

# ASTRONOMY 5

## COURSE SYLLABUS

**IMPORTANT:** Students who have taken Astronomy 10 may take this course for full credit

**Course Description:** Introduction to Stars, Galaxies, and the Universe (3 units), Lecture Course - General principles and the fundamental facts of stellar astronomy and the large scale structure of the universe. Designed primarily for students not majoring in a physical science or mathematics.

To satisfy the Sierra College laboratory science requirement, students should also enroll in Astronomy 11, Astronomy 14, or equivalent.

**Full-Time Instructors:** David Dunn, and Barry Rice

**Part-Time Instructors:** Alvaro Demarzi, Barry Mingst

**Offices:** S201 (Dunn) in Sewell Hall, S204 (Rice), ST-2A for part-time faculty all on the Rocklin Campus.

**Campus Extensions:** Dunn (x7912, 916-660-7912), Rice (x7942, 916-660-7942), Part-Time Faculty (x7910, 916-660-7910); Mingst – announced on first day

**E-mail:** Dunn ([ddunn@sierracollege.edu](mailto:ddunn@sierracollege.edu)), Rice ([brice@sierracollege.edu](mailto:brice@sierracollege.edu)); Demarzi ([ademarzi@sierracollege.edu](mailto:ademarzi@sierracollege.edu)); Mingst ([bmignst@sierracollege.edu](mailto:bmignst@sierracollege.edu))

**Office Hours:** To be announced on first day of class.

### **Part-Time Instructors and Related Information:**

Information is given in the *Syllabus Supplement* which is distributed during the first week of classes.

### **What are the “Third-Hour” Sections?**

Astronomy 5 is a 3-unit lecture course, which for most 3-unit courses usually means that you attend 3 hours of lecture during a given semester week. However, in Astronomy 5, you attend 2 hours of lecture and a third hour in “Third-Hour” (and hence its name), where the majority of time is spent working on a variety of hands-on activities (there are a few videos as well). When signing up for this class, you have signed up for both the lecture and a corresponding Third Hour. Therefore, you should attend the Third-Hour you signed up for during the first and all following weeks of class to receive a general orientation to the activities and see an introductory astronomy video. Be sure to always attend your assigned Third-Hour prepared with the required text and charts/maps, calculator, paper, and pencils/pens.

Please note: Third-Hour does not count towards lab credit.

The Third-Hour section in which you have signed up for may be changed if a legitimate academic conflict exists (e.g., it conflicts with another class) – please consult the instructor. You may attempt to change to another time, but only if there is space available in that section. You will have to drop the current section you are in and add the section you want to be in.

If you miss or cannot attend your assigned Third-Hour during a particular week, it is possible to attend another section during the same week to pick up on missed information or complete the exercises.

Inform the Third-Hour instructor (who is not necessarily the same person as your lecture instructor) that you are doing so. If a legitimate non-academic reason (such as a change in hours of a job) prevents you from attending your assigned 3<sup>rd</sup> hour throughout the semester, then you may continue to attend another 3<sup>rd</sup> hour without have to formally change your section. Again consult your 3<sup>rd</sup> hour and lecture instructor that you doing so (The *Astronomy 5 Syllabus Supplement* has the details of the times and dates of the other Third Hours).

### **Lecture Sections, Course Codes, and Missed Classes:**

On the first day of class, be sure to pick up a copy of the *Astronomy 5 Syllabus Supplement*. This sheet will give the course codes for those who may be adding Astronomy 5 during the first week of the semester. "Add Codes" must be obtained directly from the instructor in whose class you wish to be enrolled.

The *Astronomy 5 Syllabus Supplement* will also give all the days and times that the various instructors will be lecturing and leading activities in the Third-Hour sections. These times and days are important since if you must miss your assigned lecture or Third-Hour activity, it is possible to make up the class by attending a lecture or Third-Hour at another time during the week of the missed class. To do so, you must receive permission from the instructor whose lecture or Third-Hour you wish to attend.

