



ASTR 410 01E: Stellar Structure and Evolution

COURSE SYLLABUS: Spring 2026

Course Meeting Time: T Th 12:30-1:45pm

Course Meeting Place: McFarland Science Room 103

INSTRUCTOR INFORMATION

Instructor: Dr. Kurtis A. Williams

Office Location: McFarland Science Building Room 106A

Office Hours:

- Tuesday 10-11am
- Wednesday 1-2pm
- Thursday 10-11am
- Friday 2-3pm
- Appointments and Zoom talks available if arranged ahead of time

Office Phone: (903) 886-5488

University Email Address: Kurtis.Williams@etamu.edu

Preferred Form of Communication: **Email**

Communication Response Time: 24 hours (business days only)

COURSE INFORMATION

Materials – Textbooks, Readings, Supplementary Readings

Textbook(s) Strongly Recommended:

- Introduction to Modern Astrophysics, 2nd Ed., 2017 printing, by Carroll and Ostlie, published by Cambridge University Press. ISBN: 9781108422161

Software Required:

- Access to a programming language and compiler. Suggested: python3, such as anaconda. A more detailed recommendation will be made in class.

Course Description

Hours: 3

The leading observational facts about stars as interpreted by current theories of stellar structure and evolution. Equations of stellar structure, energy generation and nucleosynthesis, opacity and equation of state, radiative and convective transport, stellar atmospheres and emergent spectra, stellar evolution and stellar end states. Prerequisites: ASTR 203 and Co/Prerequisite (PHYS 321 or PHYS 333) or instructor permission.

The syllabus/schedule are subject to change.

Stars are the dominant sources of energy across large portions of the electromagnetic spectrum, from far infrared through ultraviolet light. Their life cycles are responsible for nearly all of the elements in the periodic table, and stars provide energy for those elements to combine to construct complex chemical and biological systems.

In this course we will focus on learning the vocabulary, observations, and mathematics that are necessary to develop an intuitive understanding of the basic physical properties and physical processes behind stars and their evolution.

No previous astronomy courses? No problem.

You need no prior astronomy or astrophysics courses to succeed in this course. You do need to have completed at least University Physics I and II, at least one 300-level physics course, and Calculus III (concurrent is okay).

Student Learning Outcomes

1. Students will explain common astrophysical terms, basic concepts, and theories for a variety of stellar astrophysical phenomena.
2. Students will develop basic computational skills in numerical analysis and graphical interpretation of physical systems through astrophysical problem solving.
3. Students will enhance their technical communication abilities by reading modern astrophysical literature and presenting summaries thereof to their classmates.

COURSE REQUIREMENTS

How to Get Started

myLEO Online Access Information

This course uses myLEO Online, the learning management system at East Texas A&M. All materials, assignments, and resources will be made available through this system. To access this course, go to: <http://myleoonline.tamuc.edu>. Log in with your myLEO account and password. Then click on the link to [Spring 2026 Stellar Structure and Evolution](#) to get to our course.

How This Course Is Organized

This course is organized by units. You should listen in class and check the course page on D2L often to see what activities and assignments are coming due and how they relate to specific chapters in the textbook and other materials.

What Should You Do First?

After attending class and reading this syllabus, you should proceed to the course page on D2L and familiarize yourself with the resources. Next, proceed to “Things to Do First” and start to look over the items. If anything confuses you, it can wait until the first day of class.

Finally, show up on the first day of class: Tuesday January 13.

The syllabus/schedule are subject to change.

Minimal Technical Skills Needed

You will need to be able to access myLEO Online, also known as D2L or Brightspace, and be able to use it. You should be able to read PDF documents. You should be able to create Microsoft Word documents (.docx) or plain text files. You should have minimal knowledge of Microsoft Excel. You must be familiar with Internet usage and safe browsing. You need to be able to watch YouTube videos on a computer.

Instructional Methods

Participation

Attendance is a crucial part of learning, and so attendance will be taken during most class meetings. If you are absent due to illness or other circumstances such as those listed under section 1.3 of the ETAMU [Class Attendance Policy](#), you will be excused from class with not penalty to your grade. Unexcused absences will hurt your grade. Taking a day off to study for an exam in another class is not an excusable absence, but you are adults.

Excessive tardiness or leaving class excessively early will also result in grade penalties.

