



ASTR 170B1 Physical Universe (Spring 2021)

Tu/Th 11:00 a.m.- 12:15 p.m. MST

Remote Classroom: Zoom

(Zoom ID and password are posted in the D2L Calendar and Content)

This class is scheduled to be taught in the LIVE ON-LINE modality.

Description of Course and Objectives

Welcome to ASTR 170B1 - The Physical Universe! The Physical Universe is a survey of modern astronomy. Astronomy is a field studying the properties of a wide range of objects in the observable universe, across enormous scales in both space and time: from our Earth and Moon, our Solar System, other distant planets, to stars, galaxies, black holes, and the Big Bang itself. In addition, we will use modern astronomy as a tool to study how science works: the nature and the process of scientific discovery and scientific progress. This course is a Tier One General Education Course in the area of Natural Sciences.

Expected Learning Outcomes

We hope that by the end of this course, you will be familiar with many areas of astronomy to the extent of being able to understand the context of the astronomical research and discoveries that you read in media, magazines and popular science books. You will be able appreciate how astronomy touches and affects your daily life, such as the seasons, lunar phases, eclipses. But the most important goal of this class is for you to understand scientific method and how we gain our knowledge of the universe through scientific reasoning and discovery. This, we hope, will help you to have a deeper understanding of the roles of science and technology in our society, and gain insight into the many important discussions and debates related to science and technology in our modern life

Upon completion of this course, students will be able to:

- ▶ understand the nature and application of science;
- ▶ apply ideas and processes beyond the classroom;
- ▶ learn to obtain necessary information and data from publicly available sites,
- ▶ critically analyze and interpret data and results presented in tables, graphs and charts as well as perform simple mathematical calculations appropriate for non-science major students;
- ▶ appreciate the relative scale of objects' sizes and distances;
- ▶ recognize the complexity of many scientific issues;
- ▶ speak and write about scientific knowledge;
- ▶ read and understand scientific literature from popular sources such as magazines and newspapers

Course Prerequisites or Co-requisites

We assume no prior knowledge of astronomy.

Instructor and Contact Information

Instructor: Dr. Jinyoung Serena Kim in the Department of Astronomy

- **Zoom Office** (see classroom zoom information in the D2L)
- Phone: (520) 626-0187 (office)
- Email: serena00@email.arizona.edu. **Email is the best way to reach me.** I will try to answer your emails within 24 hours.
- **Office hours via Zoom (TBA and by appointment:** dates subject to change; zoom info in the D2L office hour information; please sign up for office hours if possible.). You are welcome to see me before or after the class. I will login to zoom 10 minutes earlier and can stay longer. It is best to make an appointment first via email to set up time for office hour.

Teaching Assistant: Mr. Christopher Bilinski (Ph.D. student in Astronomy)

- Email: cbilinski@email.arizona.edu
- Office: Steward Observatory
- phone: (520) 626-1820
- **Office hours: TBA and by appointment** meet via Zoom (subject to change; see the D2L office hour information).

Class Materials and the D2L course website

We will be using the UA course management system **Desire2Learn (D2L)**, go to the URL <http://d2l.arizona.edu>, and follow the instructions for students; you'll need your UANetID to login). You are strongly advised to stay current with course related announcement and materials and class notes. Check the class d2l site daily.

Announcements, grades, lecture notes, lecture recordings, assignments, quizzes, activities, and other news related to this course will be posted in the D2L. I will also send you emails. Please make sure the email I send to your d2l email address can find you well in timely manner.

Textbook information: Inclusive Access (IA) with eText and Mastering Astronomy

The textbook is **Cosmic Perspective by Bennet, Donahue, Schneider, and Voit (9th edition)**. You will have the e-Text and Mastering Astronomy access in D2L via Inclusive Access. You can purchase access following the instruction given in the D2L/Content. An email from the UA book store was also sent to you about how to obtain access to textbook and mastering. This Mastering site will be used for homework, quizzes, and the final exam. Go to D2L/Content, and click the ;We will follow the textbook, although some extra materials will be used. Lecture notes, additional materials, including copies of the activities and homework, helpful web sites, and this syllabus, can be found in the course D2L site. If you have a question about the UA, please contact with uabks-inclusiveaccess@email.arizona.edu.

