

Astronomy 170B1, Section 1 - The Physical Universe

Fall 2016

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Wednesday 3:00 p.m. – 4:00 p.m.

Lectures: Monday/Wednesday, 10:00 a.m. – 10:50 a.m.
Steward Observatory, Room N210

Discussion Sections: Fridays as specified in schedule, 10:00 a.m. – 10:50 a.m.
Steward Observatory, Room N210
Steward Observatory, Room 202
Steward Observatory, Room 208

Midterm Exams: Wednesday, September 21, in SO N210
Monday, October 24, in SO N210
Monday, November 21, in SO N210

Final Exam: Friday, December 9, 10:30 a.m. – 12:30 p.m, in SO N210

Websites: <https://d2l.arizona.edu/>
<http://masteringastronomy.com/> (instructions below)

Course Description:

The Physical Universe is a survey of modern astronomy. Astronomy is a fast moving field covering an enormous range of phenomena, we will examine many topics including: the Earth, its Moon, our Solar System, distant planets, stars, galaxies, black holes, and the Big Bang. We will also use astronomy to learn about the nature of scientific inquiry, the process by which we learn about the world we live in. You will see the scientific method in action as we follow the discoveries that have led to our current understanding. This course is an approved Tier One course in the Natural Sciences study area of the General Education Curriculum.

Course Objectives:

At the end of this course, you will have familiarity with large parts of astronomy and be able to understand the context of astronomical research you may see reported in newspapers and magazines. You should understand aspects of astronomy that touch your daily life, for example that the moon can be up in the daytime and that we are not closer to the Sun in summer. More

importantly, you will understand the scientific method and the way in which scientific reasoning increases our understanding of the natural world. Science plays an important role in modern society and scientific issues are constantly under public discussion, this course will help you critically evaluate the positions in these debates and form independent conclusions.

Style of Instruction:

This course will meet on Mondays, Wednesdays, and most Fridays for lecture periods, and will divide into three discussion/laboratory sections on some Fridays. Lectures will be as interactive as possible, interrupted with discussion and peer instruction. The laboratory sections will involve small group work. Be prepared to interact with the instructors and with your peers, to interrupt and ask questions, to learn from each other, and to report to the class on these activities.

Required Textbooks:

The required course text is:

The Cosmic Perspective, 8th Edition, by Bennett, Donahue, Schneider, & Voit

Access to the *Mastering Astronomy* website (for all homework) is also required (see final page of this syllabus).

The textbook and *Mastering Astronomy* access are sold in the bookstore as a bundle with ISBN 9780134058290. If you buy a used book, or one without *MA* access, or want an electronic book, you can purchase these from the *Mastering Astronomy* website. See the last page of the syllabus.

Course Communications:

You will receive information about assignments, schedule changes, and any other course-related communications through D2L. For matters related to a subset of students, email will be the primary method of communication.

Grading:

Your grade will be determined by the following components:

Midterms	30%	(best two out of three)
Final	12%	
Homework	30%	
Written Assignments	10%	
Laboratory Activities	10%	
Attendance/Quizzes	8%	

The percentage thresholds for letter grades will be:

A = 90% B= 80% C=65% D=50%

I reserve the right to make the grading slightly easier, but will not raise these thresholds.

Assignment/test grades will be final one week after they are visible on D2L, please bring questions, disputes, or mistakes to my attention immediately.

Midterms/Final:

There are three midterms. The lowest of your midterm scores will be dropped. Together, the midterms and final comprise nearly half of the course grade.

Attendance at the exams is mandatory, there are no make up exams. The dates for the midterms and final are listed on the first page and will not change. If you cannot make one of the exam dates, consider switching to a different section of this course. If you do miss a midterm for an emergency, it will count as your dropped test.

Homework:

Homework assignments will consist of problem sets on *Mastering Astronomy*. These problems are intended to reinforce the concepts addressed in lecture and in the readings.

Assignments will be due approximately weekly at the start of a class session. Late homework is accepted, but 10% of the credit is lost each day, until you reach 50%. To encourage you to complete the assignments, 50% credit is possible until the day of the final exam.

Extra points are often made available to assist you in learning the material and to help improve your overall homework score. However, you may not receive more than 100% on the homework portion of your final grade.

Written Assignments:

All Tier One and Tier Two General Education Courses are writing intensive (<http://gened.arizona.edu/content/writing-component>). Over the course of the semester you will be asked to read articles on scientific research of interest to the course, taken from major publications and intended for a general audience. Your task will be to understand these articles and write about them. A grading rubric will be provided with the assignments. For the first assignment you will also review the rough draft of a peer and provide structured feedback to them. Pre-submission review of your writing will also be available from the TAs and Professor.

Laboratory Activities:

The Friday breakout sessions will provide supplementary instruction, scientific experiments, and group learning activities. You will turn in assignments from these activities that will become part of your grade. Because they rely on data gathering and/or group discussions you may not make up these activities. Excused absences will be accommodated.

