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Revised 3/4/13

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PROGRAM/DEGREE REQUIREMENT CHANGE (MAJOR/MINOR)

SUBMITTED BY:

Department	Physics	College/School	CNSM
Prepared by	Renate Wackerbauer	Phone	X6108
Email Contact	rawackerbauer@alaska.edu	Faculty Contact	Renate Wackerbauer

See <http://www.uaf.edu/uafgov/faculty/cd> for a complete description of the rules governing curriculum & course changes.

PROGRAM IDENTIFICATION:

DEGREE PROGRAM	BS Physics
Degree Level: (i.e., Certificate, A.A., A.A.S., B.A., B.S., M.A., M.S., Ph.D.)	BS

A. CHANGE IN DEGREE REQUIREMENTS: (Brief statement of program/degree changes and objectives)

BS Applied Physics is integrated into the BS Physics Program as concentrations (see below, justification for action);

B. CURRENT REQUIREMENTS AS IT APPEARS IN THE CATALOG:

Physics

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

B.A., B.S., M.S., M.A.T., PH.D. DEGREES; MINOR

Downloadable PDF

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.

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Dean's Office
College of Natural Science & Mathematics

Governance
9/27/12 TWP

Major -- B.A. Degree

- A. Complete the general university requirements.
- B. Complete the B.A. degree requirements.
- C. Complete the following program (major) requirements:
- D. Complete the following: * PHYS F211X--General Physics--4 credits PHYS F212X--General Physics--4 credits PHYS F213X--Elementary Modern Physics--4 credits PHYS F301--Introduction to Mathematical Physics--4 credits PHYS approved electives--20 credits
- E. Complete the following: MATH F200X--Calculus I**--4 credits MATH F201X--Calculus II**--4 credits MATH F202X--Calculus III--4 credits MATH electives at the F300-level or above--3 credits

F. Minimum credits required--120 credits

* *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

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

* *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)

- A. Complete all the requirements of the B.A. or B.S. degree.
- B. All prospective physics teachers must complete the following: CHEM F105X and CHEM F106X--General Chemistry--8 credits PHYS F211X--General Physics--4 credits PHYS F212X--General Physics--4 credits PHYS F213X--Elementary Modern Physics--4 credits PHYS F220--Introduction to Computational Physics--4 credits PHYS F301--Introduction to Mathematical Physics--4 credits PHYS approved electives--16 credits MATH electives--3 credits
- C. All prospective science teachers must complete the following: PHIL F481--Philosophy of Science (3)--3 credits

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

- A. Complete the following: PHYS F103X - F104X--College Physics (8) or PHYS F211X - F212X--General Physics (8)--8 credits
 - B. Complete the following: PHYS F213X--Elementary Modern Physics--4 credits Electives at the F300 - F400-level--8 credits
- Minimum credits required--20 credits

C. PROPOSED REQUIREMENTS AS IT WILL APPEAR IN THE CATALOG WITH THESE CHANGES: (Underline new wording ~~strike through old wording~~ and use complete catalog format)

Since BS applied Physics is integrated into BS Physics, the proposed requirements cannot be expressed by underlining new wording or striking old words. Thus the proposed requirements are listed below

Note: PHYS F382 is no longer a proposed degree requirement (option I). This is the rule that the department follows already since several years, and thus we request to change it in the catalog.

Note: The current MS Physics requires 3cr of PHYS471 and 3cr of Phys472. The proposed requirements list 6cr out of Phys471 and Phys472. This is the rule that the department follows already since several years, and thus we request to change it in the catalog

Since BS in Applied Physics is integrated into BS Physics, we make the math requirements across all the options consistent as "6cr at MATH 300 -400 level courses"

Physics 103/104 was removed from the Minor Degree since it would cause a hidden prerequisite.

