

## Philosophy/Religion

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- 352. Christian Heresies and Orthodoxies (3).** Development of Christian theology from Jewish and Hellenic thought. Focus on major leaders, thinkers, and movements during this time. Emphasis on Augustine, Pseudo-Dionysius, and Aquinas. (Prerequisites: one previous course in religion or philosophy).
- 354. 19th and 20th-Century Christian Theology (3).** Continental Theology from Schleiermacher and Hegel to the present. Will include dialectical thinkers, existentialists, feminists, and liberationists. (Prerequisites: one previous course in religion or philosophy).

## Special and Advanced Courses

- 199. Exploratory Internship (1-3).**
- 299. Experimental Course (1-3).**
- 399. Professional Internship (1-12).**
- 400. Senior Research Project (3).** A special project stressing the application of research skills and the synthesis of knowledge in the discipline(s) of philosophy and/or religion. Required of all majors. Spring.
- 451. Independent Study (1-3).** (Prerequisite: written departmental permission.)
- 499. Advanced Experimental Course (1-3).**

## Physics

A student may major in physics in preparation for a career in professional physics, engineering, sales engineering, education or an interdisciplinary field such as medical physics, radiological physics, biophysics, geophysics or chemical physics. Students planning to enter graduate school should complete the requirements for a Bachelor of Science degree.

### *Major Program Requirements*

#### **Bachelor of Arts in Physics (30 hours and 18-19 hours of cognates)**

##### **Physics B.A. Core (15 hours)**

PHYS 205	General Physics I (3)
PHYS 206	General Physics II (3)
PHYS 209	General Physics Laboratory I (1)
PHYS 210	General Physics Laboratory II (1)
PHYS 320	Electronics (4)
PHYS 370	Modern Physics
or PHYS 380	Nuclear Radiation Physics (3)

## Physics

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### Physics B.A. Electives (15 hours)

### Physics B.A. Cognates (18-19 hours)

CIS CIS 106 BASIC (3)  
MATH 135 Calculus and Analytical Geometry I (4)  
MATH 205 Calculus and Analytical Geometry II (4)  
MATH 215 Calculus and Analytical Geometry III  
or MATH 305 Differential Equations (3-4)  
A 4-hour laboratory science course in biology, chemistry or earth science.

### Bachelor of Science in Physics (30 hours and 28-29 hours of cognates)

### Physics B.S. Core (15 hours)

PHYS 205 General Physics I (3)  
PHYS 206 General Physics II (3)  
PHYS 209 General Physics Laboratory I (1)  
PHYS 210 General Physics Laboratory II (1)  
PHYS 320 Electronics (4)  
PHYS 370 Modern Physics  
or PHYS 380 Nuclear Radiation Physics (3)

### Physics B.S. Electives (15 hours)

15 hours of 300- or 400- level courses

### Physics B.S. Cognates (18 hours)

CIS 106 BASIC (3)  
MATH 135, 205, 215 Calculus I, II, III (4,4,4)  
MATH 305 Differential Equations (3)

### Cognate Electives (10-11 hours)

4 hours of a non-Physics laboratory course and 6 hours of mathematics courses numbered 303 and above  
OR  
11 hours in either biology, chemistry or earth science, including 3 hours numbered 300 or above.

One year of French and one year of German are also recommended.

### *Minor and Associate Program Requirements*

The **Associate of Arts** degree in physics requires a minimum of 12 semester hours in the department, including Physics 205, 206, 209 and 210 and 8 semester hours of mathematics including Mathematics 135 and 205.

A student working toward a **minor** in physics will complete at least 20 semester hours in the department, including Physics 205, 206, 209, 210, 370 and 9 hours of electives. Additional requirements are Computer Science 106 and Mathematics 135, 205, and 215 or 305.

## Physics

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The semesters listed after course descriptions indicate when courses are expected to be offered. Schedules are subject to change; students should confirm semester offerings with the department when planning degree programs.

