

Astronomy 152 - Spring 2024 Syllabus

Stars, Galaxies, and Cosmology

Spring 2024 Semester

University of Tennessee, Knoxville

Course Details

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

Class Times: Online Asynchronous - No Meeting Times

Class Location: Where it is most convenient for you

Course Number: ASTR 152-002

Dr. Lindsay's Office: **PHYS 218 in Nielsen Physics & Astronomy Building**
Phone: 865-974-2362 (I rarely check this, but will answer if it rings)

Visit/Chat Hours: In-Office: Also available for scheduled appointments
Mondays: 2 pm to 3:30 pm
Thursdays: 10:30 am to 12:00 pm
Fridays: 10:30 am to 12:00 pm
Virtual: Available by appointment
Meeting ID: 824 1324 5287
Zoom Link: <https://tennessee.zoom.us/j/82413245287>

GroupMe: [Invite Link](#)

Course TAs:

Megan Bourque (she/they) jnm951@vols.utk.edu Office Hours: Wednesdays 3-4:30 pm https://us04web.zoom.us/j/2688290562?pwd=mpu7ip9lJ1bhrH0zOzY5Q9VaL1xfWj.1	Raghav Chari rchari1@vols.utk.edu Office Hours: [time/date] [Zoom Link]
Zach Patton zpatton2@vols.utk.edu Office Hours: [time/date] [Zoom Link]	Jackson Tumlin jtumlin2@vols.utk.edu Office Hours: [time/date] [Zoom Link]

Course Resources:

Spring 2024 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

- **This Class is an Asynchronous Online Class:** As such, we do not have set meeting times, required zoom sessions, or any other in-class activities. I have set the course up to have a weekly flow to it. Please establish a schedule that works for you Astronomy 152 needs. You will have something to do every week.
- **Astronomy 152 Content via Lecture Videos**
Lecture Videos are posted in the weekly Canvas modules (e.g., Week 1 Module, Week 2 Module, etc.). The links are to my YouTube versions of the videos. If the class wants Canvas Studio versions, or professional subtitling, please reach out to me.
 - Professional subtitling may have a significant delay as that level of work requires expertise and time on the behalf of wonderful teams at UTK media services.
- **Astronomy 152 & Freely Available “Textbook.”**
You can also access the course content via “Dr. Lindsay’s Textbook,” a.k.a. “The Textbook Slides” The link to the PowerPoint Slides and PDFs are freely available on the Canvas frontpage, and on this page on Canvas - [“Dr. Lindsay’s Textbook.”](#) ← (That is a link)
 - You can get the complete course content required for this class via the Textbook Slides or via the Lecture Videos. Make use of either or both. Find what works best for you, and stick with it.
 - **There is no required textbook or homework platform purchase.** I have created all of my materials, and I have worked hard to make sure they all overlap and integrate with one another.
- **Weekly Engagement Exercises (EEs):** I will make sure you are keeping up with the week-to-week material by having you complete quick and simple Engagement Exercises (EEs). These 10 question assignments are **due every Sunday at 11:59 pm** (except in cases of holidays).
In total, the EEs are worth 15% of your grade, which makes each one about 1% of your grade in the class.
- **Optional Weekly Surveys:** I will post a survey every week where you answer the question, “Do you have any questions, concerns, or curiosities about this week’s material?” You can use these surveys to give me and our TAs feedback. We will respond to them by Wednesday of the following week.
- **Homework:** Must complete all homework assignments - No homework will be dropped
In total, the Homework Grade is worth 40 % of your grade

- **Quizzes:** Must complete all 3 quizzes - Quizzes are have 15 questions and are graded out of 15. Example: A score of 12 on a quiz has a grade of $100 * (12/15) = 80\%$.
In total, the Quiz Average is 15% of your grade. Individually, quizzes are 5% a piece.
- **Exams:** 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
- **Online Quizzes & Exams:** Exams and quizzes will be online and available to you from 9 am to 9 pm on days listed in the [Astronomy 152 Spring 2024 Semester Schedule](#). Time will be allotted during our lecture period for you to take the exam or quiz in-class if you choose.
- **Class Communication:** 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.
 - Make use of the GroupMe to make this large asynchronous class feel like a smaller, more engaging class.
- 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.**

Course Description

In this online, asynchronous astronomy class, you will engage with the content I have created on a week-by-week basis. Each week, you will have a module that includes course announcements, and information on the material covered. Each week's module will also include links to the relevant lecture videos, assignments that are due, supplemental information, and Canvas discussions related to that material.

You have access to the Astronomy 152 content in two complimentary formats. You can watch the topic-by-topic lecture videos and/or review "Dr. Lindsay's Textbook" slides. You will receive everything you need to succeed in either format independently. I suggest making use of both the videos and the textbook slides. My recommendation is to watch the videos, take notes, and then review and update your notes via going through the textbook slides.

