



ASTR 202 Life in the Universe (Fall 2018)

Tu/Th 12:30 p.m.- 1:45 p.m., Steward Observatory N210

Description of Course

Welcome to one of the most exciting adventures in science, astrobiology! We meet on Tuesdays and Thursdays from 12:30 to 1:45 PM in N210 at Steward Observatory. “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.

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

- Office: N330 (note N in front of 330) at Steward Observatory.
- Phone: 520-626-0187
- 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 (at Steward Observatory N330):
 - Mondays: 9:30 a.m. - 11:30 a.m.**
 - Tuesdays: 2:00 p.m. - 3:00 p.m.**

You are welcome to see me before or after class. It is best to make an appointment first, by phone or email.

Teaching Assistant Mr. Junhan Kim (Ph.D. student)

- Email: junhankim@email.arizona.edu
- Office: 302 at Steward Observatory
- phone: 520-621-2494
- Office hours (at Parker Library at 3rd floor Steward Observatory/Interaction area outside the library):
 - Wednesdays: 2:00pm - 3:30pm**
 - Thursdays: 10:00am - 11:30am**

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 frequently. I will use the D2L course website for announcements, grade sheets, and assignments related to this course. I will also send you emails. **Please make sure the email sent to your d2l email address is correctly forwarded to you.**

The textbook is **Life in the Universe** by Bennet and Shostak (**4th** edition). We will follow the textbook, although some extra materials may be used. Lecture notes, additional materials, including copies of the activities and homework, helpful web sites, and this syllabus, will be posted on the course D2L.

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-4th-Jeffrey-Bennett/dp/0134089081/ref=sr_1_1?ie=UTF8&qid=1502507995&sr=8-1&keywords=life+in+the+universe+4th+edition+bennett%2C+shostak
- This textbook may be available in used book section and from book stores I did not list here.

Course Format and Teaching Methods

We will have lectures, small group activities, and discussions in class. Even though this class may be large, 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.

We will touch upon the broad and selected topics from the textbook, therefore keeping up with reading assignment is important. Questions are always welcome. We will often have *group activities and mini-discussions* that relate to the lecture materials. 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. An **individual homework assignment** will be handed out at the end of each activity. Homework builds on the class activities and reading, and is due one week after the homework assignment is given. There will be seven **pop quizzes or mini discussions** in class mainly based on reading materials, previous lectures, activity and homework. There will be three **exams** during the semester. There will be **one term project** (your exo-planet) and few opportunities for extra-credit assignments. This course encourages active participation by the students.

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

Absence and Class Participation Policy

Participating in the course and attending lectures and other course events are vital to the learning process. As such, attendance is required at all lectures and discussion section meetings. Students who miss class due to illness or emergency are required to bring documentation from their health-care provider or other relevant, professional third parties. Failure to submit third-party documentation will result in unexcused absences.

- 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>

I do not take attendance separately. However, activities, *unannounced* pop quizzes and mini discussions (10-15 minute-long small group discussions) will be given throughout the semester. Extra-credit discussion may be scheduled toward the end of the semester (<5% of total grade). Activity, pop quizzes and mini discussions will together count for 35% -40% of your final grade.

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.

Exams

There will be total three exams during the semester. Exam questions will be related to the reading assignments, lectures, activities, quizzes, and homework. Details on exam format will be discussed in class. The exams typically have T/F questions, multiple choice, matching, and short answer questions. The lowest grade will be dropped. Midterm exam dates are currently planned on **September 25th (12:30pm-1:45pm)** and **October 30th (12:30pm-1:45pm)**, and the final exam date will be on **December 7th (1:00pm-3:pm)**. More details on midterms and final exam will be discussed IN CLASS, and information related to each exam will be posted in the course D2L site.

Term Projects - 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 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.

This term project counts for **15%** 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 10th) will receive feedback and comments. The final version of your paper will be due **by November 27th, 2018** (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. Note that we will discuss a lot of detailed materials related to the project **IN CLASS**.

Grading Scale and Policies

About **70%** of the total grade in this class will be based on in-class group activities, homework, pop quizzes, and a term project. Exam will be **30%** of the final grade. There are 7 planned group activities, 4 homework assignments, and 7 pop quizzes (or mini discussions) during the semester. You may drop your 2 lowest grades of activity and pop quizzes, and 1 lowest grade for homework and exams. All missed assignments and exams are scored as zero. 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:

- 3 Exams (1 exam dropped) 30% (150 points)
- 7 Group activities (2 scores dropped) 30% (150 points)
- 1 Term project 15% (75 points)
- 4 Homework (1 score dropped) 15% (75 points)
- Attendance (7 pop quizzes or mini discussion) 10% (50 points)
(2 lowest scores dropped)
- extra credit homework/activity <5% (25 points)

total grade points: 500 points

A: 90-100%	(450-500+)
B: 80-90%	(400-449)
C: 70-79%	(350-399)
D: 60-69%	(300-349)
E: < 59%	(<300)

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, mini-group discussion and quizzes require writing in sentences and paragraphs. Students will receive feedback on their assignments from the TA and/or Dr. Kim on hardcopy paper or as a comment in the d2l. The draft project paper which is submitted at least 1 week in advance will receive comments individually, and the final paper can be resubmitted to the d2l.

