

Astrophysics 2001 (AST 2001)
Fall Semester 2017
TTh 2:30-4:25 PM, Tate Hall 101
Robert D. Gehrz, Instructor
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Course Website: http://homepages.spa.umn.edu/~gehrz/ASTRO_2001_Fall_Semester_2017/

AST 2001 is an introductory course for students with astrophysics majors and minors. Mathematical and physical discussions presume that the student has had a year of both calculus and physics at the college level. The small and informal class environment should encourage stimulating discussions. This class will introduce you to a broad range of topics in modern astrophysics, with an emphasis on how we measure astrophysical quantities and how we learn what these observations tell us about the physics of the universe. By the end of this class you will have a much greater facility with elementary theoretical calculations and making the kind of order of magnitude estimates that often guide the work of scientists and engineers. A limited number of special topics representative of current astrophysical research will be investigated in depth. The ultimate objective of the course is to give you the basic tools that you will need to read the current literature on astrophysics with a basic level of understanding. I will generally be available in my office MWF after 1:00 PM (I am in Tate Hall 285.04) or at other times by appointment (call 612-624-7806). Grading will be based on five problem sets (30%), two five question mid-semester exams (20% each), and a seven question final (30%). The two mid-semester exams will cover material covered in the first and second thirds of the course. Five of the questions on the final exam will be on material covered in the last third of the course. Two of the questions on the final exam will be taken from material covered on the two mid-semester exams. Examinations will be open book and notes. The questions will be a combination of problems and essays. The text is "An Introduction to Modern Astrophysics, Second Edition" by B. W. Carroll and D. A. Ostlie. We will not be covering the text in its entirety, but will instead use it as a reference source for discussions on selected topics. Students are expected to consult elementary astronomy survey text books or the internet to supplement the lecture material. We will address selected topics from the following list, which is not necessarily in order:

1. Brief introduction - the origin and contents of the Universe
2. Orbital mechanics
3. Radiation and telescopes
4. Observation and measurement of stellar properties and the H-R Diagram
5. Stellar structure and evolution
6. White dwarfs, neutron stars, and black holes
7. Novae and supernovae
8. Elementary solar physics; the sun as a star
9. The contents, formation, and origin of the solar system
10. Earth-moon system and the physics of the planets
11. Comets, asteroids, meteors, and giant impacts

12. The galaxy and the interstellar medium
13. Topics in extra galactic astronomy and cosmology
14. Constructing and using current ground-based, space, and airborne observatories
15. Additional topics of current interest (TBD)

GRADING BY PERCENTAGE OF THE TOTAL GRADE AND IMPORTANT DATES:

FIVE PROBLEM SETS: 30%

Due Dates for Problem Sets for AST 2001, Fall Semester 2017:

- Problem set #1: Thursday, September 21, 2017
Problem set #2: Thursday, October 12, 2017
Problem set #3: Tuesday, October 31, 2017
Problem set #4: Tuesday, November 21, 2017
Problem set #5: Tuesday, December 12, 2017

THREE EXAMINATIONS: 70%

Examination Dates for AST 2001, Fall Semester 2017:

- Mid-semester exam #1: Tuesday, October 3, 2017 (Tate Hall 101): 20%
Mid-semester exam #2: Thursday, November 2, 2017 (Tate Hall 101): 20%
Final exam: 4-6 PM, Saturday, December 16, 2017 (Tate Hall 101): 30%

Grading will be on an absolute scale: A > 90%; B > 80%; C > 70%; D > 60% (These are the bottom floors for the minus (-) grade levels.) A grade of S will be awarded for performance at the level of C- (70%) or above. The assignment of an "I" grade will be made only under very special circumstances.

You are expected to be familiar with and follow the Regents Policy for Student Conduct:

http://www1.umn.edu/regents/policies/academic/Student_Conduct_Code.pdf

The head TA for the class is Allison Enterline. She will be responsible for supervising the grading and will also hold an office hour on Monday mornings from 10:30 AM to 12:00 in Tate Hall 270 (My laboratory) to render help. Allison can be reached by email at enter015@umn.edu or by cell phone at (920)422-2080. Additional office hours will be held by the other TAs. I will inform you by e-mail as these become available.