

ASTR 007 – Introduction to Astronomy
Fall 2021
MW 1:35–2:50 pm

Instructor:

Prof. Ginny McSwain

pronouns: she, her

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Free Help Sessions (LL 405): TTh 10:00am–12:00pm

(Additional help available by appointment; in person or Zoom appointments available)

Course Objectives:

Chances are, you are taking this Astronomy class as a required Natural Science component of your liberal arts degree at Lehigh. Believe it or not, Astronomy was one of the original seven liberal arts recognized by the ancients. (The full list was: Grammar, Rhetoric, Dialectic, Astronomy, Arithmetic, Geometry and Music.) Astronomy is thus the oldest of the natural sciences, but its focus has evolved over millennia. To the ancients, its practical value was in seeking astrological predictions of the future. For much of modern history, it has been studied for navigation. In the present day, Astronomy serves many purposes: to satisfy humanity's curiosity about our origins, to achieve knowledge for knowledge's sake, and to inspire innovation and exploration. Its artistic, philosophical, and religious impacts are just as significant as its mathematical applications. Thus Astronomy remains a key point of intersection between the humanities and the sciences, and we hope that this class will serve you well as you set off on your own life path.

Specifically, in ASTR 007 students will learn:

1. To explain how celestial bodies appear to move across the sky;
2. To apply the laws of planetary motion and gravity;
3. To understand how the properties of light can be measured with telescopes;
4. To describe the formation and contents of our Solar System (including our Sun, planets, moons, and other small bodies);
5. To understand how fundamental properties of stars can be measured;
6. To describe the properties of the Milky Way and other galaxies; and
7. To understand the history of the Universe.

Required Materials:

- *Astronomy* by Fraknoi, Morrison, & Wolff (*Astronomy* is a free e-book available from OpenStax; <https://openstax.org/details/books/astronomy>.)
- Scientific calculator
- PDF files or printouts of interactive classroom activities (available on Course Site)

Announcements will be distributed via your Lehigh email address listed in Banner, and course notes and other supplementary material will be distributed electronically using Lehigh's Course Site. You are expected to check your email and Course Site frequently for updates.

Grading:

Attendance & Participation – 10%*
Homework – 25%
Hour Exam 1 – 20%
Hour Exam 2 – 20%
Final Exam – 25%

*I cannot, in good conscious, require attendance in this tightly packed classroom as long as the pandemic is still raging. Until Lehigh lifts our indoor mask requirement or we move back to online classes, everyone will get free attendance credits. I will try my best to record our lectures and post them on Course Site.

Reading assignments, homeworks, and interactive classroom activities will be posted on our Course Site page in advance of each lecture. You should come to class with pdf copies of the interactive activities and be prepared to discuss the readings.

Exam grades will not be curved. After the final exam is complete and all student work is accounted for, a curve may be applied to the final averages if necessary.

I will use the following base scale for assigning letter grades. This scale gives the *minimum* letter grade you could receive for a given score. *Depending on the performance of the entire class, I may curve the scale so that you receive a higher letter grade.*

92–100: A	88–89: B+	78–79: C+	68–69: D+	0–59: F
90–91: A-	82–87: B	72–77: C	62–67: D	
	80–81: B-	70–71: C-	60–61: D-	

Special Statement for Fall 2021:

I recognize that everyone's stress levels are probably a lot higher than normal. It is entirely possible that many of us will be dealing with personal and/or family emergencies throughout

the semester that will require special accommodations. We will all need a higher level of empathy and patience than usual this semester.

If you know in advance that you will need an extended deadline on a homework assignment or to take an exam, please let me know as soon as possible, and I'll gladly work with you to reschedule a reasonable deadline without requiring documentation. **If you miss a deadline that has already passed** and want to arrange for accommodations, I may require documentation of a valid excuse.

Tips for Success in this Course

- Like most college courses, this course is much faster-paced than your high school courses. In this semester, we will cover the same amount of material that might be covered in one year of high school. You may have to work harder than you are accustomed to keep up.
- For each hour of class time, you should probably spend 2-3 hours outside of class on reading assignments and homework.
- Treat each homework assignment as you would treat studying for an exam. If you keep up with the readings and homeworks as we go along, the exams will not be so intimidating.
- When you study, put away your cell phone and other distractions. Effective studying requires focus.
- Writing out notes *by hand* instead of typing them on a computer is proven to lead to better retention.
- All of the information you need to answer homework and exam questions will be found in our class notes, textbook, or supplemental info provided by Prof. McSwain. If you want to read additional sources outside of class, that's great! But this course is not meant to be a scavenger hunt across the internet, and you will not need to Google any additional information to complete our assignments.

