Astronomy 153: A Journey Through the Solar System Lab

Syllabus – Fall 2023
Lab Website: Canvas
Vera Rubin Observatory Education Website: Link
Astronomy Lab Room: Nielsen Physics Room 108
Additional Lab Website for Online Labs: NMSU's GEAS Project (This is a link)
Required Downloads: University of Nebraska, Lincoln NAAP Astronomy Simulations
Stellarium: https://stellarium.org/
Telescope Lab Sign-Up Sheets: Link

Lab Section (Arranged Numerically by Section Number)	Lab Instructor	Email	Office & Lab Report Review Hours Tutorial Center is Room 512 in Nielsen Physics & Astronomy
001 **Mondays** **10:20 am - 12:15 pm**			**Office:** **Office Hours:** **Tutorial Center: Nielsen 512** **(Time)**
002 **Mondays** **3:00 - 4:55 pm**			**Office:** **Office Hours:** **Tutorial Center: Nielsen 512** **(Time)**
003 **Wednesdays** **5:25 - 7:20 pm**			**Office:** **Office Hours:** **Tutorial Center: Nielsen 512** **(Time)**
004 **Wednesdays** **3:00 - 4:55 pm**			**Office:** **Office Hours:** **Tutorial Center: Nielsen 512** **(Time)**
005 **Mondays** **12:40 - 2:35 pm**			**Office:** **Office Hours:** **Tutorial Center: Nielsen 512** **(Time)**

006 **Tuesdays** **3:00 - 4:55 pm**			**Office:** **Office Hours:** **Tutorial Center: Nielsen 512** **(Time)**
007 **Tuesdays** **10:20 am - 12:15 pm**			**Office:** **Office Hours:** **Tutorial Center: Nielsen 512** **(Time)**
008 **Wednesdays** **12:40 - 2:35 pm**			**Office:** **Office Hours:** **Tutorial Center: Nielsen 512** **(Time)**
009 **Wednesdays** **10:20 am - 12:15 pm**			**Office:** **Office Hours:** **Tutorial Center: Nielsen 512** **(Time)**
010 **Mondays** **5:25 - 7:20 pm**			**Office:** **Office Hours:** **Tutorial Center: Nielsen 512** **(Time)**
011 **Tuesdays** **5:25 - 7:20 pm**			**Office:** **Office Hours:** **Tutorial Center: Nielsen 512** **(Time)**
012 **Tuesdays** **8:00 - 9:55 am**			**Office:** **Office Hours:** **Tutorial Center: Nielsen 512** **(Time)**

Each lab class is 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 151 – A Journey Through the Solar System. 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 151 and ASTR 153 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 151.*** *(Pre-/Co-) requisite(s): 151.*

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 lab's activities and student responsibilities.
- 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!
- If you haven't finished the lab questions during the lab session, you will have until the next lab meeting to complete those questions as well as any reflection/writing assignments associated with the lab.

- 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

This lab makes use of a variety of in-house and external resources for the labs. **For all UTK designed labs, you will find PDF copies of the lab on Canvas**. The two external resources we use for this lab are 1) the New Mexico State University GEAS Project Astronomy Labs (links below), and 2) the Vera Rubin Observatory Educational Investigations (links below). Instructions on what to turn in related to labs focused on those resources will be given to you by your lab instructor.

NMSU GEAS Links:: 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.

VRO Investigations Links: The Vera Ruben Observatory provides insightful investigations that we will use in this lab. You can access the investigations here: https://rubinobservatory.org/education

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. Some of our labs require you to use our lab laptop computers. For labs that do not require specialized/licensed software on our laptops, you are free to use your own devices.

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.

Free UTK Software: https://oit.utk.edu/software-hardware/software/

We do not use this software for our labs, but it is a useful resource for all UTK students. Part of your technology student fees go toward providing all students at UTK with free access to software such as the full Microsoft Suite (MS Word, Excel, PowerPoint, etc.), MATLAB, VPN software, EndNote, etc.

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.

The ASTR 153 Full Lab Report

Part of engaging in science is scientific writing that clearly communicates the motivation, purpose, method, results, and conclusions of a scientific experiment. You will be required to write ***one full scientific lab report*** for this natural science laboratory class.
The Measurement + Data Analysis Lab where you determine the value of Earth's surface gravity, $g = 9.81\ m/s^2$ is the default choice for this lab report. The Instructor of Record reserves the right to change which lab will require a full write up.

