

DEPARTMENT OF PHYSICS
SOUTHERN UNIVERSITY

ASTROPHYSICS
PHYS 462, FALL 2003

COURSE INFORMATION AND REQUIREMENTS

Instructor: Dr. Greg Stacy
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Office Hours: Mondays and Wednesdays, 11:00 A.M.-12:00 Noon,
or by appointment

Primary Textbook: **An Introduction to Modern Astrophysics**
by Bradley W. Carroll and Dale A. Ostlie
(1st Edition, 1996, ISBN 0-201-54730-9, Addison-Wesley)

Course Description: *Astrophysics (PHYS 462)* is a one-semester 3-credit-hour course. The emphasis in this course is on the physics of stars. A detailed understanding of physical processes in stars forms the foundation of all of modern astrophysics. Specific topics to be covered this semester include: basic definitions and terminology, stellar classification, radiative transfer, stellar atmospheres and interiors, nuclear processes and nucleosynthesis in stars, conditions for stability, star formation, and stellar evolution leading to possible endpoints (white dwarves, neutron stars, and black holes). Those elements of atomic, nuclear, and quantum physics that bear on stellar phenomena will also be presented and treated. We will also discuss the present state of observational stellar astronomy as well as the current directions of research in theoretical stellar astrophysics, with examples drawn from the literature. As time permits, we will also touch upon the "Big Picture" of the large-scale structure of our accelerating Universe, current topics in cosmology, and the cosmic distance scale.

Course Goals: The primary objectives of this course can be summarized as follows. By the end of this semester, the successful student will have

- 1) Acquired a sound technical understanding of the fundamental physical concepts that form the basis of modern stellar astronomy and astrophysics,
- 2) Developed a practical, working knowledge of the mathematical and computational tools, methods, and techniques commonly applied in this field of research,
- 3) Reached a point where she or he can read and understand (and explain to others) technical and popular articles in news and professional journals on topics related to stellar astronomy and modern astrophysics.
- 4) Acquired a measure of understanding and a fuller appreciation for the important current questions, areas of inquiry, and latest advances in the field of stellar astronomy and modern astrophysics.

Course Prerequisite: All students enrolled in this course are expected to have satisfied the following minimum prerequisite: successful completion of a two-semester sequence of calculus-based general physics, or to be enrolled with the consent of the instructor. A background in mathematical physics through integral calculus is assumed. Note that the descriptive treatment of physical systems via differential equations will form an important part of the course.

Course Requirements: Required work in this course will consist primarily of:

- weekly assigned readings
- assigned homework problems and exercises
- a research report or mini-project on a current topic in stellar astronomy and astrophysics
- three one-hour tests
- the final examination

Course Grading: Final grades for this course will be determined as follows:

36%	Three one-hour exams (12% each)
20%	Final Exam
25%	Homework assignments
12%	Research report/mini-project
7%	Attendance, class participation

100%	Total

Final letter grades will be assigned as follows:

A (90-100%); B (80-89%); C (70-79%); D (55-69%); F (<55%)

COMMENTS, QUESTIONS, AND SUGGESTIONS ALWAYS WELCOME