

Sp23 - STELLAR ASTRONOMY (47934)

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AST 352K - Stellar Astronomy



Spring 2023 - Unique No. [47934](https://utdirect.utexas.edu/apps/registrar/course_schedule/20232/47934/)

*Meeting Times : T/Th 2:00 — 3:30pm in WEL2.110 (*In-Person*)

Office Hours (For Prof. Hawkins) : T/Th 1:00 — 2:00pm in PMA 16.228 (*Hybrid*)

Office Hours (For TA Zoe Hackshaw) : M 11:30am-12:30pm and W: 9-10 am (office PMA 16.312; Zoom: <https://utexas.zoom.us/j/9035624321>)

*Class/Office Hours (Prof Hawkins) Zoom link: <https://utexas.zoom.us/j/96209994363>

***Assume In-Person unless noted on Canvas! You are expected to be in person in class.**

***We will not simultaneously stream class virtually but we will record the sessions to accommodate all students.**

Course Webpage: <https://utexas.instructure.com/courses/1351850> (<https://utexas.instructure.com/courses/1351850>)

Instructor: Prof. Keith Hawkins (He/His)

Office: PMA 16.228

Help hours : T/TH 1:00 -- 2:00

Phone: (512) 471-1309

Email: khawkins13@austin.utexas.edu (<mailto:khawkins13@austin.utexas.edu>)

TA: Zoe Hackshaw

Office: PMA 16.312

Help hours : Mondays 11:30am-12:30pm and Wednesday: 9:00-10:00 am

Email: zoehackshaw@austin.utexas.edu (<mailto:zoehackshaw@austin.utexas.edu>)

Course Description:

Whether exploring the farthest reaches of the cosmos or the very nature of the solar system, *stars are a fundamental building block of the universe*. This course covers the theoretical and observational nature of stars and stellar astronomy. More specifically, we will explore 3 fundamental areas of stellar astronomy: (1) observing stars, (2) the basic physics needed for to describe stars & their the interior structure, and (3) how they evolve over cosmic time. This advanced undergraduate level course will be both touching on the theory of stellar structure and evolution while also exploring the observational and experimental nature of stars. Intermixed with lectures, our journey through the star this semester will feature techniques from an inquiry-based approach to learning, which include group activities and (coding) projects, peer-to-peer discussions, and written or oral presentations.

****NOTE: This syllabus is provisional. There may be changes to the schedule, material covered, class meetings format, and assigned coursework including credit given for specific assignments.**

Pre-reqs, Required Material, and Use of Electronics:

Pre-requisites and Core Requirements:

Suitable for all advanced undergraduate students in astronomy and physics. *Prerequisite:* Upper-division standing, and one of the following: Physics 301 and 303L; 301 and 316; 303K and 303L; or 303K and 316. The purpose of these prerequisite is to ensure familiarity with physical principles and problem-solving methods. In this version of 352K you will mainly be applying principles rather than carrying out theoretical derivations. The math will be mostly algebra, trigonometry, and simple calculus. You will be expected however to comment on the astrophysical interpretation of the mathematics we do in this class.

Course-Level Learning Objectives and Goals: By the end of this course you should understand —

- The *observational* properties of stars (e.g., magnitudes, colors, luminosity, etc.)
- The methods by which we observe stars (e.g., coordinate systems, astrometry, photometry, spectroscopy, etc.)
- The global properties of stars
- The underlying macro/micro-physics relevant for stars : the equations of state, nuclear reactions, energy transport, opacity, thermodynamics and statistical mechanics, & virial theorem
- The life cycle of stars of different masses
- The physical processes involved in the formation *and* evolution of stars from birth to death and how it depends on mass

Texts and Materials: As you will find, or already know that, courses, and the required textbooks, are expensive in 2023! To minimize cost to students, this course requires a textbook that can be obtained electronically from the PMA library for FREE. However print and electronic copies can be found online.

