

Astronomy 151 - Online Syllabus

A Journey Through the Solar System

Spring 2021 Semester

University of Tennessee, Knoxville

Course Details

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

Class Times: Asynchronous online. There are no required meeting times

Class Location: Asynchronous online. There are no required meeting locations

Course Number: ASTR 151-001

Dr. Lindsay's Office: Mostly my home office, but PHYS 215 in Nielsen Physics & Astronomy if need be Phone: 865-974-2362 (leave voicemail)

Zoom Office Hours: Tuesdays: 10 am – 12 pm. or by Appointment

Zoom Link: <https://tennessee.zoom.us/j/96016729447>

Passcode: **Ha6563**

Live with Dr. Lindsay: Thursdays: 3 – 5 pm Fridays 2 – 4 pm

Zoom Link: <https://tennessee.zoom.us/j/99691331626>

Passcode: **Ha6563**

Course TAs:

Brittney Contreras bcontrer@vols.utk.edu	Jesse Farr jfarr7@vols.utk.edu
Hannah Garrett hgarret4@vols.utk.edu	Sarah Wellence swellenc@vols.utk.edu

Course Resources:

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>

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

Hyperlink to Youtube Channel: [Link](#)

Course Website: Canvas

Required Course Materials: Calculator

GroupMe: [Invite Link](#)

Discord Server: [Invite Link](#)

Course Description

This course is an introduction to astronomy and an exploration of our solar system. Due to the ongoing coronavirus pandemic, this class will be done in an online-asynchronous format this semester. The asynchronous part means that we do not have any official, or required, meeting times (virtual or otherwise). You will, however, have regular due dates for course material throughout the semester. Please check the calendar 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 on topic, such as the Sun, life in the universe, or astronomy outside of solar system.

Flow of the Course

A regular weekly flow of an online-asynchronous class is paramount to the class's success. Having set days of the week when homework, quizzes, and exams take place helps you build a schedule and remember deadlines. Below I describe the flow of the course and provide information on some of the lecture video elements of the class.

Weekly Flow

- **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. Instead of creating lecture videos on every detail, I will have videos focused on the most difficult topics/concepts. So, you will have to go through the slides to learn all of this course material and be successful with the homework, quizzes, and exams.
- **Watch Released Videos:** *See below for details on lecture videos*
- **Watch the Announcements Video on Mondays.**
- **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**
- **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 only 9 of these assignments, and therefore, do not occur weekly. On the course schedule, the homework assignments are *marked in blue*.
- **Check and Engage with Weekly Canvas Discussions & Astronomy in Context Special Release Videos:** This will be my primary way of interacting on a more personal level with the class. There will be discussions for every week of class material, discussions for quizzes and exams, and discussions on a variety of other topics. Be sure to check regularly. The more active everyone is, the more vibrant this class will be.

I hope to have a special *Astronomy in Context* video every week where I take some aspect of the week's material and try to connect it to our lives or expand upon the awe and fascination that exploring the universe and other worlds can instill. See below for more details. Some topics may be decided by an online survey so I can talk about what you most want to hear about.

- **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, and a second attempt on the following Thursday.** In the intervening time, learn from your mistakes and use the Canvas Quiz/Exam Discussions.
- **Log onto Live with Dr. Lindsay Sessions:** These sessions are open to all students. You can use this time to interact with me and ask me questions. Some weeks, I may have prepared materials. Other weeks it may be more unstructured where I primarily focus on answering student questions.

Lecture Videos

Every week, I will release video recordings of my lectures for you to watch. The topics covered are the ones listed in the course schedule. My aim is to create 5 – 8 weekly videos covering what I deem to be the most difficult course concept. I will do my best to not just make these me going over the course lecture slides I have made available to you. Instead, I aim to have these videos to be more directed, include simulations when appropriate, and provide examples to the mathematical topics in the course. These videos will be released on Canvas Studio and as

YouTube links. I use their close captioning systems, which is not the best for science topics. If you require professional captions, please send me a private email, and I will see what I can do with UTK Media Services.

[Live with Dr. Lindsay](#)

Every Thursday (2 – 4 pm) and Friday (3 – 5 pm), I will be hosting live Zoom sessions for anyone to log on and interact with me. The most requested addition to my online class was some live interaction, and this is my first attempt at filling that need. The date, times, and format will be subject to change as I learn what best serves you. Please use these sessions regularly to ask me for clarification, review, alternative explanations, examples, studying for quizzes and exams, etc. They are open to all, so there may be only one student to many students in the session. I will learn how to best address your needs as I get a feel for what these sessions are like. Some of the sessions will have prepared material, while others will be answering student questions like a study session. When it close to an exam, these sessions will be exam review sessions.

