

Astronomy 154: Stars, Galaxies, and Cosmology Lab

Syllabus – Spring 2023

Lab Website: Canvas

Astronomy Lab Room: Nielsen Physics Room 108

Additional Lab Website for Online Labs: NMSU's [GEAS Project](#) (This is a link)

Required Download: University of Nebraska, Lincoln [NAAP Astronomy Simulations](#)

Stellarium: <https://stellarium.org/>

Telescope Lab Sign-Up Sheets: [Link](#)

Lab Section	Lab Instructor	Email	Office & Lab Report Review Hours Tutorial Center is Room 512 in Nielsen Physics & Astronomy
001 Wednesday 11:35 am - 1:30 pm	Ashwin Nagarajan	anagaraj@vols.utk.edu	Office: Tutorial Center:
002 Wednesday 1:55 pm - 3:50 pm	Jordan Jubeck	jjubeck@vols.utk.edu	Office: Tutorial Center:
003 Wednesday 4:10 pm - 6:05 pm	Chien-Hui Chen	cchen83@vols.utk.edu	Office: Tutorial Center:
004 Thursday 8:55 am - 10:50 am	Ramon Ogaz	rogaz@vols.utk.edu	Office: Tutorial Center:
005 Thursday 10:55 am - 12:50 pm	Chris Howard	chowar45@vols.utk.edu	Office: Tutorial Center:
006 Thursday 1:45 pm - 3:35 pm	Daniel Murphy	rmurph16@vols.utk.edu	Office: Tutorial Center:

007 Thursday 4:05 pm - 6:00 pm	Chien-Hui Chen	cchen83@vols.utk.edu	Office: Tutorial Center:
008 Wednesday 9:15 am - 11:10 am	Jordan Jubeck	jjubeck@vols.utk.edu	Office: Tutorial Center:

Each lab class will be taught by one of the lab instructors listed above. They are in charge of running their labs, so please give them the respect they deserve. The set of labs is standardized between all lab sections.

Instructor of Record: Dr. Sean Lindsay, Astronomy Coordinator

· Email: slindsay@utk.edu

Dr. Lindsay's Office Hours for the astronomy labs are by appointment. Email him for scheduling any meetings with him. Please make use of your Lab Instructor's office hours and/or email inbox before contacting him.

The Instructor of Record is responsible for managing the laboratory room and instructors. They are also ultimately responsible for any materials reported to the university and arbitrating any disputes between laboratory instructor and student. You should contact him if you have any issues or questions.

GEAS Login Credentials

The labs make use of the GEAS Project's plotting tools. These tools require a login and access code to use. For this lab course, you must use the following credentials:

Username (maybe be listed as Last Name): UTennK

Access Code: 0184

Course Description

Principles for interpretation of astronomy as a science and astronomical observations are reinforced in laboratory exercises. The content parallels the material covered in Astronomy 152 – Stars, Galaxies, and Cosmology. While the lecture focuses on general astronomy knowledge and concepts, the lab focuses on digging a bit deeper and engaging with the tougher concepts presented in lecture. As a natural science laboratory, emphasis is placed on investigation through the scientific method to discover how astronomers approach understanding the universe.

ASTR 152 and ASTR 154 must both be completed to earn credit for a single semester of laboratory-based astronomy.

Satisfies General Education Requirement: (NS with lab) if taken with ASTR 152.

(Pre-/Co-) requisite(s): 152.

Lab Class Policies

- **Attendance: You are expected to attend and complete all labs.** As a natural science lab class, much of what we will do requires hands-on equipment or specialized software we have installed on our lab computers. Therefore, attendance is a requirement and taken every lab session.
 - **Attendance Policy:** If you miss THREE meetings, you are in threat of automatically failing the class. If you miss FOUR meetings, you have automatically failed the lab, and you will need to retake it in a future semester if you choose astronomy for your natural science lab VolCore requirement.
 - You will be issued a warning after missing THREE labs. We are willing to listen to the circumstances that led to the absences.
- **Grading Policy: All labs count.** No labs will be dropped.
- **Lab Submission:** You will submit your completed labs at the beginning of the next lab session (unless otherwise notified). That gives you one week to complete the labs.
 - You will submit your hand-written completed lab sheets that you are given in class.
 - Often, you will also be required to submit electronic versions of spreadsheets. In these cases, there will be a submission assignment on Canvas for that lab.
 - Graded labs will be returned to you within 2 weeks of submission.
- **Excused Absence/Make-up Policy**
 - **Excused Absences:** Excused absences include any UT event that you are required to attend (e.g., athletics, band, etc.) AND approved Dean of Students Office absence notifications ([Link to DoS Absence Notification Submission](#)). Extenuating circumstances and illness/medical excuses will be considered on a case-by-case basis. You will need to communicate with us ASAP in these circumstances. Depending on the circumstances, you may be required to provide documentation of some form.
 - **Make-up Policy:** Make-ups for labs are difficult to orchestrate. Because of this, we have reserved the last lab meeting of the semester for a to-be-determined “Make-up Lab.” You must have expressed permission from your lab instructor to qualify for the “Make-up Lab.” This “Make-up Lab” grade will be used for the lab you have an excused absence for. Under most circumstances, you can only qualify to have ONE excused lab that can be replaced with the “Make-up Lab.”