- **REQUIRED:** “[An Introduction to Modern Astrophysics 2nd Edition](https://www.amazon.com/Introduction-Modern-Astrophysics-2nd/dp/0805304029)” by Bradley W. Carroll & Dale A. Ostlie. ****CRITICAL NOTE: This course is now in the LTA program! That means that the textbook is provided on Canvas for you. Students have through the 12th class day to “opt-out” (01/25/2023) of the LTA program and purchase a physical copy elsewhere. If they are still opted in on the 12th class day, their student account would be billed and they would have through the 18th class day to pay for the materials.**
- **OPTIONAL:** “*Stellar Interiors*”, 2nd Edition. Hansen, Kawaler, Trimble. You are free to use an earlier version of this text if you prefer. The text is completely optional for the course and is not required to succeed.
- **OPTIONAL :** If you are new to astronomy consider also supplementing with [OpenStax Astronomy e-book](https://openstax.org/details/books/astronomy) <https://openstax.org/details/books/astronomy>. Especially for astronomy novices: If you have not previously taken an astronomy course you may encounter many unfamiliar terms. You may consult any reasonably recent introductory textbook, but another option is the free OpenStax book “Astronomy” by Andrew Fraknoi, et al. at . You can download the whole book or just the relevant sections, which will be listed on Canvas.

Use of electronics: Computers/tablets for note-taking is allowed/polling. Other electronic devices can only be used for polling and attendance. Students using their electronics for non-class activities are a distraction to those around them. If I find your use of electronics a problem and a distraction to others, I will ask you to leave the classroom. Also, if you are distracted by non-academic use of electronics by a fellow student, you can ask them directly to stop or notify the instructor who will follow-up.

Class Structure:

Overview : We will be covering three main topics this semester including:

1. The Observations of Stars
2. The Physics of Stellar Interiors
3. The Life and Death of Stars (Stellar Evolution)

Attendance: This class has a strong weight towards in-class participation. Therefore, attendance in this course is **required**. However, we are also going through a global pandemic, which will make things more complex. Please bear with us as we try to ensure everyone is coming to class regularly during this challenging time. We will follow local, university, and CDC guidelines in this class. If you have COVID-19, please follow UT Guidelines for reporting and notifying instructors.

If you will miss class you must (a) let me know and (b) get all material from the class from another student (and/or the materials posted online). *It is your responsibility to do both of these things and keep abreast of all material and assignments.*

Class Website and email: The class website is hosted on Canvas (<https://utexas.instructure.com/courses/1351850> (<https://utexas.instructure.com/courses/1351850>)) and should be checked regularly for updates and messages from me regarding exam review sessions, course materials, or special events. In addition to the class website, email is recognized as an official mode of university correspondence, so you are responsible for reading your email for university course-related information, and canvas-delivered announcements. Please check your email regularly and make sure you are set to receive notifications from Canvas as appropriate. When sending an email to us please put AST352K in the subject.

Grading Components and Policies: You will receive the grade you *earn* in this course. *There likely will be little to no extra credit* awarded in this class, so please be sure to put in your best effort throughout the semester to earn the grade you would like. Your final grade will be composed of the following elements:

Exams = 25%

Homework = 25% (see below)

Presentations & Participation = 25% (see below)

Quizzes & Projects = 25% (see below)

Here is more information on each of the grade components:

Exams (25%): There will be three closed-notes, closed-book exams covering material discussed in the 3 units of the class. Calculators are allowed on the exam but a student must provide their own. *The tentative dates of the exams will be announced ~2 weeks ahead of time so please keep an eye on the course schedule which will evolve as the semester goes on. There will be no final exam in this class. We expect to drop your lowest exam grade.*

Homework (25%): The due dates (and times) for homework will be posted to Canvas (though a rough guide can be found below) so please check the class website regularly! **Late homework policy** — *Each 24 hours (barring a 10 minutes grace period) past the deadline is reduction in 15% off the final grade of the assigned work. After 2 days post deadline, no work is accepted.* Each homework assignment is worth a different number of points depending on length and difficulty, and at the end of the semester those points are added together to form your overall homework grade. Group work and discussion is allowed (and encouraged) for homework assignments, but each student must be responsible for their own understanding of the material from each assignment and independently complete the work. When computing the final grade, *I will drop your lowest 1 homework assignment for every 4 homework sets.*

Class Presentations and Participation (25%): In-class participation is a major component of your grade. You will carry out in-class activities (e.g., instapoll, worksheets etc.), peer-to-peer discussions and engage with the material over the semester. You are expected to participate in in-class discussions as these are critical for learning.

