



Astronomical Ideas

ASTR101

Instructor Info



Prof. Karen Masters



Student Hrs: MWF 10.30-11.30am



Observatory A



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Course Info



Prereq: None



Class: Mon, Wed, Fri. .



9.30am-10.30am or 11.30am-12.30pm



Observatory

Lab Info



Some evening Observing Labs will be planned



After sunset



Observatory

TA Info



TBA



TBA



TBA

Overview

ASTR101, "Astronomical Ideas" provides an introduction to both modern and ancient astronomy with minimal mathematics. My goal is to provide a framework to discuss the nature of science and astronomy. This will cover three main topics on the theme of "Our place in the Universe" - (1) the view we have from Earth and how humans have interacted with it and used it to learn about the Universe; (2) our understanding of planets (including our own Earth as a planet and the latest knowledge of planets outside our solar system), (3) what we know about galaxies (including ours and our neighbours) and the rest of universe.

Material

We will use the Open Stax "Astronomy" textbook which is available (free) online at <https://openstax.org/>.

It is not necessary to purchase a hard copy (although they are available).

If any student finds a significant error (not a simple typo, but something which impacts understanding – as verified by the Professor) in this open source books they will be rewarded with the option to drop their worst HW grade at the end of the semester.

Diversity and Inclusivity Statement

Our classroom should be a place where all members will be treated with respect. I welcome individuals of all ages, backgrounds, beliefs, ethnicities, genders, gender identities, gender expressions, national origins, religious affiliations, sexual orientations, ability - and other visible and non-visible differences. All members of this class are expected to contribute to a respectful, welcoming and inclusive environment for every other member of the class. If something was said in class (by anyone including myself) that made you feel uncomfortable, please talk to me about it (anonymous feedback is always an option). I appreciate any opportunity to continue my learning about diverse perspectives.

In an ideal world, science would be objective. However, science is done by people, and is historically built on a small subset of privileged voices. In this class, we will make an effort to notice the contributions of diverse group of scientists, but limits still exist on this diversity. I believe that integrating a diverse set of experiences is important for a more comprehensive understanding of science.

Honour Code

Collaboration is an important part of science. You are strongly encouraged to work together and/or consult one another for work in this class. You are encouraged to consult any books necessary as well as resources on the internet. You must, however, turn in your own individual homework, and this must be written on your own. Copying and pasting (even parts of sentences) is not permitted and is a violation of the Honour Code. Good collaboration involves everyone understanding what is going on in the assignments. Therefore even if the basic solution is shared you must explain it in your own words (including mathematical words as appropriate). Please list any students that you collaborated with. Please pay attention to your classmates to make sure no one is being left out of collaborative work.

You may not obtain materials from students who have taken this course in previous years, nor may you distribute your current materials to students not currently enrolled in this class. Please consult me if you have any questions.

Grading Scheme

60%	Homework Assignments
10%	Participation and Contributions
30%	Final Project

FAQs

? Will I learn how to use a telescope in this class?

! Possibly. Part of the labs will involve observing with the Strawbridge Observaory 12" telescope, and maybe the Solar telescopes in the Observatory Library. I also encourage you to join the Public Observing Team if you wish to learn to use the telescopes more and/or have fun exploring astrophysics with visitors.

? What is astrophysics?

! The use of physics to understand and learn about objects in the night sky. All areas of physics, as well as a lot of chemistry (and some biology) are important to the full understanding of astrophysical objects.

? What's the difference between astronomy and astrophysics?

! It's really just semantics in the modern usage. The most useful distinction is that there are lots of Amateur Astronomers (someone who as a hobby uses a telescope to view the skies), while it's much more unusual to be an Amateur Astrophysicist (someone who uses physics to interpret objects in the Universe). At Haverford the Astrophysics Major is basically the same as the Physics Major with an Astro emphasis, while the Astronomy Major has more astronomy and less core physics.

? What is your favorite astronomical object?

! Galaxies are my favourite - and they contain all the other interesting stuff.

Homework Assignments

A small homework assignment will be due almost every week. You will submit electronically via Moodle, so if you create handwritten work please use a Scanner (or Free Scanning Ap on your phone) to create a single PDF to upload to Moodle. Do not write your name on the scanned document (to enable blind grading).

Blind Grading

Please do not write your name on your HW before you turn it in.

Blind grading has been demonstrated to reduce unconscious bias (both positive and negative) in grading. For this reason, while I will review your HW after they are graded to check on your progress in the course, the graders or I will usually not know whose assignment we are grading when grading.

