

Physics

Develop problem-solving skills while learning about motion & magnetism, quarks & quasars.

Studying physics at TWU is an exceptional experience. Here you get to explore matter, energy, and their interactions; students learn the deeper principles involved in events from the everyday to the exotic. And it all is informed by a Christian perspective, one that recognizes the covenantally faithful ways God governs the physical aspect of creation.

Small classes, expertly led by passionate faculty, make for quality learning environments and accelerate problem-solving skills. A physics minor or concentration, combined with studies in another discipline, will allow you to explore the simplicity and complexity of the amazing universe. Our modern lab equipment and diverse curriculum affords opportunities to be involved in research at TWU and other universities.

ID	COURSE	CREDITS
PHYS 111	PHYS 111 - Fundamentals of Physics I 2022-2023 Students investigate physical reality employing basic principles of Newtonian mechanics which allow the description and explanation of motion: three-dimensional kinematics, dynamics of particles and rigid bodies including work, energy, momentum, rotational motion, simple harmonic motion, and fluids.	3
PHYS 112	PHYS 112 - Fundamentals of Physics II 2022-2023 The basic principles of classical electromagnetism and waves: mechanical waves, Coulomb's law, electric fields, Gauss's law, Faraday's law, AC circuits, electromagnetic waves, geometrical optics.	3
PHYS 210	PHYS 210 - Conceptual Modern Physics 2022-2023 A survey of the development of scientific theories, emphasizing the ideas that emerged in physics in the 20th century. The course is designed so that general audience students become engaged with the conceptual aspects of topics in relativity and quantum mechanics. NB: Not offered every year See department chair.	3
PHYS 215	PHYS 215 - Stellar and Galactic Astronomy 2022-2023 An introduction to stellar and galactic astronomy, and to the tools and techniques of astronomy. Discussion of the types of stars and their formation, energy production, and end states; the nature of nebulae, star clusters, black holes, galaxies, and quasars; modern cosmology; astrobiology. Several daytime and night-time observation sessions are undertaken. Historical, philosophical,	3

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	and Christian theological perspectives are considered.	
PHYS 220	PHYS 220 - Mechanics 2022-2023 Topics in classical mechanics, including particle motion in three dimensions, noninertial reference frames, central forces, rigid body motion, Lagrange's equation of motion, and Hamilton's variational principle	3
PHYS 230	PHYS 230 - Electricity and Magnetism 2022-2023 Electric fields and potentials of static charge distributions, currents, magnetic fields and the vector potential, electromagnetic induction, electric and magnetic energy, electromagnetic properties of matter.	3
PHYS 240	PHYS 240 - Physical Chemistry 2022-2023 Introduction to thermodynamics as applied to chemical reactions. The First and Second Laws of Thermodynamics, free energy and equilibria, phase equilibria and electro-chemistry.	3
PHYS 310	PHYS 310 - Topics in Modern Physics 2022-2023 Introduction to the special theory of relativity; the principles of quantum mechanics and its interpretation; aspects of atomic, nuclear and particle physics; and cosmology.	3
PHYS 320	PHYS 320 - Digital Electronics and Instrumentation 2022-2023 To provide students with a working knowledge of basic semiconductor devices and gates and their use for implementing logic devices and simple measurement and control functions, and to provide experience in constructing and using circuit diagrams and test/measurement equipment.	3
PHYS 321	PHYS 321 - Differential Equations 2022-2023 First order differential equations, linear differential equations, Laplace transforms, systems of differential equations, non-linear systems, series solutions, introduction to partial differential equations. Special emphasis is placed on applications to physics and engineering.	4
PHYS 341	PHYS 341 - Advanced Physical Chemistry 2022-2023 The fundamental concepts of matter and its structure in relation to energy. Quantum mechanics, statistical thermodynamics, spectroscopy, kinetics, and the solid state.	3
PHYS 360	PHYS 360 - Optics 2022-2023 Geometrical and physical optics: reflection and refraction, interference, coherence, polarization, diffraction, lasers, and holography.	3
PHYS 400	PHYS 400 - DIRECTED STUDY 2022-2023	3

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COURSE

CREDITS

Students are required to produce an outline of one topic to be studied in consultation with the instructor. A course of reading and/or experimentation is pursued according to the approved outline. Assessment may be via examination and/or a final written report.