**INTRODUCTION TO ASTRONOMY**

**Unique number: 46569**

**Fall 2020**

**Class time: MWF 2:00-3:00 PM - Internet**

**Instructor:** Judit Györgyey Ries
**Pronouns:** She, her, hers
**Email:** Use Canvas to email

**Time to chat with your instructor:**
MW 12:00- 1:30 pm or by appointment using zoom sessions

**Teaching Assistants:**

Jinsong Liu (He, him, his): Office hours TDB

Sangram Kate (He, him, his):Office hours TDB

Comet NEOWISE

**Course Description:**
This course will provide a general overview of astronomy for non-science majors, including relevant physic concepts, the nature of planets, stars, galaxies, and the universe as a whole. You will get a taste of how science works, and develop critical thinking skills while you gain insight into how the Universe works.

This course carries the Quantitative Reasoning flag. Quantitative Reasoning courses are designed to equip you with skills that are necessary for understanding the types of quantitative arguments you will regularly encounter in your adult and professional life. You should therefore expect a substantial portion of your grade to come from your use of quantitative skills to analyze real-world problems.

## What will you learn? - Course outcomes

By the end of the course

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 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

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

## How will you learn?

We will focus on conceptual understanding, rather than memorization of facts. I will illustrate the physical laws by going through examples, and check your knowledge through Instapoll questions in class. You will work on tutorials in groups, discussing and solving problems through teamwork. The quizzes and home works are also designed to reinforce the concepts. The Moon Journal is a simple project for you to learn good observing practices, and draw simple conclusion based on your observations.

## Course requirements

There is no pre-requisite for this course. Bring an inquisitive approach and reflective attitude to what you will learn will allow you to reap maximum benefits.

I will review the physics principles necessary, and how to use the simple formulas to describe them. We will practice these in class. Participation is group work in class and Canvas discussions, as interactive learning activities will be an important part of this course. I will post the worksheets before class. You will be working in small groups of 4 to 6 people, discussing questions posed during the class.

## Textbook

We are using a free on-line textbook, "**Astronomy**" by Fraknoi, Morrison and Wolff available at:

openstax.org/details/books/astronomy/

You can use it on-line, and download it for free, although contributions to maintain the site are welcome. It contains a lot of material, but you will be responsible only for the subjects covered on the lecture slides. So you can use it as a reference book when studying for exams.

## Classroom expectations

Your preparation for discussion and participation is extremely important for you and your team. Here are some ground rules:

- Even though we have the course on line, respect for others is vital. You can expect that as the instructor, I am concerned about the educational experience of each student in the class, respectful of individual differences, encouraging of creativity, reasonably open and accessible to discuss material and assignments, thorough in evaluating assignments, and rigorous yet supportive in maintaining high standards for performance.
- As a student, you are expected to work individually and with others, to create an atmosphere that is safe, valuing of one another, and open to diverse perspectives. Everyone is expected to show courtesy, civility, and respect for one another. Comments or postings that degrade or ridicule another, whether based on individual or cultural differences, are unacceptable.

- Participation/Engagement. Thinking is not a spectator sport. This course requires active participation, which is crucial to your success in developing critical thinking. The more you put into it, the more you will get out of it. Active participation includes being prepared to discuss readings, assignments, and concepts, engaging yourself in classroom activities and discussion, and putting your best effort in both formal and informal assignments.
- Have fun! This course your adventure into scientific thinking, in order to empower yourself with the ability to evaluate information, and reasoning through arguments that you encounter.

Personal Pronouns

Professional courtesy and sensitivity are especially important with respect to individuals and topics dealing with differences of race, culture, religion, politics, sexual orientation, gender, gender variance, and nationalities. Class rosters are provided to the instructor with the student's legal name, unless they have added a "preferred name" with the Gender and Sexuality Center

http://diversity.utexas.edu/genderandsexuality/publications-and-resources/

I will gladly honor your request to address you by a name that is different from what appears on the official roster, and by the gender pronouns you use (she/he/they/ze, etc). Please advise me of any changes early in the semester so that I may make appropriate updates to my records. For instructions on how to add your pronouns to Canvas, visit

https://utexas.instructure.com/courses/633028/pages/profile-pronouns.

## Class Communication

All class communication will be conducted through Canvas at canvas.utexas.edu, including email. Your student e-ID will give you access to the site. I will send announcements, and post assignments on it. You will also be submitting the quizzes, home works and the Moon Journal through Canvas.

Lectures will be conducted through regularly scheduled zoom session during the scheduled class period. When you log onto the class website, you should see a link called "Zoom", right under Syllabus. It is integrated into Canvas, so if you do not yet have it, you can click on the link and it will bring up a window asking you to either join on line, or download the app. It should work on all platforms, although computer screens and tablets will give you better visibility than your phone.