### **VERY IMPORTANT**

It is the responsibility of the student (not the instructor) to add or drop a class. An instructor may drop a student for excessive absences, but there is no guarantee of this. Also, if you switch Astronomy 5 Lecture Sections (but not Third-Hour sections), you must complete a *Change-of-Program Form* and submit it to the Admission and Records Office with the proper instructor signatures.

Consult the Sierra College *Schedule of Classes* for the last day to drop (receive a refund and avoid a "W") and the last day to withdraw (and get a "W").

### **Textbook and Materials** (Buy now at on or off campus stores):

- Required Text: *The Cosmic Perspective: Stars, Galaxies, & Cosmology, 8th Edition*, by Jeffrey Bennett, Megan Donahue, Nicholas Schneider, and Mark Voit
- Required Handbook: *Sierra College Astronomy 5 Student Handbook*, Latest Edition
- Required Web Access: *Modified Mastering Astronomy* (<https://www.pearson.com/mastering> )
- Required Maps: Star Maps (Constellation Charts) SC-001 and SC-002
- ~~Required Chart: *The Current Year's Sky Gazer's Almanac*~~
- Optional CD/Software: *Starry Night Pro*, Version 3.1
- Optional Equipment: *The Night Sky Planisphere (9"* cardboard or plastic) by David Chandler
- Optional Study Guide: *Astronomy Quick Study Guide* by BarCharts, Inc.

### **Astronomy Department, Text, and Canvas Web Sites:**

The Astronomy Department maintains a web site with a variety of features. Of particular interest to Astronomy 5 students will be the availability of lecture notes, class handouts, Third-Hour exercises and answer keys, detailed scores for all completed exercises, and current grades. Use <http://astronomy.sierracollege.edu/> for the web address of the department homepage and then select the Astronomy 5 hyperlink to access information related to this course. Friendly warning: Periodically check your assignment scores for accuracy; report any errors to your lecture instructor.

The course text has a companion web site at <https://www.pearson.com/mastering> . All students must register on this web site in order to complete homework assignments and the "Take-Home" Midterm. Before you register, you will need an Access Code (supplied with a new text or purchased at the *Modified Mastering Astronomy* web site), a *Mastering Astronomy* Course ID (to be given to you by Astronomy 5 Course Syllabus

your instructor during the first week of classes), and a *Mastering Astronomy* Student ID (also to be given to you by your instructor during the first week of classes). **Students who fail to register in Mastering Astronomy in a timely fashion may be dropped.** (See Syllabus Supplement)

Besides being the place to work on homework assignments, the *Mastering Astronomy* web site also has a few very valuable resources to help students improve their proficiency in astronomy. For example, in the “Study Area” there are “Interactive Figures”, “Movies”, and “Flashcards”.

All Sierra College students automatically receive accounts in the online *Campus* environment (see <http://irc.sierracollege.edu/dl/OnlineClasses/Index.htm> for details) and all Sierra College courses are linked to *Canvas*. However, the Astronomy Department currently does not have a uniform policy with regard to the use of *Canvas* for its course content; individual instructors may or may not activate *Canvas* for their individual sections (a possible use of *Campus* would be the “Discussions” and “Message” features that would allow students to collaborate on assignments).

Finally, there is a bulletin board area dedicated to Astronomy 5 just outside the planetarium. General announcements and selected handouts, answer keys, and gradesheets will be posted in this area. Students are expected to check this area on a regular basis.

**General Instructor Expectations of Students:** We expect each student to give his or her 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 course grade of F (with a permanent designation of “academic dishonesty”) and possible dismissal from Sierra College. Finally, students are expected to adhere to the *Policies and Procedures* given at the end of this syllabus.

**Use of Cell Phones/Electronic Devices/E-cigarettes in Class:** Using a cell phone or other electronic devices during class is prohibited unless there are extenuating circumstances which are told to the instructor prior to class beginning. Use of e-cigarettes is also prohibited in class.

**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. If you are experiencing severe difficulty with a particular instructor, bring your concerns to the attention of the Astronomy Department Chair or the Science and Mathematics Division Dean.