The Full Lab Report Write-up will due at 11:59 pm on the last day of classes - Wednesday, 6 December. This report can be submitted electronically.

The Telescope Lab (T-Lab)

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%

Lab Attendance Policies

The Instructor of Record, Dr. Sean Lindsay, reserves the right to update course policies with notification if need or circumstances arise.

Attendance Policies

- **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 have FOUR Unexcused Absences from lab meetings, you will automatically fail the lab*.
    - You will be issued a warning after missing THREE labs. We are willing to listen to the circumstances that led to the absences.
- **Skipping a lab will result in a 0 on that lab.** No make ups without an excused absence approved by your lab instructor.. With appropriate documentation/excuse, you may qualify for the "Make Up Lab" (See below).
- **If you leave a lab early before you are dismissed by your instructor**, we will assume that you have completed the lab. You will have to turn the lab into your instructor if you leave the lab early. *Failure to do so will result in a 0 on the lab.*
- **Late Arrival** without an excuse
    - **Less than 10 minutes late**: No penalty, but you are responsible for catching up on the activities and instructions you may have missed.
    - **10 - 30 minutes late**: -20% on the lab
    - **30 - 50 minutes late**: -50% on the lab
    - **> 50 minutes late**: 0%
- **Absence Excuses & Late Arrival Excuses**
    - Must be clearly communicated to the instructor via a UTK communication channel (email or a Canvas message). If you give your excuse in person, it is your responsibility to follow-up with an email reminder to your instructor.
    - Will be reviewed and approved/denied by your instructor. Simply having an excuse does not mean it will be approved. Typical examples of accepted excuses

are provable illnesses, official university activities (athletics, band, ROTC, etc.; Greek events do not count).

Lab Submission Policies

- **Lab Submission**
  - You will *physically* submit your completed labs at the beginning of the next lab session (unless otherwise notified). That gives you one week to complete any work you were unable to finish during the lab session.
    - Some labs will have parts that need to be *electronically submitted.* For these submissions, there will be a submission assignment on Canvas for you to use.
  - You will submit your hand-written completed lab sheets that you are given in class.
  - Graded labs will be returned to you within 2 weeks of submission.
- **Late Lab Submission Policy**
  - **If Present in lab on due date**
    - -10% per 24 hours past submission due date (Saturdays and Sundays not included).
      - The first -10% includes turning in later that day through the next 24 hours.
  - **If Absent from lab on due date**
    - If an approved excuse is issued for the class you missed, you have until a date and time determined by your lab instructor to turn in the previous week's lab.
    - If no excuse is given or it is not approved by your instructor: -10% per 24 hours past submission due date (Saturdays and Sundays not included).
      - The first -10% includes turning in later that day through the next 24 hours.
  - **No Late Submissions** will be accepted once the graded labs have been returned to the class. Extenuating circumstances may allow you to still turn in late work after graded labs have been returned to the class, but this requires approval from your lab instructor.

Excused Absence/Make-up Policy

- **Excused Absences**: Excused absences include any UT event that you are required to attend (e.g., athletics, band, ROTC, etc.) AND approved Student Life Absence Notifications (Link).
  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.

Lab Grading Policies

- **The lowest non-zero lab grade will be dropped in the calculation of your Lab Average.**

ASTR 153 Grading Scale	
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

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 Measuring Earth's Surface Gravity Lab.**
- **5% is the Telescope Lab (T-lab).**

Student Issues/Accommodations

- We follow all Student Disability Services (SDS; Link) accommodations. If you have need of them, or suspect you may have need of them, please speak with SDS to get your accommodations approved. We will do everything possible to assure a fair astronomy lab experience for you.
- Student's With Jobs/Families: If you have concerns about our course policies conflicting with a work schedule you have no control over or family matters, please reach out to your instructor and Dr. Sean Lindsay (slindsay@utk.edu) to let us know of your situation as early in the semester as possible. We are aware that life is often complicated, and with clear communication, we are happy to seek methods for you to balance your life with this lab. The earlier we know of your situation, the easier it will be for us to find solutions.
- Student Mental Health: Sometimes the semester, life, and much more can get the better of our mental well-being. If you start having serious mental struggles, please reach out to us as early as you possibly can. With clear communication, we can begin seeking potential solutions to help you succeed in this course.

