

Professor: Kara Beauchamp

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Office Hours: M, W, F: 11-12

Th: 3-5

or by appointment

Required Textbook:

The Cosmic Perspective, 6th Edition, Bennett, Donahue, Schneider, Voit

Other supplies you will need: a calculator which will calculate sines, cosines, logs, and exponentials.

Schedule: We will usually meet from 9 am - 11 am and 1:00 pm – 3:00 pm each day. We will have one required evening observing sessions (to be scheduled - weather permitting).

Course Content: Astronomy is the scientific study of the universe. Astronomy asks questions like:

What is the observable universe made of?

Is the universe in a steady state, or is it changing?

If the universe is in a steady state, has it always been the way it is now?

If the universe is changing, how is it changing? How long has it been changing?

We will answer these questions, and many others, in this course. The answers to these questions come from scientific understanding which has developed over the last 400 years and which is based primarily on physics, but also on chemistry, geology, and biology. In the process of answering these questions, you will learn *how* the answers have been determined. Often, in order to answer these questions we need to calculate a numerical quantity.

Course Goals:

This course supports the Educational Priorities and Outcomes of Cornell College with emphases on knowledge, reasoning, and communication. By doing the work in this class, I expect that you will develop your ability to:

- Discuss and write about scientific concepts in your own words.
- Describe evidence astronomers use to support or refute hypotheses about the structure of and interactions between the constituents of the universe.
- Calculate numerical quantities which inform astronomers' understanding of the structure of and interactions between the constituents of the universe.
- Describe the development of scientific understanding of the solar system, stars, and galaxies.
- Describe the patterns of motion of the celestial objects in the Earth's sky and the reasons for those patterns, for objects including
 - the Sun
 - the stars (constellations)
 - the planets
 - the moon
- Describe how astronomers are able to determine the properties of stars and use these properties to determine stars' life cycles. Describe the major steps in the life cycle of a star, including the formation and the demise of a star.
- Describe how astronomers know the size of our galaxy, the constituents of galaxies, the distances between galaxies, and how galaxies move in the universe.

Course Approach: There are many fascinating facts and challenging concepts to learn in astronomy. I do not believe that memorizing facts, either given to you by your professor or presented in your textbook, is the best or most interesting way to learn astronomy. I believe the best way to learn astronomy is for you to *engage* your thinking about the concepts and to *articulate* your understanding of the concepts. I want you to learn how we know what we know, so I will emphasize the process of developing scientific understanding. In fact, I want you to experience *thinking like a scientist*. In this course, I will ask you to do computer based activities, worksheets, and short projects. There will be reading assignments and homework questions almost every class day. I encourage you to ask and answer questions in class. Your understanding of the material and your ability to communicate your understanding will be tested in daily quizzes. You will demonstrate your synthesis of the ideas from class in two papers and a presentation.

Attendance: I expect you to attend class and I will keep a record of absences. If you plan to be away from class (for a sports team event, for instance) you must e-mail me the dates and times of your planned absences, along with the reason for them, by the end of the first day of the course, and you must talk to me about how you can make up the material that you will miss. If you miss class unexpectedly (you become sick, for instance) I expect a brief e-mail message explaining your absence, and you must talk to me about how you can make up the material you missed. Being sick does not excuse you from course work except under dire circumstances. I will never be able to re-create the class experience for you if you miss a class period. It is your responsibility to make up for the lost class time on your own.

Asking for Help: Please ask me for help when you need it. You may need the answer to a specific question, or you may find yourself struggling with a larger issue in the class. I am happy to work with you on small and large issues. I like to talk to students outside of class. To get in contact with me, you can see me at the end class, e-mail me, call me in my office, or stop by my office. I can talk to you during class when students are working on activities, right after class, during my office hours, or any other time that works for both of us. I will check my e-mail around 10 pm each evening as well, so for less urgent questions in the evening you can e-mail me.

