



ASTR 202 Life in the Universe (Fall 2020)

MWF 11:00 a.m.- 11:50 a.m. MST

Remote Classroom: Zoom

(Zoom ID and password posted in the D2L Calendar and Announcement)

In-person classroom: Steward Observatory N210

This class is scheduled to be taught in the FLEX IN-PERSON modality.

Description of Course and Objectives

Welcome to one of the most exciting adventures in science, **astrobiology!** "*Life in the Universe*" confronts one of the biggest questions humans can ask: Are we alone in the universe? The content is mostly astronomy, but will include aspects of physics, geology, chemistry, biology and even sociology. Astrobiology is driven by large telescopes, space missions, lab experiments and continued exploration of the full range of terrestrial life. We will critically assess the nature of life on Earth and the likelihood for finding life beyond.

We will have fun talking about various topics related to Life in the Universe, learn basic concepts and scientific backgrounds that will help you, as a group, to find the best Earth #2 candidates by the end of the semester.

Expected Learning Outcomes

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, trustworthy sources in internet;
- ▶ 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 size 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

For astronomy minors: This course is included in the astronomy minor program for liberal art (see: <http://www.as.arizona.edu/undergraduate-minors-astronomy>).

Course Prerequisites or Co-requisites

Astronomy 202 is a Tier 2 General Education course, aimed at students who have had at least one general education science course, but it assumes 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 D2L)
- Office: N330 (note N in front of 330) at Steward Observatory.
- 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 (Wednesdays 1pm -3 pm or by appointment:** see D2L; please sign up for office hours if possible).
You are welcome to see me before or after the class. I will login to zoom 10-15 minutes earlier and stay 10 minutes longer. It is best to make an appointment first, by phone or email, to set up time for office hour if you need help with assignments or any other question related to the course work.

Teaching Assistant: Mr. Alex Bixel (Ph.D. student in Astronomy)

- Email: abixel@email.arizona.edu
- Office: N208 at Steward Observatory
- phone: (520) 621-1406
- **Office hours: Thursday 9am-11am and by appointment** meet via Zoom (subject to change: see the D2L Calendar) will be posted in the D2L course site

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.

I will use the D2L course as course website, which is even more important during this time of pandemic when we meet via zoom. 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.

The textbook is **Life in the Universe by Bennet and Shostak (4th edition)**. 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.

Textbook information

ISBN-13: 978-0134089089

ISBN-10: 0134089081

- The textbook can be either hardcopy or eTextbook. You may purchase or rent for the semester.
- Hardcopy can be found in the University book store.
- If you want to buy or rent from Pearson store:
<http://www.mypearsonstore.com/bookstore/life-in-the-universe-plus-masteringastronomy-with-pearson-0134068408>
- If you want to buy or rent from Amazon:
https://www.amazon.com/Life-Universe-Jeffrey-Bennett-ebook-dp-B01C8JRW1A/dp/B01C8JRW1A/ref=mt_other?_encoding=UTF8&me=&qid=1502507995
- This textbook may be available in other used book stores I did not list here.

Meeting Times and patterns

We will be meeting remotely until the University notifies us that in-person meetings may commence. We will meet on **Mondays, Wednesday, and Fridays from 11:00 a.m. to 11:50 a.m.** in a ZOOM class room until we can resume in-person classes at N210 at Steward Observatory.

For Remote Teaching

The ZOOM login information (meeting ID and password) is posted in the class D2L calendar. Each 50 minute lecture will be divided into 2-3 parts: lecture, group activity or group discussion, for example: 15-25 minutes of lecture (recorded) + 15-20 minutes of activity or group discussion + 5-10 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.

- ▶ **Group Activities and Discussions:** we will have group activities or group discussion during a regular lecture day. There are also long activity days planned, which will be announced in the D2L and during the previous class. During this activity days, 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. There will be short and long activities. You can drop lowest activity grade at the end of the semester.
- ▶ **Attendance:** your participation in activities, quizzes, and assignments will be counted as class participation. If you feel sick please email the instructor (Dr. Kim and TA). You can catch up with lectures and activities via recorded lectures and during the office hours (in zoom).
- ▶ **Quizzes:** there will be quizzes planned which will be given via the D2L Quiz. Students will be given a direction for each quiz during the lecture. One quiz is planned for most of the weeks, and you can drop one lowest quiz grade at the end of the semester.
- ▶ **Assignments:** individual homework assignments will be given throughout the semester. Assignments are posted in the D2L content "homework" in MS Word format. Students are expected to submit the finished assignments to D2L Dropbox before each deadline.
- ▶ **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, feel free to talk, but wait until previous person finishes speaking; 4) be polite and respect each other
- ▶ **Recording:** all classes given in zoom will be recorded and posted to D2L. Only the presentation slides will be recorded. Your video, profile pictures and names will not be recorded.
- ▶ **Turning on your video during zoom:** I do not require you to turn on video. If you are comfortable with turning it on, please do. That would be helpful for me to lecture and be interactive. Feel free to change the background. If you do not want to turn on video, please use profile picture feature to represent you closely.

