Revised 2/19/2016 62-UPCH.

FORMAT 5

Submit originals and one copy and electronic copy to Governance/Faculty Senate Office (email electronic copy to jbharvie@alaska.edu)

PROGRAM/DEGREE REQUIREMENT CHANGE (MAJOR)

SUBMITTED BY:

Department	Physics	College/School	CNSM
Prepared by	Renate Wackerbauer	Phone	474-6108
Email Contact	rawackerbauer@alaska.edu	Faculty Contact	Renate Wackerbauer

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
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)

The capstone project course is added to the program. This course is a 0 credit course, used to keep track of (by department and registrar) which student initiated or has passed a capstone project. students doing a capstone project sign up for undergraduate research (taking 2 credits), or individual study (taking 2 credits), or participate at the international university physics competition.

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.S., M.S., PH.D. 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 -- B.S. Degree

1. Complete the general university requirements. (As part of the core curriculum requirements, complete MATH F251X.)*
2. Complete the B.S. degree requirements. (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 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 F251X--Calculus I--4 credits
   MATH F252X--Calculus II--4 credits
   MATH F253X--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 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 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 9 physics credits at the F300 level or above--9 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 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
ACCT F262--Principles of Managerial Accounting--3 credits

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 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 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.

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
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www.uaf.edu/physics/
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   ~~MATH F251X--Calculus I--4 credits~~
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5. 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 independent study with a faculty member within any 300 or 400 level physics course (by taking PHYS F497 – 2 credits), or as participation in the international University Physics Competition (0 credits). Credits required to fulfill the capstone experience do not count towards credits required to complete the concentrations.

6. Complete one of the following concentrations:*

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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.

A capstone project is now a university requirement for every BS degree. Faculty will mentor the capstone project through undergraduate research credits or individual study credits, which will enter into the faculty's teaching workload distribution. The department has the Noyes computer lab available to students, an increase in facilities/space is not expected.

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 is affected

F. IF MAJOR CHANGE - ASSESSMENT OF THE PROGRAM:

Description of the student learning outcomes assessment process.)

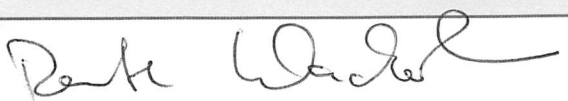
The questionnaire for evaluating the capstone project is provided with the syllabus for the new course PHYS 400. The faculty mentor of the project is evaluating the student's paper and oral presentation of the capstone project with this questionnaire. All physics faculty will evaluate the oral presentation part through the same questionnaire. The data will then be used for our biannual SLOA reports to assess this program 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.

A capstone project is now a university requirement for every BS degree. The department is fulfilling this requirement through this program change

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



Date 1/21/2016

Signature, Chair, Program/Department of: Physics

		Date	1-29-16
Signature, Chair, College/School Curriculum Council for:	CNSM		
		Date	2/1/16
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	