This class will include several activities that involve working in pairs or small groups; students who do not fully engage in these activities may also be penalized.

Exams

There will be one midterm exam and one final exam for this course. These will be take home exams distributed and turned in via D2L. Formula sheets will be provided, and you will likely want to have a calculator. Each student will be asked to sign an honor code regarding the exam, verifying that you did the work on your own without books, notes, internet, generative AI, or help from others. I trust you – please don't take advantage of that trust!

If you are certified as needing special accommodations for examinations, please see me privately well before the exam with you letter of accommodation from the Student Disability Resources and Services office.

Homework

Homework will be assigned often and will consist of a mixture of problem types. Some may require small amounts of computer programming and/or computer graphing, which will require submission of your commented code as well as the solutions.

Homework grading will be based on the rubric described under "Grading" below. Very important to notice is that homework grades will often not be graded just on you obtaining the correct answer, but also that you show evidence of understanding how to get that answer; partial credit is highly dependent on this evidence as well. I therefore suggest you annotate your work in order to tell me what you are trying to do (and, if appropriate, why).

I encourage you to work with each other in solving problems – that's just how science is done! When you work together, try to ensure first and foremost that everyone has the correct physical insight into the problem; don't simply share answers. Again, correct answers are only part of your assignment grades. Also, don't simply copy another person's full solution to a problem – it will be obvious to me.

Late homework is penalized 20% per day late. After 5 days, you will receive a zero on the assignment.

The syllabus/schedule are subject to change.

Presentations and Written Reports

Over the course of the semester, you will be assigned reading in the recent astronomical literature and be asked to summarize the crucial points in short written assignments on D2L.

During the last week of class, each student will be asked to give a 15 minute talk about an assigned paper. These talks will be conducted fully online. Details will be provided as the time approaches.

Extra Credit:

There is no extra credit available for this class.

Student Responsibilities or Tips for Success in the Course

Students who do well in this course share most of the following common habits:

- Arriving a couple minutes early for class and not leaving until class is dismissed.
- Not using phones, tablets, or computers during class
- Checking D2L often for announcements and assignments
- Completing all assignments on time
- Asking for help and advice early in the semester
- Taking responsibility for their own grade.

GRADING

Final grades in this course will be based on the following scale:

A = 90%-100%

B = 80%-89%

C = 70%-79%

D = 60%-69%

F = 59% or Below

Grading is on an absolute scale with no competition. If you all earn an A, you all get an A. I may curve grades for specific assignments at my discretion; your percentage earned will never go down if I apply such a curve. Your current grades are available through the gradebook on D2L – look for “Total Calculated Grade.”

Grades are based on a weighted system. The categories and weights are:

Attendance:	15%
Homework:	40%
Oral/written reports:	20%
Midterm Exam:	10%
Final Exam:	15%
TOTAL	100%

Course Outline/Calendar

The course will cover many of the topics outlined below, each of which will last about 1 week. Specific dates are subject to change.

The syllabus/schedule are subject to change.

Note: The textbook is used by not just advanced undergraduate astronomy classes but also graduate astrophysics classes. We will NOT be able to go over all of the material in each chapter, so please don't freak out when you look at each chapter!

Most work will focus on vocabulary, crucial qualitative relationships, and basic mathematical relations. We will not spend a lot of time on derivations and differential equations except when we can use them to illuminate the astrophysics.

Week of Jan 12	<i>Chapter 2: Celestial Mechanics</i>
Week of Jan 19	<i>Chapters 3 & 6: Light and Telescopes</i>
Week of Jan 26	<i>Chapter 5: The Interaction of Light and Matter</i>
Week of Feb 2	<i>Chapter 7: Binary Systems and Stellar Parameters</i>
Week of Feb 9	<i>Chapter 8: The Classification of Stellar Spectra</i>
Week of Feb 16	<i>Catch-up and Midterm Exam</i>
Weeks of Feb 23, Mar 2, & Mar 16	<i>Chapter 10: The Interior of Stars</i>
Week of Mar 23	<i>Chapter 12: The ISM and Star Formation</i>
Week of Mar 30	<i>Chapter 13: Main Sequence and Post Main Sequence Evolution</i>
Week of Apr 6	<i>Chapter 15: The Fate of Massive Stars</i>
Week of Apr 13	<i>Chapter 16: The Degenerate Remnants of Stars</i>
Week of Apr 20	<i>Chapter 17: General Relativity and Black Holes</i>
Week of Apr 27	<i>Oral Presentations</i>

