

PROGRAM MODIFICATION PROPOSAL

Background Information

Provide a detailed description of the proposed modification, including its nature and purpose and centrality to institutional mission. (1500 characters)

About twenty years ago, CHE approved the concentration in Meteorology in the B.S. degree in Physics and Astronomy. Due to the substantial amount of math and physics required by the B.S. degree, this program is actually a program in atmospheric physics (which is a branch of meteorology). As part of our ongoing development and overhaul of our meteorology program, we propose renaming and repackaging the existing concentration in meteorology in the B.S. degree as a concentration in atmospheric physics in the B.S. degree. The existing concentration in meteorology will be terminated and replaced by this new concentration, which serves the same audience. Renaming the concentration will enhance recruiting and help students seeking graduate study. The core courses and elective courses within the concentration will become more focused to the needs of the students. The students that we anticipate completing the Atmospheric Physics concentration are Physics students who have an ultimate goal of either attending graduate programs in Atmospheric Science/Atmospheric Physics/Meteorology *and/or* pursuing more research-oriented jobs in the atmospheric sciences in research institutions like NASA or NOAA. Other meteorology students will be guided to the newly proposed B.A. degree in meteorology.

To accomplish this modification, no new courses, no additional faculty, no additional facilities, no additional library resources and no additional financial resources are required.

List the objectives of the modified program. (1500 characters)

1. Successful students will be able to demonstrate an understanding of the fundamental principles of atmospheric physics, which includes concepts from mechanics, electromagnetism, thermodynamics, and fluid mechanics.
2. Successful students will be able to demonstrate proficiency in utilizing appropriate computational tools to analyze and interpret atmospheric data.

PROGRAM MODIFICATION PROPOSAL

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Assessment of Need

Provide an assessment of the need for the program modification for the institution, the state, the region, and beyond, if applicable. (1500 characters)

The current concentration in Meteorology (which is being terminated) was implemented to serve a very diverse student base. As our program has evolved, it has become increasingly apparent that several different programs are necessary to serve the needs of these students. Now that the resources are available (following recent hires in the Physics and Astronomy department), a multifaceted request to introduce a new major (a B.A. in meteorology) as well as a new concentrations (a concentration in Operational Meteorology, to be linked to the B.A. in meteorology) are being put forth together with the repackaging of the atmospheric physics concentration to help ensure that the needs of our students are met. No program in atmospheric physics exists in South Carolina, or for that matter in the southeastern United States. Thus we anticipate the repackaging of the concentration within the B.S. degree from 'meteorology' to 'atmospheric physics' will attract students from throughout the region.

According to the Bureau of Labor Statistics, atmospheric scientist employment will increase about 10% from 2012 to 2022, with the largest expected changes in computer systems design and related services (34.7% increase) and scientific and technical consulting services (40.8% increase). Based on demand from our students and graduation rates from peer institutions nationwide that have atmospheric physics programs, we anticipate five graduates from our program per year.

Will the proposed modification impact any existing programs and services at the institution?

Yes

No

If yes, explain. (1000 characters)

Since this new concentration is merely replacing an existing concentration, there is no expected impact on any other existing programs or courses. All courses required in this concentration are regular offerings within the Physics and Astronomy department, and all electives are already offered as part of other degree programs and/or concentrations. Since this concentration is developed to replace an existing concentration, enrollment numbers in existing classes are not expected to appreciably change.

PROGRAM MODIFICATION PROPOSAL

PROGRAM MODIFICATION PROPOSAL

List of Similar Programs in South Carolina

Program Name	Institution	Similarities	Differences
No atmospheric physics programs exist in SC, but some related programs offer a few of the courses			
Applied Physics Major with Concentration in Environmental Physics	Coastal Carolina University	Involves coursework associated with the quantitative physical sciences related to fluids, remote sensing, and atmospheric physics. Includes some of the same introductory/intermediate coursework.	Isn't designed as an atmospheric physics program; Designed for very different population.
Environmental Science B.S.	University of South Carolina	Involves some coursework associated with introductory physics coupled with natural science coursework in the environmental sciences.	Not aimed at students seeking careers in atmospheric physics. This is a much broader program.
Geology B.S. with Environmental Science Concentration	Clemson University	Closest program at Clemson to what is proposed here; involves study of Earth system as a whole, includes some environmental science classes, which may include some elements of atmospheric science.	Much more pronounced focus on Earth history and standard Geological topics. No required coursework in atmospheric science.
Environmental Studies Major	Wofford College	Program includes some elements of Natural Science investigation to elements of Earth science.	Program not targeted to atmospheric physics. Designed to be a blend of Social Science, Humanities, and Science courses within the Environmental designation.

PROGRAM MODIFICATION PROPOSAL

Description of the Program

Projected Enrollment						
Year	Fall		Spring		Summer	
	Headcount	Credit Hours	Headcount	Credit Hours	Headcount	Credit Hours
2016-2017	20	80	20	80	2	6
2017-2018	20	80	20	80	2	6
2018-2019	20	80	20	80	2	6
2019-2020	20	80	20	80	2	6
2020-2021	20	80	20	80	2	6

Curriculum

Attach a curriculum sheet identifying the courses required for the program.

