

Astronomy 151 - Spring 2023 Syllabus

A Journey Through the Solar System

Spring 2023 Semester

University of Tennessee, Knoxville

Course Details

Instructor: Dr. Sean Lindsay (he/him/his) E-mail: slindsay@utk.edu

Class Times: 4:10 - 5:00 PM Monday, Wednesday, and Friday (MWF)

Class Location: **PHYS 415** in Nielsen Physics and Astronomy Building

Course Number: ASTR 151-002

Dr. Lindsay's Office: PHYS 215 in Nielsen Physics & Astronomy Building
Phone: 865-974-2362 (I rarely check this, but will answer if it rings)

Zoom Office Hours: In-Office: Also available for scheduled appointments
Tuesdays:
Wednesdays:
Fridays:
Virtual: Available by appointment.
Zoom Link:
Passcode: HA6563

GroupMe: [Invite Link](#)

Course TAs:

Megan Bourque jnm951@vols.utk.edu Office Hours:	Jackson Tumlin jtumlin2@vols.utk.edu Office Hours:
Raghav Chari rchari1@vols.utk.edu Office Hours:	Hannah Garrett hgarret4@vols.utk.edu Office Hours:

Course Resources:

Spring 2023 Semester Schedule: [Link to Schedule](#)

Textbook: *No Official Course Textbook. No purchase necessary*

I rely on my extensive course notes provided to you for free. ***Going through the PowerPoint version in presenter mode is recommended to see all of the animations.***

Additional Text Resource: Openstax's Astronomy

Link: <https://openstax.org/details/books/astronomy?Book%20details>

(Not required in any way for this course, but it is a great free resource if you want to extend your astronomy knowledge through a textbook)

Crash Course Astronomy with Dr. Phil Plait (Great for review & reinforcement)

Hyperlink to Youtube Channel: [Link](#)

Course Website: Canvas

Required Course Materials: Calculator of any kind. *Use one that you are familiar with and feel comfortable using in a timed situation like quizzes and exams.*

Course Policies in Brief

- **Attendance Policy:** There is an attendance policy, but not a draconian one. In brief, I will have questions during most of the lectures that can be answered on Canvas. As long as you are present for 70% of the lectures, you will get a 100 for your Attendance Grade. Lower than 70%, and you get your percentage as your Attendance Grade.
In total, the Attendance Grade is worth 5% of your grade
- Must complete weekly review exercises called **Engagement Exercises (EEs)**
In total, the EEs are worth 15% of your grade, which makes each one about 1% of your grade in the class.
- There is no required textbook or homework platform purchase.
- Must complete all homework assignments - No homework will be dropped
In total, the homework Grade is worth 35 % of your grade
- Must complete all 3 quizzes - No quizzes will be dropped, but getting a 14 out of 15 on a quiz earns you a 100% (one free missed question per quiz). Extra credit given for scores of 15.
In total, the Quiz Average is 10% of your grade
- Must complete all 3 exams - As with quizzes, you will be able to miss a few questions before it starts affecting your exam score.
Each exam is worth 10% of the course grade. 3 Exams ->30% of your grade
- Exams and quizzes will be online and available to you from 9 am to 9 pm on days they are given. Time will be allotted during our lecture period for you to take the exam or quiz in-class if you choose.
- Engagement/Conversation encouraged on GroupMe and/or Canvas Discussions. Find what works best for you and your needs, and make use of it!
 - No mandatory participation grade for these conversation/discussion platforms.
- Instead of any **grade rounding**, I have set the minus of a letter grade to be within 0.5 points of the traditional letter grade. For example, an 89.5 - 89.99 is an A- and a 79.5 - 79.99 is a B-, etc.
- All times/due dates listed on Canvas are Eastern Time. That is the UTK time zone, and so all UTK Canvas operates on Eastern Time.

Missed Classes Due to Illness/Unexpected Circumstances/Other Reasons.. *I do have an attendance policy, but it is lenient enough so that you should not be negatively affected for missing class on occasion for any reason. We all have our own lives full of expected and unexpected responsibilities. If you don't feel well, please stay out of crowded spaces like a classroom.*

If you miss class, you are expected to review the Textbook Slides and/or watch the Lecture Videos linked in the Weekly ReadMes over the content you missed. Please check the course schedule and/or Canvas before asking if you missed any assignments.

