

Astronomy

Stars, Galaxies and the Big Bang

PHYS108 - Spring 2024

[Overview and basic info](#)

[Course info](#)

[Instructor: Dr. Stephanie Douglas](#)

[Course Policies](#)

[Attendance required, let me know ASAP if you will be absent](#)

[Masks required](#)

[Contact and office hours](#)

[Contingency plan for virtual meetings](#)

[Accommodations: flexible, let me know as early as possible](#)

[Collaboration and Plagiarism](#)

[Commitment to Inclusion and Equity](#)

[Do not repost learning materials, do not create your own recordings](#)

[Mandatory Moodle privacy statement](#)

[Assignments and grading](#)

[Course Grade Components](#)

[Three 48-hour free passes to extend deadlines](#)

[Late work policy: 3% off per 24 hours late](#)

[Pre-class work and reading quizzes \(10%\)](#)

[Attendance and class participation \(10%\)](#)

[Classwork \(20%\)](#)

[Labs \(15%\)](#)

[Weekly challenge assignments \(30%\)](#)

[Final project \(15%\)](#)

[Course Outcomes \(learning goals\)](#)

[Planned course schedule \(subject to change\)](#)

Overview and basic info

Course info

Classroom: Hugel 142

Lab: Mondays 1:15-4pm

Lecture: Wednesday/Friday 1:15-2:30pm

Textbook: 21st Century Astronomy, 7th Edition (Palen, & Blumenthal) with [online access](#)

Office Hours: WF 2:30-4pm (Hugel 142), W 5-6pm (Hugel 022)

Instructor: Dr. Stephanie Douglas

Please call me “Professor Douglas” or “Doctor Douglas” or “Professor”

My pronouns are she/her/hers

Email: douglste@lafayette.edu

Office: Hugel 022 (but office hours may be held elsewhere)

Course Policies

Attendance required, let me know ASAP if you will be absent

This class will be taught in person. All class and lab sessions will proceed assuming everyone is participating synchronously, and you will be graded on your participation in class activities. If you must miss class or lab sessions, please let me know as soon as possible. You are responsible for completing the day’s work to receive participation credit for that day.

Your health is always paramount, but even more these days. For minor illnesses, just let me know and I will waive participation for that day. **Please do not attend class if you are ill.**

If you will miss multiple classes due to COVID-19 or another serious illness, let me know ASAP and work with your local health provider (if applicable) and Bailey Health Center to obtain a Dean’s Excuse. Dean’s Excuses are also available for other disruptive life events. If you have a Dean’s Excuse, you will not be required to use the time bank, and participation grades will be waived for the time you were out.

If you will miss class, lab, or an assignment deadline due to a religious holiday, please **contact me by the add/drop deadline** so we can make plans for you to complete the relevant work.

Spring 2024 note: there will be a solar eclipse passing over the USA on Monday, April 8! If you are planning to travel into the path of totality that day, I will excuse your absence and give you an alternative assignment to complete on your trip.

Masks required

To protect the health of our class, masks must be worn during classes and labs. Masks should be made of a tightly woven cloth or non-woven synthetic filtering material, and should be worn properly over the nose and mouth and secured on the chin ([CDC mask recommendations](#)). Food and drink must also be consumed outside of the classroom. Students who show up to class without a mask will be asked to return to class wearing one in order to protect the health of our classroom community. In the event that you do not have access to a mask to wear during the class session, please let me know and I will help you obtain one.

Contact and office hours

Open drop-in “contact” or “office” hours are listed above. You do not need an appointment to stop by! If you would prefer to meet virtually for office hours, I will also keep a Zoom link open.

I also have blocks of time each week for one-on-one meetings; if these times don’t work for you, please email me. One-on-one meetings will be virtual unless we both agree otherwise.

You may send me an email at any time! I generally check email between 10-6 on weekdays, and will reply to your email by the end of the next weekday.

I expect you to check email (and read any announcements) at least once between each class.

Contingency plan for virtual meetings

Ideally we will be able to maintain in-person classes this semester. However, COVID-19 or weather may temporarily require us to switch to Zoom meetings. I will let you know as far in advance as possible if this is necessary. The Zoom link will be posted to Moodle.

Hopefully we’re all familiar with virtual class etiquette by now. Mute your mic when you’re not speaking, raise your hand physically or virtually to speak, be polite in the chat, etc. I would appreciate it if you keep your cameras on - if this isn’t possible, please [set up an appropriate profile picture](#) so that I’m not talking to blank squares.

Accommodations: flexible, let me know as early as possible

My policy: Your success in this class is important to me. If you need accommodations for any reason, please speak with me privately ASAP to discuss reasonable accommodations. I am happy to consider creative solutions as long as they do not compromise the learning goals of the activity.