- 101, 102. Introductory Physics I, II (NATURAL SCIENCE for 101) (3, 3).** Basic topics of physics on an elementary level, including mechanics, heat, sound, electricity and magnetism, optics, and atomic and nuclear physics. Three lectures per week. Meets natural and physical sciences distribution requirement when taken in conjunction with Physics 103 (for 101) or 104 (for 102). (A working knowledge of high school algebra and trigonometry is required.) Fall, spring.
- 103. Introductory Physics Laboratory I (NATURAL SCIENCE) (1).** Experiments in mechanics, heat, wave motion and sound. (Prerequisite or corequisite: Physics 101.) Fall.
- 104. Introductory Physics Laboratory II (1).** Experiments in electricity, magnetism, optics and modern physics. (Prerequisite or corequisite: Physics 102.) Spring.
- 113. Topics in Physics (3).** Introductory-level topics in physics intended for non-science majors. Topic may vary with semester. May be repeated with different topic. (Prerequisite: open to students qualified to take Math 101)
- 114. Topics in Physics Laboratory (NATURAL SCIENCE) (1).** Laboratory associated with introductory-level Topics in Physics. One laboratory session per week. (Corequisite: PHYS 113)
- 205, 206. General Physics (3, 3).** Physics for scientists and engineers. Topics include mechanics, heat, wave motion, sound, electricity and magnetism, and optics. (Prerequisites: Computer Science 106, Mathematics 135. Mathematics 205 is a corequisite for Physics 205.) Fall, spring.
- 209. General Physics Laboratory I (NATURAL SCIENCE) (1).** Experiments in mechanics, heat, wave motion and sound, with emphasis on measurement techniques, data handling, computer methods of analysis and experimental verification of physics principles. One 3-hour laboratory per week. (Corequisite: Physics 205.) Fall.
- 210. General Physics Laboratory II (NATURAL SCIENCE) (1).** Experiments in electricity, magnetism and optics. Computer methods of analysis are used where appropriate. (Corequisite: Physics 206.) Spring.
- 320. Electronics (4).** An introduction to linear and digital electronics. Topics include dc and ac circuits, power supplies, transistor biasing, small signal amplifiers, classes A and B amplifiers, operational amplifiers, Boolean logic, logic circuits, flip flops, counters and registers, analog-digital and digital-analog conversions, applications. Three lectures and one 3-hour laboratory per week. (Prerequisites: Physics 206, 210.) Offered as needed.

## Physics

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- 370. Modern Physics (3).** Introduction to relativity and atomic physics. Relativity: simultaneity, Lorentz transformation, velocities, momentum, and energy. Atomic physics: Bohr theory, particles and waves, Schrodinger theory, one-electron atoms, magnetic moments and spin, identical particles, and multi-electric atoms. (Prerequisites: Physics 205-206 and Mathematics 215 or 305.) Offered as needed.
- 380. Nuclear Radiation Physics (3).** An introduction to nuclear physics with attention to nuclear instrumentation, natural radioactivity, alpha-beta-gamma decay, nuclear reactions, neutrons, fission and fusion. (Prerequisites: Physics 205, 206 and Mathematics 215 or 305.) Offered as needed.
- 401, 402. Mechanics (3, 3).** Motions of particles and systems of particles in one, two and three dimensions; moving coordinate systems; continuous media; Lagrangian methods. (Prerequisites: Physics 205, 206 and Mathematics 305.) Offered as needed.
- 403, 404. Electromagnetic Theory (3, 3).** Electrostatic fields in vacuum and in dielectrics, boundary value problems, magnetic fields of steady currents and magnetic materials, induced electromotance, Maxwell's equations, plane waves, reflection and refraction, guided waves and radiation. (Prerequisites: Physics 205, 206 and Mathematics 305.) Offered as needed.
- 405. Acoustics (3).** Vibrations of strings, bars, membranes and plates; acoustic waves, transmission, absorption and radiation; pipes and cavities, resonators and filters. (Prerequisite: Physics 205, 206 and Mathematics 305.) Offered as needed.
- 406. Optics (4).** Lenses and mirrors: Image formation, design, aberrations, and stops, optical systems. Wave optics: Interference, diffraction, polarization, Fourier transform spectroscopy, holography. Quantum optics: atomic spectra, lasers. Three lectures and one 3-hour laboratory per week. (Prerequisites: Physics 206 and Mathematics 215 or 305.) Offered as needed.

## Special and Advanced Courses

- 199. Exploratory Internship (1-3).**
- 299. Experimental Course (1-3).**
- 399. Professional Internship (1-12).**
- 451. Independent Study (1-3).** Work may be either experimental or theoretical. May be repeated. (Prerequisite: departmental permission.)
- 499. Advanced Experimental Course (1-3).**