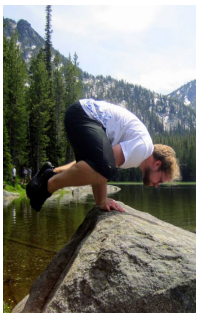
Phys 110

Astronomy

MWF, 10:20am, Collins 205

Fall 2018



Jed Rembold, Ph.D

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Collins 311
Goudy Hours: M-Th 1–2pm: Eating but open to questions or chatting!
Office Hours: M,W,Th 2–5pm or whenever my door is open (basically always)
(503) 370-6860

This syllabus is subject to change or adaptation as the semester progresses.

Course Description: Physics 110 provides a broad scientific overview of our current understanding of the universe and its evolution. We will be covering topics involving naked eye and telescope observations, our solar system, star formation and galaxies. In particular, this course will focus on the interplay between observations and theory, and how the two influence and push the boundaries of one another. This course satisfies both a Natural World MOI credit as well as a QA credit toward your graduation requirements.
Prerequisite(s): None!
Note: A minimum grade of C- is required for this course to count toward university credit.
Credits: 1.0

Text: *Astronomy*
Author: Openstax
ISBN-13: Print Version: 1-938168-28-3
Note that online or pdf copies of this book are 100% free!
https://openstax.org/details/books/astronomy

Course Objectives:
Over the semester, students will gain a working knowledge in:

1. The fundamental topics of observational astronomy
2. Our solar system
3. Stars
4. Galaxies
5. Evolution of the universe

Moreover, astronomy is a field in which observational data regularly influences theoretical concepts and vice versa. Thus we will devote a particular emphasis to analytically interpretting data and evaluating its contributions to theory.

Grade Distribution:

Attendance	5%
Labs	20%
Homework	25%
Test 1	10%
Test 2	10%
Test 3	10%
Final Exam	20%

Letter Grade Distribution:

>= 92.00	A	72.00 - 77.99	C
90.00 - 91.99	A-	70.00 - 71.99	C-
88.00 - 89.99	B+	68.00 - 69.99	D+
82.00 - 87.99	B	62.00 - 67.99	D
80.00 - 81.99	B-	60.00 - 61.99	D-
78.00 - 79.99	C+	<= 59.99	F

Student Learning Objectives (SLO):

- To gain an understanding of common astronomical concepts and to use that understanding in thinking critically about popular theories and misconceptions. Demonstrated through reading, homework, labs, and passing the midterms and final exam.
- To practice and gain skills in astronomic observations, including both the gathering of observations and interpreting those observations' influence on theory. Demonstrated through homework and lab participation.
- To gain some wonder and appreciation for the cosmos and our little place in it.

Course Assessment:

- **Homework**
  - Due to the sheer size of the class, homework will be done through the online platform WebWorK this semester. Instructions for getting setup on WebWorK will be posted online. Small homework assignments will be assigned after each class and will be due before the start of the next class period. Generally these assignments will vary from 2-4 questions. Late work can be submitted up to two class days late, but will only receive 75% of the earned points. Homework is a large percentage of your grade in this class, so try to stay on top of things! In addition, using WebWorK this semester considerably complicates my writing of assignments, but is free for you to use! So please be patient if mistakes or issues creep in throughout the semester.
- **Labs**
  - Labs will take place each Monday from 7-10pm. Owing to the single lab section for such a large class, you will be divided into two groups and will meet on alternating weeks for your lab section. In general this will mean you have lab every other week. Lab work will involve a combination of night sky observations (when it's nice out), computer planetarium activities, and other demonstrations. If circumstances arise and you have to

miss a lab, please contact me as soon as possible so that we can discuss options. There will be a few open weeks throughout the semester when a missed lab might be made up, but please try to make it on your assigned evening. In addition, we will sometimes be leaving the lab rooms to go make observations or work on some activity, so be late at your own peril! Attendance in labs is **mandatory** for you to receive points for that lab. *Failure to show up to labs will badly hurt your overall course grade, so make sure to be there!*

- **Tests**
  - There will be three tests spaced throughout the semester in addition to the final. Tests will take place during lecture hours, and will thus be limited to 1 hour. Calculators are encouraged, however cell phones or any other Internet capable devices are prohibited. Basic trig calculators will do everything you need for this course and are only a few dollars should you need one for test days. All tests will be closed book, though I will provide a cover sheet (available to see beforehand) with some basic information and equations. All needed constants and equations will be provided for you on tests, you'll just need to know how to use them!
- **Attendance**
  - Attendance to lectures will be graded. Questions will be asked in class and students will respond via polling technology. Simply responding to each question will earn your attendance points for the day, but answering correctly will earn you some extra credit. So show up and pay attention! Those extra points can definitely add up! I've had students get upwards of 2% extra on their *course grade*, which makes me real unforgiving if you come up just short of a grade breakpoint but had laissez-faire attendance...