Projects / Quiz: (25%) — You will be responsible for the completion of several (likely around 4) numerical/computational stellar astrophysics projects in this class. This will give you the opportunity to engage with *real* state of the art data in stellar astronomy to explore what we can learn from these data. There also may be the occasional quiz. No drops are anticipated for the Projects and Quiz Category. These carry the same late policy as the homework sets.

This class will not be graded on a curve. Your grade is calculated to the nearest 1/10th of a percentage point. The average percentage in each of the above grade components will be weighted by the indicated percentage to derive the final course grade, assigned as follows:

93.0—100% = A

90.0 — 92.9% = A-

87.0 — 89.9% = B+

83.0 — 86.9% = B

80.00 — 82.9% = B-

77.00 — 79.9% = C+

73.00 — 76.9% = C

70.00 — 72.9% = C-

67.00 — 69.9% = D+

63.00 — 66.9% = D

60.00 — 62.9% = D-

0 — 59.9% = F

If you have a question about your grade feel free to meet with Prof. Hawkins.

Other University / Class Policies

Accommodations for disabilities and/or family responsibilities: If you have any kind of disability, whether apparent or non-apparent, learning, emotional, physical, or cognitive, and you need some accommodations or alternatives to lectures, assignments, or exams, please feel free to contact me to discuss reasonable accommodations for your access needs. Students with disabilities should request appropriate accommodations from the Division of Diversity and Community Engagement, and from UT's Disability and Access (D&A), whose role is to determine eligibility and help implement reasonable accommodations for students with disabilities at the University of Texas at Austin. You can access A&D via their website (<https://diversity.utexas.edu/disability/>) , on campus at Student Services Building 4.206 or via phone (512-471-6259).

Regarding harassment/assault: Harassment of any sort will *not be tolerated in this classroom or related workspaces*. Title IX makes it clear that violence and harassment based on sex and gender are Civil Rights violations subject to the same kinds of accountability and the same kinds of support applied to offenses against other protected categories such as race, national origin, etc. If you or someone you know has been harassed or assaulted, you can find the appropriate resources through the University Title IX Coordinator (512-232-3992), UT Austin Campus Police (512-471-4441), the Student Ombuds Services (which can provide *confidential* advice, resources and help; 512-471-3825), and the UT Counseling and Mental Health Center (512-471-3515). Beginning January 1, 2022, Texas Education Code, Section 51.252 (formerly known as Senate Bill 212) requires all employees of Texas universities, including faculty, report any information to the **Title IX Office** (<https://titleix.utexas.edu/>) regarding sexual harassment, sexual assault, dating violence, and stalking that is disclosed to them. Texas law requires that all employees who witness or receive any information of this type (including, but not limited to, written forms, applications, one-on-one conversations, class assignments, class discussions, or third-party reports) must report it to the Title IX Coordinator. Before talking with me, or with any faculty or staff member about a Title IX related incident, please remember that I will be required to report this information.

Academic Dishonesty: The minimum penalty for cheating — in any way whatsoever — is receiving a zero on the assignment on which you cheated. I reserve the right to seek a penalty I deem appropriate for the given case of academic dishonesty, including failing the class and being reported to Student Conduct and Academic Integrity. In this class, in addition to all the traditional types of cheating (looking at someone else's answer, utilizing "cheat sheets" of any form or fashion either paper or digitized, getting an advance copy of an assessment). If the academic honesty is sufficiently serious, I will proceed by filing a formal report to the Student Conduct and Academic Integrity in the Dean of Students Office as is policy. Student Conduct and Academic Integrity would decide the

final penalty after a hearing on the matter. For more information, read in the General Information Catalog about scholastic dishonesty (i.e. cheating). See more information at <https://astronomy.utexas.edu/academics/graduate-program/policy-on-academic-honesty>. Additional information about Student Conduct and Academic Integrity can be found at their [website](https://deanofstudents.utexas.edu/conduct/index.php).

Diversity & Inclusion : Astronomy belongs to all people, independent of race, religion, gender, gender identity, gender expression, nationality, citizenship status, or sexual orientation. Incidents of discrimination, assault, harassment, threats, intimidation, profiling, or coercion based on membership or perceived membership will not be tolerated! The University of Texas President's statement of community values can be found here: <http://equity.utexas.edu/presidents-statement/>. If you notice an incident that causes concern, please contact the Professor and the Campus Climate Response Team (<http://diversity.utexas.edu/ccrt>).

