

# ASTR 202: Life in the Universe

Fall 2014, MWF, 1:00 PM - 1:50 PM, Steward Observatory N210

**Instructor: Dr. J. Serena Kim**

**TA: Mr. Tenzin Sonam**

## Overview

Welcome to one of the most exciting adventures in science, astrobiology!

Astronomy 202 is a **Tier 2** General Education course, aimed at students who have had at least one science course, but it assumes no prior knowledge of astronomy. Class is on **Mondays, Wednesdays, and Fridays from 1:00-1:50 PM in Room Steward N210**. "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.

## Teaching Team

Your instructor is Dr. Jinyoung Serena Kim in the Department of Astronomy. My office is Room **N330** (note N in front of 330), **Steward Observatory, phone 626-0187**, fax 621-1532, **serena@as.arizona.edu**. My office hours are 2:00-3:00PM on Mondays and 1:30-3:30PM on Thursdays. Email is a good way to reach me. I will try to answer all messages within 24 hours. You are welcome to see me before or after class. It is best to make an appointment first, by phone or email. **Mr. Tenzin Sonam a Ph.D. student, is the TA of this course** (tenzinsonam@email.arizona.edu). His office hours are 3:00PM - 4:00PM on Mondays and 10:00AM - 12:00 PM on Tuesdays at the Library on the 3rd floor at Steward Observatory, room N304).

## Class Materials and D2L course website

The textbook is **Life In the Universe** by Bennet and Shostak (3rd edition). We will closely 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 class web site. We will be using the UA course management system **Desire2Learn** (go to the URL <http://d2l.arizona.edu>, and follow the instructions for students; you'll need your NetID to login). You are strongly advised to stay current with reading the textbook as well as class notes to improve your performance on the quizzes and the classroom activities on Fridays. Please make sure the email sent to your d2l account is forwarded to you well. We will be using this email to contact with you.

The textbook can be either hardcopy or eTextbook:

1. Hardcopy can be found in the University book store.
2. Pearson <http://www.mypearsonstore.com/bookstore/product.asp?isbn=0321687671>
3. Course Smart <http://www.coursesmart.com/>

## Structure

Even though this class is large, you will be an active participant. Each week we will cover a particular broad topic. On Mondays and Wednesdays we will generally have lectures, although we may often break for recent news on Mars and extra-solar planets, demonstrations or short discussions. We will touch upon the broad and selected topics from the textbook, therefore keeping up with reading assignment is important. Questions are always welcome. On Fridays we will often have **group activities** that relate to the lecture material from earlier in the week, and may have short lectures. The class will split into groups of 3-4 for the 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 at the beginning of the Wednesday class that follows the activity. There will be pop **quizzes** in class mainly based on reading materials, previous lectures, activity and homework. There will be three **exams** during the semester. There will be **one project** (your exo-planet) which will be due before Thanksgiving break.

## Grades

Most of the grade (70%) 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. At the end of each activity, your group will submit a completed worksheet. It will be scored out of 20 points, with each member of the group getting the same grade. Homework is an **individual** assignment, scored out of 20 points. Scores for activities and homework use a grading scheme that allocates the points for a (majority) subset of the questions asked. There are 7 group activities and 7 homework assignments, and 7 pop quizzes during the semester. You may drop your 2 lowest scores. All missed assignments are scored as zero. Everyone is also expected to do an individual term project. I reserve the option to offer a small amount 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, so there is no curve and you’re not competing with other students.** The components of the grade and the final grade boundaries are following:

- 7 Group activities (2 scores dropped) 20% (100 points)
  - 7 Homework (2 scores dropped) 20% (100 points)
  - 7 Quizzes (2 scores dropped) 15% ( 75 points)
  - 3 Exams (1 exam dropped) 30% (150 points)
  - 1 Term project 15% ( 75 points)
  - extra credit homework/activity <5% (<25 points)
- (total grade points: 500 points)

A: 90-100% (450-500+)  
 B: 80-90% (400-449)  
 C: 70-80% (350-399)  
 D: 60-70% (300-349)  
 E: < 59.99% (<300)

**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. 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!

## Activities and Homework

On some Fridays the class will split into groups of 3-4 for hands-on activities. The activities will relate to material covered in previous lectures. At the end of each activity, you will be given a homework to be completed by the beginning of class (1PM) the following Wednesday. Note that the homework is an **individual assignment** in a worksheet format—you should do **your own work**. No late work is accepted since you can drop (or swap) 2 lowest scores during the semester. Some questions will be quantitative, but involve nothing beyond high school math level. Homework can be submitted to dropbox, or in person by 1PM on Wednesdays. Most of the homework assignments will depend closely enough on the group activity that you are unlikely to do well on the homework if you do not participate in the group activity. Group activities and homework together count for 40% of your grade.

