

## SYLLABUS

### Astronomy 202: Life in the Universe The University of Arizona

“Space is big. You just won’t believe how vastly, hugely, mind-bogglingly big it is. I mean, you may think it’s a long way down the road to the chemist’s, but that’s just peanuts to space.”  
–Douglas Adams

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**LECTURES:** Mon-Wed-Fri from 1 pm - 1:50 pm in the Dome at Flandrau Planetarium

#### COURSE DESCRIPTION

We will study the single case of life in the universe that we know of, which is life on Earth. We will also outline the conditions that we expect are required for life, and come up with schemes for trying to detect life outside of Earth. To gain perspective, will study many objects in the universe including the solar system, stars, galaxies, and properties of the universe as a whole. We will introduce the basic concepts used in physics, chemistry, geology and biology needed to better understand these objects. We will make use of mathematical tools at the level of high school algebra, including order of magnitude estimates, scientific notation, and proportionalities. We will write up the assignments using embedded references, which means we will include references to support our arguments and insert such references in full into our manuscripts. We will also discuss and write on relevant topics that appear in the media and on the ballot. The application of making a hypothesis and testing it, the scientific method, will be used throughout this course.

#### LEARNING OUTCOMES

Upon successful completion of the lectures, a student will be able:

- to understand some basic physics concepts and apply them to astronomy problems
- to gain a knowledge of the physical scales, masses, sizes, lifetimes and other properties associated with a wide variety of astronomical objects
- to analyze the results of lab activities and discussions to better understand topics presented within this course
- Importantly, to learn how by studying Astronomy we can help Earth.

These learning outcomes will be met through attendance of lectures, writing assignments, tutorials, in-class activities, observing, and in-class exams.

## OFFICE HOURS and EMAIL

Dr. Frye's office hours are in Steward Observatory 308 and by appointment. To best serve this class, the following email response policy will be followed. In general, emails to the professor will be answered only during office hours, unless they are urgent in nature.

## GRADES

Your final course grade will be calculated as follows:

| Assessment                   | Percentage |
|------------------------------|------------|
| Midterms                     | 30         |
| Writing Assignments and Labs | 40         |
| Final                        | 30         |

Attendance will not be taken at every class, and experience shows that the "A" students are those who attend all the classes.

## REQUIRED TEXT AND READINGS

1. "Life in the Universe", by Bennett and Shostak. You will be assigned regular readings and assignments from the textbook which you are expected to do prior to coming to lectures.
2. The workbook: "Lecture Tutorials for Introductory Astronomy" by Prather, Slater, Adams and Brissenden is required for this class.
3. A "voting" card. We will use this card to cast our votes at every lecture.

## COURSE WEBSITE: Desire to Learn (D2L)

This is your first stop to get assignment due dates, class announcements, copies of lectures and laboratory and writing assignments. To access d2L, go to the website, [d2l.arizona.edu](http://d2l.arizona.edu) and click on 'User Login.'

## LECTURES

"Practice does not make perfect. Only perfect practice makes perfect."  
-Vince Lombardi

The lectures will be complemented by demos, lecture tutorials, and labs. To accomplish our learning goals, **lectures will move at a pace intended to build and expand upon the assigned reading material, rather than to introduce material for the first time.** The lecture notes will be made available as PDF files, *but these notes are not a substitute for attending lectures.* Your participation is encouraged during the lecture, which at the very least means you will be expected to **vote at our Think Pair Share question time.**

While reading your textbook is a good start, it will not be sufficient to do well on the exams. This is because there is significantly more information in this course than can be obtained by passive reading and/or memorizing vocabulary. The lectures are intended to teach you how to think about the conceptually-rich topics that you have read in your textbook. at the required level to do well on the exams. Even at their best, the lectures can only cover a subset of the required material at the level that you will need in order to do well on the exams, thereby requiring extra reading, thought and/or discussion outside of class. A list of lecture topics appears below:

| <b>Week</b>          | <b>Topics</b>                               |
|----------------------|---|
| Aug 24, 26 & 28      | Syllabus; Chapter 1                         |
| Aug 31, Sep 2 & 4    | Chapters 2 and 3                            |
| Sep 9 & 11           | Chapters 3 and 4 (no class Sep 7)           |
| Sep 14, 16 & 18      | Chapter 4 and 5; Midterm I (Sep 19)         |
| Sep 21, 23 & 25      | Chapter 5 and 6                             |
| Sep 28, 30 & Oct 2   | Solar Luminosity Lab and Chapter 7          |
| Oct 5, 7 & 9         | Chapters 7 and 8                            |
| Oct 12, 14 & 16      | Chapters 8 and 10                           |
| Oct 19, 21 & 23      | Chapter 10; Midterm II                      |
| Oct 26, 28 & 30      | Chapters 11 and 12                          |
| Nov 2, 4 & 6         | Chapters 12 and 14                          |
| Nov 9, 11 & 13       | Chapters 14 and 15                          |
| Nov 16, 18 & 20      | Chapters 15 and 16                          |
| Nov 23 & 25          | Midterm III (no class on Nov 27)            |
| Nov 30, Dec 2 & 4    | Chapter 18                                  |
| Dec 7 & 9 (last day) | Review                                      |
| Dec 14               | Final exam 1-3 pm in Flandrau Dome as usual |
| Aug 25               | Syllabus; Chapter 1                         |

## **OBSERVATIONS**

You will have the opportunity to visit our telescope on the roof of Steward Observatory's telescope building, and it is required that you go at least one time and submit an observing worksheet. It is highly recommended to go to early, as observing sessions may be canceled with very little notice or even *during* your session. Merely attempting to go one or even several times, but not completing the observation will not count for credit. Note if you know in advance that you will be unable to attend ANY observing sessions then please see ASAP. Observing is available every MTuWTh excluding major holidays.

