

PHYSICS B.S.

Program Requirements

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Minimum Requirements for Degree: 120 credits

CONCENTRATIONS: APPLIED PHYSICS (P. 1), ATMOSPHERIC PHYSICS (P. 1), COMPUTATIONAL PHYSICS (P. 1), PHYSICS (P. 2), TECHNICAL MANAGEMENT (P. 2)

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

Code	Title	Credits
General University Requirements		
Complete the general university requirements. (https://catalog.uaf.edu/bachelors/#gurbachelorsdegreestext)		
General Education Requirements		
Complete the general education requirements. (https://catalog.uaf.edu/bachelors/#generaleducationrequirementstext)		36-40
As part of the general education requirements, complete the following:		
MATH F251X	Calculus I	
B.S. Degree Requirements		
Complete the B.S. degree requirements. (https://catalog.uaf.edu/bachelors/#bachelorofsciencetext)		16
As part of the B.S. requirements, complete the following:		
MATH F252X	Calculus II	
PHYS F211X	General Physics I	
PHYS F212X	General Physics II	
Physics Program Requirements		
Complete the following:		
MATH F253X	Calculus III	4
PHYS F213X	Elementary Modern Physics	4
PHYS F220	Introduction to Computational Physics	4
PHYS F301	Introduction to Mathematical Physics	4
PHYS F341	Classical Physics I: Particle Mechanics	4
PHYS F342	Classical Physics II: Electricity and Magnetism	4
PHYS F400	Capstone Project ¹	0
Concentration		
Complete one of the following:		31-40
Applied Physics		
Atmospheric Physics		
Computational Physics		
Physics		
Technical Management		
Electives		

General Electives	0-13
Total Credits	120

¹ Satisfy the capstone project requirement by passing PHYS F400, Capstone Project (0 credits).
The capstone project can be done either as individual undergraduate research with a faculty member (by taking PHYS F488 - 2 credits) or as an independent study with a faculty member within any F300- or F400-level physics course (by taking PHYS F497 - 2 credits), or as participation in the international University Physics Competition. Credits required to fulfill the capstone experience do not count toward credits required to complete the concentration.

Concentrations

APPLIED PHYSICS

Code	Title	Credits
Applied Physics Concentration Requirements		
Complete the following:		
MATH electives at the F300 level or above ¹		6
Physics credits at the F300 level or above		9
Applied physics ²		17
Total Credits		32

¹ Recommended courses include MATH F314, MATH F410 and MATH F432.

² 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

Code	Title	Credits
Atmospheric Physics Concentration Requirements		
Complete the following:		
MATH electives at the F300 level or above ¹		6
Physics credits at the F300 level or above		9
ATM F401	Introduction to Atmospheric Sciences	3
ATM F413	Atmospheric Radiation	3
ATM F445	Atmospheric Dynamics	3
Other relevant upper-division courses. ²		8
Total Credits		32

¹ Recommended courses include MATH F314, MATH F410 and MATH F432.

² 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

Code	Title	Credits
Computational Physics Concentration Requirements		
Complete the following:		
MATH electives at the F300 level or above ¹		6
Physics credits at the F300 level or above		9
CS F201	Computer Science I	3

CS F202	Computer Science II	3
MATH F426	Numerical Analysis	3
Other relevant upper-division courses. ²		8
Total Credits		32

¹ Recommended courses include MATH F314, MATH F410 and MATH F432.

² 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.

