# 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: 120 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 bachelor's 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 131).
2. Complete the B.A. degree requirements (page 136).
3. Complete the following program (major) requirements:
   a. Complete the following:*
      PHYS F211X—General Physics....4
      PHYS F212X—General Physics....4
      PHYS F213X—Elementary Modern Physics....4
      PHYS F301—Introduction to Mathematical Physics....4
      PHYS approved electives....20
   b. Complete the following:
      MATH F200X—Calculus I**....4
      MATH F201X—Calculus II**....4
      MATH F202X—Calculus III....4
      MATH electives at the F300-level or above....3
4. Minimum credits required....120

* *Students must earn a C grade (2.0) 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 131. As part of the core curriculum requirements, these courses are suggested: CHEM F105X and CHEM F106X; GEOS F101X; BIOL F115X.)
2. Complete the B.S. degree requirements (page 136).
3. Complete the following program (major) requirements:*
   PHYS F211X—General Physics....4
   PHYS F212X—General Physics....4
   PHYS F213X—Elementary Modern Physics....4
   PHYS F220—Introduction to Computational Physics....4
   PHYS F301—Introduction to Mathematical Physics....4
   PHYS F313—Thermodynamics and Statistical Physics....4
   PHYS F341—Classical Physics I: Particle Mechanics....4
   PHYS F342—Classical Physics II: Electricity and Magnetism....4
   PHYS F343—Classical Physics III: Vibration and Waves....4
   PHYS F381W,O—Physics Laboratory....3
   PHYS F382W—Physics Laboratory....3
   PHYS F421—Quantum Mechanics....4
   PHYS F462—Geometrical and Physical Optics....4
   PHYS F471—Advanced Topics in Physics I**....3
   PHYS F472—Advanced Topics in Physics II**....3
4. Complete the following program (major) requirements:
   MATH F200X—Calculus I***....4
   MATH F201X—Calculus II***....4
   MATH F202X—Calculus III....4
   MATH electives at the F300-level or above****....6
5. Minimum credits required....120

* *Students must earn a C grade (2.0) or better in each course.*
** *Students must take at least three emphasis topics from F471 and at least three application topics from F472*
*** *Satisfies core curriculum or B.S. degree requirements, but not both.*
**** *Suggested electives: MATH F314, F421 and F422.*
*Note: Other courses suggested to fulfill minimum credit requirements: ES F201, F307 and F308.*

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

1. Complete all the requirements of the B.A. or B.S. degree.
2. All prospective physics teachers must complete the following:
   CHEM F105X and CHEM F106X—General Chemistry....8
   PHYS F211X—General Physics....4
   PHYS F212X—General Physics....4
   PHYS F213X—Elementary Modern Physics....4
   PHYS F220—Introduction to Computational Physics....4
   PHYS F301—Introduction to Mathematical Physics....4
   PHYS approved electives....16
   MATH electives....3
3. All prospective science teachers must complete the following:
   PHIL F481—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 undergraduate 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 F103X – F104X—College Physics (8)
   or PHYS F211X – F212X—General Physics (8)....8
2. Complete the following:
   PHYS F213X—Elementary Modern Physics....4
   Electives at the F300 – F400-level....8
3. Minimum credits required....20

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

## Baccalaureate Core Requirements

*(Note: all courses for Core must be completed with C- or higher.)*

**COMMUNICATION (9)**

**Complete the following:**
ENGL F111X .....(3) _____
*ENGL F190H may be substituted.*

**Complete one of the following:**
ENGL F211X **OR** ENGL F213X .....(3) _____

**Complete one of the following:**
COMM F131X **OR** COMM F141X .....(3) _____

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

**Complete all of the following four courses:**
ANTH F100X/SOC F100X .....(3) _____
ECON F100X **OR** PS F100X .....(3) _____
HIST F100X.....(3) _____
ENGL/FL F200X .....(3) _____

**Complete one of the following three courses:**
ART/MUS/THR F200X, HUM F201X **OR** ANS F202X .... (3) _____

**Complete one of the following six courses:**
BA F323X, COMM F300X, JUST F300X, NRM F303X,
PS F300X **OR** PHIL F322X .....(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 F103X, MATH F107X, MATH F161X **OR**
STAT F200X .....(3 – 4) _____
** No credit may be earned for more than one of MATH F107X or F161X.*

**OR complete one of the following:***
MATH F200X, MATH F201X, MATH F202X,
MATH F262X **OR** MATH F272X.....(4) _____
**Or any math course having one of these as a prerequisite.*

**NATURAL SCIENCES (8)**

**Complete any two (4-credit) courses:**
ATM F101X.....(4) _____
BIOL F100X .....(4) _____
BIOL F103X .....(4) _____
BIOL F104X .....(4) _____
BIOL F111X .....(4) _____
BIOL F112X .....(4) _____
BIOL F115X .....(4) _____
BIOL F116X .....(4) _____
CHEM F100X.....(4) _____
CHEM F103X.....(4) _____
CHEM F104X.....(4) _____
CHEM F105X.....(4) _____
CHEM F106X.....(4) _____
GEOG F111X.....(4) _____
GEOS F100X.....(4) _____
GEOS F101X.....(4) _____
GEOS F112X.....(4) _____
GEOS F120X.....(4) _____
GEOS F125X.....(4) _____
MSL F111X.....(4) _____
PHYS F102X.....(4) _____
PHYS F103X.....(4) _____
PHYS F104X.....(4) _____
PHYS F115X.....(4) _____
PHYS F116X.....(4) _____
PHYS F175X.....(4) _____
PHYS F211X.....(4) _____
PHYS F212X.....(4) _____
PHYS F213X.....(4) _____

**LIBRARY AND INFORMATION RESEARCH (0 – 1)**
Successful completion of library skills competency test **OR**
LS F100X or F101X prior to junior standing.....(0 – 1) _____

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

**Complete the following:**
Two writing intensive courses designated (W) .....(0) _____
and 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) _____

**CORE CREDITS REQUIRED ..... 38 – 39**

**Minimum credits required for degree .....120**

UNIVERSITY OF ALASKA FAIRBANKS
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