Meeting Times and patterns - Remote Teaching (Live On Line)

We will meet on **Tuesdays and Thursdays from 11:00 a.m. to 12:15 p.m.** in a ZOOM class room. The ZOOM login information (meeting ID and password) is posted in the class D2L calendar. Each 75 minute lecture will likely be divided into 2 to 3 parts: lecture, group activity or short group discussion or news of the day. For example: 30-40 minutes of lecture (recorded) + 15-20 minutes of activity or group discussion ~10 minutes special topic/news of the day. The lecture format and pattern may be revised based on what we learn and experience during the first few weeks.

Equipment and software requirements: 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; ability to download and run the following software: web browser (Safari, Chrome, or Firefox), word processor, such as MS Word, Page, and pdf reader such as Adobe Acrobat. You will also need to **install ZOOM** and check for updates for ZOOM frequently to improve security.

Course Format and Teaching Methods

Everyone will be an active participant. We will cover a particular broad topic during each lecture. During the lectures, we may often break for recent news on related topics we are covering. In Zoom environment, we will use Breakout room feature and Chat. We will touch upon the broad and selected topics from the textbook, therefore keeping up with reading assignment is important. Questions are always welcome. You can raise hand for a question or write down in the Chat. During the *group activities and discussions* I expect all students to actively engage in discussion. The class will split into groups of 3-4 for the regular activities (maximum 4). You will be able to share screen and whiteboard via zoom. There will be **One final exam. Instead of mid term exams we will have smaller quizzes and projects.** There will be some opportunities to earn extra-credits.

- ▶ **Attendance:** your participation in activities, quizzes, and discussions will be offered in-class, therefore I strongly encourage your attendance. If you feel sick please email the instructor (Dr. Kim and TA). If you have doctor's notes, or a letter from Dean of Student's office or from your academic advisor for make up quizzes, please send the notes to Dr. Kim. You can catch up with lectures and activities via recorded lectures and during the office hours (in zoom).
- ▶ **Group Activities and Discussions:** we will have group activities or group discussion during a regular lecture day. There will be both long activities and short discussions throughout the semester. Long activity sessions will be announced at least 2 days before the activity date in the D2L and during the previous class. We may have short discussion breakout sessions without previous announcements. During this activity/discussion sessions, students will be divided into 3-4 student groups in breakout rooms. When the activities and discussions are over, students will have time to report to the entire class when reporting is planned for class-wide discussion. The lowest grade will be dropped at the end of the semester.
- ▶ **Quizzes:** there will be at least six quizzes, which will be given in class using the D2L Quiz. Students will be given a direction for each quiz during the lecture. Quiz dates will be given during the previous week or at least during previous lecture. You can drop one lowest quiz grade at the end of the semester.
- ▶ **Assignments:** individual homework and writing assignments will be given throughout the semester. There will be total 7-8 homework assignments related to reading and lecture materials for each chapter using the Mastering Astronomy. The lowest grade will be dropped. Writing assignments will be posted in the D2L content in MS Word and pdf format. Students are expected to submit the finished assignments to D2L before each deadline.
- ▶ **Presentation:** Each student will submit 3-5 minute-long presentation video (recorded using zoom) based on their Project 2 (or other topic which require discussion and approval from Dr. Kim). Submission deadline and the guidelines will be posted in the D2L.
- ▶ **Final Exam: There will be one final exam** based on quizzes, assignments, activities, and reading and discussions. Final exam date: May 11, 2021 from 10:30am to 12:30pm via zoom.
- ▶ **ZOOM etiquettes: please,** 1) mute when you enter, 2) raise hand if you have a question or write in Chat window, 3) when students are asked to be interactive, please participate, feel free to talk, but wait until previous person finishes speaking; 4) be polite and respect each

other. Please use Chat whenever you want to share your thoughts or ask questions.

- ▶ **Lecture recording:** all classes given in zoom will be recorded and posted to D2L. The recording will not include students videos, photos or names. Only voices and the Slides will be recorded. Recordings will be posted in the class D2L Content. 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.
- ▶ **Turning on your video during zoom and using personalized profile pictures and background encouraged:** I do not require you to turn on video. If you are comfortable with turning it on, please do, which is very helpful for me during the lecture. Feel free to change the background. If you do not want to turn on video, please use profile picture feature to represent you closely.