Make-up/Guest Lecture Classes: I am a professional Astronomer. In addition to my obligations to you and the other students in this and other courses, I have responsibilities to remain professionally competent through individual research. As a consequence, I may occasionally need to be away conducting research or attending a scientific meeting. Usually another faculty member will conduct the class when the regular instructor is absent.

Religious Holidays: A student absent from an examination for the observance of religious holidays are permitted to make up missed work if notice is given at least fourteen (14) days in advances of an absence.

COVID-19: COVID 19 is still very much real and a potential threat. It takes all of us to stop the spread of COVID-19. *I encourage everyone to get vaccinated when they are eligible.* You can find more information regarding COVID and UT Policies surrounding COVID at <https://protect.utexas.edu/>. *I strongly encourage all students to mask up and socially distance (remain separated by ~6ft) whenever possible but especially indoors as this is the best way to reduce the spread of COVID19. This class is listed a Face-to-Face, which means that classes will likely be held in person with the option to be held virtually (if needed) at the discretion of the instructor. Assume in-person unless otherwise noted in a Canvas announcement. If you are experiencing any symptoms of illness, follow the COVID 19 Exposure action chat (https://healthyhorns.utexas.edu/coronavirus_exposure_action_chart.html) and please obtain a COVID-19 test (free of charge) at one of the many locations you can pick them up across campus and test before coming to class (see protect.utexas.edu for more information on where to get them). If you test positive please do not come to class; A student absent from class or examination should work with Student Emergency Services in order to receive any extensions. All extensions are at the discretion of Prof. Hawkins.* Additionally, some lectures may happen virtually as needed. **Finally, as we all try to survive these difficult times, try to be open and flexible** as the need may arise to revamp the structure of the course for virtual (only) classes, or other potentially unforeseen changes due to COVID19 and related issues. As noted above, while attendance is highly encouraged it will be taken each in person class period to help with contact tracing in the event of COVID19 exposure.

Some further information Regarding COVID from UT Austin (links available)

- [Student process for positive COVID-19 test](https://healthyhorns.utexas.edu/coronavirus_self_report.html)
Self-reporting process and additional guidance for students if they have a positive COVID-19 test
- [COVID-19 health information and resources](https://healthyhorns.utexas.edu/coronavirus_tools.html)
Useful information and best practices to protect yourself and our community from COVID-19 infection
- [COVID-19 Vaccinations](https://uthealthaustin.org/patient-resources/covid-19-updates/covid-19-vaccination)
UT Health information about where to obtain COVID-19 vaccinations on campus. Vaccinations are free and not billed to health insurance.
- [What to do if you have symptoms](https://healthyhorns.utexas.edu/coronavirus_recommendation.html)
Guidance on what to look for and instructions on what to do if you have COVID-19 symptoms
- [University Health Services COVID-19 information](https://www.healthyhorns.utexas.edu/coronavirus.html)
- Student portal for all university health information, processes, and guidance related to COVID-19.

- [University's mask guidance](https://utexas.app.box.com/s/ymob0b4vimv4j9gnhskpsqywwadk3f10) [↗](https://utexas.app.box.com/s/ymob0b4vimv4j9gnhskpsqywwadk3f10) (https://utexas.app.box.com/s/ymob0b4vimv4j9gnhskpsqywwadk3f10)
Make sure your recommended protective face mask covers your nose and mouth.
- [Proactive Community Testing](https://healthyhorns.utexas.edu/coronavirus_proactive_testing.html) [↗](https://healthyhorns.utexas.edu/coronavirus_proactive_testing.html) (https://healthyhorns.utexas.edu/coronavirus_proactive_testing.html)
Will be available throughout the semester and remains an important part of the university's efforts to protect our community. Tests are fast and free.
- Visit protect.utexas.edu [↗](https://protect.utexas.edu) (https://protect.utexas.edu/) for all university COVID-19 updates and information.

