

ASTR 100: Stars & Galaxies

Fall 2023

Lectures: Monday & Wednesday 10:00 – 11:15 am, L3 Cleveland Hall

Instructor: Katie Lester, klester@mtholyoke.edu, 213 Kendade Hall

Office Hours: Monday 1:00 – 3:00 pm or by appointment.

TA Help Hours: TBD

Course Website: Moodle contains lecture slides, homework, announcements, and all other course material. (However, homework should be submitted in person at the beginning of class.)

Textbook: *The Cosmic Perspective: Stars, Galaxies, & Cosmology*, 9th edition, by Bennett, Donahue, Schneider, & Voit (ISBN [9780134990781](#)). The full *Cosmic Perspective* (which is our textbook + extra chapters) is on reserve at the library for the semester. You're welcome to use an earlier edition but the section numbers may be different.

Prerequisites: None! This is a great first step into astronomy or science in general.

Course Description: Discover how the forces of nature shape our understanding of the cosmos. Explore the origin, structure, and evolution of the earth, moons and planets, comets and asteroids, the sun and other stars, star clusters, the Milky Way and other galaxies, clusters of galaxies, and the universe as a whole.

MHC Learning Goals:

1. Think analytically and critically by questioning assumptions, evaluating evidence, and articulating well-reasoned arguments.
2. Acquire depth, methodological expertise, and historical understanding in a discipline.
3. Develop intellectual breadth through study across disciplines and different modes of inquiry.
4. Develop the ability to write and speak confidently and effectively.
5. Engage in artistic forms of expression.
6. Acquire quantitative and technological capabilities.
7. Develop skills in more than one language and engage with cultural communities other than their own.
8. Conduct independent or collaborative research incorporating diverse perspectives and skill sets.
9. Apply the liberal arts through experiential learning in work and community environments.
10. Learn practices of self-assessment and reflection for academic, personal, and career growth.

ASTR 100 Learning Goals:

With this course, we present the study of the universe as an interdisciplinary science requiring the study of the night sky, stars, the Milky Way, and the universe as a whole from within the context of astronomy and physics. We strive for students to learn to employ quantitative concepts and mathematical methods,

analytical thinking, and demonstration of the sensibilities, understandings, and perspectives of a person educated in a liberal arts tradition (particularly as these sensibilities relate to the natural environment). We aspire to prepare students to make informed decisions as stewards of their environment in their roles as voters, consumers, and contributing members of society. Specifically, this class has three learning goals:

1. Understand fundamental concepts in astronomy such as gravity, the nature of light, the origin of the universe, and physical characteristics of matter (MHC goal #3).
2. Demonstrate skills for quantitative analyses, including the ability to form a hypothesis, graphically represent and interpret data, estimate error and understand sampling bias (MHC goal #6).
3. Critically evaluate representations of science in all types of media (MHC goals #1 and #8).

Participation: : I hope you come to class and actively participate in this course so you can best engage in learning. We will often do example problems and activities in class, which you're encouraged to work on with your classmates.

Grading: Homework is 100% of your grade! There will be roughly 10 homeworks due at the start of class on Wednesdays, and I will drop your lowest homework grade. You're encouraged to work on assignments with your classmates, but each of you must write your homework in your own words. You can type+print or hand write your homework, then turn in a paper copy.

We will discuss each homework in class the week after it's due. You can work with a partner to help explain anything either of you missed, then write a short note explaining how you reviewed each other's work. You will hand this in and get extra credit on the homework. The purpose of this practice is to support two major pathways to student learning – correcting wrong answers and teaching other students.

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| Letter grades: | A > 93 | B+ = 87-89 | C+ = 77-79 | D+ = 67-69 |
| | A- = 90-94 | B = 83-86 | C = 73-76 | D = 63-66 |
| | | B- = 80-82 | C- = 70-72 | F < 60 |

Accommodations: Please let me know if you need any accommodations from the Disability Services office (Mary Lyon Hall 3rd Floor or by [email](#)). I would like to meet with you and discuss your approved accommodations and how we can apply them to this class. (For more information on who might be eligible for accommodations and the application process please see the [Disability Services website](#).)

Students with accommodations are allowed a maximum of five extra days on any homework, and this policy is strictly enforced. How this works – all homework are posted to Moodle on Friday mornings. For students without accommodations, they are due in 5 days (on Wednesday). For students with accommodations for extra time, the homework is due in 10 days (the following Monday). Then we will review the homework in class during the next lecture. In consultation with the Disability Services office, we believe that this time frame will meet the accommodation needs of most students approved for additional time. If you have concerns about how this might impact you and your accommodation needs, please reach out to Disability Services.

Academic Integrity: I encourage you to work together on homework, since science is often very collaborative. You are still expected to follow MHC's [academic integrity policy](#). Any work that does not will be given a zero and reported to the Academic Honor Board. Each student is required to write up and submit their own work. Using artificial intelligence on assignments is prohibited; students should not have another person/entity do the writing of any portion of an assignment for them, which includes AI

tools like ChatGPT.

Mount Holyoke College is a community of students, faculty, staff, and administrators committed to free inquiry and the pursuit of knowledge in the tradition of the liberal arts. The decision to join this academic community requires acceptance of special rights and responsibilities that are essential for its effective functioning and the realization of its mission. All members of the community share the responsibility to uphold the highest standards of academic integrity. I expect all your work to abide by the MHC Honor Code: "I will honor myself, my fellow students, and Mount Holyoke College by acting responsibly, honestly, and respectfully in both my words and deeds." Any work that does not will be reported to the Academic Honor Board.

Tentative Course Schedule:

| Week | Date | Topics |
|------|---------------|----------------------|
| 1 | Sept 6 | Introduction |
| 2 | Sept 11, 13 | The Night Sky |
| 3 | Sept 18, 20 | Historical Astronomy |
| 4 | Sept 25, 27 | Light & Telescopes |
| 5 | Oct 2, 4 | The Sun |
| 6 | Oct 11 | Types of Stars |
| 7 | Oct 16, 18 | Star Lifecycles |
| 8 | Oct 23, 25 | Star Lifecycles |
| 9 | Oct 30, Nov 1 | The Milky Way |
| 10 | Nov 6, 8 | Galaxies |
| 11 | Nov 13, 15 | Galaxies |
| 12 | Nov 20 | Cosmology |
| 13 | Nov 27, 29 | Cosmology |
| 14 | Dec 4, 6 | Life in the Universe |
| 15 | Dec 11 | Miscellaneous |

Schedule is subject to change. See Moodle for updates.

If class is cancelled, any homework due that day will be turned in at the beginning of the next class.