

ASTRO 110

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Develop a basic understanding of astronomy topics

At the end of the semester, we will be able to explain astronomy concepts to friends and family. We will also be able to read and understand articles written about current astronomy research.

Practice mathematical and scientific skills

Throughout the semester we will apply scientific reasoning and mathematical tools to solve astronomy problems.

Learn how current astronomy research is accomplished

At the end of the semester, we will be able to create research plans for a given scientific question that use appropriate astronomical instruments and follow the scientific method.



Introductory Astronomy

I am so excited to explore space with you this semester! We will be covering all types of fun subjects, starting with Earth and our solar system and moving through stars, galaxies, and origins of our universe. I believe (and studies have shown) the best way to learn is by doing, so throughout the semester I will be asking you to act as scientists as we work together to uncover the mysteries of life, the universe, and everything! I hope you are as excited as I am to really dig into some of the most amazing discoveries of the past few centuries (in my opinion)!



Course Expectations

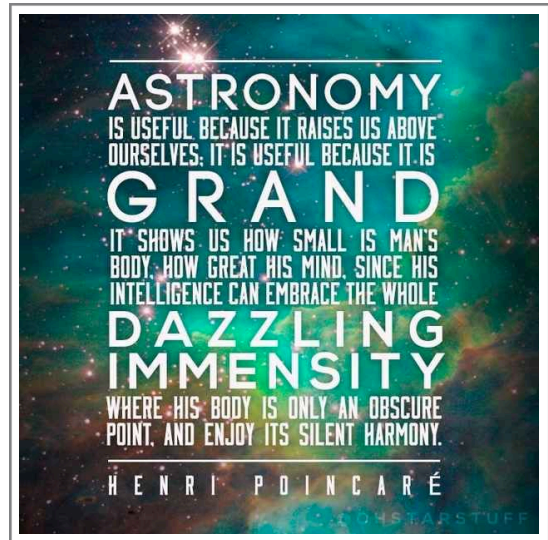
What I ask of you

1. Although we may not be able to meet in person, we will still need to work together to build knowledge of space! This means your participation is a vital part of the learning process, please be sure to stay on track, whether you choose to participate synchronously or asynchronously!
2. Respect your fellow classmates. Science can be messy, and we are going to dive right into this mess. Be kind and supportive as we work through some difficult questions!
3. Respect yourself! Astronomy isn't an easy subject, sometimes things will get tough. Remember that you are awesome and working hard to answer some of the big questions we have about the Universe!
4. Ask questions. Ask me, ask your classmates, ask your TA's, ask google. Progress couldn't be made in science if folks weren't asking questions! And no question is dumb, chances are if you're confused, someone else is as well. You asking will help the whole class!