Willamette Policies:

Academic Honesty

Cheating is defined as any form of intellectual dishonesty or misrepresentation of one's knowledge. Plagiarism, a form of cheating, consists of intentionally or unintentionally representing someone else's work as one's own. Integrity is of prime importance in a college setting, and thus cheating, plagiarism, theft, or assisting another to perform any of the previously listed acts is strictly prohibited. An instructor may imposed penalties for plagiarism or cheating ranging from a grade reduction on an assignment or exam to failing the course. An instructor can also involve the Office of the Dean of the College of Liberal Arts for further action. For further information, visit: https://willamette.edu/cla/catalog/resources/policies/plagiarism_cheating.php.

Time Commitments

Willamette's Credit Hour Policy holds that for every hour of class time there is an expectation of 2-3 hours work outside of class. Thus, for a class meeting three days a week you should anticipate spending 6-9 hours outside of class engaged in course-related activities. Examples include study time, reading and homework, assignments, research projects, and group work.

Special Accommodations

Please tell me about any special accommodations that will affect your participation in this course within the first two weeks of class. I will respect any accommodations authorized by the Office of Disabilities Services.

Tentative Course Outline:

The weekly coverage might change as it depends on the progress of the class. However, I highly recommend you follow along with the reading, as it makes a large difference!

Week	Date	Reading	Description	Lab
1	Aug 27	Chatper 1	Science and the Universe	Astronomic Distances A
	Aug 29	Chapter 2	Observing the Sky	
	Aug 31	Chapter 2		
2	Sep 3		Labor Day!	No Lab!
	Sep 5	Chapter 2		
	Sep 7	Chapter 3	Orbits and Gravity	
3	Sep 10	Chapter 3		Astronomic Distances B
	Sep 12	Chapter 4	Earth and Sky	
	Sep 14	Chapter 4		
4	Sep 17	Chapter 5	Radiation and Spectra	Light Lab A
	Sep 19	Chapter 5		
	Sep 21	Chapter 5		
5	Sep 24	Chapter 6	Astronomical Instruments	Light Lab B
	Sep 26	Chapter 7	Intro to the Solar System	
	Sep 28		**Test 1: (Ch 1-6)**	
6	Oct 1	Chapter 8	Earth as a Planet	Terrain Features A
	Oct 3	Chapter 9/10	Cratered Worlds and Earthlike Planets	
	Oct 5	Chapter 11	The Giant Planets	
7	Oct 8	Chapter 12	Rings, Moons, and Pluto	Terrain Features B
	Oct 10	Chapter 13	Comets and Asteroids	
	Oct 12	Chapter 13		
8	Oct 15	Chapter 14	Origin of the Solar System	Exoplanets A
	Oct 17	Chapter 15	A Garden Variety Star	
	Oct 19		Midsemester Day (No Class!)	
9	Oct 22	Chapter 15		Exoplanets B
	Oct 24	Chapter 16	A Nuclear Powerhouse	
	Oct 26		**Test 2: (Ch 7–14)**	
13	Oct 29	Chapter 17	Analyzing Starlight	No Lab!
	Oct 31	Chapter 18	A Celestial Census	
	Nov 2	Chapter 20	Celestial Distances	
10	Nov 5	Chapter 21	Birth of Stars	Sun/Parallax A
	Nov 7	Chapter 22	Adolescence to Old Age	
	Nov 9	Chapter 23	Death of Stars	
11	Nov 12	Chapter 24	Black Holes and Curved Spacetime	Sun/Parallax B
	Nov 14	Chapter 25	The Milky Way Galaxy	
	Nov 16		**TEST 3: (Ch 15–24)**	
12	Nov 19		Eat	
	Nov 21		all the	
	Nov 23		Turkey!!	
14	Nov 26	Chapter 25		Milky Way A
	Nov 28	Chapter 26	Galaxies	
	Nov 30	Chapter 26		
15	Dec 3	Chapter 29	The Big Bang	Milky Way B
	Dec 5	Chapter 29		
	Dec 7	Chapter 30	Life in the Universe	
16	Dec 12		**Final Exam: 8-11am**	