ASTRONOMY 11—NIGHT TIME
COURSE SYLLABUS

Course Description: Observational Astronomy (1 unit)
This course will satisfy the Sierra College lab science requirement.

Instructors: Daniel Hale (dhale6@sierracollege.edu)
(Other staff may be announced)

Offices: Instructors may be found in the offices in ST-2 prior to class.

Office Hours: To be announced on first day of class

Laboratory Codes, Times, and Instructors

43736	Monday	7:00 – 10:05 PM	Hale
40308	Tuesday	7:00 – 10:05 PM	Hale
40309	Wednesday	7:00 – 10:05 PM	Hale

Note: Ending times will be later when we meet off campus for an observing session. See the schedule for dates.

Meeting Place: Always meet in Room ST-2 at 7:00 P.M. If you are late, you will be left behind if we leave campus, and miss the points for that night's work.

Observing Sessions: Only students in Astronomy 11 may attend observing sessions; a waiver form must be signed. Always dress warmly for outdoor activities. Check with your instructor for the status of scheduled observing sessions.

Break Period: There is no formal break period during class. Students are expected to use common sense when taking a break from class activities and to inform their team members when doing so.

Textbook and Materials:

Text: NightWatch (Dickenson, 4th Ed.)

Lab Packet for night time lab sections
Maps: Star/Constellation Maps SC-001 and SC-002
Notebook and pencils
Warm clothes for observing sessions
Other materials will be made available in class during the semester

Dropping the class

If you decide to drop the class, please drop before the deadlines. Instructors may drop a student for excessive absences and, then again, they might not. Check the schedule of classes for the drop date deadlines.

Grading and Attendance

1. The final grade in this class is based on total "assigned" points (roughly 260 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. Two 10-point quizzes and a 20-point Midterm Exam may be given; your instructor will announce the times. A Final Report Project is due during the latter part of the semester (check with instructor). A 40-point Final Exam will be given on the last day of class. Any exceptions to the exam schedules will be noted in class. All exams are open book and open notes, quizzes MAY be solo or open book/notes.
3. There are approximately 14 Laboratory Exercises, worth 10 points each.
4. Observing notes may be maintained throughout the semester (check with instructor).
5. Laboratory Exercises and exams/quizzes cannot be made up. If a problem exists, notify the instructor before the exercise/exam date. One extra credit lab exercise is allowed.
6. Exercise and Exam scores are periodically posted in the ST-2 lab. Please check the results for accuracy. Once you begin taking the Final Exam, previous scores can no longer be contested.

General Instructor Expectations of Students: We expect each student to give their best effort in participating in class activities and accomplishing assigned tasks. We 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 assignment or course grade of F. 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 our best effort in teaching the principles of Astronomy. We hope to impart in our students a sense of excitement in observing and studying nature's show in the cosmos. We are very open to suggestions for topics that students 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.

Daniel Hale

ASTRONOMY 11 DRAFT LAB SCHEDULE
(Lab schedule to be shifted at instructor's discretion)

WEEK/DATE	*MONDAY*	*TUESDAY*	*WEDNESDAY*	*MOON AGE*	*ASSIGNED READING*
1 (27 Jan)	Lab N01	Lab N01	Lab N01	3-5 d	Preface, Ch 1,2
2 (3 Feb)	Lab N02	Lab N02	Lab N02	9-11 d	Ch3
3 (10 Feb)	Lab N03	DS-1 (or Lab N03)	DS-1 (or Lab N03)	17-19 d	Ch4
4 (17 Feb)	--Holiday--	DS-2 (or Lab N04)	DS-2 (or Lab N04)	24-26 d	Ch5
5 (24 Feb)	DS-1 (or Lab N04)	DS-3 (or Lab N05)	DS-3 (or Lab N05)	1-3 d	Ch6
6 (2 Mar)	BS-1 (or Lab N05)	BS-1 (or Lab N06)	BS-1 (or Lab N06)	8-10 d	Ch7
7 (9 Mar)	BS-2 (or Lab N06)	Lab N07	Lab N07	15-17 d	Ch8
8 (16 Mar)	**Midterm**	**Midterm**	**Midterm**	23-25 d	---
9 (23 Mar)	DS-2 (or Lab N07)	DS-4 (or Lab N08)	DS-4 (or Lab N08)	29-1 d	Ch9
10 (30 Mar)	BS-3 (or Lab N08)	BS-2 (or Lab N09)	BS-2 (or Lab N09)	6-8 d	Ch10
6 Apr	--Spring Break--	--Spring Break--	--Spring Break--	14-16 d	
11 (13 Apr)	DS-3 (or Lab N09)	DS-5 (or Lab N10)	DS-5 (or Lab N10)	21-23 d	Ch11
12 (20 Apr)	DS-4 (or Lab N11)	DS-6 (or Lab N11)	DS-6 (or Lab N11)	28-0 d	Ch12
13 (27 Apr)	BS-4 (or Lab N10)	BS-3 (or Lab N12)	BS-3 (or Lab N12)	5-7 d	---
14 (4 May)	Project reports	Project reports	Project reports	12-14 d	---
15 (11 May)	Final Prep	Final Prep	Final Prep	20-22 d	---
16 (18 May)	**Final Exam**	**Final Exam**	**Final Exam**	26-28 d	---

More on Observing sessions: Potential observing sessions occur on the dates indicated on the schedule (Dark-sky trips—moon ages 18-29 or 0-4 days; Bright-sky trips—moon ages 4-15 days). The instructor may further inform students about the status of a particular evening's observing session in a manner specified by the instructor (email, phone etc…).

Observing Schedule			
Week	**Dates**	**Days**	**Trip Type**
Week #3	11-12 Feb	Tues, Wed	Dark Sky
Week #4	18-19 Feb	Tues, Wed	Dark Sky
Week #5	24-26 Feb	Mon, Tues, Wed	Dark Sky
Week #6	2-4 Mar	Mon, Tues, Wed	Bright Sky
Week #7	9 Mar	Mon	Bright Sky
Week #9	23-25 Mar	Mon, Tues, Wed	Dark Sky
Week #10	30 Mar-1 Apr	Mon, Tues, Wed	Bright Sky
Week #11	13-15 Apr	Mon, Tues, Wed	Dark Sky
Week #12	20-22 Apr	Mon, Tues, Wed	Dark Sky
Week #13	27-29 Apr	Mon, Tues, Wed	Bright Sky

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 conditions.

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.