# Physics

College of Natural Science and Mathematics
Department of Physics
(907) 474-7339
www.uaf.edu/physics/

## B.A., B.S. Degrees

Minimum Requirements for Degrees: 130 credits

The science of physics is concerned with the nature of matter and energy in all physical systems, from elementary particles to the structure and origin of the universe. Physics, together with mathematics and chemistry, provides the foundation for work in all fields of the physical sciences and engineering, and contributes greatly to other disciplines such as the biosciences and medicine.

The undergraduate curriculum provides a solid foundation in classical and modern physics, with emphasis on both its experimental and theoretical aspects. A student completing this curriculum can be well prepared for advanced study in physics and related sciences, and for other careers that also require refined abilities in problem solving.

The physics department is also responsible for the baccalaureate degree programs in general science and applied physics. These programs are also described in this catalog.

### Major—B.A. Degree

1. Complete the general university requirements (page 107).
2. Complete the B.A. degree requirements (page 111).
3. Complete the following program (major) requirements:
   a. Complete the following:*
      PHYS 113—Concepts of Physics ..... 1
      PHYS 211X—General Physics ..... 4
      PHYS 212X—General Physics ..... 4
      PHYS 213X—Elementary Modern Physics ..... 4
      PHYS approved electives ..... 20
   b. Complete the following:
      MATH 200X—Calculus** ..... 4
      MATH 201X—Calculus** ..... 4
      MATH 202X—Calculus ..... 4
      MATH electives at the 300-level or above ..... 6
4. Minimum credits required ..... 130

** Student must earn a C grade or better in each course.*

*** Satisfies core curriculum or B.A. degree requirements, but not both.*

### Major—B.S. Degree

1. Complete the general university requirements. (See page 107. As part of the core curriculum requirements, these courses are suggested: CHEM 105X and CHEM 106X; GEOS 101X; BIOL 105X.)
2. Complete the B.S. degree requirements (page 114).
3. Complete the following program (major) requirements:*
   PHYS 113—Concepts of Physics ..... 1
   PHYS 211X—General Physics ..... 4
   PHYS 212X—General Physics ..... 4
   PHYS 213X—Elementary Modern Physics ..... 4
   PHYS 311—Mechanics ..... 4
   PHYS 312—Mechanics ..... 4
   PHYS 313—Thermodynamics and Statistical Physics ..... 4
   PHYS 331—Electricity and Magnetism ..... 3
   PHYS 332—Electricity and Magnetism ..... 3
   PHYS 381W,O—Physics Laboratory ..... 3
   PHYS 382W—Physics Laboratory ..... 3
   PHYS 411—Modern Physics ..... 4
   PHYS 412—Modern Physics ..... 4
   PHYS 445—Solid State Physics and Physical Electronics ..... 4
   PHYS 462—Geometrical and Physical Optics ..... 4
4. Complete the following program (major) requirements:
   MATH 200X—Calculus** ..... 4
   MATH 201X—Calculus** ..... 4
   MATH 202X—Calculus ..... 4
   MATH 302—Differential Equations ..... 3
   MATH electives at the 300-level or above*** ..... 9
5. Minimum credits required ..... 130

** Student must earn a C grade or better in each course.*

*** Satisfies core curriculum or B.S. degree requirements, but not both.*

**** Suggested electives: MATH 314, 421 and 422.*

*Note: Other courses suggested to fulfill minimum credit requirements: ES 201, 307 and 308.*

### Requirements for physics teachers (grades 7 - 12)

1. Complete all the requirements of the physics B.A. or B.S. degree.
2. All prospective physics teachers must complete the following:
   CHEM 105X and CHEM 106X—General Chemistry ..... 8
   MATH 302—Differential Equations ..... 3
   PHYS 311 and PHYS 3112—Mechanics ..... 8
   PHYS 313—Thermodynamics & Statistical Physics ..... 4
   PHYS 331 and PHYS 332—Electricity and Magnetism ..... 6
   PHYS 381W,O and PHYS 382W—Physics Laboratory ..... 6
   PHYS 411 and PHYS 412—Modern Physics ..... 8
   PHYS 445—Solid State Physics and Physical Electronics ..... 4
   PHYS 462—Geometrical and Physical Optics ..... 4
3. All prospective science teachers must complete one of the following:
   PHIL 380—Conceptual Foundations of Science (3)
   or PHIL 382—Science & Technological Limits (3)
   or PHIL 481—Philosophy of Science (3) ..... 3