Your success in this class is important to me. We will all need accommodations because we all learn differently. If there are aspects of this course that prevent you from learning or exclude you, please let me know as soon as possible. Together we'll develop strategies to meet both your needs and the requirements of the course. I also encourage you to reach out to the student resources available through UT. They are listed on this syllabus after the University policies.

## Attendance and participation:

You will not be graded based on attendance, and unexpected obligations or illness can happen. However, I strongly encourage you, please join in if you can, as I will use InstaPoll, you can also find the link in the menu on the left of the page. We will also work on tutorials in class. The lectures will be recorded and will be available shortly after class in addition to the lecture slides. When you have a chance to view it you can send me though Canvas your answers for the Instapoll questions and upload the completed tutorial I update your score.

- We will be using the Canvas InstaPoll tool for in-class polling and attendance. You are allowed to miss up to 25% of these points without penalty. For example if you earn 75 points or more of the maximum available InstaPoll points throughout the semester you will get 100% for this portion of your course grade. If you earn 74-64 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 testing your understanding of a hard concept you will receive credit even if it your answer is not correct, giving you attendance point, and helps me to gauge your comprehension. If you cannot attend the lecture on Zoom, see above.

- I we will work on tutorials in groups during some classes. I will upload to the class website the appropriate assignment in .txt format, so you can edit it on your computer. I recommend that you print it out it is easier to work on paper while you are on zoom. We will likely not finish the tutorials in class you need to submit the finished version through Canvas within a day.

## Assignments

Homework: *There will be five homework assignments, submitted through Canvas. I encourage you to discuss the homework with your classmates in an on line group, 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 up to 2 days past the deadline you will still receive 75% credit, if you are not more then 4 days late you still get 50%. Duplicate works will not receive credit.*

Exams: *There will be five, on-line exams, but no comprehensive final. You have to take all in class exams; no exceptions will be granted. However, I will drop the worst of the five scores. Make up exams will be given only under exceptional circumstances. All exams will be closed book. 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: *These will give you a low-pressure way to check your understanding of the material and some are needed to unlock modules.*

Moon Journal: *Observation are very important part of science. All you need to do is to go outside find the Moon for at least 9 clear occasions spread over about 30 days. Write down the date and the time of your observations. Give the location of the moon by measuring its altitude, and its angle from North. Draw the phase as accurately as you can, and label (waxing/ waning, new/quarter/full) for each drawing. Make sure you keep your original observations, and submit a legible, clean write up. I will provide a template you need to use, scan and upload it. (You can use a phone app to create the document if you do not have a scanner.)*

Additional assignment: *Participate in a McDonald Observatory Virtual Star party and write a short summary of what you have seen, and tell me what is the most interesting thing you learned from it.*

## Grades

You can earn 100 points in this course. The grades will be based on participation in discussion and tutorials (12 points), quizzes (8 points) home works (30 points), on-line exams (45 points), and Moon Journal (5 points). Completion of the additional assignment gives you 2 extra points.

## Grading policy

Final grades will be determined on the basis of the following rubric. Please note: to ensure fairness, all numbers are absolute, and will not be rounded up or down at any stage. Thus a B- will be inclusive of all scores of 80.000 through 83.999. The University does not recognize the grade of A+.

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| < 56 | 60-63 | 64-66 | 67-69 | 70-72 | 73-76 | 77-79 | 80-82 | 83-85 | 86-88 | 89-91 | > 92 |

| F | D- | D | D+ | C- | C | C+ | B- | B | B+ | A- | A |
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## Tentative Course Schedule

Changes to the schedule may be made at my discretion and if circumstances require. It is your responsibility to note these changes when announced (although I will do my best to ensure that you receive the changes with as much advanced notice as possible).