Course Description

The core of the class content will be delivered through the lectures and my version of a textbook, “Dr. Lindsay’s Lecture Notes.” I also offer the library of lecture videos I created during the era where all large classes were virtual. These videos will be placed in a weekly “ReadMe” that will be posted at the top of each week’s module on Canvas. There will be regular due dates for course material throughout the semester for weekly Engagement Exercises (EEs), homeworks, quizzes, and exams. There will be regular due dates for course material throughout the semester for weekly Engagement Exercises (EEs), homeworks, quizzes, and exams. Please check the Astronomy 151 Semester Schedule often.

The course is divided into three broad units.

For a breakdown into Parts and Topics, please see the [Course Schedule](#).

Unit 1: General Astronomy

This unit introduces you to astronomy as a science. It covers what astronomy and science are; the daily, yearly, and longer-period motions of the Earth and how that changes the sky on those timescales; the motions of the Moon and planets; gravity and basic Newtonian mechanics; the electromagnetic spectrum of light; the interaction of light with atoms and molecules; and telescopes.

Unit 2: The Solar System and General Planetary Science

This unit gives an overview of the Solar System. It covers what objects are in the solar system, how the solar system formed, and how planets form. Additionally, this unit covers planetary systems outside of our own focusing on how we detect those planets, what types of planets we have detected, and how that larger perspective increases our understanding of our own solar system’s formation. Since, out of all the solar system bodies, we know the most about the Earth and Moon, the Earth-Moon system is included in Unit 2. We will use the Earth and the Moon to talk about generalities of terrestrial worlds in the universe.

Unit 3: A Journey Through the Solar System

This unit provides an introduction to the planets and moons of the solar system. We begin with the other terrestrial planets (Mercury, Venus, and Mars), the gas giant planets (Jupiter and Saturn), and the ice-giant planets (Uranus and Neptune). We focus on the general properties of the planets, their features, internal structure, atmospheres (if they have them), and their evolution to their current state. If time allows, we will hold a special topics session at the end of the semester on a class-voted topic, such as the Sun, life in the universe, or astronomy outside of the solar system.

Flow of the Course

I have built this class to flow week-by-week with a regular rhythm. My goal is that this will make keeping up with the class easier for you to manage. Keeping up with the material from week to week is paramount to your success. I have set days of the week when the engagement exercises (EEs), homework, quizzes, and exams take place. I hope this helps you build a schedule and remember deadlines.

Weekly Flow

- **Attend lectures every Monday, Wednesday, and Friday**
 - Most of the lectures will have an accompanying Canvas assignment that contains one to a few questions. The questions are used to help you learn and to take attendance. If you miss the questions, there is no penalty, i.e., those questions aren't graded.
- **Read/Take Notes on Assigned Lecture Slides:** Every week will have a set of lecture slides (see *Course Materials/Dr. Lindsay's Textbook* on Canvas for the slides) that you will read through and take notes about. This is equivalent to reading assignments.
 - Some of the lectures will leave out material from "Dr. Lindsay's Textbook" (a.k.a., the Textbook Slides). You will still be responsible for this material. There simply aren't enough lectures to cover everything in the depth I think you and the subject deserve.
 - A good practice for any class is to review your class notes after each lecture. For my class, you can supplement your class notes with the Textbook Slides
- **Watch for Course Announcements on Mondays**, which are sent to you via Canvas and given at the start of Monday's lecture. This is when I will also post the weekly ReadMe that will contain links to lecture videos if you need them.
- **Do Weekly Engagement Exercise:** Short assignments with infinite attempts to reinforce course concepts and keep you going through the material in a timely manner
 - **Due every Sunday night by 11:59 pm EDT** (there are a few exceptions to this due to holidays/end of classes. These exceptions are indicated on the Semester Schedule). On the course schedule, Weekly EEs are *marked in green*.
 - Will contain many to all of the in-lecture questions used for attendance.
- **Check to see if Homework is Due:** These are the larger assignments that engage with the course material at a deeper level and help you prepare for quizzes and exams.
 - **When Assigned, they are due on Wednesdays at 11:59 PM EDT.** Note that there are fewer HW assignments than weeks of class, and therefore, HW will not occur weekly. On the course schedule, the homework assignments are *marked in blue*.
- **Check to see if there is a Quiz or Exam:** Make reminders for yourself based on the schedule. You get to take each Quiz and Exam twice. **Once on a Monday (1st Attempt), and again on the following Friday (2nd Attempt)**. In the intervening time, learn from your mistakes and use the Canvas Quiz/Exam Discussions. On the course schedule, *quizzes are marked in orange* and *exams are marked in red*
 - **First Attempts are Mandatory** and class time will be allowed for them. I give 20 minutes of class time for quizzes and the full class period for exams. Exams & quizzes are available from 9 am to 9 pm on attempt days, so you don't have to take them in the lecture hall.
 - **Second Attempts are Optional.** If you use your 2nd Attempt on a quiz or exam, your quiz or exam grade will be the *average of both attempts*.
- **Check and Engage with Weekly Canvas Discussions:** While Canvas Discussions are perennially unpopular, they are the easiest way for me to provide feedback to the entire class for exams, quizzes, homework, and the weekly material we cover. The discussions