Zoom Link: <https://tennessee.zoom.us/j/99691331626>

Passcode: Ha6563

[Office Hours](#)

Every Tuesday from 10 am until 12 pm (noon). Office hours are a time for you get one-on-one time with me. Using a waitlist, I only allow one student in at a time. That way we can have a discussion about what you need. 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 session outside of the listed time are also available by appointment. In that case, please send me an email to schedule a time to meet via Zoom.

Zoom Link: <https://tennessee.zoom.us/j/96016729447>

Passcode: Ha6563

[Live Chat Features: GroupMe & Discord](#)

In the past, I have had a lot of success by being invited into the class GroupMe. I know it might seem wrong or weird to have your professor in a GroupMe, especially considering the answer sharing and other things that frequently happens on them, but when it has happened my students have really responded well. Plus, it, and a Discord server, were the most requested addition to my online classes. The benefits of me being in these platforms is tremendous. You can ask questions and get quick responses on class material, due dates, class policies, etc. I will also send reminders of due dates, so you don't accidentally miss one. Then there is the greatest benefit of all: you get to see me as a human who is trying his best to help you succeed. A bonus, is that it also keeps these groups clean, which reduces the risk of being pulled into a cheating scandal, having to put up with cheaters, and lowers cyberbullying. In short, it becomes an integral space for the class that is more familiar and less formal than office hours, Zoom events, email, and Canvas Discussions.

To start, I have created a class GroupMe and Discord. Last semester, the votes were evenly split on the preferred platform. Discord has much more utility and ability to navigate than GroupMe,

but GroupMe offers the quick, casual conversational tone. Try using them both, and as the semester progresses, I will learn which is the best fit for my classes. See, I am still learning too!

GroupMe: [Invite Link](#)

Discord Server: [Invite Link](#)

Course Components: Homework, Engagement, Quizzes, & Exams

Homework Assignments

Homework assignments count for 30% of your overall course grade.

When assigned, Homework will be due by Wednesday's at 9:00 pm.

- I will be actively monitoring the Canvas Discussion related to the homework on the Wednesday's they are due.

All homework assignments are assigned on Canvas. The assignments are designed by me and are done so in an effort to aid you in learning the material and mastering the skills required to succeed in this course. Please complete all homework assignments by the due date. There is a homework assignment for each part of each unit. They are larger assignments than the engagement exercises and the primary workload for this course. Be sure to ALWAYS do the assignments.

You get 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 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.

Engagement Exercises

End of the week Engagement Exercises count for 10% 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. 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 on the Sunday after the week of lessons.

Your grade for this category will be the average of all of the engagement exercises

Online Examinations

Each exam counts for 10% of your course grade. Exams 1 through 3 will occur within the semester and are worth 10% of the course grade per exam. The Final Exam is also 10% of your overall course grade. It will be available for you to take anytime between 9 am on Friday, 30 April and 9 pm on Tuesday, 4 May

Please read the following carefully:

- **Exams will be available to you to take from 9 am until 9 pm on the exam day.** Once you start the exam, you will have 1 hour to complete it. The time limit makes it so studying for an exam is necessary. It also makes cheating rather difficult.
- **You will get two attempts on the exams. Your exam grade will be the average of the two attempts.**
 - **The first attempt** will be on Monday of the week we have the exam
 - I will then see where you were having the most problems and use that information to open a discussion where I can address problem areas and give you a space to ask questions of your own.
 - **The second attempt** will be the following Thursday. 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.**
 - **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:** 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 the 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-weight 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.** 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 do not 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 might be hard to do anyways. 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 1 - 3 are 55 questions long and you get 1.5 hours to complete it. The Final Exam is 70 questions long, and you get 2 hours for it.**
- **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 miss an attempt for a valid reason, please let me know via email.

Online Quizzes

Your Quiz Average counts for 20% of your overall course grade.

There will be SIX quizzes, two before each in-class exam. Quizzes will be given online in the same format as the exams [see Exam policy]. You will have two attempts: one on a Monday and a second on a Thursday. Please make use of the Canvas discussion related to the quiz.

Quizzes are 12 questions long and you will be given 12 minutes to complete them.

There are no dropped quizzes.

How your quiz average is calculated

- You can earn a total of $6 * 12 = 72$ quiz points over all six quizzes.
- A 66 out of 72 will earn you a 100% Quiz Average
- Every point above 66 counts as 1.66 % extra credit added to your Quiz Average. This gives a max Quiz Average of 110%.