Class Recording and Sharing of Material: *No materials used in this class, including, but not limited to, lecture hand-outs, videos, assessments (quizzes, exams, papers, projects, homework assignments), in-class materials, review sheets, and additional problem sets, may be shared online or with anyone outside of the class unless you have the instructor's explicit, written permission.* Unauthorized sharing of materials promotes cheating. It is a violation of the University's Student Honor Code and an act of academic dishonesty. UT is aware of the sites used for sharing materials, and any materials found online that are associated with you, or any suspected unauthorized sharing of materials, will be reported to Student Conduct and Academic Integrity in the Office of the Dean of Students. These reports can result in sanctions, including failure in the course. **Class recordings are reserved only for students in this class for educational purposes and are protected under FERPA. The recordings should not be shared outside the class in any form. Violation of this restriction by a student could lead to Student Misconduct proceedings.**

*****Approximate*** Class Schedule — Spring 2023**

Class Material and Schedule: Below is the VERY ROUGH(!!!!!!!!!!!!!!!) course schedule and material we will cover on those days. **This is subject to change.** All homework are due by the beginning of the class period on the date noted in the schedule.

Approx Schedule

Date	Lecture Topic	Pre-Class Reading	Homework to complete or NOTE
Jan 10	Syllabus Day/Intros and begin Stars from an Observational Perspective	Review Syllabus and Lecture notes	Read Syllabus; Read up on positional astronomy (see lecture notes); Download and install Topcat and Python 3 (and dependencies); Read Chapt 1 of BOB Ensure Python is working (i.e. go through the full demo ↓ https://utexas.instructure.com/courses/1351850/files/70123214/download?download_frd=1 !)
Jan 12	Resource Demo + Observing Stars : Positional Astronomy/Units	Chapter 1 (BOB); Positional Astronomy ↗ (http://star-www.st-and.ac.uk/~fv/webnotes/index.html)	-- Resources for python 1. Python Resource 1 ↗ (http://tdc-www.harvard.edu/Python.pdf) 2. Python (Chpt1,3) ↗ (https://www.brianheinold.net/python/A_Practical_Introduction_to_Python_Programming_Heinold.pdf) 3. Examples of plotting ↗ (https://matplotlib.org/stable/plot_types/index.html)










Date	Lecture Topic	Pre-Class Reading	Homework to complete or NOTE
Jan 17	Observing Stars : Positional Astronomy II	Review information on the magnitude system, stellar colors, fluxes, band passes, distances (resources for that: link1 , link2 , link3 , link4)	Read up on Spherical Astronomy (50 pages); Chapt 1 (BOB), and Magnitude, Distances, and Fluxes (22 pages).
Jan 19	Observing Stars : Positional Astronomy III, Stellar Distances & kinematics	Chapter 2 (BOB)	Read up on Spherical Astronomy (50 pages), and Magnitude, Distances, and Fluxes (22 pages).
Jan 24	Observing Stars : Stellar Positions, Distances, and Kinematics	Chapter 3.1 (BOB),	
Jan 26	Observing Stars : Stellar Kinematics, & Light	Chapter 3.2-3.5, 3.6 (BOB)	
Jan 31	Observing Stars: Stellar Magnitudes, Photometry, Colors, Reddening, Extinction I		
Feb 2	Observing Stars: Stellar Magnitudes, Photometry, Colors,		












Date	Lecture Topic	Pre-Class Reading	Homework to complete or NOTE
	Reddening, Extinction II		
Feb 7	Observing Stars : Atomic Physics/Spectra I	Chapter 3.5 (BOB), Chapter 5 (BOB)	
Feb 9	Observing Stars : Atomic Physics/Spectra II		
Feb 14	Stellar Spectra II		
Feb 16	Exam #1		
Feb 21	Radial Velocity, Stellar Types, Color Magnitude Diagrams, Clusters/Simple Stellar Populations	Chapter 8 (BOB)	
Feb 23	Stellar Interiors I: Atmospheres	Chapter 9 (BOB)	Chapter 1 of the text book; Further reading on stellar classification : link1 ↗, link2 ↗, link3 ↗
Feb 28	Stellar Interiors : II	Chapter 10 (BOB)	
Mar 2	Stellar Interiors : II		











