

Astronomy 3: Stellar Astronomy

General Information

Instructor: Dr. Anne Metevier
Schedule: Tuesday and Thursday 10:30am – noon, Lark 2009
Contact: email: ametevier@santarosa.edu
Office hours: Thursdays 9:30 – 10:30am or by appointment, Lark 2023

Course Description

A description of the universe, concentrating on celestial bodies and phenomena beyond the Solar System. Topics will include electromagnetic radiation, observed properties of stars, variable and binary stars, extra-solar planets, stellar evolution, black holes, relativity, the interstellar medium, star clusters, the Milky Way and other galaxies, cosmology, and the possibility of other life forms in the universe.

Student Learning Outcomes

Upon completion of this course, students will be able to:

1. Evaluate astronomical hypotheses using evidence-based reasoning and the scientific method.
2. Recognize and describe the various astronomical bodies, concentrating on the celestial bodies beyond the Solar System.
3. Summarize the processes which govern the evolution of a star and use this knowledge to predict when and how stars of varying color and mass will die.

Recommended Preparation

Completion or Concurrent Enrollment in Math 150A AND English 100 or ESL 100

Required Textbook, Materials, and Readings

Course textbook: *OpenStax Astronomy* by Franknoi, Morrison, and Wolff

- Available for free by downloading at <https://openstax.org/details/astronomy>
- Or, a paper copy is available at a small cost at the campus bookstore or on amazon.com
- Or, you can check out the book for a few hours at a time
 - call number QB2.A1 F73 PersCopy Sparks (Doyle library)
 - call number QB2.A1 F73 2017 (Petaluma campus library)

You will have weekly reading assignments from the course textbook, and homework assignments will depend on staying up to date with the reading.

Other required materials: 4 double-sided Scantron forms (100 questions total), binder paper

Grading Policy

Class participation	100 points	900 – 1000 points = A
Homework	200 points	800 – 899 points = B
Exam 1	150 points	700 – 799 points = C
Exam 2	150 points	600 – 699 points = D
Exam 3	150 points	0 – 599 points = F
Final exam	250 points	
Total points possible	1000 points	

I reserve the right to *slightly* raise a student's grade based on my assessment of their effort to understand the course material.

Class Participation

Participation is an important component of your final grade. I will nearly always take attendance during class. I also encourage and make note of participation during in-class discussions. There will be several in-class small-group activities that will be turned in for credit. I encourage at least one office visit during the semester.

Please note that if you miss 10% or more of the class sessions without documented excuses, it is considered excessive absence and you may be dropped from this class or fail the course.

Homework

I will give 11 homework assignments this semester through the course Canvas site. Some assignments will require writing, others will be multiple choice or short answer, and some will include a bit of each. These assignments will help you keep up with course readings and develop a stronger understanding of the course material. Homework assignments will be made available over the weekend and will be due the following Friday at midnight. Your lowest homework score will be dropped, so that only 10 homework assignments will count toward your grade. No late homework assignments will be accepted.

Exams

There will be three midterm exams and one final exam, as listed in the course schedule. The exams will cover material from lectures, homework, reading, and in-class activities. Exams will be in multiple-choice format. Make-up exams may be given at the instructor's discretion only in case of serious illness, a medical emergency in the immediate family, or other very serious circumstances.

The final exam will be comprehensive and will take place on Tuesday, December 18 from 10am – 12:45pm. No make-up final exams will be given for any reason once grading is completed.

Extra Credit

Extra credit is available for attending an SRJC Planetarium presentation or a local astronomy observing session and submitting a one-page write-up of your experience. Specific instructions on what to include in the write-up will be given on the course Canvas site. You may submit up to 2 extra credit assignments worth up to 25 points each, for a total of 50 points. Extra credit may be submitted any time up to the last day of classes, December 14.

Canvas and Checking Your Grades

Lecture notes, homework, and a list of study topics will be posted on Canvas each week. Please familiarize yourself with these tools as soon as possible, and ask me for help if needed.

Note that Canvas provides a close, but not quite perfect, calculation of your grade. For instance, it does not take into account the fact that I drop your lowest homework score. I also do not post your attendance/participation grade until the end of the semester. If you have a question about your grade, please see me during office hours or make an appointment with me.

Accommodations for Students with Disabilities

Students with disabilities who believe they need accommodations in this class are encouraged to contact Disability Resources (527-4278), as soon as possible to ensure accommodations are implemented in a timely fashion. It is important to me that every student has a fair opportunity to learn in this class.

Students with disabilities should also see me if they might need accommodation in case of an emergency. Your safety is important to me.

