduled as “M-W class, trip #1”, and the T-Th class will first attempt to go observing on the Friday scheduled as “T-Th class, trip #1.”

The fall-back observing dates will only be used if either or both classes are clouded out. If only one class is clouded out, the other class will try to go on each successive observing trip. If both groups are clouded out, they will alternate in their attempts to go observing.