Absence and Class Participation Policy

Participating in the course and attending lectures and other course events are vital to the learning process. Here are the links to UArizona's policy related to Class Participation and Absence. Please note that these policies are different for the Covid-19 pandemic.

- 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.
- 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 pre-approved by the UA Dean of Students (or Dean Designee) will be honored. See: <https://deanofstudents.arizona.edu/absences>

Makeup Policy for Students Who Register Late

If you registered late, and missed the first lecture, please come and see Dr. Kim after the class or during her office hours.

Term Projects

Project 1: Observing Moon

The objective of this project is to observe the Moon in all its phases throughout the semester, taking pictures with your cell phone of each phase (8 phases). This project should help you to understand how the Moon phases change and why. You should also be able to make observations of the world around you and hopefully appreciate a little more the beauty of the night sky. This observing project can be done anywhere in the Earth, but will need some reasonable weather. Therefore you need to start as early as possible in January and obtain photos of 8 phases of the Moon as early as you can. Do NOT procrastinate for this project. The observing form and assignment will be posted in the D2L with detailed guideline. It will be fun. This project will be due by **11:59pm, Tuesday, March 30th, 2021.**

Project 2: Your Planet/Star/Galaxy

Each student will select one astronomical object for this project. The list will contain a list of the Solar system objects, stars, and some nearby galaxies. This assignment will be announced in late February - each March. Each student is expected to do research about selected astronomical object in depth. Detailed instruction and rubric will be discussed in class. We will also learn to prepare each step to prepare this project in class as part of activities and discussions. All the used references including the websites (URLs) should be properly cited at the end of the term paper. Please find the citation guide in the University of Arizona Library website(<http://www.library.arizona.edu/search/reference/citation.html>). You may follow the suggested guide in the website, e.g., APA, Chicago, MLA guide, or AAS guide (<http://journals.aas.org/authors/references.html>).

The rubric and details for the project will be discussed in class, and will be posted in the D2L. Students who submit their draft paper two weeks before the deadline will receive feedback and comments. **The final version** of your paper will be **due by 11:59pm, Thursday, April 22nd, 2021**. All projects are to be submitted on-line to D2L Dropbox in pdf format, word or page document format.

Grading Scale and Policies

Everyone is also expected to do an individual term project ("your exoplanet"). I reserve the option to offer a small amount (about 5% of total grade) of extra credit for an outside class event. There will be three exams during this semester, one of which can be dropped (highest two exam grades will be counted). **This course uses absolute grading scheme, therefore you're not competing with other students.** By the end of the eighth week of the semester 40% of the total grade will be determined. Total points shown Table 1 below is subject to change, which will be announced in class and in D2L if/when changes are made.

Table 1. The components of the grade and the final grade boundaries are following.

Grade Item	Number (# you can DROP)	Points value per each item (pts)	Total (pts)	Total (%)
Group Activities	6 (-1)	30	150	15
Short Group Discussions	6 (-1)	20	100	10
Homework (Mastering)	7-8 (-1)	Varies	200	20
Project 1 (Observing Moon)	1	150	150	15
Project 2 (Stars/Galaxies)	1	150	150	15
Quizzes	6 (-1)	20	100	10
Presentation	1	50	50	5
Final Exam	1	100	100	10
Extra credit assignments	TBA	TBA	TBA	TBA
TOTAL	-	-	1000	100

A: 90-100%

B: 80- 90%

C: 65- 79%

D: 50- 65%

E: < 50%

Requests for incomplete (I) or withdrawal (W) must be made in accordance with University policies, which are available at <http://catalog.arizona.edu/policy/grades-and-grading-system#incomplete> and <http://catalog.arizona.edu/policy/grades-and-grading-system#Withdrawal> respectively.

Errors in grading

If you spot an error in grading or have a question you must call it to the attention of the TAs or instructor **within one week** after the graded materials are handed out and the grades are posted in the D2L. An effort will be made to hand back material in a timely manner. Make sure to review all your handed-back material as soon as possible. Note that you can only discover an error in grading if you pick up your graded material and review it!