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. For now, they are all online opportunities, but depending on how the pandemic progresses throughout the Fall 2020 semester, we may add in planetarium and rooftop telescope observations as opportunities. Please see the Extra Credit Opportunities module on Canvas for details on what is available, and how to earn the points.

Large amounts of meaningful engagement in the Canvas discussions may net you some additional extra credit points as well. This will be done at the instructor's discretion and with the astronomy TAs advocacy.

Information on How Our Online Astronomy Class Will Work

All of this class will be hosted from Canvas. The model for the class I am using is based on a successful version of my Fall 2020 online astronomy classes. The format is an asynchronous course, but I do not like the lack of in-class interaction this often entails. I will leverage all the online tools that I can to increase engagement with one another. I see my role in this online class not as the traditional instructor, but as a content generator and guide to you; my role is to help you through the material while providing insights to how to think like a scientist and an astronomer. I will be active in Canvas discussions and respond to emails. I have live Zoom sessions via "Office Hours" and "Live with Dr. Lindsay. I have also created a class GroupMe and Discord channel that we can use to communicate rapidly. Please be active in engagement as well. I am not doing any forced participation in discussions for a grade. There are good ways to do this in an online class, but I lack the resources to implement them effectively. Simply using a grade to enforce engagement creates a lot of box-checking to earn the grade. It also creates a grading nightmare to evaluate if contributions were meaningful and productive when I have over 400 students this semester.

I doubt any of us wanted our Spring 2021 to be another online semester, but currently, online, hybrid, and safety protocols are what we have to fight this global pandemic. Let's all agree to work with what we have to try to make the best of this semester. I am dedicated to making this the best learning experience for you as I can, and I will likely lose a lot of sleep this semester. Please know that I am here to help in any way I can, and I hope I have built a good online course and learning experience for you.

Below are some of the important elements you need to know. Be sure to check Canvas regularly (at least several times per week) to make sure you are not missing any deadlines or engagement opportunities

Interacting with Dr. Lindsay

Even though we are online without a meeting time, I am going to do everything I can to engage with you all on a class and individual level (if desired) this semester. I will communicate with you all via Canvas, GroupMe, Discord, Zoom (office hours and Live with Dr. Lindsay), and email. For personal communication, please use my UTK email (slindsay@utk.edu). For questions about the course or material, please post them to the appropriate Canvas Discussion if you are comfortable doing so.

List of communication platforms and links

Canvas	
Live with Dr. Lindsay	Zoom: https://tennessee.zoom.us/j/99691331626 Passcode: Ha6563
Office Hours	Zoom: https://tennessee.zoom.us/j/96016729447 Passcode: Ha6563
GroupMe	Invite Link
Discord	Invite Link

[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? Use One of the Canvas Discussions](#)

If you have a general question about the course or the material, then please use one of the Canvas discussions for this class 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. Doing so will centralize and simplify communication.

I am creating Canvas Discussions for Course Policies; Weekly Engagement Exercises; Homework Assignments (one per assignment); Quizzes (one per quiz); Exams (one per exam); and a few other special topics.

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

[Tutoring Session](#)

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 sessions, please have prepared questions ready to go as there is extra labor involved for the TAs and myself to set up these sessions.

Brittney Contreras bcontrer@vols.utk.edu	Jesse Farr jfarr7@vols.utk.edu
Hannah Garrett hgarret4@vols.utk.edu	Sarah Wellence swellenc@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 Final at 10% Total: 40%
Quiz Average	20%
Homework Average	30%
Engagement Exercises	10%

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-	79.50 – 79.99%
D+	67.50 – 69.99%
D	60.00 – 67.49%
D-	59.50 – 59.99%
F	Less than 60.00%

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.”

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.

Regarding Coronavirus and UTK

As we are all aware, the coronavirus pandemic is not going away. I personally chose to move all of my classes online in response to the growing case numbers and my ethics on keeping as many people safe, healthy, and alive as possible. While you will not be on campus for my class, following safety protocols this semester is extremely important. Please refer to the UTK Coronavirus – Information for Students page to be fully aware of responsibilities that apply to you personally, the faculty and staff, and the campus.

<https://www.utk.edu/coronavirus/students/>

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 Service

I always work fully with the Student Disability Services (SDS: <https://sds.utk.edu/> or by phone at 875-974-6087) in 915 Volunteer Blvd/100 Dunford Hall. If you have a known or suspected

disability, please contact SDS to establish accommodations. The offices have a wonderful staff that are extraordinarily helpful. If you do have SDS accommodations, they will let me know, but I encourage you to contact me to discuss how we can work with the accommodations to make your astronomy experience the best for your needs.

Course Schedule

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

Google Version of Schedule: [Link](#)