Name of Institution

College of Charleston

Name of Program (include concentrations, options, and tracks)

B.A. degree in meteorology
Concentration in operational meteorology

Program Designation

☐ Associate's Degree ☐ Master's Degree
☒ Bachelor's Degree: 4 Year ☐ Specialist
☐ Bachelor's Degree: 5 Year ☐ Doctoral Degree: Research/Scholarship (e.g., Ph.D. and DMA)
☐ Doctoral Degree: Professional Practice (e.g., Ed.D., D.N.P., J.D., Pharm.D., and M.D.)

Does the program qualify for supplemental Palmetto Fellows and LIFE Scholarship awards?
☒ Yes
☐ No

Proposed Date of Implementation
Fall 2016

CIP Code
40.0404

Delivery Site(s)
College of Charleston Campus

Delivery Mode

☒ Traditional/face-to-face*
*select if less than 50% online

☐ Distance Education
☐ 100% online
☐ Blended (more than 50% online)
☐ Other distance education

Program Contact Information (name, title, telephone number, and email address)
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Institutional Approvals and Dates of Approval
Faculty Curriculum Committee, Date: 11/20/15
Faculty Senate Budget Committee, Date: 12/7/15
Faculty Senate, Date: 12/8/15
Faculty Academic Planning Committee, 1/12/16
Board of Trustees, Date: 1/28/16 (pending)

Background Information

State the nature and purpose of the proposed program, including target audience and centrality to institutional mission. (1500 characters)

No full degree program in meteorology exists in South Carolina, and no programs meet the stringent curricular requirements of the American Meteorological Society (AMS), or those required by the Federal Civil Service for meteorologist positions within the National Weather Service (NWS). This new B.A. degree is intended for liberal arts students, students interested in double majors outside the sciences, and for students desiring one of many meteorology-related jobs such as environmental science, insurance, shipping, regulation, science journalism, and secondary science education. The concentration in operational meteorology, combined with the B.A., will prepare students for forecasting jobs in broadcast meteorology and the NWS. The concentration in atmospheric physics prepares students for graduate study in meteorology. The cost of these programs is minimal as most courses already exist and no new faculty or facilities are needed.

The AMS requires a multidisciplinary curriculum, and this approach is very compatible with the liberal arts mission of the College. In particular, because meteorology is linked to oceanography, hydrology, natural hazards and remote sensing, this strengthens interdisciplinary programs and research with the Biology and Geology departments. Additionally, the proposed program would enhance offerings in the Environmental Studies programs, and provide additional course offerings for students majoring in geology, physics, biology and other relevant fields.

List the program objectives. (2000 characters)

South Carolina has no full undergraduate degree program devoted to the study of meteorology. Therefore, the primary goal of this program is to provide a strong background in meteorology that will prepare students for many possible meteorology-related careers. When students complete the BA degree, they will be able to

1) Demonstrate an understanding of the fundamental principles of meteorology, which includes climate and either synoptic meteorology or air pollution;
2) Demonstrate an ability to connect concepts in meteorology to broader societal, environmental, political, business, or ecological issues;
3) Demonstrate proficiency in designing, conducting, and reporting results from experiments relative to topics in meteorology;
4) Synthesize core knowledge and analytical tools to design a research project relevant to meteorology;
5) Demonstrate the ability to communicate meteorological information effectively in written and oral form.

An Operational Meteorology concentration is also proposed for students who are specifically interested in pursuing forecasting and operational meteorology as a career. The operational meteorology concentration is specifically designed to meet the requirements for future employment in the NWS or in broadcast meteorology. In addition to the program objectives for the BA degree, students who complete the Operational Meteorology concentration will be able to

1) Explain the physical laws governing the structure and evolution of atmospheric phenomena spanning a broad range of spatial and temporal scales.
2) Demonstrate proficiency in interpreting various meteorological diagrams and synthesize information from various meteorological sources to diagnose synoptic and mesoscale weather phenomena.
3) Demonstrate proficiency in using computer based weather visualization and analysis packages.
4) Demonstrate skill in developing, evaluating, and disseminating short-to-medium term forecasts of synoptic and mesoscale weather phenomena.

