ASTROPHYSICS (ASTR)

ASTR 161 GENERAL ASTRONOMY I (4)
A course for non-science majors covering observational astronomy, telescopes, Earth as a planet, the Moon, Solar System, Sun, general properties of stars. Development of enough algebra-based physics to understand these topics at a non-technical level. Three lecture hours and one two-hour laboratory period. Core: Biological & Physical Sciences or GenEd II.A. Lab/Class fee will be assessed.

ASTR 162 GENERAL ASTRONOMY II (4)
A course for non-science majors covering stellar evolution, galaxies, cosmology, and possibly other topics including life elsewhere in the universe. Emphasizing determination of the distance scale and modern trends in astronomy. Development of enough algebra-based physics to understand these topics at a non-technical level. Three lecture hours and one two-hour laboratory period. Prerequisite: high school algebra suggested. Core: Biological & Physical Sciences or GenEd II.A.

ASTR 301 COSMIC ORIGINS (3)
Origin and evolution of the universe, stars, and planets; the rise of life on Earth; social, technological and ethical issues raised by the scientific search for extraterrestrial life and its possible discovery on other worlds. Prerequisite: One Core 7 or 8 science course. Core: Ethical Issues & Perspectives or GenEd II.A.

ASTR 303 ASTROPHYSICAL TECHNIQUES (3)
Observational astronomy using the department's telescope and NASA archival data, emphasizing equipment operating principles, scientific methods, signal statistics, data reduction. Includes imaging and photometry with Charge-Coupled Devices in addition to spectroscopy, space observations, radio astronomy. Prerequisites: ASTR 161 and ASTR 162 and PHYS 212 (or PHYS 242 or PHYS 252).

ASTR 331 INTRODUCTION TO STELLAR ASTROPHYSICS (3)
Applications of physics in astronomy, spectroscopy, stellar interiors and evolution, the interstellar medium. Not open to students who have successfully completed PHSC 231 or PHYS 231. Prerequisites: ASTR 161 and ASTR 162; PHYS 242 or PHYS 252 (may be taken concurrently); PHYS 243 is recommended.

ASTR 371 PLANETARY ASTRONOMY (3)
A course for science majors and minors focusing on methods of scientific inquiry as well as specific topics. Planetary formation both around our Sun and around other stars, planetary interiors and surface processes, and atmospheres. Primitive surfaces, cratering, volcanism, tectonism, origin and evolution of planetary atmospheres. The course may include an observational segment (e.g., sketching the planets through a telescope) and field trips to local sites of geological interest. Prerequisites: ASTR 161 or GEOL 121 and PHYS 211 (or PHYS 241).

ASTR 385 ASTROPHYSICS SEMINAR (1)
Students learn to present technical material orally by attending and discussing presentations given by others and by giving presentations themselves on topics of current interest in astrophysics. Prerequisites: At least junior standing as a Physics Major.

ASTR 432 GALAXIES AND COSMOLOGY (3)
Stellar populations and the general properties of galaxies, including the Milky Way; galaxy formation and evolution; active galaxies; dark matter and dark energy; current topics in the study of the early universe; special and general relativity. Prerequisites: ASTR 162; PHYS 243; PHYS 311 may be taken concurrently.

ASTR 470 SELECTED TOPICS IN CONTEMPORARY ASTROPHYSICS (3)
Special topics in the area of astrophysics. Special topics will be determined by current interests of the faculty and the needs of the curriculum. Special permission from the department is required. Prerequisites: ASTR 161 & ASTR 162.

ASTR 491 DIRECTED READINGS IN ASTROPHYSICS (1-4)
Directed readings required some advanced coursework in physics and/or astronomy. May be repeated for a maximum of six units. Prerequisites: At least junior status; one 300- or 400-level ASTR course; permission of instructor.

ASTR 495 CAPSTONE PROJECT IN ASTROPHYSICS (1-3)
Individual project in observational or theoretical astrophysics. May be completed over two semesters. Prerequisite: senior standing in Astrophysics Track or consent of instructor.

ASTR 496 RESEARCH PROBLEMS IN ASTROPHYSICS (1-3)
Individual projects in any branch of astrophysics, to be taken after a student has completed the Capstone Research course, ASTR 495. At the completion of a project, students must write a formal research paper on the work done. May be repeated for a maximum of six units. Prerequisite: permission of the instructor who will direct the proposed work. Prerequisite: Permission of instructor.

ASTR 499 HONORS THESIS IN ASTRONOMY (1-4)
Writing of an honors thesis based on independent research done under the direction of a staff member. May be repeated for a maximum of 6 units. Prerequisites: Consent of instructor and open only to advanced honors candidates.