Date	Lecture Topic	Pre-Class Reading	Homework to complete or NOTE
Mar 7	Stellar Interiors IV		
Mar 9	Stellar Interiors: V		
Mar 21	Stellar Interiors VI		
Mar 23	Stellar Interiors VII		
Mar 28	Stellar Evolution : I		Prof Hawkins away
Mar 30	Exam #2: Stellar Interiors (tentative)		Prof Hawkins away
Apr 4	Stellar Evolution : II	Chapter 12 (BOB)	
Apr 6	Stellar Evolution : III	Chapter 13, 16 (BOB)	
Apr 11	Stellar Evolution : IV	Chapter 15, Chapter 17 (BOB)	
Apr 13	Stellar Evolution : V		
Apr 18	Wrap-up : Modern Stellar Astrophysics Presentations		
Apr 20	Exam #3		

Date	Lecture Topic	Pre-Class Reading	Homework to complete or NOTE

Course Summary:

Date	Details	Due
Tue Jan 10, 2023	 Sp23 - STELLAR ASTRONOMY (47934) https://utexas.instructure.com/calendar?event_id=3417218&include_contexts=course_1351850	2pm to 3:30pm
Thu Jan 12, 2023	 Sp23 - STELLAR ASTRONOMY (47934) https://utexas.instructure.com/calendar?event_id=3417219&include_contexts=course_1351850	2pm to 3:30pm
Tue Jan 17, 2023	 Sp23 - STELLAR ASTRONOMY (47934) https://utexas.instructure.com/calendar?event_id=3417220&include_contexts=course_1351850	2pm to 3:30pm
Thu Jan 19, 2023	 Sp23 - STELLAR ASTRONOMY (47934) https://utexas.instructure.com/calendar?event_id=3417221&include_contexts=course_1351850	2pm to 3:30pm
Tue Jan 24, 2023	 Sp23 - STELLAR ASTRONOMY (47934) https://utexas.instructure.com/calendar?event_id=3417222&include_contexts=course_1351850	2pm to 3:30pm
Thu Jan 26, 2023	 Sp23 - STELLAR ASTRONOMY (47934) https://utexas.instructure.com/calendar?event_id=3417223&include_contexts=course_1351850	2pm to 3:30pm
Tue Jan 31, 2023	 Sp23 - STELLAR ASTRONOMY (47934) https://utexas.instructure.com/calendar?event_id=3417224&include_contexts=course_1351850	2pm to 3:30pm
Thu Feb 2, 2023	 Sp23 - STELLAR ASTRONOMY (47934) https://utexas.instructure.com/calendar?event_id=3417225&include_contexts=course_1351850	2pm to 3:30pm
Tue Feb 7, 2023	 Sp23 - STELLAR ASTRONOMY (47934) https://utexas.instructure.com/calendar?event_id=3417225&include_contexts=course_1351850	2pm to 3:30pm

Date	Details	Due
	event_id=3417226&include_contexts=course_1351850	
Thu Feb 9, 2023	 Sp23 - STELLAR ASTRONOMY (47934) https://utexas.instructure.com/calendar? event_id=3417227&include_contexts=course_1351850	2pm to 3:30pm
Tue Feb 14, 2023	 Sp23 - STELLAR ASTRONOMY (47934) https://utexas.instructure.com/calendar? event_id=3417228&include_contexts=course_1351850	2pm to 3:30pm
Thu Feb 16, 2023	 Sp23 - STELLAR ASTRONOMY (47934) https://utexas.instructure.com/calendar? event_id=3417229&include_contexts=course_1351850	2pm to 3:30pm
Tue Feb 21, 2023	 Sp23 - STELLAR ASTRONOMY (47934) https://utexas.instructure.com/calendar? event_id=3417230&include_contexts=course_1351850	2pm to 3:30pm
Thu Feb 23, 2023	 Sp23 - STELLAR ASTRONOMY (47934) https://utexas.instructure.com/calendar? event_id=3417231&include_contexts=course_1351850	2pm to 3:30pm
Tue Feb 28, 2023	 Sp23 - STELLAR ASTRONOMY (47934) https://utexas.instructure.com/calendar? event_id=3417232&include_contexts=course_1351850	2pm to 3:30pm
Thu Mar 2, 2023	 Sp23 - STELLAR ASTRONOMY (47934) https://utexas.instructure.com/calendar? event_id=3417233&include_contexts=course_1351850	2pm to 3:30pm
Tue Mar 7, 2023	 Sp23 - STELLAR ASTRONOMY (47934) https://utexas.instructure.com/calendar? event_id=3417234&include_contexts=course_1351850	2pm to 3:30pm
Thu Mar 9, 2023	 Sp23 - STELLAR ASTRONOMY (47934) https://utexas.instructure.com/calendar? event_id=3417235&include_contexts=course_1351850	2pm to 3:30pm
Tue Mar 14, 2023	 Sp23 - STELLAR ASTRONOMY (47934) https://utexas.instructure.com/calendar? event_id=3417236&include_contexts=course_1351850	2pm to 3:30pm
Thu Mar 16, 2023	 Sp23 - STELLAR ASTRONOMY (47934) https://utexas.instructure.com/calendar? event_id=3417237&include_contexts=course_1351850	2pm to 3:30pm