  The UTK Counseling Center is potentially a tremendous resource. Here is a link to their website and provided student services (Link)

Cheating/Plagiarism

We have a zero tolerance policy when it comes to cheating & plagiarism. You are expected to complete the questions posed to you during lab and via the lab PDFs on your own. You are allowed to work in groups during the lab, but you still need to show YOUR work and provide YOUR explanations/reflections. *If you have a feeling that what you are doing might be considered cheating/plagiarism, it very likely IS cheating/plagiarism as defined by UTK Honor Code. This certainly includes turning in files created by another student or downloaded from a cheat site like Course Hero, Chegg, etc.*

- If cheating/plagiarism is suspected, you will be notified by your instructor and the Instructor of Record, Dr. Sean Lindsay. We follow the UTK Student Conduct & Community Standards (SCCS) Academic Dishonesty procedure, which is given here (Link).
- The first step of this process is to communicate with you about the suspected plagiarism/cheating and give you the opportunity to share your thoughts and views on the incident. If the process proceeds further, the second step is for the Instructor of Record to submit an Incident Report to Student Conduct & Community Standards.
- If cheating/plagiarism is found to have occurred, the penalties are at the discretion of your lab instructor and the Instructor of Record, Dr. Sean Lindsay. These penalties may vary from a 0 on activity you cheated on to failure of the lab course.

- At this point, you may choose to appeal the penalties with SCCS

Lab Schedule

Lab Materials are due at the start of the next lab meeting.			
Dates	**Week**		**Lab**
23 - 25 August	Week 1		**No ASTR 153 Labs (First Week)**
28 Aug - 1 Sept	Week 2	Lab 1	**The Planetarium Lab**
5 Sept - 8 Sept	Week 3		**No ASTR 153 Labs (Labor Day)**
11 Sept - 15 Sept	Week 4	Lab 2	**Phases of the Moon**
18 Sept - 22 Sept	Week 5	Lab 3	**Scientific Measurement & Data Analysis I - Measuring Earth's Surface Gravity**
25 Sept - 29 Sept	Week 6	Lab 4	**Scientific Measurement & Data Analysis I - Data Analysis & Visualization**
2 Oct - 6 Oct	Week 7	Lab 5	**Working with the Thermal Radiation Laws**
11 Oct - 13 Oct	Week 8		**No ASTR 153 Labs (Fall Break)**
16 Oct - 20 Oct	Week 9	Lab 6	**Exploring Spectroscopy**
23 Oct - 27 Oct	Week 10	Lab 7	**VRO Coloring the Universe**
30 Oct - 3 Nov	Week 11	Lab 8	**VRO Survey the Solar System**
6 Nov - 10 Nov	Week 12	Lab 9	**Extrasolar Planets**
13 Nov - 17 Nov	Week 13	Lab 10	**Cratering & the Lunar Surface 1 (GEAS)**
20 Nov - 21 Nov	Week 14		***No ASTR 153 Labs (Thanksgiving Break)***
27 Nov - 1 Dec	Week 15	Lab 11	**Cratering & the Lunar Surface 2 (GEAS)**
4 Dec - 5 Dec	Week 16		**No ASTR 153 Labs (Last Week of Classes)**

AI Policy: Permitted when Assigned in this Course with Attribution

In this course, students are permitted to use Generative AI Tools such as ChatGPT for specific assignments, as designated by the instructor. If your instructor does not notify you that use of AI is allowed, then it is NOT ALLOWED. To maintain academic integrity, students must disclose any use of AI-generated material. As always, students must properly use attributions, including in-text citations, quotations, and references.

A student should include the following statement in assignments to indicate use of a Generative AI Tool: "The author(s) would like to acknowledge the use of [Generative AI Tool Name], a language model developed by [Generative AI Tool Provider], in the preparation of this assignment. The [Generative AI Tool Name] was used in the following way(s) in this assignment [e.g., brainstorming, grammatical correction, citation, which portion of the assignment]."

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/.

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.