Attendance/Quizzes:

Attendance is strongly encouraged, and is part of your grade. If the lectures and discussions are operating as intended, the interactions between us will be far more valuable to your success in this course than whatever time you could save by skipping class. You are expected to have read the textbook before lecture, and quizzes in class will be used to enforce this.

Notecards will be distributed in lecture to record your presence (and, occasionally, to give quizzes). Attending 75% of the lectures is good enough for full attendance credit. Turning in a card for someone else is not allowed and will be treated as a violation of the Code of Academic Integrity.

The UA's policy concerning Class Attendance, Participation, and Administrative Drops is available at:

<http://catalog.arizona.edu/policy/class-attendance-participation-and-administrative-drop>

The UA policy regarding absences for any sincerely held religious belief, observance, or practice will be accommodated where reasonable:

<http://policy.arizona.edu/human-resources/religious-accommodation-policy>

Absences preapproved by the UA Dean of Students (or dean's designee) will be honored. See:

<http://policy.arizona.edu/employmenthuman-resources/attendance>.

Extra Credit:

Extra credit opportunities will be announced in class. They will have a value comparable to homework assignments. Your extra credit is capped at 4% of the course grade.

Tentative Schedule:

Week	Date	Lec/Lab/Other	Topic	Reading
1	08/22	Lec 1	Cosmic scales	1
	08/24	Lec 2	Seasons/sky	2.1-2.2
	08/26	Lec 3	Moon/eclipses	2.3-2.4
2	08/29	Lec 4	Planetary motion, Science	3.1-3.4
	08/31	Lec 5	Kepler/Galileo	3.3
	09/02	Lab 1	<i>Nature of Science</i>	
3	09/05	NO CLASS		
	09/07	Lec 6	Newton	4.1-4.2
	09/09	Lec 7	Force and motion	4.3-4.5
4	09/12	Lec 8	Light	5.1-5.3
	09/14	Lec 9	Spectra	5.4
	09/16	Lab 2	<i>Spectroscopy</i>	
5	09/19	Lec 10	Telescopes	6
	09/21	Midterm #1	Lectures 1-10, Labs 1-2	
	09/23	Lec 11	Solar System Formation	7.1-7.2, 8.1-8.2
6	09/26	Lec 12	Terrestrial Planets	9.1-9.2
	09/28	Lec 13	Atmospheres	10.1,10.4-10.6
	09/30	Lec 14	Climate	10.6
7	10/03	Lec 15	Outer Planets	11
	10/05	Lec 16	Pluto	12.1, 12.4
	10/07	Lec 17	Leftovers	12.2-12.3, 12.5
8	10/10	Lec 18	Sun, First Essay Due	14.1-2
	10/12	Lec 19	Stars	15.1
	10/14	Lab 3	<i>The Sun</i>	
9	10/17	Lec 20	HR Diagram	15.2
	10/19	Lec 21	HR Diagram	15.3, 16
	10/21	Lab 4	<i>HR Diagram</i>	
10	10/24	Midterm #2	Midterm 1 + Lectures 11-21, Labs 3-4	
	10/26	Lec 22	Low Mass Stars	17.1-17.2
	10/28	Lec 23	High Mass Stars	17.3-17.4
11	10/31	Lec 24	Stellar Afterlife	18.1-18.2
	11/02	Lec 25	Black holes	18.3, 19.4
	11/04	Lec 26	The Milky Way Galaxy	19.1-19.2
12	11/07	Lec 27	Galaxies	20.1-20.2
	11/09	Lec 28	Distances	20.2
	11/11	NO CLASS		
13	11/14	Lec 29	Expansion of the Universe	20.3
	11/16	Lec 30	Dark Matter	23.1-23.3
	11/18	Lec 31	Dark Energy	23.4
14	11/21	Midterm #3	Midterms 1&2 + Lectures 22-31	
	11/23	Lec 32	Big Bang	22.1
	11/25	NO CLASS		
15	11/28	Lec 33	CMB: Evidence for the CMB, Second Essay Due	22.2
	11/30	Lec 34	Inflation	22.3-22.4
	12/02	Lab 5	<i>Big Bang</i>	
16	12/05	Lec 35	Other planetary systems	13.1-13.2
	12/07	Lec 36	Life	24.1, 24.3
	12/09	Final	All Lectures and Labs	

Learning Support:

I want to ensure that you are able to succeed in this course. Over the semester I will provide frequent opportunities for direct feedback on the course, and will be able to see progress in learning through the homework and tests. The office hours for the TAs and myself are listed on the first page, please make use of us.

Inclusion and Respect:

Our classroom is a place where everyone is encouraged to seek information and present their thoughts and opinions. We must work together to preserve a tolerant and open environment where everyone can participate without criticism, bullying, or discrimination.