Revised 3/4/13

Physics

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

B.S. DEGREE; MINOR

Downloadable PDF

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 option* represents the classical undergraduate Physics curriculum. The *Applied Physics option* 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 option* provides a solid foundation at the interface of Physics, Climate Sciences, and Meteorology. The *Computational Physics option* is relevant for students seeking careers in any areas that require expertise in computational modeling and simulation of physical systems. The *Technical Management option* 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 with approval for some courses are, upon graduation, welcome to apply to the M.B.A. program in UAF's School of Management. GMAT exam required.

Major -- B.S. Degree

1. Complete the general university requirements. As part of the Core requirements, complete MATH200X.
2. Complete the B.S. degree requirements. As part of the BS degree requirements, complete MATH201X, PHYS211X, and PHYS212X.
3. Complete the following program (major) requirements:*
PHYS F211X--General Physics--4 credits
PHYS F212X--General Physics--4 credits
PHYS F213X--Elementary Modern Physics--4 credits
PHYS F220--Introduction to Computational Physics--4 credits
PHYS F301--Introduction to Mathematical Physics--4 credits
PHYS F341--Classical Physics I: Particle Mechanics--4

- credits PHYS F342--Classical Physics II: Electricity and Magnetism--4 credits
4. Complete the following program (major) requirements: MATH F200X--Calculus I**--4 credits MATH F201X--Calculus II**--4 credits MATH F202X--Calculus III--4 credits
 5. Complete one of the following options
Option I -- Physics
 - a. Complete MATH electives at the F300-level or above***--6 credits
 - b. Complete the following:* PHYS F313--Thermodynamics and Statistical Physics--4 credits PHYS F343--Classical Physics III: Vibration and Waves--4 credits PHYS F381W,O--Physics Laboratory--3 credits PHYS F421--Quantum Mechanics--4 credits PHYS F462--Geometrical and Physical Optics--4 credits
 - c. Complete credits from the following:*--6 credits PHYS F471--Advanced Topics in Physics I PHYS F472--Advanced Topics in Physics II
 - d. Minimum credits required--120 credits

Option II -- Applied Physics

- a. Complete MATH electives at the F300-level or above***--6 credits
- b. Complete physics credits at the F300-level or above*--9credits
- c. Complete credits in applied physics* ****--17cr
- d. Minimum credits required--120 credits

Option III -- Atmospheric Physics

- a. Complete MATH electives at the F300-level or above***--6 credits
- b. Complete physics credits at the F300-level or above*--9credits
- c. Complete the following:* ATM F401--Introduction to Atmospheric Science--3 credits ATM F413--Atmospheric Radiation--3 credits ATM F445--Atmospheric Dynamics--3 credits
- d. Complete credits in other relevant upper-division courses* ****--8 credits
- e. Minimum credits required--120 credits

Option IV -- Computational Physics

- a. Complete MATH electives at the F300-level or above***--6 credits
- b. Complete credits in applied physics* ****--12 credits
- c. Complete the following:* MATH F310--Numerical Analysis--3 credits CS F201--Computer Science I--3 credits CS F202--Computer Science II--3 credits
- d. Complete credits in other relevant upper-division courses* ****--5 credits
- e. Minimum credits required--120 credits

Option V -- Technical Management

- a. Complete mathematics electives at the F300-level or above*** --3 credits
- b. Complete STAT F200X--Elementary Probability and Statistics--3 credits
- c. Complete physics credits at the F300-level or above*--12 credits
- d. Complete the following*****. ACCT F261, F262--Accounting Concepts and Uses--6 credits BA F325--Financial Management#--3 credits BA F330--The Legal Environment of Business#--3 credits BA F343--Principles of Marketing#--3 credits BA F360--Operations Management#--3 credits BA F390--Organizational Theory and Behavior#--3 credits
- e. Minimum credits required--120 credits

* Students must earn a C grade (2.0) or better in each course.