are a great way for you to ask me questions about the material and get responses that the entire class can benefit from. The more active everyone is, the more vibrant this class will be.

- Engage with the class via the class GroupMe.

Lecture Videos

For your convenience, I will post links to the lecture videos I created in Spring 2020/Fall 2020 when this class was taught in a virtual asynchronous format. Please excuse any anachronisms. These videos are made to cover the material topic by topic in a very thorough manner. I encourage you to use them for review, supplemental instruction, and for cases when you miss class.

My Video Lecture Series will be available on the Weekly Readme documents at the top of every week's module. I apologize for any bad closed-captioning done by YouTube. About 30% of the videos have professional capturing that are available upon request.

Office Hours

Every Tuesday from 10 am until 12 pm.

Every Wednesday & Friday from 2 to 3:30 pm.

Office hours are a time for you to get one-on-one time with me. You can use the office hours to get individualized help with the course, talk about astronomy in general, or even just have a chat with me. Office Hour sessions outside of the listed time are also available by appointment.

I offer a Zoom option for office hour meetings as well. The Zoom information is below.

Zoom Link: <https://tennessee.zoom.us/j/96089969586>

Passcode: HA6563

The Class GroupMe

I have created a GroupMe for this class. Joining is not required, but you will find it very useful. I use our GroupMe to answer questions about the class, homework, etc. I also will send you reminders about due dates & cool space news. The class TAs also monitor the GroupMe to offer you help when needed.

I also want our GroupMe to be a space where you all can feel comfortable to chat with one another. I encourage you to help one another by asking and answering questions. I try to keep things interesting by occasionally asking open ended questions and posting polls. Whether you want to be an active participant or someone who simply reads and benefits from the messages, you should find our GroupMe a helpful resource.

Please be respectful. I will not tolerate any discrimination, posting of answers (cheating), bullying behavior, etc.

GroupMe: [Invite Link](#)

Course Components: Homework, Engagement, Quizzes, & Exams

Homework Assignments

Homework assignments count for 35% of your overall course grade.

When assigned, Homework will be due by Wednesdays at 11:59 pm.

- I will be actively monitoring the Canvas Discussion related to the homework. Please post your questions about homework there so everyone can benefit from my response.
- ***Do not post questions with an answer (incorrect or correct) marked.*** You can post a question, but make sure all the choices are left blank.
- You can ask questions about the homework in the GroupMe, but please do not post questions with any answers marked (correct or incorrect).

All homework assignments are assigned on Canvas. I have designed all the homework assignments. In doing so, I have done my best to make the questions in the homework as helpful to your learning as possible. I have also strived to make them a strong preparation for quizzes and exams. Please complete all homework assignments by the due date.

You get at least three attempts for every assignment. The highest of your three attempts is taken as your grade for that homework assignment. Use them wisely, take notes as you work through each attempt, and engage in the discussions.

