

Physics 3561/5561
Astrophysics I Stellar Astrophysics
Fall 2020

Tuesday & Thursday 14:00-15:15 MWAH 195

Instructor: Alec Habig
Office: MWAH 358
Office Hours: 11:00-12:00 M
15:30 Th (or by appt)

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<http://neutrino.d.umn.edu/phy5561>

Prerequisites: Phys 2021, Ast 2050

Core Course: Astronomy Minor (elective for Phys BS, BA, MS)

Text: Bradley W. Carroll & Dale A. Ostlie,
An Introduction to Modern Astrophysics (2nd ed.)

Additional readings or assignments from other texts or the web might be assigned over the course of the semester, but arrangements will be made so you do not have to buy more books. This one is expensive enough.

Course Objectives: This course is a quantitative introduction to astrophysics. In addition to learning what is out there, we want to explore how it works and how we know what we know. We will apply our earthly knowledge of the laws of physics to astronomical observations.

The topics to be covered include the following (I), with (II) covered in Spring Semester's Phys 3562/5562. Things will be added or subtracted based on the needs of the course and as we see how long it takes to cover the topics in question.

- Review of the tools used in astronomy (I):
 - Celestial Mechanics
 - Spectra, both continuous and discrete
 - Telescopes and optics
- How stars work (I):
 - Determining stellar parameters from observation
 - Stellar Atmospheres, radiative transfer
 - Stellar Structure, equations of state
 - Star Formation, Stellar Evolution and remnants
- The Interstellar Medium (I)
- Galaxies (II):
 - Galactic Structure and Classification
 - Galactic Evolution
- Large Scale Structure (II)
- Cosmology (II)

Grading: Course grades will be determined based on the following four areas, with their respective weights:

- Homework 50%
- Mid-term 20%
- Final exam 30%

Letter grades will be assigned based upon the weighted average on a non-competitive curve. In order to keep the students informed as to their progress, a letter grade will be assigned after the mid-term exam or guesstimated upon request.

Phys 3561 vs. Phys 5561: This course has two sections (one undergraduate and one graduate) taught at the same time. Students registered for the graduate version will be assigned more and more complicated problems on homework and exams.

Homework: Homework assignments are important and will be assigned at least on a weekly basis. Hearing or reading about something does not make it sink in. In order to really learn about a topic, you need to practice it. Homework is this practice as applied to the concepts and theory, thus the comparatively large weight in the grade. In addition to really helping one learn things, the homework helps the instructor see what areas need more or different explanation.

When writing out your homework solutions, include not only the diagrams and equations which lead to the answer, but elaborate on the reasoning that led you to the steps in your answer. Think of the good and bad examples your various physics texts have presented you with. Write your homework problems like the good ones, and remember how frustrating those “the remainder is an exercise left to the reader” passages have been. Late homework grades depreciate at a rate of 25% per 24 hours.

Students with Disabilities: It is the policy and practice of the University of Minnesota Duluth to create inclusive learning environments for all students, including students with disabilities. If there are aspects of this course that result in barriers to your inclusion or your ability to meet course requirements such as time limited exams, inaccessible web content, or the use of non-captioned videos, please notify the instructor as soon as possible. You are also encouraged to contact the Office of Disability Resources to discuss and arrange reasonable accommodations. Call 218-726-6130 or visit the Disability Resources web site at <https://umd-general.umn.edu/disability-resources> for more information.

Standard UMD academic policies: are in force and described online at <https://www.d.umn.edu/evcaa/academic-policies/recommended-syllabi-policy-statements>

Important Dates:

Midterm Exam, somewhere near October 14.

Final Exam, Tuesday December 15, 14:00-15:50am

Breaks: no class on Thanksgiving November 26