Getting More Help: Cornell College has a Center for Teaching and Learning, located on the lower level of Cole Library. This center provides drop-in support for both writing and mathematics. Please use the resources available at the center. Please also talk to me if you are having trouble with understanding the mathematical or scientific ideas in this course.

Academic Honesty: Cornell College expects all members of the Cornell community to act with academic integrity. An important aspect of academic integrity is respecting the work of others. A student is expected to explicitly acknowledge ideas, claims, observations, or data of others, unless generally known. When a piece of work is submitted for credit, a student is asserting that the submission is her or his work unless there is a citation of a specific source. If there is no appropriate acknowledgement of sources, whether intended or not, this may constitute a violation of the College's requirement for honesty in academic work and may be treated as a case of academic dishonesty. The procedures regarding how the College deals with cases of academic dishonesty appear in *The Compass*, our student handbook, under the heading "Academic Policies – Honesty in Academic Work."

Students with disabilities: Students who need accommodations for learning disabilities must provide documentation from a professional qualified to diagnose learning disabilities. For more information see cornellcollege.edu/disabilities/documentation/index.shtml. Students requesting services may schedule a meeting with the disabilities services coordinator as early as possible to discuss their needs and develop an individualized accommodation plan. Ideally, this meeting would take place well before the start of classes. At the beginning of each course, the student must notify the instructor within the first three days of the term of any accommodations needed for the duration of the course.

Assignments and Exams:

Late work will not be accepted unless you describe the conditions which prevent you from turning in an assignment on time at least 12 hours before the deadline and I accept your excuse.

In-class Activities: We will often spend class time doing an activity. These activities should help you develop your understanding of the topics in the course.

Homework: I will assign reading and quiz questions almost every night. Often you will have an additional assignment as well. The reading and homework assignments can be found on Moodle under the headings: Homework Week 1, Homework Week 2, and Homework Week 3.

Quiz Questions: You can find the quiz questions on Moodle under the headings: Quiz Questions Week 1, Quiz Questions Week 2, and Quiz Questions Week 3. You should copy all the quiz questions for each week into a Google doc and share it with me. After you have shared it with me, also make me an owner (this way, even if you delete the file, I will still have a copy). Each day, you should answer the quiz questions in the Google doc by 8:30 am on the day they are due. I will be able to see your answers and to see when you entered your answers. You will get one point for each question answered on time (but I will not otherwise grade your answers). You can discuss your answers with your classmates outside of class. Your answers should be written in your own words, not in the words of your classmates or of the textbook. We will spend some time in class discussing the answers to the questions on the day they are due. I may ask students to present their answers to specific questions. (about 120 pts)

At 9 am *the day after* the quiz questions are due, I will randomly pick one of the questions for you to write up as a closed-notes, closed-book quiz. Written quiz answers are worth 10 points. Your answers must be correct, complete, and written in your own words for full credit. (about 120 pts)

Short Answer Questions: There will be occasional short answer questions to turn in (about 20 pts)

Quantitative Homework: Numerical values are very important in astronomy. You will have occasional quantitative homework in which you calculate numerical values. (about 80 points)

Papers and Presentation: I will assign several short papers/essays and a presentation. (330 pts)

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| Observing Mars | (30 pts) | Paper, due Wednesday, Sept 4, 5 pm |
| Scientific Controversies | (100 pts) | Essay, in class, Monday, Sept 9, 9 am |
| Galactic Object | (100 pts) | Presentation, in class, Wednesday, Sept 18 |
| Size of Galaxy | (100 pts) | Essay, in class, Monday, Sept 23, 9 am |

Closed-Book, Closed-Notes Tests:

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| Moon Phase Questions | (10 pts) | Friday, Sept 6 |
| HR Diagram Quiz | (25 pts) | Monday, Sept 16 |
| Final Essay Questions | (60 pts) | Wednesday, Sept 25 at 9:00 am |