ASTRONOMY 353 – SPRING 2019 – ASTROPHYSICS

Unique No. 46620

Course Web Page
Course information including announcements, homework assignments, homework solutions, and lecture notes will be made available within the University's Canvas portal: https://utexas.instructure.com/courses/1239671. Programming assignments will also require a Google account such as a UTmail account.

Instructor
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Teaching Assistant

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Research: Formation of the first stars!

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TA Help Sessions: To be scheduled preceding exams and homework due dates in RLM 15.216b

COURSE OBJECTIVES

The course introduces *astronomy, physics, and other science and engineering majors* to fundamental concepts and analytical techniques of astrophysics. The concepts are developed from first principles *thus linking the elementary physics curriculum (classical and quantum mechanics, electromagnetism, thermodynamics) to astrophysical phenomena*.

The material is introduced rigorously and/or with order-of-magnitude and dimensional analysis techniques. The lectures are interactive and are designed to foster proficiency in independent physical reasoning and mathematical modeling. Connections to current research problems are highlighted.

This course carries the Quantitative Reasoning flag. Quantitative Reasoning courses are designed to equip you with skills that are necessary for understanding the types of quantitative arguments you will regularly encounter in your professional life. You should therefore expect a substantial portion of your grade to come from your use of quantitative skills to analyze real-world problems.

The cause also introduces scientific programming with Python. The students are expected to become proficient in translating quantitative problems into Python code, running the code, and visualizing the results. (Previous exposure to computer programing and Python is not required. Help will be provided.)

PREREQUISITES, LECTURES, HELP SESSIONS, OFFICE HOURS, AND STUDENTS WITH DISABILITIES

Prerequisites
To take Astronomy 353, you should have taken calculus and multivariable calculus, and should have taken calculus-based courses in classical mechanics and in electromagnetism at the level of the standard physics major curriculum. Hands-on experience with vector calculus and ordinary and partial differential equations is also assumed.

Hours and Venue
The class meets in RLM 15.216b on Mondays, Wednesdays, and Fridays at 10:00 – 10:50 a.m.

Help Sessions
TA study sessions will be preceding exams and homework due dates in RLM 15.216b.

Office Hours
Instructor office hours: by appointment in RLM 17.220; Prof. Milosavljevic is generally available and eager to meet you in person or electronically via a conferencing app of your choice. Please send email to request an appointment.

Students with Disabilities
Students with disabilities can request appropriate academic accommodations from the Division of Diversity and Community Engagement, Services for Students with Disabilities, 471-6259, or directly with Prof. Milosavljevic.

NO TEXTBOOK REQUIRED

Recommended Reading:
The Physics of Stars, Second Edition, by A. C. Phillips (Wiley)
Astrophysics in a Nutshell, either 1st or 2nd edition, Dan Maoz (Princeton)

EXAMS AND GRADING

Exams
There will be 4 in-class exams, on **February 15**, **March 15**, **April 12**, and **May 10**, and no final exam. Please bring a calculator and writing paper to each of the exams! The cumulative exam grade will count 40% of the final grade. Exam grades will *not* be dropped.

Homework
There will be weekly homework assignments with some exceptions for exam weeks. The cumulative homework assignment grade will count a total of 60% toward the final grade. Analytical "paper and pencil" portion of the assignments will count for a half of the cumulative homework grade and Python programing assignments will count for the other half. Python homework will be assigned in Google Drive and Google Colaboratory. You are encouraged to collaborate on the homework assignments and work groups, but you must write the solutions on your own.

Attendance
To learn in this course it is essential that you attend lectures. The lectures will provide crucial insight that cannot be replaced by reading the slides. Please don't miss lectures.

Calculation of the grade

Component	Maximum Score
Exams	$4 \times 10\% = 40\%$
Homework Assignments: Analytical	30%
Homework Assignments: Python	30%
Total	**100%**

Score Range	Grade
$92\% \leq S \leq 100\%$	A
$88\% \leq S < 92\%$	A−
$84\% \leq S < 88\%$	B+
$80\% \leq S < 84\%$	B
$76\% \leq S < 80\%$	B−
$72\% \leq S < 76\%$	C+
$68\% \leq S < 72\%$	C
$64\% \leq S < 68\%$	C−