Mandatory statement for any Lafayette course with a disability policy: Lafayette College is committed to creating a learning environment that meets the needs of its diverse student body. If you anticipate or experience any barriers to learning in this course, you are welcome to discuss your concerns with me. If you have a disability, or think you may have a disability, please meet with the [Office of Accessibility Services](#), to begin this conversation or request an

official accommodation. If you have already been approved for accommodations through the Office of Accessibility Services, please meet with me so we can develop an implementation plan together.

Collaboration and Plagiarism

You are expected to abide by the principles of intellectual honesty outlined in the [Lafayette College Student Handbook](#). All answers must be given in your own words, not copied from the textbook or any other resources. Copying solutions from another source is a violation of the [Academic Integrity Policy](#). This includes Chegg, Bartleby, CourseHero, or similar websites; instructor/publisher solutions; the work of past students; or anything you can find on Google. Use of large language models or “generative AI” such as ChatGPT to generate text or project components is also prohibited. If you have any questions about whether something constitutes academic dishonesty, I encourage you to discuss it with me without hesitation.

Science is a social enterprise, and I encourage you to collaborate with your peers on in-class activities, labs, studying, etc. “Collaboration” does not mean “copying.” You must understand and individually write out your own answers, and you must turn in your own copy of each assignment (unless otherwise noted).

You may not work collaboratively on projects, unless otherwise noted.

Evidence of plagiarism or other academic dishonesty will be reported to the College.

Commitment to Inclusion and Equity

Lafayette College is committed to creating a diverse community: one that is inclusive and responsive, and is supportive of each and all of its faculty, students, and staff. The College seeks to promote diversity in its many manifestations. These include but are not limited to race, ethnicity, socioeconomic status, gender, gender identity, sexual orientation, religion, disability, and place of origin. The College recognizes that we live in an increasingly interconnected, globalized world, and that students benefit from learning in educational and social contexts in which there are participants from all manner of backgrounds. The goal is to encourage students to consider diverse experiences and perspectives throughout their lives. All members of the College community share a responsibility for creating, maintaining, and developing a learning environment in which difference is valued, equity is sought, and inclusiveness is practiced.

If you are experiencing discrimination or harassment in this class, please do not hesitate to reach out to me so that I can help resolve the issue.

Do not repost learning materials, do not create your own recordings

All course materials are proprietary and for class purposes only. This includes posted recordings of lectures, worksheets, discussion prompts, and other course items. Such materials should not be reposted, and should be deleted at the end of the semester. Online discussions should also remain private and not be shared outside of the course. If you have any questions about proper usage of course materials feel free to ask me. You may not record classes yourself.

Mandatory Moodle privacy statement

Moodle contains student information that is protected by the Family Educational Right to Privacy Act (FERPA). Disclosure to unauthorized parties violates federal privacy laws. Courses using Moodle will make student information visible to other students in this class. Please remember that this information is protected by these federal privacy laws and must not be shared with anyone outside the class. Questions can be referred to the Registrar's Office.

Assignments and grading

Unless otherwise noted, all assignments must either be completed entirely within Moodle or Norton Smartwork. Submissions to Moodle must be uploaded as PDF files or Kaltura video links. Work that is uploaded as an image straight from your camera will not be graded.

Course Grade Components

Attendance: 10%
Pre-class work/reading "quizzes": 10%
Classwork: 20%
Labs: 15%
Weekly challenge assignments: 30%
Final project: 15%

Three 48-hour free passes to extend deadlines

Over the course of the semester, you will have three 48-hour passes that you can use to extend deadlines for homework, labs, or projects, no questions asked. You may combine 2 or 3 of these passes on a single assignment, but you may not subdivide the 48-hour increments. The only exception is the final project - you may only use 1 pass on the final. To use a pass, just email me (either ahead of time, or when you turn the assignment in), indicating the number of passes you would like to use.

Late work policy: 3% off per 24 hours late

If you do not use the time bank, late assignments will be penalized by 3 percentage points per 24 hours after the assigned deadline, up to 25% of the total points for that assignment. **Late work will still be accepted through the last day of class, but you are on your honor not to get solutions or assistance from your classmates.**

Pre-class work and reading quizzes (10%)

Reading and pre-class assignments will be assigned ahead of each lecture, generally at least 1 week in advance. These assignments may include watching videos or exploring interactive apps ahead of the class. The goal of the pre-class work is to increase the amount of interaction during our synchronous class time, and minimize the time you're spending watching me talk.

Expect to spend about 4 hours actively reading and interacting with pre-class material per week. Use the listed learning goals to guide your reading. Before each class, you will take small quizzes and/or submit short reflections on the content. These will be graded for completion only.

(If it becomes clear that many students are not completing pre-class work, the reading quizzes will be graded for accuracy.)

Attendance and class participation (10%)

Showing up to class is the bare minimum for receiving participation points. You can also increase your participation score by participating in poll questions, group work, and other in-class activities, and by attending office hours.

Classwork (20%)

Each day in class, you will complete a worksheet in collaboration with your group. Some days I will collect these worksheets to provide feedback and check completion. To receive full credit for classwork, you must make a good-faith effort to work through as many problems as you can, carefully and thoughtfully.

