

Fa19 - INTRODUCTION TO ASTRONOMY

Unique number: **46140**

TTH 12:30PM – 2:00PM · PAI 3.02

Instructor: **Judit Györgyey Ries**

Office hours: **Th 2:15 - 3:30 in RLM 17.214,**
F 2:00 - 3:00 or by appointment

Teaching assistants:

Alicia Montecinos MW 2:00 - 3:30 pm

Akshi Tomar M 1:00 - 2:30 pm, T 2:15 - 3:45 pm
in **RLM.16.304B**



Textbook

We are using a free textbook “**Astronomy**” by Fraknoi, Morrison and Wolff available at:

openstax.org/details/books/astronomy/

You can view it on line, download it for free, although contributions to maintain the site are welcome. It covers a lot of material, we will have time for a lot less, but you can use it as a reference book when studying for exams.

Course Description:

This course will provide an overview of astronomy, including basic physics concepts, planets, stars, galaxies, and cosmology. We will focus on conceptual understanding, rather than memorization of facts, although you do need to remember some fundamental laws. You will get a taste of how science works, and develop critical thinking skills while you gain insight into how the Universe works. These skills should help you understand scientific news.

The syllabus can be downloaded from:

<https://utexas.instructure.com/courses/1256502/files/>

Main course goals and objectives

By the end of the course

You will be able to illustrate the role Astronomy plays in our everyday life

- Explain how the natural cycles observed on the sky lead to our modern timekeeping
- Describe how the observation of the planets, and prediction of planetary motion lead to the use of artificial satellites
- Connect how astronomical discoveries shaped the way we see ourselves, and our place in the universe

You will discover that science is not a straightforward, one step process

- Identify the steps of the scientific method, and explain the role of each step
- Illustrate how did the process work on the laws you learned in class

You will develop the ability to do quantitative reasoning from the fundamental laws explained in class, such as

- Interpret equations to predict what happens to the outcome if one or more variables are changed
- You will develop a basic familiarity with the night sky

- Find some well know constellation and find North on the Northern hemisphere
- Explain how we constructed our coordinate systems on the sky

You will be able to describe the hierarchy of the objects in the Universe, and the scale of the sizes and distances in actual sizes and proportions

- Compare and contrast the sizes of the planets in our solar system to the distances between the planets
- Have an order of magnitude recollection for the sizes of planets, stars and galaxies

Course requirements

There is no pre-requisite for this course. However, we will rely on high school physics, and some familiarity with interpreting formulas is necessary, but it is a skill we will practice in class. Attendance and participation is required, and they will count as part of your grade, as in-class, interactive learning activities will be an important part of this course. I will post the worksheets, and you need to print them out and bring them to class. You will be working in small groups of 2 to 4 people, discussing questions posed during the class. These interactive discussions will help you reinforce the concepts, and help you complete your homework assignments and prepare for the exams.

Class Website: All class communication will be conducted through Canvas at canvas.utexas.edu. Your student e-ID will give you access to the site. I will send announcements, and give assignments through it; you can send me, or your TAs e-mail through Canvas, or to start any class related discussions. You also will be submitting the quizzes, home works and the Moon Journal through Canvas.

For the in-class work you need **InstaPoll** to participate and get credit for attendance. (See below)

Participation and attendance: I expect you to come to every class, and stay till the very end. I will make every effort to finish the class on time. However, there can be emergencies, so you can miss 4 out of the 30 lectures without penalty. If you need to miss more due to illness or accident, or attending to family matters, please bring an appropriate note. For religious holidays see the note further down.

In-class response system - we will be using a system through Canvas, called **InstaPoll**. Be prepared to bring a device (phone, laptop, tablet) to class each day, which will allow you to respond to your instructor's questions and get immediate feedback.

- We will be using the Canvas InstaPoll tool for in-class polling and participation. You are allowed to miss up to 15% of these points without penalty. For example if you earn 85 points or more of the maximum Canvas InstaPoll points throughout the semester you will get 100% for this portion of your course grade. If you earn 80-84 points you'll receive a 90% for this portion of the course grade; if you earn 70-79 voting points you will receive 80% for participation, etc. For some questions you will receive credit even if your answer is not correct, give you attendance point, and for me to gauge your understanding of a hard concept. There are no opportunities for make-ups.

Note that while web-enabled devices are required for the course (to use Canvas InstaPoll response system), I expect you to stay focused on the class content. If you use the device for unapproved activity (texting, surfing, shopping!) you will receive one warning. A second violation will result in the loss of remaining voting points for the semester since you will no longer be allowed to use your device to class.