There are regular due dates for course material throughout the semester. The weekly **Engagement Exercises (EEs) are due on Sundays by 11:59 pm**. When due **homework assignments are due on Wednesdays at 11:59 pm**. When we have them, **quizzes and exams occur according to my 2-attempt Policy with a 1st Attempt on a Monday and a 2nd Attempt on the following Friday**. You can get a detailed view of what is due when on 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 Sun, Stars, and Interstellar Medium

This unit is all about the stars. It begins with an in-depth look at our nearest-neighboring star, the Sun, and then expands to stars in general. In this unit, we will cover what a star is; how we measure the brightness and distances to the stars; how we classify stars; and how the properties of stars are related. We will also cover the formation and death of stars, including stellar remnants after death such as white dwarfs, neutron stars, and black holes. We round out this important material with nucleosynthesis, which is the generation of elements of the periodic table.

Unit 3: The Life and Death of Stars

Unit 3 deepens our understanding of stars by examining how they form, live, and eventually die. We explore the mass dependency on birth and death. For low-mass stars, we learn they die in white dwarf stars, while high-mass stars die in one of the most energetic events in the universe - a supernova explosion. This unit also explores how stars produce the elements on the periodic table, so-called nucleosynthesis. It ends by covering neutron stars and black holes, which are the exotic relics of dead high-mass stars and a modern view of Einstein's relativity to understand what would happen if you were to fall into a black hole.

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 an online, asynchronous class easier for you to manage and integrate into your routine. 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

- **Watch the Lecture Videos and Take Notes on the Relevant Textbook Slides**
 - I suggest scheduling in Astronomy 152 times into your weekly schedules. That gives you set times when you can pay attention to this class.
- **Watch for Course Announcements on Mondays**, which are sent to you via a Canvas Announcement & posted in the Weekly Module.
- **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** (there are a few exceptions to this rule because of holidays). 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)** (there are a few exceptions to this rule because of holidays). 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.** Exams & quizzes are available from 9 am to 11:59 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.**
- **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*.

Lecture Videos

The Lecture Videos are posted in the Weekly Modules and can also be found in the Weekly ReadMes. These videos cover the material topic-by-topic in a very thorough manner. I encourage you to watch them and re-watch them if need be.

I originally filmed the majority of the videos you will watch during the Spring and Fall 2020 semesters. Please excuse any anachronisms. If you find anything that you feel is in great need of updating, please reach out to me and let me know. I'll work to update that video.

I apologize for any bad closed-captioning done by YouTube. About 30% of the videos have professional capturing that are available upon request via Canvas Studio.

To add some depth and personality to the semester, I will also work toward releasing specialized videos filmed during our semester together. These may range from supplemental instruction videos to fun videos that contextualize the course content.

Office Hours

Every Monday from 2 pm until 3:30 pm.

Every Thursday from 10:30 am - 12:00 pm

Every Friday from 10:30 am to 12:00 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/82413245287>

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 40% of your overall course grade.

When assigned, Homework will usually be due by the following 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.

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.

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 Thursday, 9 May until 11:59 pm on Tuesday, 14 May.

Please read the following carefully:

- ***Exams will be available to you to take from 9 am until 11:59 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.
- ***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*** normally 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 you can address problem areas and give you a space to ask questions of your own. This feedback will be given via a Canvas.
 - ***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 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 use AI in an attempt to get an answer.*** The point of you answering the questions is to demonstrate learning of the material. It is not to test the capabilities of modern AI, which aren't great on very specific material like astronomy.
- ***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 50 questions long and you get 1.5 hours (90 minutes) to complete 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 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

- ***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.

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.

Other Extra Credit Opportunities

Will be announced as the semester progresses. These will be available as online assignments that do not require you to come to campus.

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.

The names and contact information for the TAs is listed at the top of the syllabus.

Course Grades

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

Grade Category	Weight Percent	Grading Scale	Letter Grade	Percentage Range
Exams	3 at 10% each Total: 30%		A	90.00 or greater
Quiz Average	15%		A-	89.50 – 89.99%
Homework Average	40%		B+	87.50 – 89.49%
Engagement Exercises	15%		B	80.00 – 87.49%
			B-	79.50 – 79.99%
TOTAL	100%		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.

AI Policy: Not Permitted in this Course

In this course, it is expected that all submitted work is produced by the students themselves, whether individually or collaboratively. Students must not seek the assistance of Generative AI Tools like ChatGPT. Use of a Generative AI Tool to complete an assignment constitutes academic dishonesty.

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 152 Semester Schedule*** in the ***Course Materials*** Module

Google Version of Schedule: [Link](#)