PHYSICS

Code	Title	Credits
Physics Concentration Requirements		
Complete the following:		
MATH electives at the F300 level or above ¹		6
PHYS F343	Classical Physics III: Vibration and Waves	4
PHYS F351	Thermal Physics	2
PHYS F381	Physics Laboratory	3
PHYS F421	Quantum Mechanics	4
PHYS F451	Statistical Physics	2
PHYS F462	Geometrical and Physical Optics	4
Complete 6 credits from the following:		6
PHYS F471A	Advanced Topics in Physics I: Condensed Matter Physics I	
PHYS F471B	Advanced Topics in Physics I: Condensed Matter Physics II	
PHYS F471C	Advanced Topics in Physics I: Space and Auroral Physics	
PHYS F471D	Advanced Topics in Physics I: Nonlinear Dynamics	
PHYS F471E	Advanced Topics in Physics I: Biophysics	
PHYS F471F	Advanced Topics in Physics I: Nuclear and Particle Physics	
PHYS F471G	Advanced Topics in Physics I: General Relativity	
PHYS F471H	Advanced Topics in Physics I: Astrophysics	
PHYS F471I	Advanced Topics in Physics I: Topics in Modern Mathematical Physics	
PHYS F471J	Advanced Topics in Physics I: Order of Magnitude Physics	
PHYS F472A	Advanced Topics in Physics II: Planetary Atmospheres	
PHYS F472B	Advanced Topics in Physics II: Fluid Dynamics	
PHYS F472C	Advanced Topics in Physics II: Plasma Physics	
PHYS F472D	Advanced Topics in Physics II: Hamiltonian Mechanics	
PHYS F472E	Advanced Topics in Physics II: Physics of Glaciers	

PHYS F472F	Advanced Topics in Physics II: Remote Sensing	
PHYS F472G	Advanced Topics in Physics II: Solar Physics	
PHYS F472H	Advanced Topics in Physics II: Advanced Laboratory	
PHYS F472I	Advanced Topics in Physics II: Spectroscopy	
PHYS F472J	Advanced Topics in Physics II: Cosmology	
PHYS F472K	Advanced Topics in Physics II: Quantum Computation	
PHYS F472L	Advanced Topics in Physics II: Covariant Kinematics/Dynamics	
PHYS F472Z	Advanced Topics in Physics II: Current Topics in Physics	
Total Credits		31

¹ Recommended courses include MATH F314, MATH F410 and MATH F432.

TECHNICAL MANAGEMENT

Code	Title	Credits
Technical Management Concentration Requirements		
Complete the following:		
MATH electives at the F300 level or above ¹		3
Physics credits at the F300 level or above		12
ACCT F261X	Principles of Financial Accounting	3
ACCT F262	Principles of Managerial Accounting	3
STAT F200X	Elementary Statistics	3
<i>College of Business and Security Management Courses²</i>		
BA F325	Financial Management ³	3
BA F330	The Legal Environment of Business ³	4
BA F343	Principles of Marketing ³	3
BA F360	Operations Management ³	3
BA F390	Organizational Theory and Behavior ³	3
Total Credits		40

¹ Recommended courses include MATH F314, MATH F410 and MATH F432.

² Students must take ACCT F261X, MATH F253X and PHYS F220 before taking these courses, or have permission of the MBA director. The College of Business and Security Management agrees that such students will be allowed to register for these courses.

³ 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 and ES F307.

Note: Must exclude PHYS F123X and PHYS F124X from core curriculum natural science requirement.

REQUIREMENTS FOR PHYSICS TEACHERS (GRADES 7-12)

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

Code	Title	Credits
Physics Program Requirements		
Complete all the requirements of the B.S. degree		
All prospective physics teachers must complete the following:		
CHEM F105X and CHEM F106X	General Chemistry I and General Chemistry II	8
PHYS F211X	General Physics I	4
PHYS F212X	General Physics II	4
PHYS F213X	Elementary Modern Physics	4
PHYS F220	Introduction to Computational Physics	4
PHYS F301	Introduction to Mathematical Physics	4
MATH electives		3
Physics-approved electives		16
All prospective science teachers must complete the following:		
PHIL F481	Philosophy of Science	3
Total Credits		50

Note: We strongly recommend that prospective secondary science teachers seek advising from the Alaska College of Education early in their undergraduate degree program so they can be appropriately advised of the State of Alaska requirements for teacher licensure. Students will apply for admission to the Alaska College of Education's postbaccalaureate teacher preparation program, a one-year intensive program, during their senior year.