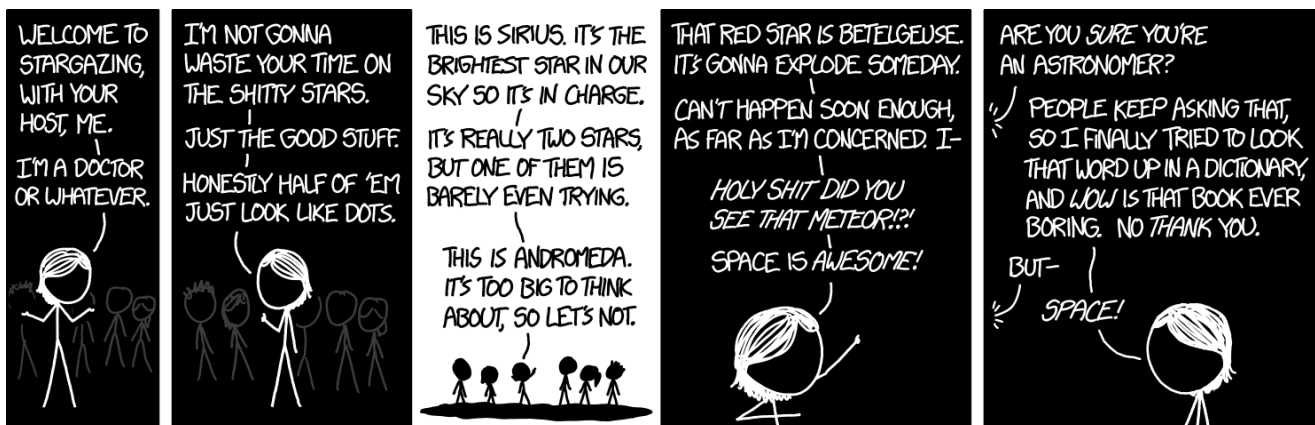
What you can expect of me

1. Pretty much everything I ask of you. I will come to class prepared and ready to teach! And of course, I will maintain the utmost respect for each student in this class.
2. To teach in a clear, organized manner to help you become competent and confident astronomers. At the expense of skipping some of the later topics, I will reserve the option of slowing down the pace of the course according to the students' needs.
3. Throughout the course, I will administer feedback questionnaires and act on the advice you give me on how to make this course the best learning experience for you.
4. I will encourage group learning with frequent questions and activities to be discussed in groups. Research on how people learn **STRONGLY** indicates that lecture alone is **NOT** an effective way to learn. Effective learning requires interaction with the material, instructor, and your classmates.
5. Think of me as your tour guide to the Universe! Classes should be fun, engaging, and interesting. It is my job to help you all discover all the cool things out there!



If you want to learn more about my thoughts on teaching, feel free to check out my video teaching philosophy (or my written one). Both are accessible on my webpage, here:

www.physics.uwyo.edu/~jessicas/teach/



Schedule

Week	Subject	Assignments	Reading
1	Introduction, Mapping the Sky	Begin Planetary Scientist badge points	8/25: None 8/27: Chapter 2.1, 4.1-4.2
2	Gravity, Light		9/1: Chapter 3 9/3: Chapter 8.1-8.4, 9.1-9.4
3	Earth and the Terrestrial Planets		9/8: Chapter 9.5 9/10: Chapter 10
4	Jovian Planets and Dwarf Planets	Exam on Planetary Astronomy	9/15: Chapter 11 9/17: None (Exam 1)
5	The Sun	Begin earning Stellar Scientist badge points	9/22: Chapter 5 9/24: Chapter 15.1, 15.2
6	Classifying Stars		9/29: Chapter 16 10/1: Chapter 7.2, 17.3-4, 18.1, 18.4
7	Lives and Deaths of Stars		10/6: Chapter 18.2-3, 19 10/8: Chapter 22
8	The Milky Way	Exam on Stellar Astronomy	10/13: Chapter 23 10/15: None (Exam 2)
9	Galaxy Types and Structures	Begin Extragalactic Scientist badge points	10/20: Chapter 25 10/22: Chapter 26.1-4
10	Galaxy Evolution		10/27: Chapter 28 10/29: Chapter 29.1-5
11	TBD		
12	TBD		
13	TBD/ Final Exam	Complete any unfinished badges	
14	Poster Presentations		

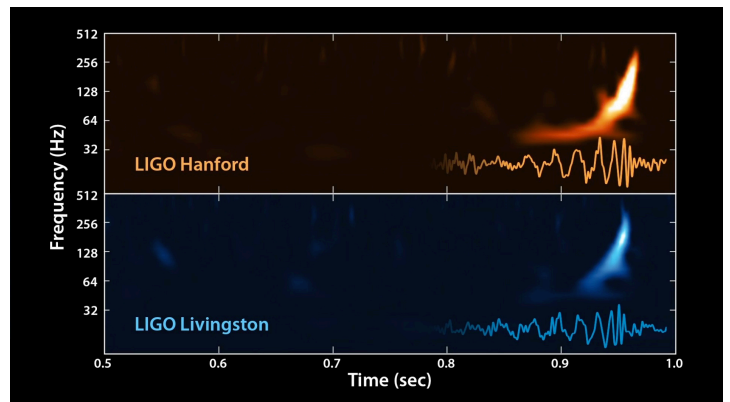
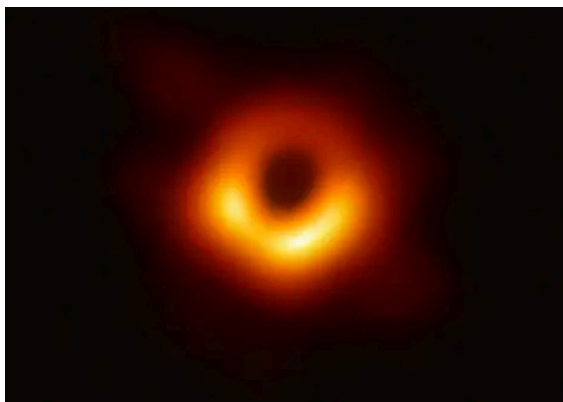
TBD Part of the Schedule