Labs (15%)

Lab periods will generally involve extended activities intended to help you uncover challenging concepts and to meet the Natural Science requirements of the Common Course of Study.

Lab grades will be based on the following

- A completed worksheet or brief report turned in at the end of the lab period (one per group) (6/10 points)
- Accuracy of responses on the group worksheet (4/10 points)

Weekly challenge assignments (30%)

Each week you will be assigned a small project focused on the previous week's content, **due on Fridays at 5pm**. There will be 12 such weekly assignments, and I will drop the lowest two grades.

You may consult your book, class material, and me for your projects. You may consult outside sources as long as you cite them and paraphrase all material in your own words. You may not work with other students on projects unless you talk to me first.

Final project (15%)

You have two options for the final project. In both cases, you will need to meet with me during finals week. Rough outlines of the projects are provided below; details may change.

Option one: individual lab summary, consisting of

- Corrected copies of 3-4 labs on the distance ladder, compiled into a single report linking them together. While the labs were done as a group, these corrections should be completed independently.
- 1-2 pages of additional text explaining how this demonstrates the expansion of the universe, and what is missing from the Hubble-Lemaitre Law.
- A one-on-one meeting with me to review your results

Option two: group demonstration project

- Create a unified demonstration of the distance ladder, with each group member creating a presentation for one step in the ladder.
- Individual meetings with me to review your understanding of the distance ladder and the implications of the Hubble-Lemaitre Law

Course Outcomes (learning goals)

After completing this course, you will be able to...

- Describe the basic levels of structure in the universe and arrange objects in order of size
- Describe the various ways that light gives us information about the universe
- Explain why eclipses happen, and the reasons for the particular appearance of the April 8, 2024 eclipse as viewed from Easton
- Use Kepler's laws to describe the motion of objects in the Solar System
- Explain how the Sun affects our life on Earth
- Relate the appearance of different galaxies and star clusters to their stellar populations
- Identify which types of stars are most common, and how that changes over time for a given group of stars
- Describe the evolution of stars of different masses, and their end products
- ~~Explain how galaxies reach their current form, and how this may affect their appearance~~
- Describe the history of the universe and its expansion
- [NOTE: don't pick this one for the W14 reflection.] Determine the relative distances to other galaxies using a standard candle technique

In addition to the outcomes listed above, this course will promote the outcomes from the Natural Sciences section of the Common Course of Study. You will be able to...

- NS 1: Employ the fundamental elements of the scientific method in the physical and natural world by identifying and evaluating a testable scientific hypothesis.
- NS 2: Create and evaluate descriptions and representations of scientific data via equations, graphs, tables, and/or models.

Specific learning goals for each unit will be distributed weekly.

Student work in this course is in full compliance with the federal definition of a 4 credit hour course.

Planned course schedule (subject to change)

Textbook: 21st Century Astronomy, 7th Edition (Kay, Palen, & Blumenthal) with [online access](#)

*indicates supplemental material will be provided on Moodle

Wk	Dates	Ch.	Topic	Other notes
1	Jan 22 - 26	1, A1-2	Our place in space, scientific method, math review	Lab: intro/setup
2	Jan 29 - Feb 2	2	What we see in the sky; eclipses	Lab: Seasons & moon phases Add/drop deadline Friday
3	Feb 5 - Feb 9	3, *	Kepler's laws, gravity	Lab: Angular sizes and eclipses
4	Feb 12 - Feb 16	5.1-5.2	Light, Part I	Lab: Safely observing the Sun (weather permitting)
5	Feb 19 - Feb 23	5.2-5.4	Light, Part II	Lab: Spectroscopy
6	Feb 26 - Mar 1	13	Observing the stars	Lab: TBD
7	Mar 4 - Mar 8	14	The Sun	Lab: Safely observing the Sun (weather permitting)
			Spring break, no classes	Daylight Saving Time starts
8	Mar 18 - Mar 22	15	Star formation	Lab: Distance ladder - Parallax (Mid-term grades due)
9	Mar 25 - Mar 29	16	Stellar evolution - low-mass stars	Lab: HR Diagrams
10	Apr 1 - Apr 5	17.1-17.3	Stellar evolution - high-mass stars; the Sun in context	Lab: Distance ladder - Cepheid variables
11	Apr 8 - Apr 12	17.4	Eclipse recap; star clusters	Lab: SOLAR ECLIPSE
12	Apr 15 - Apr 19	18, 19.1	Black holes; different types of galaxies	Lab: TBD
13	Apr 22 - Apr 26	20, 19.2, 21	Galaxies & the Milky Way; Hubble's Law and the expansion of the universe	Lab: Distance ladder - white dwarf supernovae
14	Apr 29 - May 3	22	Variable expansion rate; summary activities	Monday: regular class replaces lab
	Finals week			Final project due