Feedback on assignments and writing: Activity, homework, group discussion and quizzes require writing in sentences and paragraphs. Students will receive feedback on their assignments from the TA and/or Dr. Kim as a comment in the D2L.

Classroom Behavior Policy (Zoom)

To foster a positive learning environment, students and instructors have a shared responsibility. We want a safe, welcoming, and inclusive environment where all of us feel comfortable with each other and where we can challenge ourselves to succeed. Students are asked to refrain from disruptive conversations during the Zoom breakout sessions or Zoom chat during lecture or during In-person classes. Students observed engaging in disruptive activity will be asked to cease this behavior. Those who continue to disrupt the class will be asked to leave lecture room or discussion and may be reported to the Dean of Students.

Threatening Behavior 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>.

Code of Academic Integrity

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/academic-integrity/students/academic-integrity>.

The University Libraries have some excellent tips for avoiding plagiarism, available at <http://www.library.arizona.edu/help/tutorials/plagiarism/index.html>.

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. Violations to this and other course rules are subject to the Code of Academic Integrity and may result in course sanctions. Additionally, students who use D2L or UA e-mail to sell or buy these copyrighted materials are subject to Code of Conduct Violations for misuse of student e-mail addresses. This conduct may also constitute copyright infringement.

Accessibility and Accommodations

At the University of Arizona, we strive to make learning experiences as accessible as possible. If you anticipate or experience barriers based on disability or pregnancy, please

contact the Disability Resource Center (520-621-3268, <https://drc.arizona.edu/>) to establish reasonable accommodations.

Our goal in this class 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. If you have reasonable accommodations, please plan to meet with me by appointment or during office hours (via zoom) to discuss accommodations and how my course requirements and activities may impact your ability to fully participate.

UA Nondiscrimination and Anti-harassment Policy

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>

Our classroom is a place where everyone is encouraged to express well-formed opinions and their reasons for those opinions. We also want to create a tolerant and open environment where such opinions can be expressed without resorting to bullying or discrimination of others.

Additional Resources for Students

UA Academic policies and procedures are available at <http://catalog.arizona.edu/policies> . Student Assistance and Advocacy information is available at <http://deanofstudents.arizona.edu/student-assistance/students/student-assistance>

- ▶ **Academic advising** 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.
- ▶ **Life challenges** 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.
- ▶ **Physical and mental-health challenges:** 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.

Confidentiality of Student Records

<http://www.registrar.arizona.edu/personal-information/family-educational-rights-and-privacy-act-1974-ferpa?topic=ferpa>

Subject to Change Statement

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.

Scheduled Topics/Activities (subject to change - please check updated schedule in D2L)

*These lectures/activities/date for activity **may be revised or rescheduled** during the semester.*

A: Activity EC: extra credit

Week	DAY	DATE	TOPIC	CHAPTER for reading
1	Th	01/14	Introduction, Syllabus, The Scale of the Universe	Ch1
2	Tu	01/19	The History of the Universe, Night Sky, Patterns in the Sky	Ch2
	Th	01/21	The Reasons for Seasons, Moon Phases	Ch2
3	Tu	01/27	The Science of Astronomy, Copernican Revolution	Ch3
	Th	01/29	The Nature of Science Astrology, Activity	Ch3, A
4	Tu	02/02	Gravity, Conservation Laws, Orbits	Ch4
	Th	02/04	Light and Matter	Ch5
5	Tu	02/09	Light and Matter	Ch5
	Th	02/11	Telescopes, Activity	Ch6, A
6	Tu	02/16	Our Planetary System	Ch7
	Th	02/18	Formation of Solar System	Ch8
7	Tu	02/23	Planetary Geology, Planetary Atmosphere	Ch9, Ch10
	Th	02/25	Jovian Planets and Moons Activity	Ch11, A
8	Tu	03/02	Jovian Moons, Asteroids, Comets, Dwarf Planets	Ch12
	Th	03/04	Other Planetary Systems, Distant Worlds	Ch13
9	Tu	03/09	Life in the Universe Fermi Paradox, Drake Equation	Ch24
	Th	03/11	Activity	A
10	Tu	03/16	Our Star: The Sun	Ch14
	Th	03/18	Other Stars: properties of stars, star clusters	Ch15
11	Tu	03/23	Star Birth: stellar nurseries, young stars, planet formation	Ch16
	Th	03/25	Star Stuff: Stellar Evolution, why do stars shine?	Ch17
12	Tu	03/30	Stellar Death: White Dwarf, Neutron Stars, Black Holes	Ch18
	Th	04/02	Activity	A