This course supports elective gender pronoun use and self-identification and I will maintain a roster indicating such choices that will be updated upon student request. As the course includes group work and in-class discussion, it is vitally important for us to create an educational environment of inclusion and mutual respect.

Students with Disabilities:

Our goal in this classroom is that learning experiences be as accessible as possible. If you anticipate or experience physical or academic barriers based on disability, please let me know immediately so that we can discuss options. You are also welcome to contact the Disability Resource Center (520-621-3268) to establish reasonable accommodations. For additional information on the Disability Resource Center and reasonable accommodations, please visit <http://drc.arizona.edu>.

If you have reasonable accommodations, please plan to meet with me by appointment or during office hours to discuss accommodations and how my course requirements and activities may impact your ability to fully participate.

Some accommodations, such as extra testing time, will require scheduling with the DRC and advance work on my part. You will remain responsible for scheduling a test-taking spot in the DRC well in advance of all tests (>1 week).

Classroom Etiquette:

In order to provide an environment conducive to learning and interaction, the following policies will be enforced:

- No eating or drinking (other than water) in the classroom
- Cell phones must be turned off and out of sight
- Laptops/iPads may be used for note taking only, in designated sections of the room.
- Late arrival and early departures are strongly discouraged and the disturbance they cause to neighboring students must be minimized

Violators will be ejected and we will record you as having missed class. We will work very hard to foster a stable learning environment during lectures and expect your cooperation in this effort.

The University is committed to creating and maintaining an environment free of discrimination. See <http://policy.arizona.edu/human-resources/nondiscrimination-and-anti-harassment-policy>

The UA Threatening Behavior by Students Policy prohibits threats of physical harm to any member of the University community, including to oneself. See

<http://policy.arizona.edu/education-and-student-affairs/threatening-behavior-students>

Academic Dishonesty:

Students are encouraged to share intellectual views and discuss freely the principles and applications of course materials. However, graded work/exercises must be the product of independent effort unless otherwise instructed. Students are expected to adhere to the UA Code of Academic Integrity as described in the UA General Catalog. See:

<http://deanofstudents.arizona.edu/codeofacademicintegrity>

Presentation of any work other than your own is considered academic dishonesty. This includes copying test answers or homework assignments, other persons taking exams for you, or reference to any unauthorized materials during the exam. Any other technique that gains unfair advantage over other students is also considered academically dishonest. All students must be prepared to present valid picture identification if requested during an exam period. Selling class notes and/or other course materials to other students or to a third party for resale is not permitted without the instructor's express written consent. Any incidents of academic dishonesty will be dealt with according to the University of Arizona's Code of Academic Integrity. The consequences can range from loss of credit on an assignment to dismissal from the University, depending on the severity of the offense.

turnitin.com:

By continuing in this course, you are agreeing to submit your written assignments online to a plagiarism-prevention program called TurnItIn.com. When you set up your individual account with TurnItIn.com, make sure you understand and consent to all the terms that the program provides you at that point. You should note that TurnItIn.com will retain your writing (without your name or other identifying information) as part of their database so that students who plagiarize from it can be detected. Because of this program, the vast majority of you who do your own work and cite your sources of information properly will not have to compete with students who commit plagiarism. Anyone who has questions or problems with TurnItIn.com may talk privately about these with Dr. Marrone.

Syllabus Changes:

Information contained in the course syllabus, other than the grade and absence policy, may be subject to change with advance notice, as deemed appropriate by the instructor.

INSTRUCTIONS FOR OPENING AN ACCOUNT ON *MASTERING ASTRONOMY*

1. Go to <http://www.masteringastronomy.com>
2. Click on the “Get Registered” in the “Students” box in the middle of the page. Click “OK! Register now” on the following page.
3. In the “Enter Your Course ID” box enter **MARRONE16FALL**.
4. You should be taken to a page to sign in or create a Pearson account. On the right you should see “Your Course”:
 ASTR 170B1, Fall 2016
 Course ID: marrone16fall
 Taught by Dan Marrone
5. You must now purchase access or use the code in your textbook to gain access.

If you bought a new book with a bundled access code (as sold in the UA Bookstore), click “Use an access code” and enter your code.

If you did not buy a bundled book and access code, you may buy access to Mastering Astronomy and optionally the electronic version of the textbook.

 A Mastering Astronomy account, without the eText, will cost \$60.95.

 A Mastering Astronomy account plus the eText will cost \$94.95.

6. **IMPORTANT:** when prompted, enter your **University of Arizona NetID**. This is the username you use for almost everything at the U of A.

If you have registration questions or problems with Mastering Astronomy, visit <http://goo.gl/5d86U7> and follow the links to get assistance.

NOTE ON D2L:

To access your course on D2L you must have a UA NetID and be officially enrolled in the course for at least 24 hours. Your browser and its settings must be compatible with D2L.