## Projects - YOUR EXO-PLANET

Each student will adopt one extrasolar (exo) planet that will be randomly selected from a list of known exo-planets. Nobody will share the same planet. Each student is expected to do mini-research on the planet and the system (star+planet) as well as the method used to discover the planet. Example items and more information will be provided early in the semester during the lectures. The term project counts for 15% of your grade. Please do not copy the materials just as written in a webpage or in a journal. If you quote, please reference the site clearly. Quotes can not be more than 10% of your paper. All the used references including the links (URLs) should be clearly written at the end of the term paper. The page limit of the written part of the project is minimum 3 page, maximum 5 page not including large figures and citations (single spaced, point size should be 12). Details of rubric and submission details for the project will be discussed IN class. All projects are due by **1:00PM, Nov 24, 2014—a firm deadline. No late submission will be accepted.**

## Exams and Pop quizzes

There will be total three exams during the semester (see the schedule table). Exam questions will be related to the reading assignments, lectures, activities, and homework. Details on exam format will be discussed in class. The lowest grade will be dropped. Midterm exam dates are currently planned on **September 26 (1:00PM-1:50PM), October 29 (1:00-1:50PM)**, and the final exam is scheduled on **December 10 (1:00-1:50PM)**. More details on midterm and final will be discussed IN CLASS, and information related to each exam will be posted in the course D2L site. Pop quizzes and exams will count for 45% of your final grade.

## Conduct & Code of Academic Integrity

Please be courteous to each other, the TA, and me. Please do not eat, carry on conversations unless permitted for activities, or read materials unrelated to the class. Please arrive on time, and do not leave early. Always do your own work, and keep your academic integrity. Please turn off the mobile phones, electronic devices, and do not use your computer unless asked. No twitter, texting, facebook, social network allowed during the class. Note takers using computers must talk to me to use laptops during the lectures, and sit down on the first row in the classroom. For emergency phone calls, you may quietly step out of the classroom, and may come back to your seat quietly.

I don't take attendance, but 35% of your grade is based on group activities and pop quizzes, and if you miss a group activity, you're unlikely to do well on the homework and quizzes. The UA Code of Academic Integrity (see <http://deanofstudents.arizona.edu/academicintegrity>) prohibits all forms of academic dishonesty, including cheating, plagiarism, and fabrication; all students should be familiar with it and follow it in this class. The report that you turn in at the end of each Friday's activity is awarded a group grade, but each homework (due on Wednesday before the class starts) is an individual assignment and must be your own work. When you sign an activity, you are stating that you were actually there! Homework that is identical or nearly identical will be graded zero; a second infraction will be considered a Code of Conduct violation. It may be possible to collaborate on a creative project, but you must get my explicit approval first. The projects should be your own work for this class, and can not be copied directly from any website or book without proper references, can not be a copy of other person's work, and can not ask help from friends, family, or others without a permission from me. Please read the Code of Academic Integrity (<http://deanofstudents.arizona.edu/codeofacademicintegrity>) very carefully, and follow the code. Any project in violation with the code of conduct will be graded zero.

## Students with Disabilities:

If you anticipate barriers related to the format or requirements of this course, please meet with me soon, 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; <http://drc.arizona.edu>) and notify me of your eligibility for reasonable accommodations. We can then plan how best to coordinate your accommodations.

## Class Schedule

These lectures/activities may be revised during the semester.

A: Activity E: exam EC: extra credit

Week	DAY	DATE	TOPIC	Chapter
1	M	8/25	Welcome & Introduction	1
	W	8/27	Scientific Methods, Science vs. Pseudoscience	1
	F	8/29	Activity 1: Astrology and Statistics	A

Week	DAY	DATE	TOPIC	Chapter
2	M	9/1	No class	-
	W	9/3	Astronomical numbers, definition of astronomical objects	Appendixes (A,B,C)
	F	9/5	Special Activity (EC): Planetarium (night sky and more)	-
3	M	9/8	Ancient Debates, Copernican Revolution	2
	W	9/10	Scales, Space, and History of the Universe	2
	F	9/12	Activity 2: Scale of the Universe	A
4	M	9/15	Nature of Worlds, Properties of Light	3
	W	9/17	Radiation, Matter, Energy	3
	F	9/19	Activity 3: Light and Spectroscopy	A
5	M	9/22	Geology and Life, History of Earth and Life, The Hadean Earth and the Dawn of Life	4
	W	9/24	Geology and Habitability, Climate Regulation and Change	4
	F	9/26	Exam1	E1
6	M	9/29	Defining Life, Cells	5
	W	10/1	Metabolism	5
	F	10/3	DNA and Heredity	5
7	M	10/6	Life at the Extreme	5
	W	10/8	Life at the Extreme	5
	F	10/10	Activity 4: Extracting DNA	A
8	M	10/13	The Origin of Life - How did life begin?	6
	W	10/15	The Evolution of Life, Extinction	6
	F	10/17	Human Evolution, Artificial Life	A
9	M	10/20	Solar System Intro	7
	W	10/22	Biological Tour of the Solar System (inner solar system)	7

