

**ASTR 170B1 (The Physical Universe), Section 3, Spring 2021**  
**MWF 1-1:50 PM via Zoom**

**Prof. Ann Zabludoff (Instructor)**  
**Jeremy Dietrich (Teaching Assistant)**

**Office Hours: Dietrich: T 10:30-11:30 am and Th 6-7 pm; Zabludoff: W 1:50-3 pm, right after class**

**Email: [azabludoff@as.arizona.edu](mailto:azabludoff@as.arizona.edu), [jdietrich1@arizona.edu](mailto:jdietrich1@arizona.edu)**

This course satisfies the Natural Sciences Tier 1 requirement. We will focus on astronomy, the observational and theoretical study of objects in our Universe. This course is a broad survey intended for non-science majors and covers some of the questions that stumped astronomers of the past and that puzzle astronomers today. These questions include: What makes the Sun shine? Why are there seasons? What is dark matter? Do Black Holes exist? What is the origin of the Moon? Are we alone in the Universe? and Did the Big Bang occur? We will discuss the physical principles necessary to understand why these questions are important, how astronomers have learned what they know, and what issues remain uncertain. **The emphasis of the course is on understanding, not on memorization.**

## **Background**

No previous astronomy experience is necessary. You should be familiar with basic algebra, trigonometry, fractions, and scientific notation. The development of basic physical concepts as they relate to the detection and workings of astronomical objects will be a fundamental part of the course. A strong interest in the course material is the best prerequisite! You should have a calculator at your disposal (one that does powers, roots, and trigonometric functions). *Please seek help when you encounter a concept that you do not understand.*

All exams are closed-note, and no calculators are allowed. The in-class and final exams will consist of multiple-choice and short written answer questions.

To take notes, please annotate the posted lecture outlines as we go along.

## **Evaluation**

Your grade in this course will depend on your performance on the homework and in-class laboratory exercises (2/5 of the total), two in-class exams (1/5 of the total), and the final exam (2/5). At the end of the term, the lower of your two in-class exam grades will be dropped. Your worst homework grade will also be discarded.

## **Interactive Learning**

Several times during the term, students will conduct astronomy lab exercises on one of the topics discussed in class. Write-ups of the labs will be due as the homework assignment for the next week. Students will have the opportunity to work directly with the instructors and in a smaller group during these breakout labs.

## Policies

- *Do your own work.* Modern science is collaborative, and people learn from talking to each other. Feel free to talk to the instructor, TA, or other students about homework/laboratory assignments. But the work you turn in must be your own. **The University's Code of Academic Integrity** prohibits all forms of academic dishonesty, including cheating, plagiarism, and facilitating dishonesty by others. The repercussions for those found guilty of violating the Code will include loss of credit for the work and may include failure of the course or more extreme measures.
- *Attendance, participation, and conduct.* Attendance and participation in class are important—especially as exam and homework material will be drawn from the lectures, and only supplemented from the readings. **Students who are regularly absent will be Administratively Dropped from the course.** Please participate in class by asking questions so that we can get discussions going.
- *Late Homework.* **No credit will be given for late homework.** Because we want to be fair to those that turn in work on time, we will not accept late work. There is an absolute deadline for homework. We will accept homework at any class meeting prior to the deadline. Your lowest homework will be dropped.
- *Missed Tests.* **No makeup tests will be administered.** The exams are already scheduled and posted on the class schedule. If you know that you will miss a test, you must make arrangements (for valid reasons) for an oral exam at a time and date prior to the written test. The lower of your two in-class exams will be dropped.
- *Grading.* You have one week from the time an assignment or exam is returned to challenge any perceived errors. Although rare, there are occasions when grading errors occur, and you should review your returned work. The final course grades will be on a curve, but you can be assured that if you have > 90% of the total number of points available you will receive an A, 80 to 90% at least a B, 70 to 80% at least a C.
- *Students with Disabilities:* If you anticipate barriers related to the format or requirements of this course, please meet with me so that we can discuss ways to ensure your full participation in the course. If you determine that disability-related accommodations are necessary, please register with Disability Resources (621-3268; <https://drc.arizona.edu/>) and notify me of your eligibility for reasonable accommodations. We can then plan how best to coordinate your accommodations.
- *Learning Outcomes.* Upon successful completion of the course, students will be able to apply basic physics concepts to certain astronomy questions and to understand the physical scales, masses, lifetimes, and other properties associated with a wide variety of astrophysical phenomena.

## COVID-Related Policies

This class is scheduled to be taught in the LIVE ONLINE modality.

We will meet via Zoom for live lectures and discussions.

If the COVID-19 situation permits meeting on campus, Zabludoff will host some of her office hours,

in person, outside the Steward Observatory building.

Face coverings are required when meeting for in-person office hours: Per UArizona's Administrative Directive, face coverings that cover the nose, mouth, and chin are required to be worn in all learning spaces at the University of Arizona. Any student who violates this directive will be asked to immediately leave the learning space, and will be allowed to return only when they are wearing a face covering. Subsequent episodes of noncompliance will result in a Student Code of Conduct complaint being filed with the Dean of Students Office, which may result in sanctions being applied. The student will not be able to return to the learning space until the matter is resolved.

Physical distancing is required when meeting for in-person office hours: We will respect CDC guidelines, including restricted seating to increase physical distancing and appropriately-worn face coverings.

The Disability Resource Center is available to explore face coverings and accessibility considerations if you believe that your disability or medical condition precludes you from utilizing any face covering or mask option. DRC will explore the range of potential options as well as remote course offerings. Should DRC determine an accommodation to this directive is reasonable, DRC will communicate this accommodation with your instructor.

If you feel sick, or may have been in contact with someone who is infectious, stay home. Except for seeking medical care, avoid contact with others and do not travel. Notify your instructors if you will be missing an in person or online course. Campus Health is testing for COVID-19. Please call (520) 621-9202 before you visit in person. Visit the UArizona COVID-19 page for regular updates.

If you have questions about your academic progress this semester, or your chosen degree program, please note that advisors at the Advising Resource Center can guide you toward university resources to help you succeed.

If you are experiencing unexpected barriers to your success in your courses, please note the Dean of Students Office is a central support resource for all students and may be helpful. The Dean of Students Office can be reached at 520-621-2057 or [DOS-deanofstudents@email.arizona.edu](mailto:DOS-deanofstudents@email.arizona.edu).

If you are facing physical or mental health challenges this semester, please note that Campus Health provides quality medical and mental health care. For medical appointments, call (520-621-9202. For After Hours care, call (520) 570-7898. For the Counseling & Psych Services (CAPS) 24/7 hotline, call (520) 621-3334.

For this class you will need daily access to the following hardware: laptop or web-enabled device with webcam and microphone; regular access to reliable internet signal.

**For lecture recordings, which are used at the discretion of the instructor, students must access content in D2L only. Students may not modify content or re-use content for any purpose other than personal educational reasons.** All recordings are subject to government and university regulations. Therefore, students accessing unauthorized recordings or using them in a manner inconsistent with UArizona values and educational policies are subject to suspension or civil action.

## **Tutoring**

The UA Astronomy Department offers free tutoring through the [ATOMM](#) program.

Also, check out [TIMESTEP](#), a bi-weekly discussion group about topics of professional development for UA undergraduates in STEM fields. And, we have the world's best [Astronomy Club](#)!

## **Textbook**

There will be useful reading assignments each week from the on-line and free textbook, [Teach Astronomy](#). These assignments are listed on the course schedule page and are a required complement to the course lectures, which are posted on the course website. Another free, on-line reference is [Astronomy](#).