Classroom Etiquette / Code of Conduct

I will treat you with respect, and I expect you to treat me and your fellow students with respect at all times. In order to create an environment that is safe for learning and free of distractions, you are expected to behave according to the SRJC standards of conduct, which can be found online here: <https://student-conduct.santarosa.edu/>

The student code of conduct states that the following activities are prohibited: *“Obstruction or disruption of teaching, research, administration, disciplinary procedures, District activities, or other activities authorized by the District...”*

Some examples of disruptive behaviors that are not permitted in this class are:

- Talking, whispering, or note-passing that is distracting to other students or the instructor
- Excessive tardiness, leaving class early, or leaving and returning to the classroom
- Inappropriate use of phones, tablets, laptops, or headphones
- Sleeping during class
- Eating meals during class (small snacks may be ok)

Consequences of disruptive behavior:

Disruptive behavior will result in one or more of the following at the instructor’s discretion:

- Verbal warning
- Loss of in-class activity points
- Conference in office hours to discuss behavior
- Dismissal from class
- Additional disciplinary action at the discretion of school administrators

If I request that you come see me to discuss your behavior in class, and you fail to do so before the next class period, you will be suspended from that class. When you are suspended, you cannot make up any points that you miss due to your absence, and your absences may result in grading penalties (see note on excessive absence above).

Academic Honesty

Cheating in any form will not be tolerated. You are welcome to share ideas in groups, but make sure that the work you turn in is your own and is not copied from another person. Plagiarism of written work is cheating and will not be tolerated.

The student code of conduct states that you can be disciplined for: *“Dishonesty, such as cheating, plagiarism, or knowingly furnishing false information to the District.”*

Some examples of cheating include but are not limited to:

- Copying work from another student, or giving your work to another student to copy
- Copying and pasting text from internet sources into homework assignments or projects
- Viewing, comparing, or copying the work of another student during an exam or quiz
- Intentionally allowing another student to view your work during an exam or quiz
- Using a cell phone, smart phone, or “cheat sheet” during an exam or quiz
- Falsifying evidence to imply that you attended an event that you really did not attend

Consequences of Academic Dishonesty

If you are caught cheating on an assignment or exam, you will receive a grade of zero for that assignment. In case of severe academic dishonesty, or a repeated offense, you may be suspended for up to two class periods at the instructor’s discretion in addition to receiving a zero grade. You may also be subject to additional disciplinary action at the discretion of school administrators.

Approximate Course Schedule

Over the course of the semester, I may adjust the pacing of topics and readings slightly, depending on what seems best for students' learning in this course.

#	Day	Date	Chapter	Topic	Assignment/Test
1	Tues	Aug 21		Course introduction	
2	Thurs	Aug 23	1	Our place in the Universe	
3	Tues	Aug 28	1, 2.4	Our place in the Universe	
4	Thurs	Aug 30	5	The nature of light	HW#1 due Friday
	Tues	Sept 4		No classes	
5	Thurs	Sept 6	5	Light and spectra	HW#2 due Friday
6	Tues	Sept 11	5	Types of spectra, telescopes	
7	Thurs	Sept 13	16	Gravity, energy, and the Sun	HW#3 due Friday
8	Tues	Sept 18	16	The Sun and nuclear fusion	
9	Thurs	Sept 20			Exam 1
10	Tues	Sept 25	17	Stars and spectra	
11	Thurs	Sept 27	17,18	Masses and sizes of stars	HW#4 due Friday
12	Tues	Oct 2	18	HR diagrams	
13	Thurs	Oct 4	19	Distances to stars	HW#5 due Friday
14	Tues	Oct 9	19	Parallax and cosmic distances	
15	Thurs	Oct 11	20.1-20.3	Between the stars	HW#6 due Friday
16	Tues	Oct 16	21.1-21.3	How stars are born	
17	Thurs	Oct 18			Exam 2
18	Tues	Oct 23	22	Star clusters	
19	Thurs	Oct 25	22	Star life stages	HW#7 due Friday
20	Tues	Oct 30	23	Planetary nebulae, supernovae	
21	Thurs	Nov 1	23	Star deaths and remnants	HW#8 due Friday
22	Tues	Nov 6	23	Star deaths and remnants	
23	Thurs	Nov 8	24	Relativity	HW#9 due Friday
24	Tues	Nov 13	24	Black holes	
25	Thurs	Nov 15			Exam 3
26	Tues	Nov 20	25	Our Galaxy, the Milky Way	
	Thurs	Nov 22		Thanksgiving	
27	Tues	Nov 27	25, 26	Our Galaxy, types of galaxies	
28	Thurs	Nov 29	26	The expansion of the Universe	HW#10 due Friday
29	Tues	Dec 4	27.1, 28	The distribution of galaxies	
30	Thurs	Dec 6	28	Dark matter	HW#11 due Friday
31	Tues	Dec 11	29	The Big Bang	
32	Thurs	Dec 13	29	The evolving Universe	Extra credit due Friday
	Tues	Dec 18			Final exam 10am – 12:45pm