Week	DAY	DATE	TOPIC	Chapter
	F	10/24	Biological Tour of the Solar System (outer solar system)	7
10	M	10/27	Mars	8
	W	10/29	Exam2	E2
	F	10/31	Activity 5: Habitability, Green House Effect	A
11	M	11/3	Jovian Moons	8
	W	11/5	Moons of Saturn	9
	F	11/7	Definition of Habitability	10
12	M	11/10	Habitability Venus	10
	W	11/12	Detecting extra-solar planets	11
	F	11/14	Activity 6: Distant Suns and Exo-planets	A
13	M	11/17	Habitability	11
	W	11/19	Search for Extraterrestrial Intelligence (SETI), Aliens?	11
	F	11/21	SETI, Drake Equation	11
14	M	11/24	<b>Term project paper due by 1PM</b> <b>Activity 7: Drake equation</b>	12
	W	11/26	Thanksgiving Break (no class)	
	F	11/28	Thanksgiving Break (no class)	
15	M	12/1	Interstellar travel	13
	W	12/3	Interstellar travel, Fermi Paradox	13
	F	12/5	Lecture + Activity	L/A
16	M	12/8	Last lecture	
	W	12/10	Last Day of Class - our class Exam 3	E3

Notes:

- (1) All classes meet in Room Steward N210 starting at 1:00 PM (MWF).
- (2) Read the textbook, activities, and lecture notes for quizzes.
- (3) Pop quizzes are given in class.
- (4) Group activities are typically on Fridays.

(5) Homework given out at the end of Friday's activities are due in class the following Wednesday by 1:00PM.

(6) **Term project paper is due by 1:00 PM, Nov. 24, 2014, a firm deadline.**

(7) **Exams are in class on Sep. 26, Oct. 29, and Dec. 10**

## Tips for the Class

Sometimes students view each class as a puzzle to be solved, where the intentions of the instructor and the ways to get a good grade are not entirely clear. This syllabus serves as the "contract" for this class, so there should be no mystery as to what we can expect from each other. There are no exams other than quizzes, because learning facts alone is not as important as understanding how science works. Come to class regularly. 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 assignments it will be difficult to get the best grade in the class. Group activities work best when everyone contributes. Since you can drop 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. Grades on projects will be designed to reward particularly risk-taking, creative, and novel ideas and hard work. Remember to participate 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 most important information you'll need for the course is summarized below:

**Class:** MWF at Steward N210 1:00PM-1:50PM

**Materials:** Textbook: Life in the Universe by Bennet & Shotstak (3rd edition)

**Instructor:** Dr. J. Serena Kim ([serena@as.arizona.edu](mailto:serena@as.arizona.edu) 626-0187)

Office Hours: Mondays: 2PM - 3:00PM (Steward N330)

Thursdays: 1:30 - 3:30PM (Steward N330)

**TA:** Mr. Tenzin Sonam ([tenzinsonam@email.arizona.edu](mailto:tenzinsonam@email.arizona.edu))

Office Hours: Mondays: 3PM-4PM (Steward Library, N304)

Tuesdays: 10AM - 12PM (Steward Library, N304)

**Mondays and Wednesdays:** Lectures in class. Pop quizzes may be given in class.

The previous week's homework is due before the lecture starts on Wednesdays.

**Fridays:** Group activity in class or lectures. Hand in the group report at the end of the activity. You may want to keep your own copy for homework, and submit only one for your group.

**Grade:** 20% group activities, 20% homework, 15% quizzes, 15% project, 30% exam, <5% extra credit homework/activity

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

**Late Work/make-up:** **No late work or makeup** without excused absence, because 2 lowest scores can be dropped.

**Project:** Final project due by Nov. 24, 2014 (by 1:00PM **before** the class).

**you can hand in early, but not late! No late work will be accepted.**

## Classroom Etiquette

**Please read carefully, date, sign, and return it to me or TA today.**

In order to foster a good learning environment for the ASTR 202 course, I agree to obey the following rules of etiquette while attending class:

1. I will carefully read the The UA Code of Academic Integrity, and will follow the code.
2. I will respect the instructor, TA, and other students in the classroom.
3. I will not eat food or drink anything other than water in the classroom
4. I will not read the Arizona Daily Wildcat or any other newspaper while class is in session.
5. I will turn my cell phone (or other mobile devices) OFF while class is in session.\*  
\* If I am a parent or I am in an emergency situation, I will set my cell phone to VIBRATE.
6. I will not disrupt class by talking to my classmates about non-course-related subjects while the professor is speaking to the class.
7. I will not use my laptop to play movies or games or surf the Internet for non-course-related subjects and sites (e.g.,facebook, twitter) while class is in session.
8. I will make every effort to arrive in class on time and not leave until class is over. If I must arrive late or leave early, I will not disrupt class or distract my classmates.
9. I will not bring any pets or animals into the classroom (seeing-eye/therapy dogs exempted.)
10. Should I break any of these rules of etiquette which are listed above, I give Dr. Kim full authority to eject me from the classroom.

Date: \_\_\_\_ / \_\_\_\_ / \_\_\_\_

**YOUR COPY (KEEP)**

Signed,

\_\_\_\_\_  
Print your name

\_\_\_\_\_  
Your signature



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Signed,

\_\_\_\_\_  
Print your name

\_\_\_\_\_  
Your signature