How to Succeed

My goal is to help everyone to succeed in this class. Lectures will be (technology willing) recorded on Panopto and made available for review on the Moodle site. If you cannot make my reserved for student hours, you can see when my calendar thinks I'm free (and likely working in my office in the Observatory) here: <https://calbird.com/karen/1136>.

Extensions and Absences

You are expected to attend all lectures, having done the required reading/pre-work. Unexplained absences (i.e. not caused by illness, emergency or religious observance) will count against your participation grade. Please email me (in advance if possible) if you know you need to miss class.

You will not be able to participate fully in class if you do not keep up with the HW schedule. However, if requested in advance, a 48 hour extension will be granted no questions asked. If you do not ask in advance, or need to go beyond that (without a formal accommodation), 10% credit will be lost each day that any assignment is late, up to 50% off. After ten days late, an assignment will earn no credit.

Participation

Participation is more than just attending lectures (although not attending will hurt your participation grade). My assessment of your participation and contributions will factor in your positive efforts to engage with the material, your coming to class prepared (having read the material, and done any pre-class assignments), your professional and respectful interactions with other members of the class, and your willingness to share your knowledge and understanding with others.

There will be some pre-class material posted to turn in online. While this will not be formally graded, missing significant amounts of this will count against your participation grade.

Accommodation Statement

Haverford College is committed to providing equal access to students with a disability. If you have (or think you have) a learning difference or disability – including mental health, medical, or physical impairment, please contact the Office of Access and Disability Services (ADS) at hc-ads@haverford.edu. The Coordinator will confidentially discuss the process to establish reasonable accommodations.

Students who have already been approved to receive academic accommodations and want to use their accommodations in this course should share their verification letter with me and also make arrangements to meet with me as soon as possible to discuss their the specific accommodations. Please note that accommodations are not retroactive and require advance notice to implement.

It is a state law in Pennsylvania that individuals must be given advance notice if they are to be recorded. Therefore, any student who has a disability-related need to audio record this class must first be approved for this accommodation from the Coordinator of Access and Disability Services and then must speak with me. Other class members will need to be aware that this class may be recorded. It is my intention to record all classes in Panopto to make them available on Moodle.

Class Schedule (Subject to Change)

Week	Topic	Reading	Assignment Due
Our View of the Universe			
Week 1: 21-24th Jan	What is Astronomy? The Nature of Science Astronomy as one of the original liberal arts	Ch 1	
Week 2: 27-31st Jan	Observing the Sky - days, seasons and Moon phases Observing Sessions (TBC)	Ch2.1 Ch4.1, 4.2, 4.3, 4.5	1. Letter
Week 3: 3-7th Feb	Ancient Astronomy Starlore from Around the World	Ch2.2, Ch4.4, Greek Con- stellation Myths Relearning Star Sto- ries of Indigenous Peoples	2. Where is Ithaca Jones?
Week 4: 10-14th Feb	Light and Light Pollution		3. Star stories
Wed 12th:	Planetarium Visit (~10.30am-1.30pm)		
Fri 14th:	No class		
Week 5: 17-21st Feb	Astrology and the Birth of Modern Astronomy	Ch 2.3/2.4	4. Astrology Opinions
Fri 21st:	Special Collections Visit, Lutnick 232		
Planets			
Week 6: 24-28th Feb	Our Solar System Earth as a Planet (inc. Zootools 101)	Ch 7, 3.1 Ch 8	5. Moon Observations
Week 7: 2-6th Mar	The Sun as a Star (Stars) Exoplanets	Ch15, 16 Ch21.3-6	6. Diameter of Earth
Spring Break Mar 9-13th			

Week	Topic	Reading	Assignment Due
Galaxies and the Universe			
Week 8: 16-20th Mar	What is a Galaxy and How do we observe them?	Ch 26	7. Mass of Jupiter
Week 9: 23-27th Mar	The Contents of Galaxies (Stars mostly)	Ch21.2	8. Research Groups Set
Week 10: 30th - 3rd Apr	The Process of Modern Research	Ch 26	9. Research Questions and Hypothesis.
Week 11: 6-10th Apr	KLM AWAY - Dr. Dave Stark will take class	TBA	TBA
Week 12: 13-17th Apr	Research Project Work	-	10. Key Plots
Week 13: 20-24th Apr	Research Project Work	-	Final Project Videos
Week 14: 27th -1st May	Final Project Peer Review	-	Final Submission
Exam Period	No work due		