- In some circumstances and labs, you may have the opportunity to complete the lab on your own, or with the help of your instructor during their office or Tutorial Center hours. You will need to contact your instructor for these cases.
- **You are expected to complete the T-lab portion of the course.** This requires you to sign up and attend at least one telescope session. Sign up early and often. In cases where you are unlucky with multiple weather cancellations, alternatives to the traditional T-lab will be considered (Do not bank on this policy. You have to provide evidence that you tried to attend a telescope session multiple times, but could not do the observations due to bad weather).
 - If you sign up for 3 or more T-lab sessions that are canceled, you will be offered a make-up
- If you sign up for T-labs, you are expected to attend the session. If you cannot make it, please notify the contact person at the top of your sign-up sheet.
 - You are allowed 1 unexcused no-show for a T-lab. Every unexplained no-show after that will reduce your T-lab grade by 20%

<u>ASTR 154 Grading Scale</u>	
Grade	Score (%)
A	> 90.00
A-	89.50 - 89.99
B+	87.50 – 89.49
B	80.00 – 87.49
B-	79.50 - 79.99
C+	77.50 – 79.49
C	70.00 – 77.49
C-	69.50 - 69.99
D+	67.50 – 69.49
D	60.00 – 67.49
D-	59.50 - 59.99
F	< 59.50

Grade Categories and Weights - ASTR 154

Your grade in this lab is

- **70% is lab reports associated with each lab.**
 - Two-week labs are worth twice the points as one-week labs
- **15% Attendance**
- **10% is a full write-up scientific lab report on the Parallax Lab.**
- **5% is the Telescope Lab (T-lab).**

Schedule of Labs

Lab materials are due at 11:59 pm Eastern Time one week after the lab.

Date	Week No.	Lab (See Your Canvas Page for Lab Materials)
23 - 27 Jan	Week 1	Lab 1 - <i>The Planetarium Lab:</i>
30 Jan - 3 Feb	Week 2	Lab 2- <i>Motions in the Sky with Stellarium</i>
6 - 10 Feb	Week 3	Lab 3 - <i>Scientific Data Analysis Spreadsheets</i>
13 - 17 Feb	Week 4	Lab 4 - <i>1st Week of Fundamentals of Measurement Error and Analysis.</i>
20 - 24 Feb	Week 5	Lab 4 - <i>2nd Week of Fundamentals of Measurement Error and Analysis.</i>
27 Feb - 3 March	Week 6	Lab 5 - <i>Kepler's Laws Lab</i>
6 - 10 March	Week 7	Lab 6 - <i>Working with the Thermal Radiation Laws (A154 version)</i>
13 - 17 March	Spring Break	No Labs
20 - 24 March	Week 8	Lab 7 - <i>Exploring Spectroscopy</i>
27 - 31 March	Week 9	Lab 8 - <i>Intensity vs Distance</i>

3 - 5 April	Spring Recess	No Labs
10 - 14 April	Week 11	Lab 9 - Parallax Measurements and Determine Distances + Introduce Full Parallax Lab Report
17 - 21 April	Week 12	Lab 10 - Hertzsprung-Russell (HR) Diagrams Lab Part 1 - Stellar Spectral Classes
24 - 28 April	Week 13	Lab 11 - Hertzsprung-Russell (HR) Diagrams Lab Part 2 - Spectroscopic Parallax
1 - 5 May	Week 14	Make-Up Lab "Hubble's Law"
8 & 9 May	Week 15	No Labs

Format of Astronomy Labs

You will have an in-person lab once per week on your scheduled lab date. The general procedure for labs will be:

- Your Lab Instructor will introduce you to the week's lab/activities. They will provide background information and a description of the what you need to do to complete the in-lab portion of the lab
- Some labs take TWO WEEKS to complete. For these TWO WEEK LABS, you will have a First Week Update that is due before you start the second week.
 - **Updates for the halfway point through two week labs and complete lab reports are due at 11:59 pm (Eastern Time) one week after your lab.**
 - One Week Labs are worth 100 points; Two Week Labs are worth 200 points. Your First Week Update during Two Week Labs is worth 25 of those 200 points.
- You are expected to stay until you have been dismissed by the instructor. Often, you will be given instructions and then will work on the lab materials collaboratively. Your Lab Instructor will provide guidance and assistance while you work on completing the lab. You will gain the most out of the lab by asking for help when you need it!
- After the session, you will continue to work on the parts of the lab that are still unfinished or specifically designed as take-home materials. Your completed lab will be handed into your lab instructor at the start of the next lab session. You may need to also submit electronic versions of spreadsheets and other documents/files.

Lab Resources and Information

Lab Manuals

We make use of two different lab manuals for Astronomy Labs. **Links and PDF digital copies to all labs conducted this semester are provided to you on your lab's Canvas page.** The goal is to have Canvas be a single resource for you to gain access to all materials.