You might have noticed that the last week on the schedule is 'TBD'. This is because I want you to have some input on what you want to learn about in this class. You all signed up for this class because you are interested in astronomy, and I want to make sure I cover everything you were hoping to learn about. Below are some topics we could cover in those last weeks:

- Rockets and space travel
- Current NASA and other space agencies' missions
- Exoplanet detection characterization
- Dark Matter: What is it and how do we know it's there?
- Black holes and other strange object
- Aliens! The new field of astrobiology
- LIGO and gravity waves
- The history of astronomy
- Astronomy in other cultures
- Asteroids, comets and other space debris
- Telescopes



If there are other topics you are interested in, please let me know! Our second reading quiz will include a vote, and the most popular topics will be added to the schedule for the last week of class.



Assessment

Throughout this course, your goal will be to earn the three scientist badges (planetary, stellar, and extragalactic). To earn each badge, you will need to earn 70 points by completing different types of assignments in that subject. You can then earn up to 100 points in each badge by completing as many additional assignments as you choose. The main ways to earn points are by attending classes and completing the in-class assignments for that day, doing homework projects, completing labs, and taking exams.

PARTICIPATION (32 POINTS POSSIBLE PER BADGE)

As we will be working together in class to build knowledge, it is important that you attend classes. Participation points will be determined based on turning in written reflections, participating in PollEverywhere questions, and completing in class worksheets. There is no partial credit for participation, either you tried or you didn't; there is no penalty for getting an in-class assignment 'wrong'. Failure is an important part of the scientific process, and we should learn from it! Each day you attend class and turn in the assignment will earn you 4 points towards that module's badge.

HOMEWORK (25 POINTS POSSIBLE PER BADGE)

There will be multiple ways for you to earn homework points throughout the semester. I want you to be able to choose the methods that you think show your learning best. This way, you can create your own path through this course. The types of homework assignments will be:

- ✦ Biography Projects (5 points each)
- ✦ Problem Sets (5-10 points each)
- ✦ Citizen Science Projects (7 points each)
- ✦ Open-ended Projects (7 points each)
- ✦ Science Article/Podcast Projects (5 points each)
- ✦ Reading Quizzes (2 points each)

EXAMS (30 POINTS POSSIBLE PER BADGE)

There will be one exam per badge (so, three exams) in this course. They will be based on the work we have done together in class. I will provide a study guide at least a week before each exam. After each exam, you will have the option to correct mistakes and earn half-points back for any questions missed during the test.

LABS (25 POINTS POSSIBLE PER BADGE)

Throughout the semester we will have lab meetings on Tuesday nights. During these times, you can complete written labs or observing labs to earn points towards each badge. Each lab will list how many points it is worth.



Planetary
Scientist badge



Stellar Scientist
badge



Extragalactic
Scientist badge

FINAL POSTER PROJECT (10 % OF FINAL GRADE)

In addition to your three badges, you will be required to complete a final poster project on a subject of your choosing.

Nuts and Bolts

Grades

The points you earn towards badge will be 90% of your grade in this course, divided evenly between the three badges. 90-100 points is an A, 80-89 points a B, 70-79 points a C, 60-69 points a D, and anything below 60 an F. The final 10% of the course grade will be determined by the final poster project.

Office Hours

I will set up zoom office hours Tuesday and Thursday mornings from 10:00AM to noon. I will also be available for one-on-one virtual meetings throughout the week, please do not hesitate to reach out!

Textbook

We will be using the OpenStax Astronomy 101 textbook. This is a free astronomy textbook and can be downloaded here: <https://openstax.org/details/books/astronomy>

My Remote Plan

I want to make this course as flexible as I can. With that in mind, my plan is to host live zoom sessions that I will also record. This way, you can choose to join and participate during the scheduled class time or watch later. If you join in the live zoom meeting, I will be able to answer your questions in real-time and you will be able to chat with your classmates during discussions. If you choose to watch the recordings later, it might take me a little longer to get to any questions you have about the material, but you will also be able to pause, rewind, etc. This is a learning process for me as well, and I ask for your patience and feedback as we determine the best way to learn during this unusual time. I will post all materials for the class on the canvas site along with the videos of the lectures as soon as I get them edited and ready to post. Please do let me know if there is any way I can make your learning experience better despite difficult circumstances!

Disclaimer

This document is subject to change throughout the course.