Physics, Applied

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

B.S. Degree

Minimum Requirements for Degree: 130 credits

The science of physics is concerned with the nature of matter and energy for 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 fields such as the biosciences and medicine.

The field of applied physics encompasses those areas that have developed practical applications from fundamental research in physics in the last century, including space physics, plasma physics, condensed matter physics, device physics, surface physics, biophysics, laser physics and reactor physics.

The undergraduate curriculum provides a solid foundation in general physics. Students may study in areas of applied physics such as atmospheric physics, computational physics and engineering physics.

Major—B.S. Degree

Concentrations: Atmospheric Physics, Computational Physics

1. Complete the general university requirements (page 106. As part of the core curriculum requirements, complete: MATH 200X.)

2. Complete the B.S. degree requirements (page 112. As part of the B.S. degree requirements, complete: MATH 201X, PHYS 211X* and PHYS 212X*.)

3. Complete the following program (major) requirements:
   a. Complete the following:
      MATH 202X—Calculus ........................................... 4
      MATH 302—Differential Equations ...................... 3
      PHYS 213X—Elementary Modern Physics* ........... 4
      PHYS 311—Mechanics* ...................................... 4
      PHYS 331—Electricity and Magnetism* ............... 3
   b. Complete mathematics credits at the 200-level or above ... 9
   c. Complete physics credits at the 300-level or above* ... 12
   d. Complete physics requirements in other relevant upper-division courses* (see note) .......... 20

4. Minimum credits required ..................................................... 130

Atmospheric Physics

1. Complete the general university requirements (page 106. As part of the core curriculum requirements, complete: MATH 200X.)

2. Complete the B.S. degree requirements (page 112. As part of the B.S. degree requirements, complete: MATH 201X, PHYS 211X* and PHYS 212X*.)

3. Complete the following program (major) requirements:
   a. Complete the following:
      MATH 202X—Calculus ........................................... 4
      MATH 302—Differential Equations ...................... 3
      PHYS 213X—Elementary Modern Physics* ........... 4
      PHYS 311—Mechanics* ...................................... 4
      PHYS 331—Electricity and Magnetism* ............... 3
   b. Complete mathematics credits at the 200-level or above ... 9
   c. Complete physics credits at the 300-level or above* ... 12
   d. Complete the following:
      ATM 401—Introduction to Atmospheric Science .......... 3
      ATM 409—Atmospheric Thermodynamics ................ 3
      ATM 413—Atmospheric Radiation ........................ 3
      ATM 445—Atmospheric Dynamics ....................... 3
   e. Complete credits in other relevant upper-division courses* (see note) .................. 8

4. Minimum credits required ..................................................... 130

Computational Physics

1. Complete the general university requirements (page 106. As part of the core curriculum requirements, complete: MATH 200X.)

2. Complete the B.S. degree requirements (page 112. As part of the B.S. degree requirements, complete: MATH 201X, PHYS 211X* and PHYS 212X*.)

3. Complete the following program (major) requirements:
   a. Complete the following:
      MATH 202X—Calculus ........................................... 4
      MATH 302—Differential Equations ...................... 3
      PHYS 213X—Elementary Modern Physics* ........... 4
      PHYS 311—Mechanics* ...................................... 4
      PHYS 331—Electricity and Magnetism* ............... 3
   b. Complete mathematics credits at the 200-level or above ... 9
   c. Complete physics credits at the 300-level or above* ... 12
   d. Complete the following:
      PHYS 220—Introduction to Computational Physics .......... 4
      MATH 310—Numerical Analysis ......................... 3
      CS 201—Computer Science I ............................ 3
      CS 202—Computer Science II .......................... 3
      Complete credits in other relevant upper-division courses* (see note) 4

4. Minimum credits required ..................................................... 130

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

Note: These credits must be in a chosen subject area and approved before the beginning of the student’s final semester by the head of the physics department.

Note: Must exclude PHYS 103X and 104 from core curriculum Natural Science requirement.

See General Science. Note: Page numbers refer to the UAF 2004-2005 academic catalog, which can be viewed online at www.uaf.edu/catalog/.

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### General University Requirements

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

#### COMMUNICATIONS (9)

Complete the following:
- ENGL 111X ........................................ (3)
- ENGL 211X OR 213X ........................... (3)
- COMM 131X OR 141X ......................... (3)

#### LIBRARY & INFORMATION SKILLS (0–1)

Complete the following:
- LS 100X OR 101X ................................ (0–1)
- OR Successful completion of library skills competency test.

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

Complete either the following six courses:
- ANTH 100X OR SOC 100X ...................... (3)
- ECON/PS 100X ..................................... (3)
- HIST 100X ........................................... (3)
- ART/MUS/THR 200X, HUM 201X OR ANS 202X .......... (3)
- ENGL/FL 200X ...................................... (3)
- PHIL 322X, NRM 303X, COMM 300X, PS 300X OR JUST 300X ........................................... (3)
- OR Complete 12 cr from the above list PLUS two semester-length courses in a single non-English or Alaska Native language at the university level OR three semester-length courses (9 cr) in American Sign Language.

#### MATHEMATICS (3–4)

Complete 3–4 credits from the following:
- MATH 107X ........................................ (3)
- OR MATH 131X (except for BBA) ............. (3)
- OR MATH 161X ..................................... (3)
- MATH 200X ........................................... (4)
- MATH 201X ........................................... (4)
- MATH 202X ........................................... (4)
- MATH 262X ........................................... (4)
- MATH 272X ........................................... (3)

**NOTE:** Additional 3 cr of math needed for degree requirements.

#### NATURAL SCIENCES (8)

Complete 8 credits from the following:
- ATM 101X ........................................... (4)
- BIOL 103X OR 104X ............................ (4)
- BIOL 105X–106X .................................. (8)
- BIOL 111X–112X .................................. (8)
- CHEM 100X ........................................... (4)
- CHEM 103X–104X .................................. (8)
- CHEM 105X–106X .................................. (8)
- GEOG 205X ........................................... (4)
- GEOS 100X OR 120X OR 125X .............. (4)
- GEOS 101X–112X .................................. (8)
- MSL 111X ........................................... (4)
- PHYS 102X OR 175X ............................ (4)
- PHYS 103X–104X .................................. (8)
- PHYS 211X–212X .................................. (8)
- PHYS 211X–213X .................................. (8)
- PHYS 212X–213X .................................. (8)