

# Courses for the Astronomy Minor

## Catalog Years 2017-18 to Present

### Advisor Contact Information:

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*Appointments required.*

### **Pre-Signed Minor Form Available Here:**

<https://www.depts.ttu.edu/artsandsciences/CurrentStudents/forms.php>

### **Credit Hour Requirements for the Astronomy Minor:**

- 21 credit hours total
- 9 credit hours at the 3000 level or above

### **Recommended Sequence**

**PHYS 1408 - Principles of Physics I.** 4 Credit Hours. Prerequisite: MATH 1451. Calculus-based introductory physics covering mechanics, kinematics, energy, momentum, and thermodynamics. (Honors section offered) Partially fulfills core Life and Physical Sciences requirement. [all]

**PHYS 2401 - Principles of Physics II.** 4 Credit Hours. Prerequisites: PHYS 1408 and MATH 1452. Calculus-based introductory physics covering electric and magnetic fields, electromagnetic waves, and optics. (Honors section offered) Partially fulfills core Life and Physical Sciences requirement. [all]

**PHYS 3301 - Principles of Physics IV: Introduction to Quantum Physics.** 3 Credit Hours. Prerequisites: PHYS 1408 and MATH 2450. Corequisite: PHYS 3201. Failure of classical physics in the microscopic realm, development and fundamentals of quantum theory, applications to atoms, molecules, solids, nuclei, and particles. [Fall & Spring]

**PHYS 3201 - Modern Physics Lab and Data Analysis.** 2 Credit Hours. Corequisite: PHYS 3301. Laboratory experiments and accompanying lectures designed to illustrate the basis of quantum physics and proper techniques for data acquisition, analysis, and determination of uncertainties. [Fall & Spring]

## Electives

- In addition to the recommended sequence, choose 8 credit hours with at least 4 hours at the 3000 level or above from the following.

**ASTR 2401 - Observational Astronomy.** 4 Credit Hours. Prerequisite: ASTR 1400 or ASTR 1401 or instructor consent. Designed for anyone interested in learning the use of an optical telescope, both visually and for imaging. [Fall]

**ASTR 3300. Special Topics in Astrophysics.** 3 Credit Hours. C- or better in ASTR 2401, PHYS 2302, PHYS 3301, and PHYS 4325 or MATH 3350 or MATH 3354. (*Some prerequisites may be waived by instructor on a case by case basis.*) Topics in radio astronomy, X-ray astronomy, gravitational wave astronomy, compact objects, accretion, stellar explosions and others. May be repeated in different areas. [Spring]

**ASTR 4301 - Astrophysics I.** 3 Credit Hours. Prerequisite: PHYS 3301. Introduction to the tools of astronomy, stellar properties, stellar structure, and stellar evolution. [Spring]

**ASTR 4302 - Astrophysics II.** 3 Credit Hours. Prerequisite: PHYS 3301. Structure, formation and evolution of galaxies; cosmology. [Fall]

**ASTR 4305 - Radiative Processes in Astrophysics.** 3 Credit Hours. Prerequisites: C or better in PHYS 3305 and PHYS 4307 (the latter may be taken concurrently). A survey of the physical processes related to the production and propagation of radiation in astrophysical phenomena, including thermal and non-thermal radiation, and atomic transitions. [Fall]

**PHYS 3000 - Undergraduate Research.** 1-6 Credit Hours. Prerequisite: Permission of the instructor. Individual and/or group research projects in basic or applied physics, under the guidance of a faculty member. [all] (Student must work on an astrophysics project.)

**PHYS 4350 – Relativity.** 3 Credit Hours. Prerequisites: C- or better in PHYS 3305 and PHYS 4304 (the latter may be taken concurrently). Introduction to spacetime, differential geometry, special and general relativity; with applications to black holes, cosmology, and gravitational waves. [Spring]

- Under some circumstances and with approval from the undergraduate advisor, courses in engineering, geosciences, or mathematics with significant astronomy content may be taken as electives for the Astronomy minor.

*Revised 8/30/22.*