Electronics Policy:

While use of computers is encouraged outside of class, please refrain from using laptops, cell phones, or other electronic devices in the classroom. Studies have shown that laptop users and the students around them are distracted by the devices, lowering their average grades by 11–17 percentage points on average¹. If you do choose to use a laptop in class, please sit in the back row to minimize distractions of other students.

¹http://www.huffingtonpost.ca/2013/08/14/laptops-in-classrooms_n.3756831.html

Academic Integrity:

Academic dishonesty will not be tolerated on any assignment. Copying work from other students or outside sources is considered plagiarism. Outside references (other than the class notes or textbook) must be properly cited if used on any assignment. If I have evidence of copying, cheating, plagiarism, or any other dishonest behavior, I will not hesitate to report my suspicions to the Office of Student Conduct. Their penalties may range from a minor penalty, assigning a zero for that assignment, assigning an F for the final course grade, and even expulsion from the university. Please consider this your final warning.

For every assignment, please ensure that the work that you turn in is your own work. When you collaborate on homework assignments with your classmates, you may discuss the problem solving strategy together. Working together is encouraged when it is used as a learning tool. But, at no time should you share your paper or your answers with anyone else. Allowing someone to copy your answers makes you just as guilty as the copier. If someone asks you something like, “What did you get for Problem 2?” you should not provide the final answer. You may, however, tell them what equation you used or refer to the textbook or notes together and discuss the general topic. When you write your solutions, all mathematical calculations and written explanations must reflect your own work. Showing all of the steps of your calculations and explaining your reasoning throughout a problem is an excellent way to guard your independent work and remove suspicions of academic dishonesty.

Accommodations for Students With Disabilities:

Lehigh University is committed to maintaining an equitable and inclusive community and welcomes students with disabilities into all of the University’s educational programs. In order to receive consideration for reasonable accommodations, a student with a disability must contact Disability Support Services (DSS), provide documentation, and participate in an interactive review process. If the documentation supports a request for reasonable accommodations, DSS will provide students with a Letter of Accommodations. Students who are approved for accommodations at Lehigh should share this letter and discuss their accommodations and learning needs with instructors as early in the semester as possible. For more information or to request services, please contact Disability Support Services in person in Williams Hall, Suite 301, via phone at 610-758-4152, via email at indss@lehigh.edu, or online at <https://studentaffairs.lehigh.edu/disabilities>.

The Principles of Our Equitable Community:

- We affirm the inherent dignity in all of us, and we maintain an inclusive and equitable community.
- We recognize and celebrate the richness contributed to our lives by our diverse community.
- We promote mutual understanding among the members of our community.

- We confront and reject discrimination in all its forms, including that based on age, color, disability, gender identity, genetic information, marital status, national or ethnic origin, political beliefs, race, religion, sex, sexual orientation, socio-economics, veteran status, or any differences that have been excuses for misunderstanding, dissension, or hatred.
- We affirm academic freedom within our community and uphold our commitment to the highest standards of respect, civility, courtesy, and sensitivity toward every individual.
- We recognize each person's right to think and speak as dictated by personal belief and to respectfully disagree with or counter another's point of view.
- We promote open expression of our individuality and our differences within the bounds of University policies.
- We acknowledge each person's obligation to the community of which we have chosen to be a part. We take pride in building and maintaining a culture that is founded on these principles of unity and respect.

We expect each member of this class to acknowledge and practice these Principles. Respect for each other and for differing viewpoints is a vital component of the learning environment inside and outside the classroom.

Tentative Schedule:

Week of Aug. 23:	Introduction to Course; The Celestial Sphere
Week of Aug. 30:	The Seasons; The Moon
Week of Sept. 6:	Solar System Models; Kepler's Laws
Week of Sept. 13:	Gravity and Density; Light and Spectra
Week of Sept. 20:	Atoms and Doppler Shift; Exam 1 Sept. 22
Week of Sept. 27:	Telescopes and Observing Techniques
Week of Oct. 4:	The Solar System; Geology and Planetary Atmospheres
Week of Oct. 11:	Formation of the Solar System
Week of Oct. 18:	Exoplanets; The Sun
Week of Oct. 25:	The Sun's Nuclear Power; Exam 2 Oct. 27
Week of Nov. 1:	Fundamental Properties of Stars; Measuring Distance to Stars
Week of Nov. 8:	Binary Stars; Star Formation and Evolution
Week of Nov. 15:	Variable Stars and Stellar Death; The Milky Way Galaxy
Week of Nov. 22:	Other Galaxies and Structure of the Universe
Week of Nov. 29:	The Expanding Universe
Date TBD	Final Exam (sometime between Dec. 7–15)

This syllabus is only a tentative outline of the course. The grading policy, dates of exams, or the topics covered in class may change as needed.