

# Spring19 - INTRODUCTION TO ASTRONOMY (46560)

**MWF 2-3 pm RLM 4.102**

Instructor: **Judit Györgyey Ries**

Office: **RLM 17.214**

Office hours: **Monday 11:00 – 12:30** and **Wednesday 12:00 – 1:30**  
or by appointment

**TAs: Xiao (Rita) Tian**

Office hours: **Tuesday 1:00 - 2:30 pm** and **Wednesday 4:00 - 5:30 pm**

Office hours location: **Engineering and Education Research Center (EER) 6.614.**

**Ajit Gopalakrishnan**

Office hours: **Monday 3:30 – 4:30**

Office hours location: **RLM 17.214**

## **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 ones. 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 news about incredible scientific discoveries, to decide whether they are true, or just a hoax.

## **Textbook**

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

[https://cnx.org/contents/LnN76Opl@13.86:\\_45u6IpQ@4/Introduction](https://cnx.org/contents/LnN76Opl@13.86:_45u6IpQ@4/Introduction)

You can 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.

You will also need an unused copy of the following work book:

### **Lecture-Tutorials for Introductory Astronomy, 3rd Edition**

by Edward E. Prather, Slater Timothy F, Jeff P. Adams, Gina Brissenden

We will use it regularly in class to better understand the concepts presented during the lectures.

## **Course requirements**

There is no pre-requisite for this course. 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. Research into how people learn shows that active discussions, verbalizing your thoughts helps you in understanding and retaining the material. You will be working in small groups of 2 to 4 people, discussing questions posed during the class. The course material will emphasize observations and theory which when combined gives us insight into

the operation of the natural world. 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](https://canvas.utexas.edu). Your student e-ID will give you access to the site. You can also send e-mail through Canvas to me, your TAs, or you can start class related discussions. You will be submitting any essay type assignments through Canvas also.

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 an effort to finish the class on time. However, there can be emergencies, so you can miss 5 out of the 44 lectures without penalty, which will be monitored through InstaPoll. 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 to class each day which will allow you to respond to instructor questions and get immediate feedback.

- In class 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 Canvas InstaPoll Voting 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. Some fraction of the questions you will receive credit for just by answering, other questions you will only receive the points if you get the correct answer, but by being in class and discussing the assignment with peers you will have the opportunity to answer those questions correctly. 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!) will receive a 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.

**Homework:** There will be five homework assignments. 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 comprehensive final. Make up exams will be given only under exceptional circumstances; however, I will drop your worst exam. All exams will be closed book and closed-note. Before each test there is 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.

**Extra credit tasks** - Moon Journal: 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 observation, but create a booklet of your drawings and turn it in to complete your assignment. Turn it in no later than May 1 (worth 9 points).

You also can visit the Star party at UT. If you bring me your proof of attendance you can get 1 extra point. 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 in class participation (10% of the grade), home works (40%), the in-class exams (50%). Please note, that having perfect participation will gain you a full grade. The completed extra credit work, the Moon journal and the Star party visit can add and additional grade. Keep in mind, that you need 30 days to successfully complete the Moon assignment.

#### Grading scheme:

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

### Course Conduct

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.

Academic Dishonesty: 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

<http://deanofstudents.utexas.edu/sjs/conduct.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:

<http://deanofstudents.utexas.edu/sjs/academicintegrity.html>

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.

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

	<b>Class date</b>	<b>Subject</b>	<b>Book chapter</b>
<b>Week 1</b>	23-Jan	Getting acquainted, overview	Chapter 1
	25-Jan	Navigating the sky	
<b>Week 2</b>	28-Jan	Celestial cycles	Chapter 4
	30-Jan	Lunar phases/Eclipses	Chapter 4
	1-Feb	Seasons, Tutorials	Chapter 4
<b>Week 3</b>	<b>4-Feb</b>	<b>Exam 1</b>	
	6-Feb	Ancient Astronomy	Chapter 2
	8-Feb	Copernicus, Galileo, Brahe	Chapter 2

<b>Week 4</b>	11-Feb	Kepler's Laws	Chapter 3
	13-Feb	Newton's laws of motion	Chapter 3
	15-Feb	Gravity	Chapter 3
<b>Week 5</b>	18-Feb	Electromagnetic Waves,	Chapter 5
	20-Feb	Black body radiation	Chapter 5
	22-Feb	Doppler effect + Tutorials	Chapter 5
<b>Week 6</b>	25-Feb	Astronomical Instruments	Chapter 6
	<b>27-Feb</b>	<b>Exam 2</b>	
<b>Week 7</b>	1-Mar	Solar system overview	Chapter 7
	4-Mar	Earth-like Planets	Chapter 8, 10
	6-Mar	Earth, Life and Climate	Chapter 8, 10
	8-Mar	Cratered Worlds	Chapter 9
<b>Week 8</b>	11-Mar	Giant Planets	Chapter 11
	13-Mar	Giant Planets	Chapter 11
	15-Mar	Rings, Moons and Pluto	Chapter 12
<b>Week 9</b>	March 18-23	Spring break	
<b>Week 10</b>	25-Mar	Comets and Asteroids	Chapter 13
	27-Mar	Origin of the Solar System	Chapter 14
	<b>29-Mar</b>	<b>Exam 3</b>	
<b>Week 11</b>	1-Apr	The Sun - I	Chapter 15
	3-Apr	The Sun - II	Chapter 16
	5-Apr	Organizing the stars	Chapter 17
<b>Week 12</b>	8-Apr	Organizing the stars	Chapter 18
	10-Apr	Measuring stellar distances	Chapter 19
	12-Apr	Interstellar matter	Chapter 20
<b>Week 13</b>	15-Apr	Other planetary systems	Chapter 21
	<b>17-Apr</b>	<b>Exam 4</b>	
	19-Apr	Basics of Stellar evolution	Chapter 22
<b>Week 14</b>	22-Apr	From main sequence to stellar remnants	Chapter 23
	24-Apr	High mass stars - Supernovae, black holes	Chapter 24
	26-Apr	Our galaxy and its architecture	Chapter 25
<b>Week 15</b>	29-Apr	Other galaxies	Chapter 26, 27
	1-May	Galaxy evolution	Chapter 28
	3-May	Structure of the Universe - Tutorial	Chapter 29
<b>Week 16</b>	6-May	The evolving universe - the big picture	Chapter 29
	8-May	Life in the Universe	Chapter 30
	<b>10-May</b>	<b>Exam 5</b>	