** Satisfies core curriculum or B.S. degree requirements, but not both.

*** Suggested electives: MATH F314, F421 and F422.

**** 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.

***** Students can be required to earn a B grade or better if applying for the M.B.A. program.

Students must take ACCT F262, MATH F202X, STAT F200X, and PHYS F220 before taking these classes; or permission of the M.B.A. director. The School of Management agrees that such students will be allowed to register for these classes.

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

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

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 credits
PHYS F211X--General Physics--4 credits PHYS F212X--General Physics--4 credits
PHYS F213X--Elementary Modern Physics--4 credits
PHYS F220--Introduction to Computational Physics--4 credits
PHYS F301--Introduction to Mathematical Physics--4 credits
PHYS approved electives--16 credits MATH electives--3 credits
3. All prospective science teachers must complete the following: PHIL F481--Philosophy of Science (3)--3 credits

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:
2. PHYS F211X--General Physics I--4 credits PHYS F212X--General Physics II--4 credits PHYS F213X--Elementary Modern Physics--4 credits Physics electives at the F300 - F400-level--8 credits
3. Minimum credits required--20 credits

D. ESTIMATED IMPACT

WHAT IMPACT, IF ANY, WILL THIS HAVE ON BUDGET, FACILITIES/SPACE, FACULTY, ETC.

no impact on budget, facilities and faculty since program existed before, and all Physics courses are continued to be taught

E. IMPACTS ON PROGRAMS/DEPTS:

What programs/departments will be affected by this proposed action?
Include information on the Programs/Departments contacted (e.g., email, memo)

None. It is a program change within Physics Department

F. IF MAJOR CHANGE - ASSESSMENT OF THE PROGRAM:

Description of the student learning outcomes assessment process.)

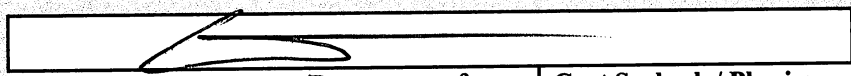
No major change

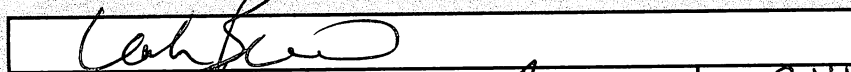
JUSTIFICATION FOR ACTION REQUESTED

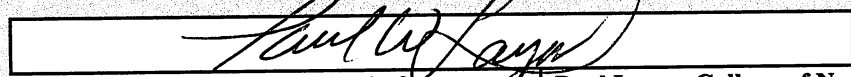
The purpose of the department and campus-wide curriculum committees is to scrutinize program/degree change applications to make sure that the quality of UAF education is not lowered as a result of the proposed change. Please address this in your response. This section needs to be self-explanatory. If you drop a course, is it because the material is covered elsewhere? Use as much space as needed to fully justify the proposed change and explain what has been done to ensure that the quality of the program is not compromised as a result.

The Physics Department was required by the Provost to reduce the number of offered undergraduate degrees. BS in Applied Physics was terminated by the Provost. The Physics department is integrating the Applied Physics degree with all its concentrations into the BS Physics, since there is student demand for this degree as well as it is attractive to employers in applied science disciplines.

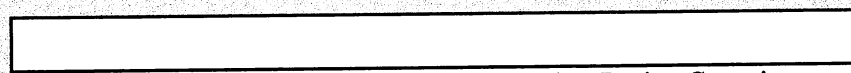
APPROVALS:


Signature, Chair, Program/Department of: **Curt Szuberla/ Physics** Date **20 SEP 2012**


Signature, Chair, College/School Curriculum Council for: **CNSM** Date **9/26/2012**


Signature, Dean, College/School of: **Paul Layer, College of Natural Science and Mathematics** Date **9/26/12**

ALL SIGNATURES MUST BE OBTAINED PRIOR TO SUBMISSION TO THE GOVERNANCE OFFICE


Signature, Chair, UAF Faculty Senate Curriculum Review Committee Date 