

PHYSICS

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

B.S. Degree

Minimum Requirements for Degree: 120 credits

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 in industry, government or the private sector that require refined abilities in problem-solving.

The **physics** concentration represents the classical undergraduate physics curriculum, while the **applied physics** concentration provides a solid foundation in general physics with the flexibility to include applied or interdisciplinary course work, aimed at e.g., engineering physics, biophysics or oceanography.

The **atmospheric physics** concentration is a solid foundation at the interface of physics, climate sciences and meteorology. The **computational physics** concentration is relevant for students seeking careers in any areas that require expertise in computational modeling and simulation of physical systems.

The **technical management** concentration provides an opportunity to combine basic knowledge of physics with an aptitude for leadership in business. Declared physics majors in good standing with appropriate grades, department mentoring and approval for some courses are, upon graduation, welcome to apply to the MBA program in UAF's School of Management.

Major — B.S. Degree

1. Complete the general university requirements. (See page 187. As part of the core curriculum requirements, complete MATH F251X.)*
2. Complete the B.S. degree requirements. (See page 187. As part of the B.S. degree requirement, complete MATH F252X, PHYS F211X and PHYS F212X.)*
3. Complete the following program (major) requirements:*
- PHYS F211X—General Physics4
- PHYS F212X—General Physics4
- PHYS F213X—Elementary Modern Physics4
- PHYS F220—Introduction to Computational Physics4
- PHYS F301—Introduction to Mathematical Physics4
- PHYS F341—Classical Physics I: Particle Mechanics4
- PHYS F342—Classical Physics II: Electricity and Magnetism4
4. Complete the following program (major) requirements:**
- MATH F251X—Calculus I4
- MATH F252X—Calculus II4
- MATH F253X—Calculus III4
5. Complete one of the following concentrations:*

Physics

- a. Complete 6 credits of MATH electives at the F300 level or above. (MATH F314, MATH F421 or MATH F422 are recommended.)*6
- b. Complete the following:*
- PHYS F351—Thermal Physics2
- PHYS F451—Statistical Physics2
- PHYS F343—Classical Physics III: Vibration and Waves4
- PHYS F381W,O—Physics Laboratory3
- PHYS F421—Quantum Mechanics4
- PHYS F462—Geometrical and Physical Optics4

- c. Complete 6 credits from the following:*
- PHYS F471—Advanced Topics in Physics I
- PHYS F472—Advanced Topics in Physics II

Applied Physics

- a. Complete 6 credits of MATH electives at the F300 level or above. (MATH F314, MATH F421, or MATH F422 are recommended.)6
 - b. Complete 9 physics credits at the F300 level or above9
 - c. Complete 17 credits from applied physics17
- Note: The 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.*

Atmospheric Physics

- a. Complete 6 credits of MATH electives at the F300 level or above. (MATH F314, MATH F421 or MATH F422 are recommended.)*6
 - b. Complete 9 physics credits at the F300 level or above.*9
 - c. Complete the following:*
 - ATM F401—Introduction to Atmospheric Science3
 - ATM F413—Atmospheric Radiation3
 - ATM F445—Atmospheric Dynamics3
 - d. Complete 8 credits in other relevant upper-division courses.*8
- Note: The 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.*

Computational Physics

- a. Complete 6 credits of MATH electives at the F300 level or above. (MATH F314, MATH F421 or MATH F422 are recommended.)*6
 - b. Complete 9 physics credits at the F300 level or above9
 - c. Complete the following:*
 - MATH F310—Numerical Analysis3
 - CS F201—Computer Science I3
 - CS F202—Computer Science II3
 - d. Complete 8 credits in other relevant upper-division courses*8
- Note: The 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.*

Technical Management

- a. Complete 3 credits of MATH electives at the F300 level or above. (MATH F314, MATH F421 or MATH F422 are recommended.)*3
 - b. Complete STAT F200X—Elementary Probability and Statistics3
 - c. Complete 12 physics credits at the F300 level or above.*12
 - d. Complete the following:*
 - ACCT F261—Principles of Financial Accounting3
 - ACCT F262—Principles of Managerial Accounting3
 - e. Complete the following:
(Students must take ACCT F261, MATH F253X and PHYS F220 before taking these courses; or have permission of the MBA director. The School of Management agrees that such students will be allowed to register for these courses.)
 - BA F325—Financial Management***3
 - BA F330—The Legal Environment of Business***3
 - BA F343—Principles of Marketing***3
 - BA F360—Operations Management***3
 - BA F390—Organizational Theory and Behavior***3
6. Minimum credits required120
- * Students must earn a C- grade or better in each course.
** Satisfies core curriculum or B.S. degree requirements, but not both.
*** Students can be required to earn a B grade or higher if applying for the MBA program.

Note: Other courses suggested to fulfill minimum credit requirements: ES F201, F307 and F308.

Note: Must exclude PHYS F103X and PHYS F104X from core curriculum natural science requirement.

Requirements for physics teachers (grades 7-12)

1. Complete all the requirements of the B.S. degree.
 2. All prospective physics teachers must complete the following:*
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|---|---|
| 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 |
| MATH electives | 3 |

3. Complete 16 credits of physics-approved electives..... 16
 4. All prospective science teachers must complete the following:*
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| PHIL F481—Philosophy of Science (3)..... | 3 |
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* Students must earn a C- grade or better in each course.

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. Apply for admission to the UAF School of Education's postbaccalaureate teacher preparation program, a one-year intensive program, during your senior year.

Minor

1. Complete the following:*
- | | |
|---|---|
| PHYS F211X—General Physics | 4 |
| PHYS F212X—General Physics | 4 |
| PHYS F213X—Elementary Modern Physics..... | 4 |
2. Complete 8 credits of physics electives at the F300-400 level..... 8
 3. Minimum credits required20

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