For In-Person Teaching

When the COVID-19 situation permits teaching on campus, we will meet at Steward Observatory room N210. In-person lecture will be given at least once a week in the classroom, alf the total number of student stays small (less than 50), we will all meet at least once a week in person at the classroom and the rest via Zoom. Students must wear face-coverings at ALL TIME

during the in-person class and will keep safe distance (> 6ft) between students. If anyone feels sick or unwell, please stay at your home/dorm. The lecture will be recorded.

Entrance and Exit: The entrance and exit doors are different, and are marked on the door clearly. I will post in the D2L the map of N210 to show you the entrance and exit doors. Please check the D2L content before we start our first in-person class. When students enter or exit the classroom, please line up and keep the 6 feet distance between students.

Rules on Seating: Each students will leave enough space between students in all direction (at least two seats left empty between students). During the group activities, students will stay in their seats. Lectures and activities will follow the social distancing rules. Should there be more than 50 students when we start in-class lectures, we will break students into two groups: Group 1 will meet on Mondays, and Group 2 will meet on Wednesdays at SO N210. We have smaller than 50 at this time, so I do not think we will have two groups. If we need to divide class into two groups, I will announce the group via D2L, and students will be able to find the information prior to the class. All our lectures from N210 classroom will be recorded and will also be on live via zoom. Recordings of all lectures will be posted in the D2L Content site for each week.

Our in-class meetings will give us the opportunity to have face to face teaching for lectures. In addition, you will complete activities and group discussions on your own time to accomplish the remaining course goals. For the meeting days when your group is NOT in class, you will be taking classes via zoom to to work on activities or assignments.

Remain flexible: If pandemic conditions warrant, the University may require that we return to remote operations. If that is the case, we will notify you by D2L Announcement and email that we are moving to remote operations.

Face Coverings and Social Distancing requirement for in-person classroom

Face coverings are required in our classroom: 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 (e.g., in classrooms, laboratories and studios). 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 in our classroom:** During our in-person class meetings, we will respect CDC guidelines, including restricted seating to increase physical distancing and appropriately-worn face coverings. 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 (e.g., in classrooms, laboratories and studios). 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.

- 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.

Classroom attendance:

- 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.

Course Format and Teaching Methods

Everyone will be an active participant. We will cover a particular broad topic each week. During the lectures, we may often break for recent news on extra-solar planets, solar system planets, and other news on astrobiology related topics. In Zoom environment, we will use Breakout room feature and Zoom 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), and as a group you will fill in a worksheet and get a "[group](#)" grade (the same score for each person) for the activity. You will be able to share screen and whiteboard via zoom. There will be at least seven **pop quizzes or mini discussions** in class mainly based on reading materials, previous lectures, activity and homework. There will be **NO exam**. There will be **two projects** instead of exams, and some opportunities to earn extra-credits.

- ▶ **Exams: There will be no written exam!**
- ▶ **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.
- ▶ **Remote / online only after Thanksgiving:** After the Thanksgiving holiday, we are scheduled to move to remote teaching. That means that we will meet at 11am Arizona Time (MST) via Zoom. The Zoom meeting ID and password will remain the same, and are posted in the D2L Calendar. There will be no final exam in this course. However, we will have the main final project (project #2) due after the Thanksgiving holiday. After Thanksgiving holidays, we will have activity/discussion. Students will create slides and record 3-5 minutes presentation about their project #2, and the recording and slides will be submitted to the D2L which will be the final exam. For students who wish to show their recorded presentations in class, we will show them during the last 3 lectures.

- ▶ **Class Recordings:** If course recordings are being made, we will notify students. 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. 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.

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.

- 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: Habitability of the Solar System Objects (other than Earth)

Each student will work on a mid term project on habitability among the Solar System bodies (planets, moons, asteroids, comets, Kuiper Belt object). More details will be discussed during the class. During the class activities, students will learn how to find data, information, analyze, and prepare writing a short paper. Total 15% of the final grade. Format of the paper will be discussed during the class. Project 1 will be **due by 11:59pm, October 23rd, 2020**.