- Canvas's homework system has some unfortunate quirks that you will likely find annoying. For each attempt, you have to work every question, even if you got it correct on the previous attempt. It also shows no mercy on the due time. ***You have up until the due time, which is always 11:59 pm EASTERN TIME of the listed due date.*** If you are even a minute late, it will give you a zero. Please be aware of this and start your homework early.

Attendance via In-class Question

Attendance counts for 5% of your overall course grade.

For most lectures, I will have one to a few questions at the beginning, end, and/or during our lectures. These questions will be used to monitor attendance, and they will act as a way for you to test your understanding of the material as we go through it. There is no penalty for incorrect answers. There is no benefit for getting them correct. They are designed to cause you to reflect and engage with the lecture material.

The In-Lecture Attendance Questions will be answered via a Canvas Assignment that will be available for the duration of our lecture starting 10 minutes before the lecture begins. If you are in attendance, but cannot access Canvas that day, please see me after class so I can mark you as present.

I, regretfully, suggest that you install the Canvas app on your phone for these questions. If you bring a laptop to class, that is much better, but I know many choose to not bring their laptops to class.

Attendance Grading Scale

- If you have greater than or equal to 70% of lectures with questions attended, then you get a 100 Attendance Grade
- If you have less than 70% of the lectures with questions attended, then the percentage you attended becomes your Attendance Grade.

Weekly Engagement Exercises (EEs)

End of the week Engagement Exercises count for 15% of your overall course grade.

Every week will have a set of questions called “engagement exercises.” These are shorter assignments that directly relate to the material on the schedule for the week. They will include the in-lecture attendance questions that you had during the week plus additional questions meant to help you keep up with the material and identify what concepts I find important for you to review and understand.

You will get unlimited tries up until the due date for these assignments. The point of these, and having a grade attached to them, is to keep you working on the material throughout the semester while reinforcing the concepts I find most important for that week’s lessons.

Every week of lessons will have a Canvas Discussion associated with it. If you have questions regarding the material and the engagement exercise for that week, please post them there.

The engagement exercises will be due at 11:59 pm Eastern Time on the Sunday after the week of lessons. Your grade for this category will be the average of all the engagement exercises

Examinations

Each Exam is available online via Canvas and counts for 10% of your course grade. You get two attempts per exam (see 2-attempt policy below).

Exams 1 through 2 will occur within the semester.

Exam 3 will be during UTK’s Final Exam Period. You will still get 2 attempts for Exam 3, but you choose when to take the first and second attempts within a window of 9 am on Friday, 9 December until 11:59 pm on Wednesday, 14 December.

Please read the following carefully:

- *Exams will be available to you to take from 9 am until 9 pm on the exam days.* Once you start the exam, you will have 90-minutes to complete it. The time limit makes it so studying for an exam is necessary. It also makes cheating rather difficult.
- *No lecture will be held on 1st Attempt Exam days.* You can use the class time to take the exam, but be aware that we only have the lecture room for the duration of the scheduled class time. The exams are designed to be finished within an hour if you have studied for them.