## **HOMEWORK**

There will be regular homework assignments. Please do your own work. No late homework will be accepted as this quickly becomes unwieldy in a class of this size. If there is a true emergency, then please let me know as soon as possible.

## **LABORATORIES**

There will be 3-4 laboratory activities in this class. The sum total of the laboratory assignments plus the homework will be worth 40% of your final grade.

## **EXAMINATIONS**

There will be three in-class midterms, and one final exam. All exams will be closed notes and closed book, and will be comprised of multiple choice questions. Cell phones, laptops, and all other handheld devices must be turned off and put out of sight. This is not to time to test me with regards to cheating. If you have a true emergency and cannot attend the final exam, please contact me immediately with documentation. There will not be makeup exams in this

course. To help account for this, I will drop the lowest midterm score at the end of the semester. If you miss a midterm then you will receive a grade of "0" and this one score will be dropped from the calculation of the final grade. It is not advisable to miss the final exam for any reason. An unexcused absence from the final will result in an F for the entire course.

There will be opportunities to earn extra credit by attending evening public talks on astronomy on campus. Please see me for details.

## **ACADEMIC HONESTY**

I follow the policies outlined in the Dean of Students code of academic integrity, including cases of plagiarism and cheating (see <http://deanofstudents.arizona.edu>). I strongly encourage you to work with your peers on the homework assignments. Such collaborations can include discussion of the qualitative concepts and on the mathematics, but in the end you must write-up and submit your own work using your own words. If an assignment even only *appears* to be copied from someone else, or copied from a source without a reference, or copied from a referenced source and only a few words changed then the assignment will be assumed to be plagiarized. I will give a grade of "F" for the assignment, and further to that the Dean may assign a grade of "F" for the whole course and/or pursue a more stringent repercussion.

Note that copying large amounts of text even with proper references will result in a low grade. One can avoid such 'lazy writing' by talking over what you intend to write with a peer, your teaching assistant or professor, through email or conversations during office hours, until there is enough confidence in your answer that you can write the answer down on paper in your own words. Another trick is to use direct quotations that are short and infrequent.

Cheating is the second type of serious infraction. Some examples include: cheating on an exam, use of electronic devices or translators without prior consent from your professor, substituting someone else to take an exam and changing an answer to an exam/assignment after the document has been returned to you.

## **ATTENDANCE AND CLASSROOM ETIQUETTE**

The students are expected to attend all lectures, lab sections, and the required observing session. Please turn off cell phones in class, and refrain from extraneous talking, distracting/discourteous behavior, distracting use of laptops/cell phones, and coming late and/or leaving early. Please bring your clickers to class each day as the clickers will be used to take attendance. If you are interested to use a laptop or other electronic device (cell phone, electronic tablet) to take notes during the lecture you are requested to sit in the first two rows of the lecture hall.

## **WRITING ASSIGNMENTS**

You will have a few opportunities to communicate scientific ideas through writing assignments. Examples of writing assignments are the Sunset Lab write-up on archaeoastronomy, the Solar luminosity writeup and the term paper. Of these, the Sunset Lab and term paper must include embedded references, which means we will include references to support our arguments and insert such references in full into our manuscripts. Otherwise the student will receive a 0 for the assignment. Here are a few more details about the various writing assignments.

All write-ups will be graded according to the formula used in the Writing Program of the Department of English: Content (50%), Organization (20%), Expression (20%), Mechanics (10%).

All writing must be single-spaced and with a maximum font size of 12 pt and no smaller than 11 pt. Handwritten assignments are technically acceptable, but will be returned if they are illegible.

**All writing assignments should be submitted in-class before the start of class.** Assignments may also be turned in prior to the due date. Late assignments, or assignments submitted elsewhere (my mailbox, for example) will not be accepted as such administration becomes too unwieldy for a class of this size.

## **ASSISTANCE**

I and my TA are here to help you, so please take advantage of office hours. We want to get to know you, so you are very welcome to stop by to introduce yourself. See Page 1 of this syllabus for our contact details.

Please contact me promptly if you have any questions or concerns regarding this class. If you would like extra tutoring you may attend the FREE weekly astronomy tutoring “Think Tank.” Please see me for details regarding the dates/times.

If disability-related assistance is required, please contact the Disability Resources office (621-3268; <http://drc.arizona.edu/>) and also please let me know. I, together with the DR office, can then work together to ensure your full participation in this course.

From experience, students find this to be challenging class, and in a rewarding way. I am delighted to be able to teach this course, and am looking forward getting to know you and to learn from you as well. Good luck!