13	Tu	04/07	Our Galaxy	Ch19
	Th	04/09	Galaxies and Modern Cosmology	Ch20
14	Tu	04/14	Galaxy Evolution	Ch21
	Th	04/16	Activity	A
15	Tu	04/21	Birth of the Universe: The Big Bang Theory	Ch22
	Th	04/23	Selected Topic (TBD)	
16	Tu	04/28	Dark Matter, Dark Energy, Fate of the Universe	Ch23
	Th	04/30	Life in the Universe Discussion, Space Travel Student presentation	Ch24
17	Tu	05/04	LAST LECTURE	
Final Exam	Tu	05/11	Final Exam (10:30am - 12:30pm)	

Tips for the Class

This syllabus serves as the “contract” for this class. Please read this syllabus very carefully and continuously check for updated schedule that will be posted in the D2L class site. Come to class (zoom classroom) regularly, and come to one of our office hours if you have a question or have trouble understanding certain topics. Keep up with the readings (the textbook and the lectures). You will get a chance to give your opinion on a variety of topics during the class and during breakout sessions.

Get help if you need it. If you miss two weeks of assignment it will be difficult to get the best grade in the class. Group activities and discussions work best when everyone contributes. Since you can drop one lowest scores for activities, homework, discussions, and quizzes, no late work will be accepted. Whenever I offer late acceptance the late submission penalty policy will be discussed in class, and posted in the D2L. With absolute grading, you know what you need to do to get a particular grade on day one, and you are not competing with other students. Everyone can earn good grade!

Do not procrastinate until the last moment. TA and I are available for help. Remember to participate actively in class. Always ask questions. Try to think outside the box. The best part of university education is the chance to think deeply about big questions. Enjoy the class! Let’s have a fun semester!

SUMMARY

The summary of most important information you'll need for the course is summarized below:

Class Meeting Time: Tu/Th via ZOOM from 11:00 a.m. to 12:15 p.m.

Required Course materials: Cosmic Perspective 9th edition (via **D2L/Inclusive Access** with eText and Mastering)

Instructor: Dr. J. Serena Kim (serena00@email.arizona.edu)
Office Hours: (ZOOM) or via appointment

TA: Mr. Christopher Bilinski (cbilinski@email.arizona.edu)
Office Hours: (ZOOM) or via appointment

ZOOM info: ZOOM information is posted in D2L. ZOOM lecture and activity will be recorded. Zoom etiquettes will be discussed in class and posted in D2L.

Project 1 and 2: Final projects due dates (subject to change): **March 30, 2021 (Project 1) and April 22, 2021 (Project 2)**. you can hand in early to D2L, but don not be late! Late work will be subject to reduced grade. No submission will be accepted after 24 hours from the deadline.

Final Exam: Tuesday, May 11, 2021 from 10:30am to 12:30pm (Zoom/D2L)

Grade Categories and Grade Boundaries:

A: 90-100%, B: 80- 90%, C: 65- 79%, D: 50- 65%, E: < 50%

Grade Item	Number (# you can DROP)	Points value per each item (pts)	Total (pts)	Total (%)
Group Activities	6 (-1)	30	150	15
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Quizzes	6 (-1)	20	100	10
Presentation	1	50	50	5
Final Exam	1	100	100	10
Extra credit assignments	TBA	TBA	TBA	TBA
TOTAL	-	-	1000	100

Grading queries and appeals: All grade queries or appeals should be done **within a week** of work being handed back.

Late Work/make-up: No late work/makeup will be offered unless formal excused absence is reported to the instructor. One lowest scores of quizzes, homework (mastering), discussions, and activities can be dropped. In general no late work will be accepted. In case of illness and excused cases (discussed with the instructors) there will be late work policy given during the class and will be posted in the D2L.

Your email address: Please make sure you receive emails sent to your D2L email address.