AST 2001 is an introductory course for Astrophysics majors and Aerospace Engineering and Mechanics minors. Mathematical and physical discussions presume that the student has had a year of both calculus and calculus-based physics at the college level. The small and informal class environment encourages 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 M-F after 13:15 PM in room 533 Shepherd Laboratories 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%). 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 examination 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. We will address selected topics from the following list, which is not necessarily complete or in order:

1. Brief introduction - applying the physics to astrophysical situations
2. Orbital mechanics
3. Radiation and telescopes
4. Celestial mechanics
5. The contents, formation, and origin of the solar system
6. Comets, asteroids, meteors, and giant impacts
7. Earth-moon system and the physics of the planets
8. Elementary solar physics; the sun as a star
9. Observation and measurement of stellar properties
10. Stellar structure and evolution
11. White dwarfs, neutron stars, and black holes
12. Novae and supernovae
13. The galaxy and the interstellar medium
14. Topics in extra galactic astronomy and cosmology
15. Other topics of current interest by the lecturer and guest lecturers (TBD)
Grading will be based upon five problem sets (30%) and three examinations (70%). Grades will be awarded on an absolute scale: A > 90%; B > 80%; C>70%; D > 60% (These are the bottoms of 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 special circumstances by agreement with the instructor.

DUE DATES FOR PROBLEM SETS:
  Problem set #1: Thursday, September 24, 2015
  Problem set #2: Tuesday, October 13, 2015
  Problem set #3: Tuesday, November 3, 2015
  Problem set #4: Thursday, November 19, 2015
  Problem set #5: Thursday, December 15, 2015

EXAMINATION DATES:
  Mid-semester exam #1: Thursday, October 8, 2015 (Willey Hall 20): 20%
  Mid-semester exam #2: Tuesday, November 10, 2015 (Willey Hall 20): 20%
  Final exam: 10:30-12:30, Wednesday, December 23, 2015 (Willey Hall 20): 30%

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


The Teaching Assistant for the class, Ben Setterholm, will hold an office hour every Friday from 2:15 to 3:15 in room 544 Shepherd Laboratories. Ben can be reached by e-mail at sette066@umn.edu or by cell phone at 763-639-7315.