



## Physics Courses

---

### PHYS 1101 General Physics I (4 credits)

A survey of introductory physics, with laboratory. Topics include mechanics, vibrations, fluids, waves, heat, electricity, magnetism, dc circuits, and optics. Elementary algebra and trigonometry are employed as needed. Liberal Education Goal Area 3 (LC).

### PHYS 1102 General Physics II (4 credits)

Continuation of a survey of introductory physics, with laboratory. Topics include mechanics, vibrations, fluids, waves, heat, electricity, magnetism, DC circuits, and optics. Elementary algebra and trigonometry are employed as needed. Liberal Education Goal Area 3 (LC).

### PHYS 2101 Physics I (5 credits)

### PHYS 2102 Physics II (5 credits)

Continuation of a calculus-based introductory physics sequence, with laboratory. Topics include heat and thermodynamics, electricity, magnetism, electrical circuits, light, and optics. Prerequisite: PHYS 2101, MATH 2471. Pre/Co-requisite MATH 2472 or consent of instructor. Liberal Education Goal Area 3 (LC).

### PHYS 2210 Statics and Strength of Materials (3 credits)

Analysis of loads and moments borne by non-accelerating bodies and structures, considering distribution of forces and moments, material deformation, and prediction of material failure. Prerequisite: PHYS 2101.

### PHYS 2220 Dynamics (3 credits)

Dynamics force and moment systems, including applications to systems of particles and rigid bodies, with an engineering emphasis. Prerequisite: PHYS 2101.

### PHYS 2500 Electronics (4 credits)

Use and analysis of digital ICs, with application to computer circuitry and interfacing. Intensive laboratory. Corequisite: PHYS 1101 or PHYS 2101, or consent of instructor.

### PHYS 2951 Study Travel Physics (1-6 credits)

Study Travel course in Physics for Lib Ed Goal Area 3.

### PHYS 3103 Physics III (4 credits)

Conclusion of a calculus-based introductory physics sequence with a focus on modern physics, with laboratory. Topics include special relativity, quantum mechanics, atomic physics and radiation, elementary particles, astrophysics and cosmology. Prerequisites: PHYS 2102, MATH 2472, or consent of instructor.

### PHYS 3300 Thermal and Statistical Physics (3 credits)

Principles of thermodynamics and statistical mechanics. Topics include temperature, the laws of thermodynamics, entropy, heat engines and refrigerators, free energy, and Boltzmann and quantum statistics. Prerequisites: PHYS 2102, PHYS 3103, MATH 2472, or consent of instructor.

### PHYS 3400 Mathematical Physics (3 credits)

Introduction to mathematical techniques used to solve problems in the physical sciences. Topics include complex numbers, Fourier series, ordinary and partial differential equations, and series solutions including Legendre polynomials and Bessel functions. Prerequisites: PHYS 2102, MATH 2472, or consent of instructor.

### PHYS 3700 Classical Mechanics (3 credits)

Newton's laws applied to systems of particles and rigid bodies. Topics includes energy and momentum conservation, non-inertial reference frames, Lagrangian and Hamiltonian mechanics. Prerequisites: PHYS 2101, PHYS 3400 or MATH 2490.

### PHYS 3720 Advanced Laboratory (1 credit)

A laboratory designed to supplement various advanced courses that currently have no laboratory component. Content varies with term and may be repeated. Prerequisite: PHYS 2102.

### PHYS 4100 Solid-State Physics (3 credits)

Fundamentals of condensed matter physics, emphasizing crystalline solids. Includes transport mechanisms, band theory, lattice vibrations, insulators and semiconductors. Prerequisites: PHYS 2102, PHYS 3103, MATH 2472.

### PHYS 4300 Optics (4 credits)

Electromagnetic wave phenomena, including Fraunhofer and Fresnel diffraction, interference, coherence, dispersion, and polarization. Lecture and laboratory. Prerequisites: PHYS 2102, PHYS 3400 or MATH 2490, or consent of instructor.

### PHYS 4400 Mathematical Physics II (3 credits)

Advanced topics in mathematical physics, including vector and tensor analysis, calculus of variations, Sturm-Liouville theory of orthogonal functions, complex residues, and Green functions. Prerequisite: PHYS 2102, PHYS 3400.

### PHYS 4500 Electromagnetism (4 credits)

Classical theory of electric and magnetic fields. Topics include Maxwell's equations, boundary value problems, static fields, dielectric materials, waves, waveguides, and antennas. Prerequisites: PHYS 2102, PHYS 3400, or consent of instructor.

### PHYS 4700 Quantum Mechanics (3 credits)

Development and formulation of quantum mechanics, with selected applications in spectroscopy, atomic/nuclear structure, and lasers. Prerequisites: PHYS 3103, PHYS 3400.

### PHYS 4800 Special Topics in Theoretical Physics (4 credits)

Advanced topics in electromagnetism, classical mechanics, and quantum mechanics. Prerequisites: PHYS 3103, PHYS 3400, and consent of instructor.

### PHYS 4980 Research (3 credits)

Research carried out by the student that is based on appropriate methodology and scholarship.

## All-University Courses

The course numbers listed below, not always included in the semester class schedule, may be registered for by consent of the advisor, instructor, or department chair, or may be assigned by the department when warranted. Individual registration requires previous arrangement by the student and the completion of any required form or planning outline as well as any prerequisites.

1910, 2910, 3910, 4910 DIRECTED INDEPENDENT STUDY  
1920, 2920, 3920, 4920 DIRECTED GROUP STUDY  
1930, 2930, 3930, 4930 EXPERIMENTAL COURSE  
1940, 2940, 3940, 4940 IN-SERVICE COURSE  
1950, 2950, 3950, 4950 WORKSHOP, INSTITUTE, TOUR  
1960, 2960, 3960, 4960 SPECIAL PURPOSE INSTRUCTION  
1970, 2970, 3970, 4970 INTERNSHIP  
1980, 2980, 3980, 4980 RESEARCH  
1990, 2990, 3990, 4990 THESIS