

SYLLABUS
Astronomy: The Physical Universe (Astr170B1)
The University of Arizona, Spring 2013

“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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Office hours: Monday, Wednesday and Friday, 2-3 pm

LECTURES: Monday-Wednesday-Friday from 12 noon - 1 pm in Steward Observatory N210

COURSE DESCRIPTION

We will study 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 understand the science. 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 our assignments with embedded references and discuss and write on relevant topics that appear in the media and on the ballot. The application of 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 assemble results of labs and discussions in both writing and in numerical forms.

These learning outcomes will be met through attendance of lectures, observing sessions, writing assignments, tutorials, in-class activities, field trips, 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	30
On-line Homework	10
Final	30

Attendance will be taken with the aid of the 'Clicker,' and experience shows that the "A" students are those who attend all the classes.

REQUIRED TEXT AND READINGS

1. "The Essential Cosmic Perspective", **Sixth** Edition, by Bennet, Donahue, Schneider, and Voit. Note this text is different from the one entitled, "The Cosmic Perspective." This edition is *strongly* recommended, and comes with free online materials and resources. You will be assigned regular readings from the textbook which you are expected to do prior to coming to lectures.

2. You are **required to purchase** access to MasteringAstronomy at:

<http://www.masteringastronomy.com> (class code is: **SUPERNOVA**)

You can purchase MasteringAstronomy along with a new textbook OR purchase it separately on-line, with or without the text E-Book option. You will not be able to share access codes with your neighbor, and so will need to purchase one in your own name. You will need to input your code to access homework and occasional labs.

3. If you do not already have one, you will need to purchase a Clicker and can do so in three different ways. You can walk to the bookstore, go online at <https://store.turningtechnologies.com>, or buy the app for iPhone or iTouch (and maybe some others). To get the app, go also to <http://store.turningtechnologies.com>, and follow the instructions. If you encounter problems please contact me.

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 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, student presentations, field-trips and videos. We will be following the textbook. 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 must **bring your clicker to class.** Participation will be taken into account by your registered clicker responses.

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. The science concepts often appear to be easy and on further thought turn out to have a deeper meaning. The lectures are intended to teach you how to think about these deceptively easy concepts at the required level to do well on the exams. Even at their best, the lectures will 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:

Week	Topics
January 9-11	Syllabus; Chapter 1
January 14-18	Chapters 2 and 3
January 23-25 (no classes Monday)	Chapter 3; Planetarium
January 28 - February 1	Chapter 4
February 4 - 8	Chapter 5; Review; Midterm I (Feb 8)
February 11-15	Chapter 6; Solar Luminosity Lab
February 18-22	Chapters 7 and 8
February 25- March 1	Chapters 8 and 10
March 4-8	Chapter 10; Review; Midterm II
March 11-15	No classes: Spring Recess
March 18-22	Chapters 11 and 12
March 25-29	Chapters 12 and 14
April 1-5	Chapters 14 and 15; Planetarium
April 8-12	Chapters 15 and 16
April 15-19	Chapters 16; Review; Midterm III
April 22-26	Chapter 18
April 29 - May 1 (last day Wednesday)	Misc. Topics; Review
May 8 (Wednesday)	Final exam from 10:30 am - 12:30 pm

OBSERVATIONS

You will have the opportunity to observe through our large telescope on the roof, 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 and also pending weather conditions.

HOMEWORK

There will be weekly homework from the text website at MasteringAstronomy. Please do your own work. Note late homework will not 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 four laboratory activities in this class, the sum total of which will be worth 30% towards your final grade. They are:

Name	Date
Sunset Lab	Jan - Mar
Observing: Ray White 21inch Telescope	Jan - Apr
Planetarium	Jan and Apr
Solar Luminosity Lab	
The Hubble Lab	April

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. Here is the website: <https://www.as.arizona.edu/pubevelec.html>

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 until there is enough confidence in your answer that you can put 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, 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 to take notes during the lecture you are requested to sit in the first five 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 archeoastronomy, the Solar luminosity writeup and the term paper. Of these, the Sunset Lab and term paper must include embedded references. Otherwise the student will receive a 0 for the assignment. Here are a few more details about the various writing assignments.

The Sun Lab Writeup is a straightforward write-up of the laboratory experiment plus a short answer essays. The Solar Calendar assignment includes a writeup and a longer essay on the topic of, "Archeoastronomy of the ... (insert favorite world site here)."

The Informative Essay + Letter to Your Representative comprises two parts: a long essay and a letter. **Part One: The Essay.** Pages 1 and 2 of the essay are to be on the subject of the pros and cons of space- vs. ground-based modern astronomical observatories. Pages 3 and 4 are to be on a discussion of the advantages and disadvantages of infrared observations over observing at other wavelengths (optical and/or radio and/or high energy X-rays and gamma rays). **Part Two: The Letter.** Pages 5 and 6 are to be a mock letter in formal style of a letter to your own Congressional Representative. You will need to look up the name and address on the Representative in your district, but you will not need to mail the letter! The subject is to be on one of the following three topics: 1) Your opinion on the James Webb Space Telescope (JWST), 2) Your opinion on Kitt Peak National Observatory, or 3) Your opinion on the development of the Giant Magellan Telescope (GMT).

These three 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 weekly astronomy tutoring “Think Tank.” usually held in their Recreation Center location (<http://thinktank.arizona.edu/>). Please contact me for exact hours of operation for this semester.

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 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!