



PHYS 550-01E – Nuclear Astrophysics

COURSE SYLLABUS: Fall 2026

Classes on Mo, Wed, Fri, 11:00a-11:50a, room 135, STC

Instructor information

Instructor: Dr. Carlos Bertulani, <http://faculty.tamuc.edu/cbertulani/>

Office location: Science Building room 140

Office hours: Mo, Wed, Fri, anytime by verbal appointment or email, room 140

Instructor's phone: 517-214-3953

Fax: 903-886-5480 (Department of Physics and Astronomy)

University email address: carlos.bertulani@etamu.edu

Preferred form of communication: office & email

Catalog Description

PHYS 512. Nuclear Astrophysics - 3 semester hours

A course designed to introduce students to nuclear astrophysics. This course is an introduction to nuclear astrophysics, without which one is absolutely unable to understand the stars and the structures in universe. It covers the topics describing the behavior of space-time, particles under high pressure and temperatures, and stellar environments. This course is typically taken by physics and other science majors. The course material will be based on lecture notes by the instructor.

Course Outline

1. Big-bang theory – 2 weeks
2. Nucleosynthesis – 2 weeks
3. The Sun – 1 week
3. Giants – 0.5 weeks
4. Dwarfs – 0.5 weeks
5. Black holes – 0.5 weeks
6. Supernovae explosions – 2 weeks
7. Neutron stars and pulsars – 2 weeks
8. Exotic stellar sites – 2 weeks
9. Neutrinos from the cosmos – 1 week

Student Learning Outcomes

- Students will understand the discipline-specific knowledge covering the subjects listed above.

- Students will be able to show a working knowledge of a broad array of physical phenomena that are based upon fundamental concepts.
- Students will have strong physical reasoning and problem-solving skills and apply these skills to the solution of theoretical and applied problems.
- This course will offer a curriculum emphasizing physical science to produce professionals capable of applying broad theoretical insight to solution of practical problems.

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.

COURSE REQUIREMENTS

Activities Assessment

The following measures will be used to assess the success of this course in achieving the above objectives: 2 midterm tests and a final exam. All taken in classroom. A two-sided handwritten formula sheet will be allowed.

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

Assessments

Two midterm exams: 30% each

Final Exam: 40%

Exams

- There will be **two midterms** and a final. The midterm exams will be weighted equally (**30% each**). The **final** will be cumulative and accounts for **40%**.
- The exam will consist of typically 3-4 problems taken from a list of printed problems given by the instructor. The list will be made available ahead of the exams.
- **Make-up exams will only be allowed for excused absences.** See course policies below for details on excused absences.

Exam dates (Tentative)

Exam 1 10/07

Exam 2 11/11

Final Exam 12/09, pending on university schedule

Course specific rules

1. Cell phone use is only allowed for class activities.
2. Eating is not allowed. However, covered drinks are allowed.
3. Attendance will be taken at the beginning of class.
4. **The instructor must be notified by email** (carlos.bertulani@etamu.edu) **about any excused absences no later than 24 hours after the missed class.** Even if you choose to notify the instructor in person, you must still follow up with email within 24 hours of the missed class. If you do not follow this policy, you may not be able to make up missed exams or turn in late work except in extreme circumstances.
5. You are responsible for obtaining notes and class announcements from missed classes.
6. Excessive absences may result in being dropped from the course. **Any student who misses more than three consecutive classes without a proper excuse will be penalized a letter grade.**
7. When emailing the instructor, include the course and section number in the subject line.
9. **You are expected to check your email at least once a day for class announcements.** Emails will be sent to the email addresses you provided to MyLeo. Notify the instructor if you would prefer to receive emails at a different address.
11. Students should fully participate in class activities.
12. Students are expected to be professional and respectful and take responsibility for their learning. **If you find yourself struggling, the instructor is available to provide advice outside of class.**

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University Specific Procedures

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.etamu.edu/campuslife/CampusServices/CITESupportCenter/Zoom_Account.aspx?source=universalmenu

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, a 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 Conduct

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 in the [Student Guidebook](#).

<http://www.etamu.edu/Admissions/oneStopShop/undergraduateAdmissions/studentGuidebook.aspx>

Students should also consult the Rules of Netiquette for more information regarding how to interact with students in an online forum: <https://www.britannica.com/topic/netiquette>

ETAMU Attendance

For more information about the attendance policy please visit the [Attendance](#) webpage and [Procedure 13.99.99.R0.01](#).

<http://www.etamu.edu/admissions/registrar/generalInformation/attendance.aspx>

<http://www.etamu.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/13students/academic/13.99.99.R0.01.pdf>

Academic Integrity

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

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

<http://www.etamu.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/13students/undergraduates/13.99.99.R0.03UndergraduateAcademicDishonesty.pdf>

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

<http://www.etamu.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/13students/graduate/13.99.99.R0.10GraduateStudentAcademicDishonesty.pdf>

East Texas A&M Supports Students' Mental Health

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

AI use policy [Draft 2, May 25, 2023]

Texas 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.

13.99.99.R0.03 Undergraduate Academic Dishonesty

13.99.99.R0.10 Graduate Student Academic Dishonesty

Students with Disabilities-- ADA Statement

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

Gee Library- Room 162

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

Fax (903) 468-8148

Email: studentdisabilityservices@etamu.edu

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

<http://www.etamu.edu/campusLife/campusServices/studentDisabilityResourcesAndService/s/>

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 East Texas A&M 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.

Web url:

<http://www.etamu.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/34SafetyOfEmployeesAndStudents/34.06.02.R1.pdf>

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