Important Class Dates:

- Jan 12: First Day of Classes
- March 9-13: **No Classes (Spring Break)**
- March 27: Last Day to Drop Class
- May 1: **Last Day of Classes**

FINAL EXAM: Take-Home Exam, due Thursday May 7th 12:30 PM

TECHNOLOGY REQUIREMENTS

LMS

All course sections offered by East Texas A&M University have a corresponding course shell in the myLeo Online Learning Management System (LMS). Below are technical requirements

LMS Requirements:

<https://community.brightspace.com/s/article/Brightspace-Platform-Requirements>

LMS Browser Support:

https://documentation.brightspace.com/EN/brightspace/requirements/all/browser_support.htm

Zoom Video Conferencing Tool

https://inside.tamuc.edu/campuslife/CampusServices/CITESupportCenter/Zoom_Account.aspx?source=universalmenu

The syllabus/schedule are subject to change.

ACCESS AND NAVIGATION

You will need your campus-wide ID (CWID) and password to log into the course. If you do not know your CWID or have forgotten your password, contact the Center for IT Excellence (CITE) at 903.468.6000 or helpdesk@etamu.edu.

Note: Personal computer and internet connection problems do not excuse the requirement to complete all course work in a timely and satisfactory manner. Each student needs to have a backup method to deal with these inevitable problems. These methods might include the availability of a backup PC at home or work, the temporary use of a computer at a friend's home, the local library, office service companies, Starbucks, an ETAMU campus open computer lab, etc.

COMMUNICATION AND SUPPORT

If you have any questions or are having difficulties with the course material, please contact your Instructor.

Technical Support

If you are having technical difficulty with any part of Brightspace, please contact Brightspace Technical Support at 1-877-325-7778. Other support options can be found here:

<https://community.brightspace.com/support/s/contactsupport>

STUDENT RESPONSIBILITIES FOR COURSE

CWID and Password

You will need your campus-wide ID (CWID) and password to log into the course. If you do not know your CWID or have forgotten your password, contact the Center for IT Excellence (CITE) at 903.468.6000 or helpdesk@etamu.edu.

Technology-Related Issues

Personal computer and internet connection problems do not excuse the requirement to complete all course work in a timely and satisfactory manner. Each student needs to have a backup method to deal with these inevitable problems. These methods might include the availability of a backup PC at home or work, the temporary use of a computer at a friend's home, the local library, office service companies, Starbucks, a ETAMU campus open computer lab, etc.

TECHNOLOGY REQUIREMENTS AND SUPPORT

Minimal Technical Skills Needed

Students will need reliable computer and internet access for this course. Students must be able to effectively use myLeo email, myLeo Online D2L, and Microsoft Office.

The syllabus/schedule are subject to change.

Learning Management System (LMS) – D2L

All course sections offered by East Texas A&M University have a corresponding course shell in the myLeo Online Learning Management System (LMS). Below are the technical requirements:

- View the [Learning Management System Requirements Webpage](#).
- Learn more on the [LMS Browser Support Webpage](#).

Technical Support

If you are having technical difficulty with any part of Brightspace, please contact Brightspace Technical Support at 1-877-325-7778. Other support options can be found on the [Brightspace Support Webpage](#).

COMMUNICATION AND SUPPORT

Interaction with Instructor Statement

If you have any questions or are having difficulties with the course material, please contact your instructor. Correspondence will always be through university email (your “myLeo” mail) and announcements in myLeo online (D2L). You will not RECEIVE email through D2L, so be sure to check your ETAMU email for communication. Students are encouraged to check university email daily.

Include the Following in Emails with Instructor:

- Course name and subject in the subject line
- Salutation (Good afternoon, Dr. Jackson)
- Proper email etiquette (no “text” emails – use proper grammar and punctuation)
- Student name and CWID after the body of the email (possibly add to student signature on email)

COURSE AND UNIVERSITY PROCEDURES/POLICIES

Syllabus Change Policy

The syllabus is a guide. Circumstances and events, such as student progress, may make it necessary for the instructor to modify the syllabus during the semester. Any changes made to the syllabus will be announced in advance.

