Bachelor of Science in Physics: Applied Physics Concentration

FIRST YEAR

Fall
- Social and Behavioral Sciences* 3
- PHYS 1408, Principles of Physics I 4
- MATH 1451, Calculus I 4
- ENGL 1301, Essentials of Coll. Rhetoric 3
- Personal Fitness and Wellness 1
- COMS 2300, Public Speaking 3
- Creative Arts* 3
- TOTAL 14

Spring
- PHYS 2401, Principles of Physics II 4
- PHYS 2402, Principles of Physics III 4
- MATH 3350, Math for Engr. & Sci. † 3
- ENGL 3302, Advanced College Rhetoric 3
- Foreign Language † 3
- FOREIGN LANGUAGE 3
- TOTAL 15

SECOND YEAR

Fall
- PHYS 2401, Principles of Physics II 4
- PHYS 2402, Principles of Physics III 4
- MATH 3350, Math for Engr. & Sci. † 3
- POLS 1301, American Govt. Org. 3
- Language, Philosophy, & Culture* 3
- Foreign Language† 3
- TOTAL 17

Spring
- PHYS 3305, Electricity and Magnetism 3
- PHYS 3306, Electricity and Magnetism 3
- HIST 2300, History of the U.S. to 1877 3
- PHSE 2401, Principles of Physics II 4
- TOTAL 16

THIRD YEAR

Fall
- PHYS 2305, Comput. for Physical Sci. 3
- PHYS 3401, Optics 3
- MATH 3351, Math for Engr. & Sci. † 3
- HIST 2300, History of the U.S. to 1877 3
- FOREIGN LANGUAGE 3
- TOTAL 13

Spring
- PHYS 3305, Electricity and Magnetism 3
- PHYS 3306, Electricity and Magnetism 3
- HIST 2300, History of the U.S. to 1877 3
- PHSE 2401, Principles of Physics II 4
- TOTAL 15

FOURTH YEAR

Fall
- PHYS 2305, Comput. for Physical Sci. 3
- PHYS 3401, Optics 3
- MATH 3351, Math for Engr. & Sci. † 3
- HIST 2300, History of the U.S. to 1877 3
- FOREIGN LANGUAGE 3
- TOTAL 15

Spring
- PHYS 3305, Electricity and Magnetism 3
- PHYS 3306, Electricity and Magnetism 3
- HIST 2300, History of the U.S. to 1877 3
- PHSE 2401, Principles of Physics II 4
- TOTAL 15

TOTAL HOURS: 120

Applied physics 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.
‡ These electives can be any of a number of junior/senior-level physics courses.
§ Choose from the university’s Multicultural Requirement list.
¶ These courses should be selected in consultation with, and approved by, the physics undergraduate advisor.
** Physics electives are offered in alternate years. Consult the current Physics Undergraduate Handbook at www.phys.ttu.edu for current scheduling.

5304. Solid State Physics (3). Prerequisite: PHYS 5301 or equivalent. A survey of the microscopic properties of crystalline solids. Major topics include lattice structures, vibrational properties, electronic band structure, and electronic transport.

5305. Statistical Physics (3). Elements of probability theory and statistics; foundations of kinetic theory. Gibb's statistical mechanics, the method of Darwin and Fowler, derivation of the laws of macroscopic thermodynamics from statistical considerations; other selected applications in both classical and quantum physics. M.S. and Ph.D. core course.


5307. Methods in Physics I (3). Provides first-year graduate students the necessary skill in mathematical methods for graduate courses in physical sciences; applications such as coordinate systems, vector and tensor analysis, matrices, group theory, functions of a complex variable, variational methods, Fourier series, integral transforms, Sturm-Liouville theory, eigenvalues and functions, Green functions, special functions and boundary value problems. Tools course.

5308. Molecular Biophysics (3). Study of the physics of the structures and dynamics of biological molecules and assemblies at the molecular level. Required for students in biophysics research.

5309. Methods in Biophysics (3). Study of experimental and computational methods in biophysics. Requires an individual research project. Mandatory for students in biophysics research.

5311. Nuclear Physics (3). Prerequisite: PHYS 5301. Deals with nuclear physics covering such topics as nuclear structure models, interactions, reactions, scattering, and resonance. Nuclear energy is discussed as an application.

5312. Elementary Particle Physics (3). Prerequisites: PHYS 5302, 5303. The role of symmetries, gauge theories, and the Standard Model. First-order Feynman diagram calculations aided by computing tools and comparison with the experimental data. Experimental techniques and detectors in particle physics.


5330. Semiconductor Materials and Processing (3). Survey of semiconductor materials deposition, characterization, and processing techniques with emphasis on the fundamental physical interactions underlying device processing steps.

5335. Physics of Semiconductors (3). Theoretical description of the physical and electrical properties of semiconductors; Band structure, vibrational properties and phonons, defects, transport and carrier statistics, optical properties, and quantum confinement.