Project 2: Your Exo-Planet

Each student will adopt one extrasolar (exo) planet that will be randomly selected from a list of known exo-planets. Exoplanet assignment will be announced during the first few weeks of the semester. Everyone will work on her/his/their own unique planet! Each student is expected to do research about the planet and the system (star+planet), discovery method, habitability, etc. 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.

This term project counts for 20% of your grade. All the used references including the websites (URLs) should be 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 page limit of the written part of the project is 5 singled-spaced pages (not including large figures and citations) using font size similar to 11-12 for Time New Roman font type. The rubric and

submission details for the project will be discussed in class, and will be posted in the d2l. Students will also submit their draft paper by the deadline (November 23rd) will receive feedback and comments. **The final version** of your paper will be **due by 11:59pm, November 25th, 2020 (firm deadline)**. No late draft will receive comments, therefore do not procrastinate until the last moment. All projects are to be submitted on-line to D2L Dropbox in pdf format, word or page document format.

Recorded Student Presentation based on Project 2

Instead of written final exam, student will prepare 3-5 slides (up to 5 minutes) to present their adopted exoplanet using power point or keynotes or pdf. Students will record their presentation and submit the recordings to the D2L Dropbox. Selected excellent presentations, final four exoplanets for the Earth#2 activity, and students who wish to earn extra credit will be selected to play pre-recorded videos during last few days of classes. The Instructor will provide guideline and instruction to prepare the presentation. Individual help is available during the office hours by TA and Dr. Kim. Final slides and recordings are **due by 11:59pm Dec 4, 2020**.

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.

The components of the grade and the final grade boundaries are following:

• Group activities	25%
• Mid Term Project 1	15%
• Final Project 2	20%
• Homework	20%
• Student Presentation (pre-recorded/in-person)	10%
• Quizzes	10%
• Extra credit homework/activity	<5%

A: 90-100%

B: 80-90%

C: 70-79%

D: 60-69%

E: < 59%

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. The draft project paper which is submitted at least 1 week in advance will receive comments individually.

Honors Credit

This course offers Honors contracts to any Honors students who would like to receive Honors credit. Honors students will be given a semester-long project that will turn into a 5-page paper, and will be expected to give a short presentation at the end of the semester. Honors students will discuss possible topics for the project with Dr. Kim at the beginning of the semester, and will have regular meetings outside the regular class to discuss progress of their projects. The project can be either individual project or a group project. Please talk with Dr. Kim if you wish to receive Honors credit. Students wishing to contract this course for Honors Credit should email me to set up an appointment to discuss the terms of the contact. Information on Honors Contracts can be found at <https://www.honors.arizona.edu/honors-contracts>.

Classroom Behavior Policy (Zoom and In-person)

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. To that end, our focus is on the tasks at hand and not on extraneous activities (e.g., texting, chatting, reading a newspaper, making phone calls, web surfing, etc.).

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.

Note-taking using electronic devices, such as laptops and iPad are permitted during the in-person lectures. However these devices can be distracting to other students. Please be courteous to other students and the instructor.

No mobile phone use policy: use of personal electronics, such as mobile devices, is distracting to the other students and the instructor. Their use can degrade the learning environment. Therefore, students are not permitted to use these devices during the class period unless instructor gives permission for certain activities. No mobile phone, texting, web surfacing is permitted during the class.

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>.

Accessibility and Accommodations

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 (DRC, 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. Please be aware that the accessible table and chairs in this room should remain available for students who find that standard classroom seating is not usable.

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.

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
1	M	8/24	Welcome, Introduction, Course Overview, Definition of Habitability	–
	T	8/26	Astronomical Numbers and basic concepts Definition of Astronomical Objects	1, 2 Appendixes
	W	8/26	Ancient Debate	2
2	M	8/31	Copernican Revolution	2
	W	9/2	Nature of Modern Science	2
	F	9/4	Activity	A
3	M	9/7	LABOR DAY (NO CLASS)	no class
	W	9/9	Scientific methods History of the Universe	1
	F	9/11	Scales, Space, power of 10 Activity	A
4	M	9/14	Universe of Matter and Energy, Properties of Light, Radiation	3
	W	9/16	Matter, Energy	3
	F	9/18	Activity	A
5	M	9/21	Light and Spectroscopy	3
	W	9/23	History of the Earth	4
	F	9/25	Geology and Life	4
6	M	9/28	The Hadean Earth and the Dawn of Life	4
	W	9/30	Impacts and Extinctions	6.4