Date	Details	Due
Tue Mar 21, 2023	 Sp23 - STELLAR ASTRONOMY (47934) (https://utexas.instructure.com/calendar? event_id=3417238&include_contexts=course_1351850)	2pm to 3:30pm
Thu Mar 23, 2023	 Sp23 - STELLAR ASTRONOMY (47934) (https://utexas.instructure.com/calendar? event_id=3417239&include_contexts=course_1351850)	2pm to 3:30pm
Tue Mar 28, 2023	 Sp23 - STELLAR ASTRONOMY (47934) (https://utexas.instructure.com/calendar? event_id=3417240&include_contexts=course_1351850)	2pm to 3:30pm
Thu Mar 30, 2023	 Sp23 - STELLAR ASTRONOMY (47934) (https://utexas.instructure.com/calendar? event_id=3417241&include_contexts=course_1351850)	2pm to 3:30pm
Tue Apr 4, 2023	 Sp23 - STELLAR ASTRONOMY (47934) (https://utexas.instructure.com/calendar? event_id=3417242&include_contexts=course_1351850)	2pm to 3:30pm
Thu Apr 6, 2023	 Sp23 - STELLAR ASTRONOMY (47934) (https://utexas.instructure.com/calendar? event_id=3417243&include_contexts=course_1351850)	2pm to 3:30pm
Tue Apr 11, 2023	 Sp23 - STELLAR ASTRONOMY (47934) (https://utexas.instructure.com/calendar? event_id=3417244&include_contexts=course_1351850)	2pm to 3:30pm
Thu Apr 13, 2023	 Sp23 - STELLAR ASTRONOMY (47934) (https://utexas.instructure.com/calendar? event_id=3417245&include_contexts=course_1351850)	2pm to 3:30pm
Tue Apr 18, 2023	 Sp23 - STELLAR ASTRONOMY (47934) (https://utexas.instructure.com/calendar? event_id=3417246&include_contexts=course_1351850)	2pm to 3:30pm
Thu Apr 20, 2023	 Sp23 - STELLAR ASTRONOMY (47934) (https://utexas.instructure.com/calendar? event_id=3417247&include_contexts=course_1351850)	2pm to 3:30pm

Date	Details	Due
	Exam1 (https://utexas.instructure.com/courses/1351850/assignments/6154798)	
	Exam2 (https://utexas.instructure.com/courses/1351850/assignments/6154799)	
	Exam3 (https://utexas.instructure.com/courses/1351850/assignments/6154800)	
	Homework #1: Stellar Positions & Velocities (https://utexas.instructure.com/courses/1351850/assignments/6154801)	
	Homework #2: Observing Stars (https://utexas.instructure.com/courses/1351850/assignments/6154802)	
	Homework #3: Stellar Atmospheres and Interiors (https://utexas.instructure.com/courses/1351850/assignments/6154803)	
	Homework #4: Stellar Structure & Evolution (https://utexas.instructure.com/courses/1351850/assignments/6154804)	
	Project 1: Building Color Magnitude Diagrams (CMDs) of the Milky Way Field (https://utexas.instructure.com/courses/1351850/assignments/6154805)	
	Project 2: Building Color Magnitude Diagrams (CMDs) of Open and/or Globular Clusters (https://utexas.instructure.com/courses/1351850/assignments/6154806)	
	Project 3: Stellar Atmospheres : The Physics of Why A stars have strong(est) Balmer Lines? (https://utexas.instructure.com/courses/1351850/assignments/6154807)	
	UT Instapoll (https://utexas.instructure.com/courses/1351850/assignments/6154808)	