- **Two-Attempt Policy: You will get two attempts on the exams. Your exam grade will be the average of the two attempts (even if you score lower on the 2nd attempt).**
 - **The first attempt** will be on the **Monday** of the week listed on the Course Schedule.
 - Based on the results of the 1st Attempt, I will open a discussion where I can address problem areas and give you a space to ask questions of your own. **This feedback will be given via a Canvas Discussion called Exam X Review - Preparing for you 2nd Attempt**
 - **The second attempt** will be on the **Friday** after the 1st Attempt. You should have used the intervening time to shore up where you had problems.
 - Note that I used pools of questions, so your second attempt will be a different version of the exam and will contain questions not on your first attempt. The goal is for you to learn the concepts; it is not to just memorize answers.
 - **If you are happy with your first attempt, then you can skip the second.** Canvas will still show a 0 for your second attempt, but I will ignore that when I calculate your overall Exam Grade, which will be released on Canvas after the 2nd attempt.
 - **YOU MUST TAKE THE FIRST ATTEMPT! If you skip the first attempt, that will be counted as a 0 making the highest exam grade you can earn a 50%.**
 - **Philosophy Behind This Method - Opportunity to Learn from Your Mistakes**
The goal with this method is that I want you to feel comfortable with making mistakes and learning from them. This is why each exam is only 10% of the overall grade, and you get the opportunity to retake the exam. I hope it also encourages you to engage with me through the Canvas discussions. Hopefully, the lower overall grade weight and the multiple attempts brings exams more in line with how I view they should be with respect to education. It is not about catching students out on a single, high-stakes assessment. It is about offering you a way to test what you have learned, giving you the chance to learn from that, and then demonstrate growth.
- **Exams will be open book and open note.** With my online exams, I choose to avoid using the Respondus monitoring system. For me, it feels too invasive and too much like a dystopian novel. This opens the door to many forms of cheating, so I build exams (and quizzes) to make traditional cheating methods difficult. This includes large pools of questions where typically every exam has as many, or more, unique versions as there are stars in the universe (10^{23} versions, or 100,000,000,000,000,000,000,000 versions).
The list of things NOT TO DO
 - Do not work with others on exams. It would be difficult to do so with the time limit and the different versions of the exams. Doing so will likely mean that you all run out of time before completing the exam.

- Do not Google the answers. I write all of my own questions, so this will be hard to do successfully. Plus, with a time limit, trying to sift through Google results will waste precious exam time.
- Do not share exam information with fellow students. If you take the exam earlier than your friends, don't just tell them what was on the exam and the answers to questions. With $\geq 10^{23}$ exam versions, you are probably just giving them bad information anyways and making it harder for them since they will feel like they don't have to study. You will have to study.
- **Exams will be 55 questions long and you get 1.5 hours (90 minutes) to complete it.**
- **You will be permitted to miss a to be determined (TBD) set number of questions before it starts to affect your grade.**
- **There are no dropped Exams**
- If you have testing accommodations, please email me to let me know. I will give all allowances afforded to you on the time limit.
- If you will miss an attempt for a valid reason, please let me know via email prior to the exam. A full day of advanced notification will go a long way in my consideration for a make-up exam.

Quizzes

Your Quiz Average counts for 15% of your overall course grade.

There will be THREE quizzes, one before Exams 1 and 2, and Exam 3. Quizzes will be given online in the same format as the exams [see Exam policy]. **You will have two attempts: one on the Monday listed on the schedule and a second on the following Friday.** I will give you 20 minutes at the end of Monday's lecture to take your 1st Attempt. You are welcome to leave early or take the quiz there and then in the lecture hall.

Quizzes are 15 questions long and you will be given 20 minutes to complete them.

There are no dropped quizzes.

Please make use of the Canvas discussion related to the quiz.

How Quiz Grades Are Calculated

- **You can miss one question per quiz without it affecting your grade on the quiz. That is a 14 out of 15 is recorded as a 100. Getting a 15 on a quiz earns you a 105 on the quiz. Getting a 14.5 on a quiz earns you a 102.5. Other fractional grades above 14 are scaled accordingly.**
- **Your Quiz Average at the end of the semester will be the average of your THREE quiz grades.**

Extra Credit (EC) Opportunities

You can earn up to 5% added to your course grade via our Astronomy Extra Credit opportunities.

There are a variety of ways you can earn extra credit in this class. Please see the Extra Credit Opportunities module on Canvas for details on what is available, and how to earn the points.

Before each exam, you have a chance to earn extra credit. On Canvas, you will see there are EC assignments for each period before class exams. A completed extra credit assignment is worth +1% added to your overall course grade with a cap on the maximum allowed earned points set at +5%.

The way this plays out is that you can earn up to +3% before Exam 1. One point for each completed EC assignment. You have a second opportunity to earn up to +3% between Exams 1 and 2 (+1% for each completed EC assignment). A third, and final, opportunity to earn up to +3% between Exams 2 and 3. Notice that means if you put off doing extra credit until the 11th-hour, you will not be able to earn up to the maximum of +5%.