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

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 with people sitting around them during lecture. 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 or discussion and may be reported to the Dean of Students.

Note-taking using electronic devices, such as laptops and iPad are permitted. These devices can be distracting to other students. Therefore, students who prefer to use electronic devices for note-taking during lecture should use one side of the classroom. 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. 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 (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>

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

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

A: Activity E: exam EC: extra credit

Week	DAY	DATE	TOPIC	CHAPTER
1	Tu	8/21	Welcome, Introduction, Course Overview, Astronomical Numbers	1, Appendixes (A,B,C)
	Th	8/23	Definition of astronomical object Ancient Debate	2, Appendixes (A,B,C)
2	Tu	8/28	Copernican Revolution Nature of modern science	2
	Th	8/30	Activity 1: Astrology and Statistics Activity	A
3	Tu	9/4	Scientific methods Scales, Space, power of 10	2, 3
	Th	9/6	History of the Universe Activity 2: Scale of the Universe	3, A
4	Tu	9/11	Universe of Matter and Energy, Properties of Light Radiation, Matter, Energy	3
	Th	9/13	Special lecture/show at the Flandrau Science Center (Planetarium)	A
5	Tu	9/18	Activity 3: Light and Spectroscopy	4
	Th	9/20	History of the Earth Geology and Life	4
6	Tu	9/25	Exam 1	Exam
	Th	9/27	The Hadean Earth and the Dawn of Life Climate Regulation and Change	4

7	Tu	10/2	Climate regulation and Change, night sky	4
	Th	10/4	Defining Life, CELLS, DNA DNA and Heredity, Biological revolution, Natural Selection	4, 5
8	Tu	10/09	Activity 4: DNA extraction	A
	Th	10/11	Metabolism Life at the Extreme,	5
9	Tu	10/16	Origin and Evolution of Life on Earth	6
	Th	10/18	Impact, Extinction, and Human Evolution	6
10	Tu	10/23	Biological Tour of the Solar System, Runaway Greenhouse Effect on Venus, Mars	7, 8
	Th	10/25	Mars Activity 5: TBA	8, A
11	Tu	10/30	Exam 2	Exam
	Th	11/01	Life on Jovian Moons Habitability, Habitable zone around other stars	9, 10
12	Tu	11/06	Detecting extra-solar planets	10,11
	Th	11/08	Detecting extra-solar planets H-R diagram Activity 6: Distant Suns and Exo-planets	11, A
13	Tu	11/13	Habitable zone in other solar systems	10.5
	Th	11/15	Project paper due by 12:30 PM Drake Equation, SETI, UFOs	12
14	Tu	11/20	Drake Equation Activity 7: Drake equation or Habitability	13, A
	Th	11/22	THANKSGIVING DAY (no class)	

15	Tu	11/27	Travel to other planets?	13+
	Th	11/29	Discussion on selected exoplanets,	9-13
16	Tu	12/4	Last lecture: Summary and Ending remarks	
17	F	12/7	Exam 3 (final exam day ~1PM – 3PM at SO N210)	

Tips for the Class

This syllabus serves as the “contract” for this class. Please read this syllabus 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 each category of work, no late work will be accepted, and no make-up will be offered. 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 project on your own planet should be started as soon as you receive the name of your planet. **Do not procrastinate until the last moment.** Ask for comment for draft of your project writing well in advance. 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: Tu/Th at Steward Observatory N210 from 12:30PM to 1:45PM

Materials: Textbook: *Life in the Universe* by Bennet & Shotstak (4th edition)

Instructor: Dr. J. Serena Kim (serena00@email.arizona.edu)

Office Hours: Mondays: **9:30AM - 11:30AM** (Steward N330)

Tuesday’s: **2:00AM - 3:00PM** (Steward N330)

TA: Mr. Junhan Kim (junhankim@email.arizona.edu))

Office Hours:

Wednesdays: **2:00pm - 3:30pm** (Steward Observatory Library)

Thursdays: **10:00am - 11:30am** (Steward Observatory Library)

Group Activities: Group activities will be given in class. Hand in the group report as a group at the end of the activity. Students are encouraged to submit a draft paper for the term project at least 1 week earlier than the project due date. You may want to keep your own copy for homework assignments.

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 before the lecture starts (to D2L dropbox).

Grade: 40% exam, 25% group activities, 15% homework, 10% pop quizzes, 10% project, and <5% extra credit

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 or makeup will be offered without a formal excused absence, because 1 or 2 lowest scores can be dropped.

Project: Final project due by **Nov. 27, 2018 (by 12:30PM before the class)**. you can hand in early, but not late! No late work will be accepted.