**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 or lockdown, and location and use of the building first aid kit, fire extinguishers, and phones.

## **COMPLETE THE PINK INFORMATION CARD**

Give this card to the instructor before leaving class on the first day. Be sure to note the **4-DIGIT NUMBER** on the card and write it down in your text or notebook. This is your **Astronomy 5 Student ID#** and will be used to record and post your scores throughout the semester. Important items to remember about this number:

- Do not confuse your Astronomy 5 Student ID# with any other identifying number associated with your name (e.g., your Sierra College 970-number). Whenever you are asked by your instructor for an ID number, unless specifically stated otherwise, the number you will give is the astronomy course ID number.

- Always, always, and always include your Astronomy 5 Student ID# on all assignments, emails, or any other form of communication with your instructor. And always, always, and always, include all four digits and not just the last two (which only identifies which CPS clicker you use during lecture).

## **Grading and Attendance**

1. The final grade in this class is based on total "assigned" points (500):
  - A = 90% or more of total points assigned (= 450)
  - B = 80% or more, but less than 90%, of total points assigned (= 400)
  - C = 70% or more, but less than 80%, of total points assigned (= 350)
  - D = 60% or more, but less than 70%, of total points assigned (= 300)
2. A two-part 100-point Midterm Exam will be given at the times and places shown on the *General Schedule of Activities*. A Star Quiz worth 30 points and a three-part Final Exam worth 110 points will be given during the last week of class. Any exceptions to the exam schedule will be noted in class.
3. During lectures, instructors will give "CPS Quizzes" (using a *CPS Keypad* explained in class) based on material presented during the lectures. These quizzes are worth 5 points each week (beginning in Week 2) and you must be in attendance to participate. See the *General Schedule of Activities* for scheduling. In lieu of the "CPS Quizzes", instructors may give weekly 5-point quizzes using a different format or base the 5 points on attendance.

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4. Homework exercises are worth 10 points each. Generally, there are 20 questions with each question worth 0.5 point, although the number of questions and the point value for a given question may vary slightly from one exercise to the next. A final homework score that includes a half-point is rounded up to the next highest integer. See the *General Schedule of Activities* for the exact due dates.
5. Third-Hour exercises are worth 5 points each. There are more questions on these exercises than are graded. A pseudo-random process is used to determine which five questions are graded (one point per graded question). See the *General Schedule of Activities* for the exact due dates.
6. Extra Credit may be earned for special activities described on the *Extra Credit Options* sheet. Any single extra credit activity may earn no more than 5 points. The maximum number of points for extra credit during the semester is 25 points. Ten of this total must be completed by the Midterm with the remainder due by the end of the second to last week of classes. See the *General Schedule of Activities* for the exact due dates.
7. Bonus point activities may be given at the instructor's discretion. These points, like extra credit can only enhance your grade. You have to be in attendance to receive any bonus points the instructor may offer.
8. The maximum total points a student may earn through extra credit and bonus is 50.
9. A student may be dropped from class for excessive absences. See the Sierra College catalog for the definition of excessive absences.