	Th	10/2	Climate regulation and Change Activity	4
7	M	10/5	Biological revolution Defining Life, Cells: Basic Units of Life	5
	W	10/7	Metabolism: The Chemistry of Life	5
	F	10/9	DNA and Heredity, Natural Selection	5
8	M	10/12	Life at the Extreme (Extremophiles)	5
	W	10/14	Searching for Life in Our Solar System	7
	F	10/16	Solar System Objects and Habitability: Mars Activity/Discussion	8, A
9	M	10/19	Solar System Objects and Habitability: Jovian Moons Europa and Enceladus	9
	W	10/21	Solar System Objects and Habitability: Other Solar System Bodies	7, 9
	F	10/23	Activity/Discussion Project 1 due	A
10	M	10/26	Searching for Life Origins, The Origins of Life	6
	W	10/28	Evolution of Life Artificial Life?	6
	F	10/30	Biological Tour of the Solar System: the Inner S.S. Activity	7, A
11	M	10/26	Biological Tour of the Solar System: the outer S.S.	7
	W	10/28	Venus, Surface Habitability of Factors and the H.Z.	10
	F	10/30	Activity, The Future Life on Earth	
12	M	11/2	The Nature an Evolution of Habitability, Concept of Habitability	10,
	W	11/4	Discovering Extrasolar Planets	11
	F	11/6	Activity	10, 11, A
13	M	11/16	The Habitability of Extrasolar Planets and Moons	11
	W	11/18	Revisiting Mars and Terraforming Mars	8
	F	11/20	Activity	8, 9
14	T	11/23	Jovian Planets and Moons, Activity	9, A
	W	11/25	Drake Equation, Searching for Intelligent Life FINAL Project paper due	12
	F	11/27	THANKSGIVING DAY (no class)	–

15	M	11/30	SETI, UFOs, Travel to other planets?	12, 13
	W	12/2	Activity: YOUR exoplanets - what is the best Earth #2 candidate?	A
	F	12/4	Activity: Finding Earth #2 candidates (from final project) Student presentation Due	A
16	M	12/7	Interstellar Travel, Fermi Paradox Selected student presentations	A
17	W	12/9	Last Lecture Students presentations on the final Four Earth#2 candidates Activity: Deciding the best Earth #2 candidate	A

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 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. 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 or two scores for activities and quizzes, no late work will be accepted. 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. Research projects on Habitability of Solar System Objects and Your Exo-Planet should be started as soon as possible. **Do not procrastinate until the last moment.** Ask for comment for draft of your project writing in advance. 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 a university education is the chance to think deeply about big questions. Enjoy the class! Let’s have a fun semester to search for life in the universe!

SUMMARY

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

Class: MWF **via ZOOM** or at Steward Observatory N210 from 11:00 a.m. to 11:50 a.m.

Materials: Required textbook: *Life in the Universe* by Bennet & Shostak (4th edition)

Instructor: **Dr. J. Serena Kim** (serena00@email.arizona.edu)
Office Hours: Wednesdays, 1pm -3pm (ZOOM) or via appointment

TA: **Mr. Alex Bixel** (abixel@email.arizona.edu)
Office Hours: Thursdays, 9am - 11am (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.

In-Class mode requirements: 1. face coverings (masks), 2. social distancing in class (at least 6 ft distance between students; at least 2 seats between students), 3. sanitization of desk/seat area, 4. use different entrance and exit doors (see the map posted in the D2L), 5. no sitting in first few rows.

Group Activities: Group activities will be given in class. Submit the group report as a group at the end of the activity to D2L Dropbox.

Pop Quizzes, Mini-discussion, and Homework assignment:

Pop quizzes and mini-discussions may be given in class UNANNOUNCED. The previous week's homework is due by 11:59pm Friday (to D2L Dropbox).

Grade:

• Group activities	25%
• Mid Term Project 1	15%
• Final Project 2	20%
• Homework	20%
• Student Presentation (recorded)	10%
• Quizzes	10%
• Extra credit homework/activity	<5%

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 assignments or makeup will be offered** without a formal excused absence. 1 or 2 lowest scores of quizzes, homework and activity can be dropped.

Project 1 and 2: **Final projects due dates (subject to change) by 11:59pm, October 23rd (project 1) and November 25th, 2020 (project 2).** you can hand in early, but not late! Late work will be subject to reduced grade. No submission will be accepted after 24 hours from the deadline.

Final Exam: Student presentation (pre-recorded) - **due 11:59pm Friday December 5th 2020.**