The proposed Atmospheric Physics Concentration within the Physics B.S. degree will consist of 18 hours (9 core credits and 9 elective credits).

Core Courses (all required) (9 credits):

1. **PHYS 405** (Thermal Physics) (3 cr.)
(PR: PHYS 230 and (MATH 323 or PHYS 272) or permission of instructor.)
2. **PHYS 415** (Fluid Mechanics) (3 cr.)
(PR: (MATH 323 or PHYS272) and PHYS 301 or permission of instructor.)
3. **PHYS 459** (Cloud and Precipitation Physics) (3 cr.)
(PR: (PHYS 112 or HONS 158); CO: (MATH 323 or PHYS 272), or permission of the instructor)

Electives (at least 9 credits from the following list)

1. **ASTR 306** (Planetary Astronomy) (3 cr.)
(PR: ASTR 231)
2. **ENVT 352*** (Special Topics in Environmental Science and Studies) (1-4 cr.)
(CO or PR: At least 3 courses in environmental studies minor).
3. **GEOL 442** (Geological Application of Remote Sensing) (4 cr.)
(PR: GEOL 103; GEOL 105 or HONS 155 and 156. Some computer experience is helpful.)
4. **GEOL 449** (Geographical Information Systems) (4 cr.)
(PR: GEOL 103; GEOL 105 or HONS 155 and 156; or permission of the instructor. Some computer experience is helpful.)
5. **HONS 390*** (Special Topics) (3-6 cr.)
(PR: varies)
6. **PHYS 210** (Introduction to Air Pollution) (3 cr.)
(PR: PHYS 105, or PHYS 106L with a grade of C- or better, or permission of the instructor)
7. **PHYS 215** (Synoptic Meteorology) (3 cr.)
(PR: MATH 120 and (PHYS 101 (with a grade of C- or better) or PHYS 105 or PHYS 111 or HONS 157), or permission of the instructor)
8. **PHYS 225** (Climate) (3 cr.)
(PR: PHYS 112 or HONS 158 or (PHYS 102 (with a grade of C- or better) and (MATH220 or MATH229) or Permission of Instructor.)
9. **PHYS 298*** (Special Topics) (1-3 cr.)
(PR: Instructor and department chair permission)
10. **PHYS 320** (Intro to Electronics) (4 cr.)

PROGRAM MODIFICATION PROPOSAL

PROGRAM MODIFICATION PROPOSAL

Faculty

Provide a brief explanation of any additional institutional changes in faculty and/or administrative assignment that may result from implementing the proposed program modification. (1000 characters)

N/A

Resources

Identify any new library/learning resources, new instructional equipment, and new facilities or modifications to existing facilities needed to support the modified program. (2000 characters)
N/A

PROGRAM MODIFICATION PROPOSAL

Financial Support

Category	Estimated New Costs by Year					Total
	1 st	2 nd	3 rd	4 th	5 th	
Program Administration	0	0	0	0	0	0
Faculty and Staff Salaries	0	0	0	0	0	0
Graduate Assistants	0	0	0	0	0	0
Equipment	0	0	0	0	0	0
Facilities	0	0	0	0	0	0
Supplies and Materials	0	0	0	0	0	0
Library Resources	0	0	0	0	0	0
Other*	0	0	0	0	0	0
Total	0	0	0	0	0	0
Sources of Financing						
Category	1 st	2 nd	3 rd	4 th	5 th	Total
Tuition Funding	\$51,792	\$51,792	\$51,792	\$51,792	\$51,792	\$258,960
Program-Specific Fees						
State Funding (i.e., Special State Appropriation)*						
Reallocation of Existing Funds*						
Federal Funding*						
Other Funding*						
Total						\$258,960
Net Total (i.e., Sources of Financing Minus Estimated New Costs)						\$258,960

*Provide an explanation for these costs and sources of financing in the budget justification.

PROGRAM MODIFICATION PROPOSAL

Budget Justification

Provide a brief explanation for the other new costs and any special sources of financing (state funding, reallocation of existing funds, federal funding, or other funding) identified in the Financial Support table. (1000 characters)

Note: Institutions need to complete this budget justification *only* if any other new costs, state funding, reallocation of existing funds, federal funding, or other funding are included in the Financial Support table.

There are no new costs to this concentration. It is replacing an existing concentration.

Evaluation and Assessment

Will any the proposed modification impact the way the program is evaluated and assessed?

Yes

No

If yes, explain. (1000 characters)

PROGRAM MODIFICATION PROPOSAL

Will the proposed modification affect or result in program-specific accreditation?

Yes

No

If yes, explain; if the modification will result in the program seeking program-specific accreditation, provide the institution's plans to seek accreditation, including the expected timeline for accreditation. (500 characters)

Will the proposed modification affect or lead to licensure or certification?

Yes

No

If yes, explain how the program will prepare students for licensure or certification. (500 characters)

PROGRAM MODIFICATION PROPOSAL

Teacher or School Professional Preparation Programs

Is the proposed modified program a teacher or school professional preparation program?

Yes

No

If yes, complete the following components.

Area of Certification

Attach a document addressing the South Carolina Department of Education Requirements and SPA or Other National Specialized and/or Professional Association Standards.