

# ASTR Astronomy

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## **ASTR 1000 Introduction to the Universe**

**3 Credit Hours. 3 Lecture Hours. 0 Lab Hours.**

A study of the motions and constitution of the solar system, stars and other celestial bodies. Theories of evolution of celestial bodies and the universe are considered in addition to the instrumentation used by astronomers.

## **ASTR 1010 Astronomy of the Solar System**

**3 Credit Hours. 3 Lecture Hours. 0 Lab Hours.**

A study of the motions and physical properties of the planets, asteroids, and comets.

**Prerequisite(s):** Prior or concurrent enrollment in ASTR 1211.

## **ASTR 1020 Stellar and Galactic Astronomy**

**3 Credit Hours. 3 Lecture Hours. 0 Lab Hours.**

A study of the physical properties of stars and galaxies and of the origins of the universe.

**Prerequisite(s):** Prior or concurrent enrollment in ASTR 1211.

## **ASTR 1211 Astronomy Lab**

**1 Credit Hour. 0 Lecture Hours. 2 Lab Hours.**

A series of laboratories designed to measure the physical properties of planets, stars, and galaxies.

**Prerequisite(s):** Prior or concurrent enrollment in ASTR 1010 or ASTR 1020.

## **ASTR 3131 Optics**

**3 Credit Hours. 3 Lecture Hours. 0 Lab Hours.**

Geometric, physical, and quantum optics in which the general principles of wave optics and several optical devices are studied. A minimum grade of "C" in PHYS 2211 and PHYS 2212.

**Cross Listing(s):** PHYS 3131.

## **ASTR 3137 The Search for Life in the Universe**

**3 Credit Hours. 3 Lecture Hours. 0 Lab Hours.**

The course will describe the current quest to find intelligent life in the universe. It will begin with a discussion of the nature and origin of life on Earth. After considering the search for life in our solar system, techniques used to search for extrasolar planets and extraterrestrial life will be explored. The course will also include a discussion of the physical limitations to interstellar spaceflight and alternative methods of communication.

**Prerequisite(s):** ASTR 1000 or ASTR 1010 or ASTR 1020.

## **ASTR 3538 Physical Astronomy**

**3 Credit Hours. 3 Lecture Hours. 0 Lab Hours.**

The physical nature of the solar system, stars and galaxies will be studied in detail. Principles of physics will be used and illustrated, especially in the areas of mechanics, thermodynamics, physical optics, and spectral analysis.

**Prerequisite(s):** PHYS 2211 or PHYS 1111 and PHYS 2212 or PHYS 1112.

## **ASTR 3558 Introduction to General Relativity**

**3 Credit Hours. 3 Lecture Hours. 0 Lab Hours.**

An introduction to the metric description of different spacetimes that describe flat and various curved geometries so as to derive the laws of mechanics for planets, stars, black holes, etc. The course also introduces a very simple model of the expanding universe and briefly introduces cosmology.

**Prerequisite(s):** PHYS 3537 or permission of instructor.

**Cross Listing(s):** PHYS 3558.

## **ASTR 3790 Teaching Internship in Astronomy**

**1-2 Credit Hours. 0 Lecture Hours. 0 Lab Hours.**

The internship allows students to investigate teaching practices in astronomy. The student will participate in an introductory workshop immediately prior to the start of the semester, intern in the planetarium, and meet with the faculty mentor one hour each week.

**Prerequisite(s):** Permission of instructor required and ASTR 1000 or ASTR 1010 or ASTR 1020.

## **ASTR 4130 Astrophysics**

**3 Credit Hours. 3 Lecture Hours. 0 Lab Hours.**

This course will cover advanced topics in Astrophysics. Students will become familiar with the fundamental physics of stars. This includes stellar atmospheres, interiors, and evolution. Students will study the atomic properties of matter and its interaction with light. Students will also study techniques for observing stars using telescopes and interferometers.

**Prerequisite(s):** PHYS 1112 or PHYS 2212.

## **ASTR 4138 Galactic Astronomy**

**3 Credit Hours. 3 Lecture Hours. 0 Lab Hours.**

Galactic Astronomy will cover advanced topics in galactic structure and evolution. This includes galaxy morphology, stellar and gaseous content, stellar orbits, disk dynamics, central massive black holes, large scale structure, interactions and evolution in a cosmological setting. Students will also be introduced to the historic development of our modern view of the universe.

**Prerequisite(s):** PHYS 1112 or PHYS 2212.

## **ASTR 4330 Observational Techniques in Astronomy**

**3 Credit Hours. 3 Lecture Hours. 0 Lab Hours.**

This course will cover advanced topics in astronomical observing techniques. This includes the basic physical principles and methods needed to plan, obtain, and reduce photometric data of celestial objects. Students will be introduced to the principles of spherical astronomy, photoelectric detectors, atmospheric extinction and standard system transformations, and the Image Reduction and Analysis (IRAF) software package.

**Prerequisite(s):** PHYS 1112 or PHYS 2212.

## **ASTR 5090 Selected Topics in Astronomy**

**2-5 Credit Hours. 0-5 Lecture Hours. 0-6 Lab Hours.**

A course allowing for investigation of selected topics in Astronomy; it will be taught on a one-time basis. Lecture only courses can be for two, three, or five credit hours. For laboratory courses, one credit hour will be given for every three hours spent working in lab.

**Prerequisite(s):** PHYS 1112 or PHYS 2212.

**Cross Listing(s):** ASTR 5090G.

## **ASTR 5890 Astronomy Research Experience**

**1-4 Credit Hours. 0-3 Lecture Hours. 0 Lab Hours.**

An independent physics research experience in which a student will investigate a research question under the direction of a faculty member. Students will be expected to maintain a laboratory notebook, prepare a written summary of the research, and give an oral presentation at the end of the experience.

**Prerequisite(s):** Permission of instructor is required.

**Cross Listing(s):** ASTR 5890G, PHYS 5890, PHYS 5890G, PHYS 5890H, PHYS 5890S.