## **Policies and Procedures**

1. Tests and quizzes cannot be made up. If a problem exists, notify your lecture instructor before the test/quiz date. However, even with prior notification, an instructor is not obliged to extend any test/quiz deadline. In addition, instructors reserve the right to refuse student admission to a test/quiz for excessive tardiness (defined as more than 5 minutes after the test/quiz begins).
2. Late homework exercises are not accepted under any conditions. These exercises are due by 11:59 pm (just before midnight), **Thursday** of the week they are assigned (see the *General Schedule of Activities* for the exact dates). Homework exercises are completed in the *MasteringAstronomy* environment.
3. Third-Hour exercises are to be completed in the section assigned to the student and during the week the exercise is due (see the *General Schedule of Activities* for the exact dates). However, if a student is unable to attend his/her assigned section (for a valid reason; for example illness), he/she may attend another Third-Hour section provided it is during the same week the exercise is due and he/she informs the Third-Hour instructor of his/her presence in the class.
4. Students are expected to be on time for their Third-Hour class. Third-Hour instructors reserve the right to refuse student admission to class for excessive tardiness (defined as more than 5 minutes after class starts).
5. Third-Hour instructors may penalize students up to 20 points for non-participation in class with the severity of the penalty being in direct proportion to the severity of the non-participation.
6. The Astronomy Department teaching staff believes it is important for students to maintain basic communication and organization skills in a science class. Consequently, students may be penalized 1 point per exercise/exam for not displaying these skills. Examples are: 1) Not writing your name and/or Astronomy 5 ID # (see “Complete the Pink Information Card” section above) on an exercise/exam that is turned in for grading; and 2) Gross misspelling of any common word (gross misspelling is defined as more than two letters in a given word are incorrect).
7. Students are expected to check the grading accuracy of their exams/quizzes, exercises, and bonus/extra credit. Students are also expected to check their posted grades for accuracy. Students are given 2 weeks (14 days) after a given deadline to bring any errors to the attention of their lecture instructor. Under no circumstances will grade accuracy be discussed after the final grade-reporting deadline established by the Sierra College Admissions and Records office. This deadline is usually set in the week after the last week of class.
8. Examples of behavior subject to a grade F with academic dishonesty:
  - The use of answer keys from previous semesters
  - Passing/receiving answers to/from students taking Third-Hour classes at another time
  - The use or visible proximity of any electrical or related device during exams/quizzes
  - The use of “crib sheets” written on anything, including your skin, rubber bands, etc.

## **Course Content Outline**

1. Historical Developments in Stellar and Galactic Astronomy
2. Physical Principles Relevant to the Science of Stars and Galaxies
3. Telescopes, Observatories, and Spacecraft
4. The Celestial Sphere
5. The Sun – One Star

6. The Properties of Stars
7. Stellar Evolution
8. Stellar Remnants: White Dwarfs to Black Holes
9. The Milky Way Galaxy
10. Galaxies: Properties, and Evolution
11. The Large Scale Structure of the Universe
12. Cosmology

### **Student Performance Outcomes**

1. Discuss a variety of historical developments that have led to important discoveries in the science of stars and galaxies.
2. Identify 20-30 celestial objects and/or groupings associated with stars and galaxies and found in the night sky and provide descriptive information about each.
3. Use a star chart, a "cosmic window", a planisphere, and/or a "Stargazer's Almanac" to determine the time and date of a variety of celestial events associated with stars and a variety of deep sky objects.
4. Solve problems involving spatial relationships with regard to the stars and galaxies found on the celestial sphere.
5. Use computer software to retrieve and evaluate information and data of significance to stellar and galactic systems.
6. Compute various performance measures of telescopes and other astronomical instrumentation.
7. Apply physical principles (mechanics, gravitation, electromagnetism, atomic structure) to the natural behavior of stars and galaxies.
8. Discuss the physical principles behind the overall structure and appearance of the Sun.
9. List the principle properties of stars and the various techniques used to measure them.
10. Describe the general physical processes associated with a given star as it evolves from its birth to its death.
11. State the possible end states for stars.
12. Draw a detailed picture of the overall structure of the Milky Way Galaxy and its content.
13. Compare and contrast the various types of galaxies and their possible evolutionary associations.
14. Describe the observed large-scale structure of the Universe.
15. Discuss a current theory for the structure and evolution of the Universe since its creation.

### **Course Student Learning Outcomes**

1. Students analyze basic science and core physics, to discover how they apply to astronomy.
2. Students will evaluate concepts in cosmology, relating concepts in underlying physics and observations to scientific frameworks of our universe's formation and evolution.
3. Students will relate core concepts in basic science to stellar astronomy, assessing the various factors that are important to stellar evolution.
4. Students will synthesize information from various sources (classroom instruction, online resources, etc) to produce a coherent understanding of galactic/extragalactic astronomy.

*Thank you for electing to take Astronomy 5. We hope you will enhance your knowledge and appreciation of astronomy and enjoy the subject as much as we do.*

*The Sierra College Astronomy Department Staff*