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PROGRAM/DEGREE REQUIREMENT CHANGE (MAJOR)

SUBMITTED BY:

Department	Physics	College/ School	CNSM
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Prepared by	Renate Wackerbauer	Phone	X6108
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See <http://www.uaf.edu/uafgov/faculty-senate/curriculum/course-degree-procedures/> for a complete description of the rules governing curriculum & course changes.

PROGRAM IDENTIFICATION:

DEGREE PROGRAM	Physics
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Degree Level: (i.e., Certificate, A.A., A.A.S., B.A., B.S., M.A., M.S., Ph.D.)	BS
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A. CHANGE IN DEGREE REQUIREMENTS: (Brief statement of program/degree changes and objectives)

In 2012 the physics department was required by the provost to consolidate the BS Physics, BS Applied Physics, and BS Computational Physics into a single BS Physics program with concentrations. While the BS in Computational Physics was a well balanced degree at the interface of physics and computation, and highly relevant for the job market, its consolidation with the BS Physics program requires to add more physics courses such that the physics background is sufficient and also consistent with our other concentrations (in atmospheric physics, applied physics). This change makes sure that all (non-management related) concentrations under the BS physics do have the same required physics course work.

CHANGES:

current computational physics: 12 cr of applied physics (to be approved by dept chair) + 5cr relevant upper division courses (to be approved by dept chair)

proposed computational physics: 9cr of physics courses at 300 level or above + 8cr relevant upper division courses (to be approved by dept chair)

In addition we correct a current mistake in the catalog: The concentration in applied physics requires also 6cr (not 3cr) of MATH at the 300 level or above, as all our concentrations do.

RECEIVED

FEB - 9 2015

Dean's Office

College of Natural Science & Mathematics

JESSICA LARSEN

2/10/15

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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/

BS, MS, PHD DEGREES; 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** 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 -- BS Degree

1. Complete the [general university requirements](#). (As part of the core curriculum requirements, complete MATH F200X.)*
 2. Complete the [BS degree requirements](#). (As part of the BS degree requirement, complete MATH F201X, PHYS F211X and PHYS F212X.)*
 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 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 credits
 - b. Complete the following:*
 PHYS F351--Thermal Physics--2 credits
 PHYS F451--Statistical Physics--2 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 6 credits from the following:*
 PHYS F471--Advanced Topics in Physics I
 PHYS F472--Advanced Topics in Physics II

Applied Physics

- a. Complete 3 credits of MATH electives at the F300 level or above.
 (MATH F314, MATH F421, or MATH F422 are recommended.)--3 credits
 - b. Complete 9 physics credits at the F300 level or above--9 credits
 - c. Complete 17 credits from applied physics--17 credits
- 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 credits
 - b. Complete 9 physics credits at the F300 level or above.*--9 credits
 - 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 8 credits in other relevant upper-division courses.*--8 credits
- 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 credits
 - b. Complete credits in other relevant upper-division courses--5 credits
- 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.*
- 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 12 credits in applied physics*--12 credits

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 credits

- b. Complete STAT F200X--Elementary Probability and Statistics--3 credits

- c. Complete 12 physics credits at the F300 level or above.*--12 credits

- d. Complete the following:*

ACCT F261--Principles of Financial Accounting--3 credits

ACCT F262--Principles of Managerial Accounting--3 credits

- e. Complete the following:

(Students must take ACCT F261, MATH F202X 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 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

6. Minimum credits required--120 credits

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

** Satisfies core curriculum or BS 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.

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)

Physics

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

BS, MS, PHD DEGREES; MINOR

[Downloadable PDF](#)

Minimum Requirements for Degree: 120 credits

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 (MATH F314, MATH F421 or MATH F422 are recommended.)*--6 credits
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Applied Physics

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Atmospheric Physics

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 - d. Complete 8 credits in other relevant upper-division courses.*--8 credits
- 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 credits
 - b. Complete 9 physics credits at the F300 level or above.* --9 credits
- ~~*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.*~~
- 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 8 credits in other relevant upper-division courses.*--8 credits

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 credits

b. Complete STAT F200X--Elementary Probability and Statistics--3 credits

c. Complete 12 physics credits at the F300 level or above.*--12 credits

d. Complete the following:*

ACCT F261--Principles of Financial Accounting--3 credits

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e. Complete the following:

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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.

D. ESTIMATED IMPACT

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

No impact, courses are offered already for BS physics program

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)

No other program will be affected

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.

In 2012 the physics department was required by the provost to consolidate the BS Physics, BS Applied Physics, and BS Computational Physics into a single BS Physics program with concentrations. The proposed changes in the computational physics concentration make sure that there are enough physics courses at the upper level to justify a concentration within a BS physics. With the changes, the concentrations in applied physics, atmospheric physics and computational physics have the same rigor/standard in physics. This is achieved by replacing 12 credits in applied physics (typically courses outside of PHYS, approved by dept chair) with 9cr in upper level PHYS courses and an increase of relevant upper level courses from 5 to 8cr.

In addition we correct a current mistake in the catalog: The concentration in applied physics requires also 6cr (not 3cr) of MATH at the 300 level or above, as all our concentrations do.

APPROVALS: SIGNATURES MUST BE OBTAINED PRIOR TO SUBMISSION TO THE GOVERNANCE OFFICE



Digitally signed by Curt A. L. Szuberla
DN: cn=Curt A. L. Szuberla,
o=University of Alaska Fairbanks,
ou=Physics Dept.,
email=caszuberla@alaska.edu, c=US
Date: 2015.02.09 10:08:17 -09'00'

Date

9 February 2015

Signature, Chair, Program/Department
of:

Dr. Curt Szuberla, Physics Department Chair

[Signature]

Date

2/17/15

Signature, Chair, College/School Curriculum Council
for:

(NSM)

[Signature]

Date

2/18/15

Signature, Dean, College/School of:

CNSM

CHAIR SIGNATURE OBTAINED FOLLOWING APPROVAL BY FACULTY SENATE COMMITTEE

Date

Signature, Chair, UAF Faculty Senate
Curriculum Review Committee

Graduate Academic and Advisory Committee