Observing/Planetarium Extra Credit Opportunities

We also offer planetarium and rooftop observations (night sky & solar) as additional extra credit opportunities. These opportunities will be posted weekly on the corkboard outside of Room 108 in Nielsen Physics and Astronomy. Each completed session earns you +0.5% when you turn your work into me. To earn this credit, you simply need to complete the instructions on the worksheet that will be given to you at the beginning of the session.

Canvas Announcements

Enable at least daily email announcements for this class.

I have pinned the most recent announcements to appear at the top of the Canvas page. Make sure you read all of them as this is the most direct way for me to communicate with all of my students at once.

Have A Question about Course Material?

If you have a general question about the course or the material, then please first check the syllabus or Course Resources Module on Canvas instead of immediately emailing me. If you have a question, the answer to it will likely be a benefit to other students. If you are comfortable with it, please post the question to an appropriate Canvas Discussion or on GroupMe. Doing so will centralize and simplify communication.

If you need to contact me personally, or feel uncomfortable posting your question, then please email me directly.

Tutoring Sessions

Having some trouble with the course concept and material? Our Astronomy TAs are willing to help! If you feel more comfortable communicating with them instead of directly with me, you can ask for help via email, or schedule a Zoom tutoring session. If requesting a Zoom session, please have prepared questions ready to go as there is extra labor involved for the TAs and myself to set up these sessions.

Course Undergraduate Teaching Assistants

Megan Bourque jnm951@vols.utk.edu	Jackson Tumlin jtumlin2@vols.utk.edu
Raghav Chari rchari1@vols.utk.edu	

Course Grades

All grades are calculated according to the following grading weights and on the following grading scale.

Grade Category	Weight Percent
Exams	3 at 10% each Total: 30%
Quiz Average	15%
Homework Average	35%
Engagement Exercises	15%
Attendance	5%

Course Grading Scale

Letter Grade	Percentage Range
A	90.00 or greater
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	Less than 59.50%

Grade Rounding Policy: I do not round grades for any reason or special pleading. I offer enough points in this class for the decimal places to have meaning. I also offer an extraordinary amount of extra credit that you could have done to boost your grade. I use the extra credit and a 0.5% buffer earning you a “minus” grade at letter grade boundaries as my “grade rounding policy.”

Other Course Policies

Cheating/Academic Dishonesty

Cheating of any kind will not be tolerated. This includes my finding out of any collaboration while taking the open book quizzes and exams. I have given you a lot with how I am administering those. Please respect that and do not resort to cheating. Remember that the point of all of this is to gain an education and grow as an individual. Cheating is the opposite of that, and a big pet peeve of mine. I will report you to Student Conduct if caught.

I am probably more tech-savvy than you guess, and I am aware of many of the social media platforms commonly used for cheating (GroupMe, Google Drive, Chegg, Quizlet, etc.). I will actively be trying to gain access to any of these groups through trusted people in my classes who dislike cheating as much as I do. If you are interested in keeping academic fairness and honesty alive and well, please contact me privately, and we can discuss secure and anonymous ways to do so.

Consequences for getting caught cheating are severe. First time offenders will receive no credit for the assignment cheated on and will have their maximum grade in that grade category reduced to 65%. Cheating on exams will result in a 0 on that exam. Second offenses result in failure of the course and, without exception, a report to the Office of Student Conduct.

Student Issues

If you have any concerns that you would like me to know about, please see me or email me early in the semester. I understand that many of you have jobs, complicated family circumstances, private personal struggles, or a whole host of other factors that could affect your performance in this course. This is exacerbated by several orders of magnitude this semester. If you can let me know early, and before it becomes a problem in the course, I am almost always happy to work with you in order to foster an optimal educational experience. Please feel free to approach me during my office hours or via email.

Technology Concerns

If you are having any limitations due to technology, please let me know as early as you can. I am collecting a set of resources that UTK is providing. Until I have that gathered and released, please contact UTK OIT (<https://oit.utk.edu/>) and ask how they might be able to help you. I will work with you from my end while solutions are found.

Student Disability Services

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.

Course Schedule

See Canvas and the Canvas Page *Astronomy 151 Semester Schedule* in the *Course Materials* Module

Google Version of Schedule: [Link](#)