In addition to working with InstaPoll, we will do tutorials during some classes. I will upload the appropriate assignment and you need to print it out, and bring it to class. If you do not bring it, you will lose participation points. If you do not have access to a printer send me a message through Canvas, and I get it printed for you.

Homework: There will be five homework assignments, submitted through Canvas. I encourage you to discuss the homework with your classmates, and work on it together. However, you must write what you turn in on your own, using your own words. Just because you missed the original deadline do not give up on the homework. If you submit it until 2 days past the deadline you will still receive 75% credit, if you are not more the 4 days late you still get 50%. Duplicate works will not receive credit.

Exams: There will be five, in-class, written exams, but **no** comprehensive final. You have to take all in class exams; no exceptions will be granted. Make up exams will be given only under exceptional circumstances. All exams will be closed book and closed-note. Before each test there will be a review session to help you with the preparation. I recommend that you send your questions to us ahead of the session, so we can focus on what you really need.

Quizzes: In order to prepare for lectures you need to watch and read the assigned material, and answer some simple questions on line.



Moon Journal: Observations are a very important part of Astronomy. So, go outside find and sketch the Moon for at least 9 clear occasions over the space of one month. Write down the date and the time of your observations. Give the location of the moon i.e. height above the horizon, and the angle from South. Draw the phase as accurately as you can. Do not forget to label the phase (waxing/ waning, new/quarter/full) for each drawing. Keep your observations, but create a booklet of your drawings and turn it in to complete your assignment. Turn it in no later than April 23. Keep in mind, that you need 30 days to successfully complete this assignment.

Additional assignment: Visit the Star Party at UT. If you bring me proof of your attendance you receive 2 additional points. You can go more than once, but you will get credit only for one visit. The information you need to know can be found at:

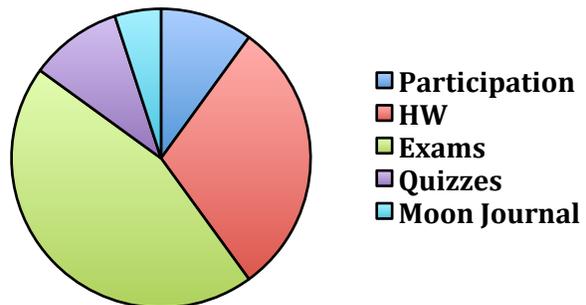
<http://outreach.as.utexas.edu/public/viewing.html>

Grades:

Grades will be based on attendance and class participation (10% of the grade), quizzes (10%) home works (30%), in-class exams (45%), and 5% for the Moon Journal. Please note, that having perfect participation will gain you a full grade.

Grading scheme:

A		≤ 92.0%
A-	< 92.0 %	≤ 88.0%
B+	< 88.0 %	≤ 85.0%
B	< 85.0 %	≤ 81.0%
B-	< 81.0 %	≤ 78.0%
C+	< 78.0 %	≤ 75.0%
C	< 75.0 %	≤ 70.0%
C-	< 70.0 %	≤ 67.0%
D+	< 67.0 %	≤ 64.0%
D	< 64.0 %	≤ 60.0%
D-	< 60.0 %	≤ 57.0%
F	< 57.0 %	



Course Conduct and Academic Dishonesty

Please put your cell phones to airplane mode before you enter the classroom, unless you have a legitimate reason to expect a phone call. Then set it on “vibrate”, answering it only in case of an emergency. Also, as consideration for your fellow students stay till the end of the class early unless you have talked to me in advance about leaving.

The core values of The University of Texas at Austin are learning, discovery, freedom, leadership, individual opportunity, and responsibility. Each member of the university is expected to uphold these values through integrity, honesty, trust, fairness, and respect toward peers and community. Students who violate University rules on scholastic dishonesty are subject to disciplinary penalties, including the possibility of failure in the course and/or dismissal from the University. Standards for Academic Integrity are posted at

<https://deanofstudents.utexas.edu/conduct/standardsofconduct.php>

The penalty for cheating on an exam is serious; you will get a total score of zero.

