

Physics



College of Science, Engineering and Mathematics
Department of Physics
(907) 474-7339

www.uaf.edu/physics/

Degrees: B.A., B.S., M.S., M.A.T., Ph.D.

Minimum Requirements for Degrees: B.A.: 130 credits; B.S.: 130 credits; M.S.: 30-33 credits; M.A.T.: 36 credits; Ph.D.: 18 thesis credits

The science of physics is concerned with the nature of matter and energy and encompasses all phenomena in the physical world from elementary particles to the structure and origin of the universe. Physics provides, together with mathematics and chemistry, the foundation of work in all fields of physical science and engineering, and contributes to other fields such as biology and medicine.

The undergraduate curriculum provides a solid foundation in general physics with emphasis on its experimental aspects. A student completing this curriculum should be prepared for careers in education and industry, and for advanced work in the fields of physics, applied physics and related sciences.

The M.S., M.A.T., and Ph.D. degrees are offered in physics, space physics and general science.

Graduate work is offered in various areas of physics and applied physics including many of the research areas found in the UAF Geophysical Institute. Faculty and student research programs currently emphasize investigation of auroral, ionospheric, magnetospheric and space plasma physics, the physics and chemistry of the upper and middle atmosphere, radio wave propagation and scattering, solar-terrestrial relations, condensed matter physics and polar meteorology.

Teaching and research assistantships are available on a competitive basis. Contact the department or individual faculty members for more information.

The physics department is responsible for the physics, space physics and the general science programs. See computational physics and space physics programs for more information on degree requirements in these disciplines.

UNDERGRADUATE PROGRAM

MAJOR

Physics—B.A. Degree

1. Complete the general university requirements (page 28).
2. Complete the B.A. degree requirements (page 33).
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.

Physics—B.S. Degree

1. Complete the general university requirements (page 28). (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 34).

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.

MINOR

1. Complete the following:

PHYS 103X-104X—College Physics (8) or PHYS 211X-212X—General Physics (8)	8
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2. Complete the following:

PHYS 213X—Elementary Modern Physics	4
Electives at the 300- 400-level	8

3. Minimum credits required 20



University of Alaska Fairbanks

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GRADUATE PROGRAM

Physics—M.S. Degree

1. Complete the general university requirements (page 43).
2. Complete the master's degree requirements (page 46).
3. Complete the thesis or non-thesis requirements:

Thesis

- a. Complete the following:
 - PHYS 699—Thesis 6-12
- b. Complete 4 of the following:
 - PHYS 611—Mathematical Physics 3
 - PHYS 612—Mathematical Physics 3
 - PHYS 621—Classical Mechanics 3
 - PHYS 622—Statistical Mechanics 3
 - PHYS 631—Electromagnetic Theory 3
 - PHYS 632—Electromagnetic Theory 3
 - PHYS 651—Quantum Mechanics 3
 - PHYS 652—Quantum Mechanics 3
- c. Complete 12 credits from the following:
 - Approved PHYS 600-level courses
 - Approved ATM 600-level courses
- d. Minimum credits required 30

Non-Thesis

- a. Complete the following:
 - PHYS 698—Research 3-6
 - Approved courses 18
- b. Complete 4 of the following:
 - PHYS 611—Mathematical Physics 3
 - PHYS 612—Mathematical Physics 3
 - PHYS 621—Classical Mechanics 3
 - PHYS 622—Statistical Mechanics 3
 - PHYS 631—Electromagnetic Theory 3
 - PHYS 632—Electromagnetic Theory 3
 - PHYS 651—Quantum Mechanics 3
 - PHYS 652—Quantum Mechanics 3
- c. Minimum credits required* 33

* At least 30 credits must be regular coursework.

Physics—M.A.T. Degree

1. Complete the general university requirements (page 43).
2. Complete the M.A.T. degree requirements (page 46).
3. Contact the department head for specific degree requirements.
4. Minimum credits required 36

Physics—Ph.D. Degree

1. Complete the general university requirements (page 43).
2. Complete the Ph.D. degree requirements (page 48).*
3. Minimum credits required 18

* Demonstrate competency in a foreign language or a research tool.

See General Science.

See Physics, Applied.

See Physics, Computational.

See Space Physics.