Lab Manual 1: The University of Tennessee, Department of Physics and astronomy Astronomy Lab Manual. This manual is via your lab's Canvas page

Lab Manual 2: New Mexico State University's GEAS Project. This manual is available at <http://astronomy.nmsu.edu/geas/oview/labs.shtml>

- This NASA and NSF funded public astronomy lab resource is used by students around the world. It is designed to offer quality astronomy lab exercises in a remote learning situation. The project started in 2013, and it has had several years of vetting to become one of the best astronomy education resources available.

Lab Materials and Technology

Lab materials for this course will be provided to you during labs. You are not required to do any additional purchases.

The class makes use of Google Drive and Docs, for which UTK provides accounts for every student and faculty member. Some of the labs have Microsoft Excel Spreadsheets. You are not required to download/purchase/install any other specialized software. All of our software is already installed on our Astronomy Lab computers. We realize that not everyone has access to Microsoft products – any spreadsheet, including Google Sheets will work.

Telescope Lab (T-labs)

Telescopic Observations:

The Telescope Lab (T-Lab) needs to be completed before the end of the semester. You must attend one T-lab session on a Monday or Thursday Night. The T-lab Schedule and Sign-up Sheets are linked at the top of the syllabus.

- You must sign-up for a telescope session to attend. Your Lab Instructor will give you instructions on how to sign up
- For the telescope sessions, you will report to Room 108 at the indicated time. You will be given an orientation and instructions on how the T-lab session will be conducted. After orientation, a Telescope Teaching Assistant will bring you to the rooftop.
- T-Lab Telescope Sessions include three types of observations

- a. **Naked-eye Observations.** You will learn how to find Polaris, the North Star, as well as learn a few constellations and planets (if they are up).
- b. **Eye-piece Observations.** You will observe celestial objects through a telescope equipped with an eye-piece. We will have safety precautions in place.
- c. **CCD Camera Observations/Data Collection.** You will take a series of black-and-white and color photographs of celestial objects.

Alternative to Telescopic Observations:

Dr. Lindsay is aware and empathetic that not all students will feel comfortable and safe with any gathering, including telescopic observations with every precaution we can think of in place. For those who feel unsafe with telescope observations, please inform your instructor early in the semester. We will not consider end of the semester reports of “I didn’t feel safe,” being used as a blanket excuse for those who simply failed to complete their T-Labs. For those who truly feel unsafe, we will offer you an alternative simulated T-Lab Observations Lab using the free software Stellarium. Details on this assignment will be given if they are requested.

University Civility Statement

Civility is genuine respect and regard for others: politeness, consideration, tact, good manners, graciousness, cordiality, affability, amiability and courteousness. Civility enhances academic freedom and integrity and is a prerequisite to the free exchange of ideas and knowledge in the learning community. Our community consists of students, faculty, staff, alumni, and campus visitors. Community members affect each other’s well-being and have a shared interest in creating and sustaining an environment where all community members and their points of view are valued and respected. Affirming the value of each member of the university community, the campus asks that all its members adhere to the principles of civility and community adopted by the campus: <http://civility.utk.edu/>.

Academic Integrity Pledge

“An essential feature of the University of Tennessee, Knoxville is a commitment to maintaining an atmosphere of intellectual integrity and academic honesty. As a student of the university, I pledge that I will neither knowingly give nor receive any inappropriate assistance in academic work, thus affirming my own personal commitment to honor and integrity.”

The goal of this lab is to offer a different learning environment that depends on students being honest with their engagement and not cheating. You will be offered ample opportunity to arrive at answers to the lab questions that will earn you full credit. Please choose that route in your efforts this semester and hopefully grow as a student and in your scientific ability.

In cases of cheating, the lab instructor, and Instructor of Record (Dr. Lindsay) will agree upon a grade penalty in proportion to the degree of violation. The default score until more information is available is a 0 for cases of plagiarism. Plagiarism includes turning in other's work as your own.

This certainly includes turning in files created by another student or downloaded from a cheat site like Course Hero, Chegg, etc.

In the case of a cheating event, all evidence of the event will be gathered, documented, and the student will be informed of the accusation and recommended penalty. After the student responds with an explanation, if the matter still is a case of cheating, all documentation will be reported to the office of Student Conduct and Community Standards for official investigation. We will then act in accordance with the findings of their investigation. Grade penalties may range from 0 on the lab report to failure of the entire lab class.

Disability Statement

The University of Tennessee, Knoxville, is committed to providing an inclusive learning environment for all students. If you anticipate or experience a barrier in this course due to a chronic health condition, a learning, hearing, neurological, mental health, vision, physical, or other kind of disability, or a temporary injury, you are encouraged to contact Student Disability Services (SDS) at 865-974-6087 or sds@utk.edu. An SDS Coordinator will meet with you to develop a plan to ensure you have equitable access to this course. If you are already registered with SDS, please contact your instructor to discuss implementing accommodations included in your course access letter.