Bachelor of Science in Physics: Astrophysics Concentration

FIRST YEAR

Fall
- Social and Behavioral Sciences* 3
- MATH 1451, Calculus I 4
- ENGL 1301, Essentials of Coll. Rhetoric 3
- Personal Fitness and Wellness 1
- COMS 2300, Public Speaking 3
- TOTAL 17

Spring
- PHYS 2401, Principles of Physics II 4
- MATH 2450, Calculus II 4
- POLS 1301, American Govt. Org. 3
- Language, Philosophy, and Culture* 3
- Foreign Language † 3
- TOTAL 17

SECOND YEAR

Fall
- PHYS 3305, Electricity and Magnetism 3
- MATH 3354, Math for Engr. & Sci. II § 3
- PHYS 2305, Computation for Phys. Sci. 3
- Elective 3
- TOTAL 15

Spring
- PHYS 2402, Principles of Physics III 4
- PHYS 3306, Electricity and Magnetism § 3
- PHYS 4304, Mechanics 3
- Elective 3
- TOTAL 15

THIRD YEAR

Fall
- ASTR 4301, Astrophysics I 3
- PHYS 4307, Quantum Mechanics I 3
- HIST 2301, History of the U.S. Since 1877 3
- Electives 3
- TOTAL 15

Spring
- ASTR 4302, Astrophysics II 3
- PHYS 3304, Intermediate Physics Lab 3
- PHYS 4312, Nuclear & Particle Physics 3
- Electives 3
- TOTAL 15

FOURTH YEAR

Fall
- HIST 2300, History of the U.S. to 1877 3
- PHYS 4307, Quantum Mechanics I 3
- PHYS 4301, Optics 3
- Elective 3
- TOTAL 15

Spring
- HIST 2301, History of U.S. Since 1877 3
- PHYS 4307, Quantum Mechanics I 3
- Electives 3
- TOTAL 15

TOTAL HOURS: 120

Astrophysics concentration students are strongly encouraged to minor in mathematics, as assumed in the curriculum above.
* Choose from the university’s core curriculum.
† A student must complete 6 hours at the sophomore level or above in a single language.
‡ The prerequisite for all sophomore language courses is credit for the freshman level. This credit can be determined through a credit by examination. The score attained on the exam will determine whether the student is placed in a second-year course, a 5-hour review course, or in some cases the first or second semester of a beginning (first-year) language course. See Arts and Sciences General Degree Requirements for further explanation.
§ MATH 3354 and 4354 may substitute for MATH 3350 and 3351.
# Choose from the university’s Multicultural Requirement list

4312. Nuclear and Particle Physics (3). Prerequisite: PHYS 4307. Deals with modern nuclear physics covering such topics as nuclear structure models, radioactivity, nuclear reactions, elementary particles, nuclear conservation, forces, and symmetry.

4371. Physics as It Is Taught (3). Discusses the teaching of introductory material. Extends topic coverage into advanced treatments and mathematics. Designed for students seeking teaching certification. (Writing Intensive)

4372. Astronomy as It Is Taught (3). Discusses solar system, stellar, and galactic astronomy and develops the use of activities in the process of instruction. Designed for students seeking teaching certification.

4373. Math Modeling in Physics (3). Motivates extensive use of mathematics in the practice of physics and teaching physics. Designed for students seeking teacher certification. (Writing Intensive)

Graduate Courses

5000. Independent Study (V1-3). Prerequisite: Permission of the department chair. Offers independent study under the direct supervision of a faculty member. Not to be used for thesis or dissertation research or writing.

5001. Master’s Internship (V1-12). Prerequisite: Permission of the internship coordinator. Internship in an industrial or research laboratory setting. Arranged through the department and directly related to degree program.

5101. Seminar (1). Must be taken by every graduate student for at least the first four semesters. Taken pass/fail.

5104. Instructional Laboratory Techniques in Physics (1). Laboratory organization and instructional techniques. Must be taken by all teaching assistants when on appointment.


5300. Special Topics (3). Prerequisite: Approval of graduate advisor and/or department chair. Topics in semiconductor, plasma, surface, particle physics, spectroscopy, and others. May be repeated in different areas.

5301. Quantum Mechanics I (3). Experimental basis and history, wave equation, Schrödinger equation, harmonic oscillators, piecewise constant potentials, WKB approximation, central forces and angular momentum, hydrogen atom, spin, two-level systems, and scattering. M.S. and Ph.D. core course.

5302. Quantum Mechanics II (3). Prerequisite: PHYS 5301 or equivalent. Quantum dynamics, rotations, bound-state and time-dependent perturbation theory, identical particles, atomic and molecular structure, electromagnetic interactions, and formal scattering theory. Ph.D. core course.

5303. Electromagnetic Theory (3). Electrostatics and magnetostatics, time varying fields, Maxwell’s equations and conservation laws, electromagnetic waves in materials and in waveguides. M.S. and Ph.D. core course.