Student Conduct

The syllabus/schedule are subject to change.

All students enrolled at the University shall follow the tenets of common decency and acceptable behavior conducive to a positive learning environment. The [Code of Student Conduct](#) is described in detail online in the [Student Guidebook](#).

Students should also consult the [Rules of Netiquette Webpage](#) for more information regarding how to interact with students in an online forum.

ETAMU Attendance

For more information about the attendance policy, please view the [Attendance Webpage](#) and the [Class Attendance Policy](#)

Academic Integrity

Students at East Texas A&M University are expected to maintain high standards of integrity and honesty in all their scholastic work. For more details and the definition of academic dishonesty see the following procedures:

[Undergraduate Academic Dishonesty University Procedure 13.99.99.R0.03](#)

[Undergraduate Student Academic Dishonesty Form](#)

[Graduate Student Academic Dishonesty University Procedure 13.99.99.R0.10](#)

[Graduate Student Academic Dishonesty Form](#)

Use of Artificial Intelligence

East Texas A&M University acknowledges that there are legitimate uses of Artificial Intelligence, ChatBots, or other software that has the capacity to generate text, or suggest replacements for text beyond individual words, as determined by the instructor of the course.

Any use of such software must be documented. Any undocumented use of such software constitutes an instance of academic dishonesty (plagiarism).

Individual instructors may disallow entirely the use of such software for individual assignments or for the entire course. Students should be aware of such requirements and follow their instructors' guidelines. If no instructions are provided the student should assume that the use of such software is disallowed.

In any case, students are fully responsible for the content of any assignment they submit, regardless of whether they used an AI, in any way. This specifically includes cases in which the AI plagiarized another text or misrepresented sources

Students with Disabilities-- ADA Statement

The syllabus/schedule are subject to change.

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you have a disability requiring an accommodation, please contact:

Office of Student Disability Resources and Services

East Texas A&M University

Velma K. Waters Library Rm 162

Phone (903) 886-5150 or (903) 886-5835

Fax (903) 468-8148

Email: studentdisabilityservices@etamu.edu

Website: [Office of Student Disability Services](#)

Nondiscrimination Notice

East Texas A&M University will comply in the classroom, and in online courses, with all federal and state laws prohibiting discrimination and related retaliation on the basis of race, color, religion, sex, national origin, disability, age, genetic information, or veteran status. Further, an environment free from discrimination on the basis of sexual orientation, gender identity, or gender expression will be maintained.

Campus Concealed Carry Statement

Texas Senate Bill - 11 (Government Code 411.2031, et al.) authorizes the carrying of a concealed handgun in East Texas A&M University buildings only by persons who have been issued and are in possession of a Texas License to Carry a Handgun. Qualified law enforcement officers or those who are otherwise authorized to carry a concealed handgun in the State of Texas are also permitted to do so. Pursuant to Penal Code (PC) 46.035 and ETAMU Rule 34.06.02.R1, license holders may not carry a concealed handgun in restricted locations.

For a list of locations, please refer to the [Carrying Concealed Handguns On Campus](#) document and/or consult your event organizer.

Pursuant to PC 46.035, the open carrying of handguns is prohibited on all East Texas A&M University campuses. Report violations to the University Police Department at 903-886-5868 or 9-1-1.

East Texas A&M Supports Students' Mental Health – Counseling Services

The Counseling Center at East Texas A&M University, located in the Halladay Building, Room 203, offers counseling services, educational programming, and connection to community resources for students.

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Students have 24/7 access to the Counseling Center's crisis assessment services by calling 903-886-5145. For more information regarding Counseling Center events and confidential services, please visit www.tamuc.edu/counsel

Mental Health and Well-Being

The university aims to provide students with essential knowledge and tools to understand and support mental health. As part of our commitment to your well-being, we offer access to Telus Health, a service available 24/7/365 via chat, phone, or webinar. Scan the QR code to download the app and explore the resources available to you for guidance and support whenever you need it.



As an Institutional Member of the National Association of Schools of Music, East Texas State A&M University supports the Association's commitment to student health and wellness. The following web address provides links to information for resources related to physical and mental well-being, as well as assists in offering preventative measures that students can take to avoid serious and/or chronic conditions: [Musician Health and Safety - East Texas A&M University](#)

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