*Note: We strongly recommend that prospective secondary science teachers seek advising from the UAF School of Education early in your undergradutae degree program, so that you can be appropriately advised of the state of Alaska requirements for teacher licensure. You will apply for admission to the UAF School of Education's post-baccalaureate teacher preparation program, a one-year intensive program, during your senior year.*

### Minor

1. Complete the following:
   PHYS 103X-104X—College Physics (8)
   or PHYS 211X-212X—General Physics (8) ..... 8
2. Complete the following:
   PHYS 213X—Elementary Modern Physics ..... 4
   Electives at the 300-400-level ..... 8
3. Minimum credits required ..... 20

***Note: Page numbers refer to the UAF 2005-2006 academic catalog, which can be viewed online at www.uaf.edu/catalog/.***

# Baccalaureate Core Requirements

**All degrees (e.g. B.A., B.S., etc.) require additional courses. Refer to specific degree and program requirements.**

**COMMUNICATION (9)**

**Complete the following:**
ENGL 111X .....(3) _____
*ENGL 190H may be substituted.*

**Complete one of the following:**
ENGL 211X **OR** ENGL 213X .....(3) _____

**Complete one of the following:**
COMM 131X **OR** COMM 141X.....(3) _____

**PERSPECTIVES ON THE HUMAN CONDITION (18)**

**Complete all of the following four courses:**
ANTH 100X/SOC 100X.....(3) _____
ECON 100X **OR** PS 100X .....(3) _____
HIST 100X.....(3) _____
ENGL/FL 200X .....(3) _____

**Complete one of the following three courses:**
ART/MUS/THR 200X, HUM 201X **OR** ANS 202X..... (3) _____

**Complete one of the following six courses:**
BA 323X, COMM 300X, JUST 300X, NRM 303X,
PS 300X **OR** PHIL 322X.....(3) _____
**OR** complete 12 credits from the above courses **PLUS**
- two semester-length courses in a single Alaska Native language or other non-English language **OR**
- three semester-length courses (9 credits) in American Sign Language taken at the university level.

**MATHEMATICS (3)**

**Complete one of the following:**
MATH 107X, MATH 161X **OR** MATH 103X.....(3-4) _____
** No credit may be earned for more than one of MATH 107X or 161X.*

**OR complete one of the following:***
MATH 200X, MATH 201X, MATH 202X,
MATH 262X **OR** MATH 272X.....(4) _____
**Or any math course having one of these as a prerequisite*

**NATURAL SCIENCES (8)**

**Complete any two (4-credit) courses:**
ATM 101X .....(4) _____
BIOL 100X.....(4) _____
BIOL 103X.....(4) _____
BIOL 104X.....(4) _____
BIOL 105X.....(4) _____
BIOL 106X.....(4) _____
BIOL 111X.....(4) _____
BIOL 112X.....(4) _____
CHEM 100X .....(4) _____
CHEM 103X .....(4) _____
CHEM 104X .....(4) _____
CHEM 105X .....(4) _____
CHEM 106X .....(4) _____
GEOG 205X .....(4) _____
GEOS 100X .....(4) _____
GEOS 101X .....(4) _____
GEOS 112X .....(4) _____
GEOS 120X .....(4) _____
GEOS 125X .....(4) _____
MSL 111X.....(4) _____
PHYS 102X.....(4) _____
PHYS 103X.....(4) _____
PHYS 104X.....(4) _____
PHYS 115X.....(4) _____
PHYS 116X.....(4) _____
PHYS 175X.....(4) _____
PHYS 211X.....(4) _____
PHYS 212X.....(4) _____
PHYS 213X.....(4) _____

**LIBRARY AND INFORMATION RESEARCH (0–1)**
Successful completion of library skills competency test **OR**
LS 100X or 101X prior to junior standing .....(0–1) _____

**UPPER-DIVISION WRITING AND ORAL COMMUNICATION (0)**

**Complete the following:**
Two writing intensive courses designated (W) .....(0) _____
One oral communication intensive course designated (O) .....(0) _____
**OR** two oral communication intensive courses designated (O/2), at the upper-division level (see degree and/or major requirements) .....(0) _____

**TOTAL CREDITS REQUIRED.....38–39**

**UNIVERSITY OF ALASKA FAIRBANKS**
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