| | Class date | Subject | Mod | Book chapter |
|---|---|---|---|---|
| | August 26 | Introduction - Getting acquainted | 1 | |
| **Week 1** | August 28 | Overview of the universe | | Chapter 1 |
| | August 31 | Navigating the sky, Daily motion | | Chapter 1 |
| | September 2 | Yearly motion, Seasons | 2 | Chapter 1 |
| **Week 2** | September 4 | Lunar phases/Eclipses | | Chapter 2 |
| | **September 7** | **Labor Day Holiday** | | |
| | September 9 | Electromagnetic Spectrum/Waves | 3 | Chapter 2 |
| **Week 3** | September 11 | Spectrum/composition and motion | | Chapter 2 |
| | September 14 | **Exam 1** | | Chapter 2 |
| | September 16 | Astronomical instruments | 4 | |
| **Week 4** | September 18 | Ancient Astronomy to Copernicus | | Chapter 3 |
| | September 21 | Galileo Brahe and Kepler | | Chapter 3 |
| | September 23 | Newton's laws and gravity | 5 | Chapter 3 |
| **Week 5** | September 25 | Solar System overview | | Chapter 3 |
| | September 28 | Earth in detail | | Chapter 4 |
| | September 10 | Mercury, Venus, Mars, Moon | 6 | Chapter 4 |
| **Week 6** | October 2 | Altering our planet - Climate change | | Chapter 5 |
| | October 5 | **Exam 2** | | Chapter 5 |
| | October 7 | Giant planets | 7 | |
| **Week 7** | October 9 | Small bodies and ring systems | | Chapter 6 |
| | October 12 | Pluto, Solar System formation | | Chapter 6 |
| | October 14 | Search for other planets | 8 | Chapter 7 |
| **Week 8** | October 16 | Life beyond Earth | | Chapter 7 |
| | October 19 | Satellite Systems | | Chapter 7 |
| | October 21 | Search for other planets | 9 | Chapter 4 |
| **Week 9** | October 23 | Life beyond Earth | | Chapter 8 |
| | October 26 | **Exam 3** | | Chapter 9 |
| | October 28 | The Sun as a star | 10 | |
| **Week 10** | October 30 | The Sun's energy production and structure | | Chapter 9 |
| | November 2 | Measuring stellar distances | | Chapter 9 |
| | November 4 | Properties of distant stars | 11 | Chapter 10 |
| **Week 11** | November 6 | Organizing the stars | | Chapter 10 |
| | November 9 | Basics of Stellar evolution | | Chapter 10 |

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|---|---|---|---|---|
| | November 11 | Low and medium mass stars | 12 | Chapter 11 |
| **Week 12** | November 13 | High mass stars | | Chapter 11 |
| | November 16 | **Exam 4** | | Chapter 12 |
| | November 18 | Stellar Systems | 13 | |
| **Week 13** | November 20 | Our galaxy | | Chapter 13 |
| | November 23 | Other galaxies | | Chapter 13 |
| | **November 25** | **Thanksgiving Holiday** | | |
| **Week 14** | **November 27** | **Thanksgiving Holiday** | | |
| | November 30 | Active galaxies and the evolving universe | | Chapter 14 |
| | November 2 | The big picture | 14 | Chapter 15 |
| **Week 15** | December 4 | The big picture | | Chapter 15 |
| | December 7 | **Exam 5** | | |

*The appropriate book sections will be posted in the modules.

Scheduled Review Sessions will be conducted through Zoom before the exam.

## 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

Sharing of Course Materials is Prohibited:

No materials used in this class, including, but not limited to, lecture hand-outs, videos, assessments (quizzes, exams, papers, projects, homework assignments), in-class materials, review sheets, and additional problem sets, may be shared online or with anyone outside of the class unless you have my explicit, written permission. Unauthorized sharing of materials promotes cheating. It is a violation of the University's Student Honor Code and an act of academic dishonesty. I am well aware of the sites used for sharing materials, and any materials found online that are associated with you, or any suspected unauthorized sharing of materials, will be reported to Student Conduct and Academic Integrity in the Office of the Dean of Students. These reports can result in sanctions, including failure in the course.

Class Recordings:

Class recordings are reserved only for students in this class for educational purposes and are protected under FERPA. The recordings should not be shared outside the class in any form. Violation of this restriction by a student could lead to Student Misconduct proceedings.

**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

## Title IX Reporting

Title IX is a federal law that protects against sex and gender-based discrimination, sexual harassment, sexual assault, unprofessional or inappropriate conduct of a sexual nature, dating/domestic violence and stalking at federally funded educational institutions. UT Austin is committed to fostering a learning and working environment free from discrimination in all its forms. When unprofessional or inappropriate conduct of a sexual nature occurs in ourcommunity, the university can:

1. Intervene to prevent harmful behavior from continuing or escalating.

2. Provide support and remedies to students and employees who have experienced harm or have become involved in a Title IX investigation.

3. Investigate and discipline violations of the university's relevant policies.

## 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 through Canvas 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.

## Counseling and Mental Health Center

The Counseling and Mental Health Center serves UT's diverse campus community by providing high quality, innovative and culturally informed mental health programs and services that enhance and support students' wellbeing, academic and life goals. To learn more about your counseling and mental health options, call CMHC at (512) 471-3515.

If you are experiencing a mental health crisis, call the CMHC Crisis Line 24/7 at (512) 471-2255.

## The Sanger Learning Center

Did you know that more than one-third of UT undergraduate students use the Sanger Learning Center each year to improve their academic performance? All students are welcome to take advantage of Sanger Center's classes and workshops, private learning specialist appointments, peer academic coaching, and tutoring for more than 70 courses in 15 different subject areas. For more information, please visit http://www.utexas.edu/ugs/slc or call 512-471-3614 (JES A332).