Plagiarism: As a research university, the University of Texas at Austin takes plagiarism very seriously. The consequences of getting involved in a plagiarism infraction are simply not worth it. Always cite your sources, and when in doubt consult a professor or librarian. You may also read more about plagiarism at the Student Judicial Services website:

<https://deanofstudents.utexas.edu/conduct/academicintegrity.php>

Documented Disability Statement: Please notify me of any modification/adaptation you may require accommodating a disability related need. The University of Texas at Austin provides upon request appropriate academic accommodations for qualified students with disabilities. For more information, contact Services for Students with Disabilities at 471-6259 (voice) or 232-2937 (video phone) or

<http://www.utexas.edu/diversity/ddce/ssd>

Religious Holidays: By UT Austin policy, you must notify the professor of a pending absence at least 14 days prior to the date of observance of a religious holy day. If you must miss a class, an examination, a work assignment, or a project in order to observe a religious holy day, you will be given an opportunity to complete the missed work within a reasonable time after the absence.



A climate conducive to learning and creating knowledge is the right of every person in our community. Bias, harassment, and discrimination of any sort have no place here. If you notice an incident that causes concern, please contact the Professor, TA, and the Campus Climate Response Team.

<http://diversity.utexas.edu/ccrt>

Department of Astronomy Ground Rules: The Department of Astronomy has ground rules for all of its undergraduate courses. They are described in the document “Memo to Undergraduate Astronomy Students Regarding Astronomy Courses,” which is available online at

<https://astronomy.utexas.edu/academics/undergraduate-program/memo-to-undergraduate-astronomy-student>

Email is recognized as an official mode of university correspondence; therefore you are responsible for reading your email for university and course-related information and announcements. Please check your email regularly and frequently.

Scheduled Review Sessions:

Will be posted on Canvas and in the updated syllabus on Canvas, as soon as we have the room assignment.

Tentative Course Schedule (The actual topic covered is subject to change)

		Class date	Subject	Book chapter, section
Week 1	Lecture 1	Jan-21	Getting acquainted, Scientific method, Overview	1
	Lecture 2	Jan-23	Observing the Sky, Celestial Cycles	2.1, 4.1 - 4.4
Week 2	Lecture 3	Jan-28	Moon Phases, Tides, Eclipses	4.5 - 4.7
	Lecture 4	Jan-30	Historical Perspectives, Planetary Orbits	2.2 - 2.4, 3.1
Week 3	Lecture 5	Feb-4	Newton's Laws, Gravity + Tutorial	3.2 – 3.6
	Lecture 6	Feb-6	Exam 1	
Week 4	Lecture 7	Feb-11	EM spectrum, Spectroscopy	5.1 – 5.3
	Lecture 8	Feb-13	Atomic Physics and Spectral Lines	5.4 – 5.5
Week 5	Lecture 9	Feb-18	Doppler effect, Instruments + Tutorial	5.6, 6
	Lecture 10	Feb-20	Planetary System Overview, Earth as a Planet	7, 8.1 - 8.5
Week 6	Lecture 11	Feb-25	Venus, Mars, Mercury, and the Moon,	9, 10
	Lecture 12	Feb-27	Exam 2	
Week 7	Lecture 13	Mar-3	Giant Planets, Satellites, Rings	11, 12
	Lecture 14	Mar-5	Small bodies, Origin of Planetary Systems	13, 14
Week 8	Lecture 15	Mar-10	Sun	15
	Lecture 16	Mar-12	Sun's Energy Production, and Structure	16
Week 9	Spring	Break		
Week 10	Lecture 17	Mar-24	Celestial Distances + Tutorial	19.1-19.2
	Lecture 18	Mar-26	Exam 3	
Week 11	Lecture 19	Mar-31	Stellar Masses and Sizes	17.3, 18.2 – 18.3,
	Lecture 20	Apr-2	The HR Diagram + Tutorial	18.4, 19.3-19.4
Week 12	Lecture 21	Apr-7	Interstellar Matter, Birth of Stars	20, 21.1 – 21.2
	Lecture 22	Apr-9	Stellar Evolution, Death of stars	22,
Week 13	Lecture 23	Apr-14	Planets beyond the Solar System	21.3-21.6
	Lecture 24	Apr-16	Exam 4	
Week 14	Lecture 25	Apr-21	Milky Way Exploration, and Other Galaxies,	25, 26.1- 26.3
	Lecture 26	Apr-23	Black holes, Active galaxies, Extragalactic Distances	24.5 -24.6, 27
Week 15	Lecture 27	Apr-28	Observable universe + Tutorial	26.4-26.5, 28
	Lecture 28	Apr-30	Big Bang - Cosmology	29
Week 16	Lecture 29	May-5	Life in the Universe	30
	Lecture 30	May-7	Exam 5	