Assessment of Need

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

The U.S. Bureau of Labor Statistics (BLS) estimates that the U.S. employs a total of 11,100 atmospheric scientists/meteorologists. If South Carolina contributes a representative fraction (about 1.5% of the U.S. population), this suggests between 150-200 people working as atmospheric scientists/meteorologists in the state right now, all of whom had to be trained in other states. The proposed program also trains graduates for other types of careers such as meteorology research, national defense (particularly air force), insurance, airlines, sailing, shipping, farming, Wall street, government policy and regulation, law, environmental assessment, and satellite remote sensing.

According to the BLS, 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). Another common path for our students would be environmental science work. According to BLS, environmental scientist employment will increase approximately 15% from 2012 to 2022, with the largest expected change in scientific and technical consulting services (40.8% increase).

Based on demand from our students and graduation rates from peer institutions nationwide that have meteorology programs, we anticipate ten graduates from our program per year, which should cover most of the need for meteorologists in S.C.

Employment Opportunities

Is specific employment/workforce data available to support the proposed program?

☒Yes

☐No

If yes, complete the table and the component that follows the table on page 4. If no, complete the single narrative response component on page 5 beginning with “Provide supporting evidence.”

Employment Opportunities			
Occupation	**Expected Number of Jobs**	**Employment Projection**	**Data Source**
Atmospheric scientists/meteorologists	11,100	10% from 2012 to 2022	Bureau of Labor statistics
Environmental scientists and specialists	90,000	15% from 2012 to 2022	Bureau of Labor statistics
Environmental science and protection technicians	32,800	19% from 2012 to 2022	Bureau of Labor statistics
Atmospheric Science postsecondary teachers	10,930	10% from 2012 to 2022	Bureau of Labor Statistics

Provide additional information regarding anticipated employment opportunities for graduates. (1000 characters)

Since there are no programs for operational meteorology (OM) in S.C., it is expected that successful students in OM will have greater opportunities for employment within S.C. About 50 OMs are currently employed at NWS offices within S.C. About 70 OMs are currently employed at TV and radio stations within S.C. Perhaps 30 OMs are currently employed at the state climatology office, Savannah River Site and other governmental agencies within S.C. About 20 OMs are currently employed at S.C. airports and air force bases. Dozens more are currently employed by S.C. industrial concerns and businesses. Currently, S.C. residents who desire any of these jobs must receive their education outside of S.C. In summary, there are over 200 OMs employed in the state today. Assuming a career lifetime of about 30 years would mean that about 7 OMs retire on average each year and would be replaced by 7 graduates from our program each year.

Provide supporting evidence of anticipated employment opportunities for graduates, including a statement that clearly articulates what the program prepares graduates to do, any documented citations that suggests a correlation between this program and future employment, and other relevant information. Please cite specific resources, as appropriate. (3000 characters)

Note: Only complete this if the Employment Opportunities table and the section that follows the table on page 4 have not previously been completed.

Will the proposed program impact any existing degree programs and services at the institution (e.g., course offerings or enrollment)?

☒Yes

☐No

If yes, explain. (500 characters)

The new courses created may serve as allowable electives within several existing programs at the institution (Physics B.S., Physics B.A., Energy Production Concentration, Astronomy B.A., Minors in Astronomy and Environmental Studies, and the Physics Cognate of the Data Science Degree). There also will be some (modest) impact on enrollment in existing courses, due to the fact that this newly served student population will be required to take existing courses to complete the degree program.

List of Similar Programs in South Carolina

Program Name	Institution	Similarities	Differences
No full meteorology 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 a meteorology program; doesn't meet AMS or NWS requirements; doesn't include forecasting, synoptic, dynamic, or climate courses; requires more physics than this 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 meteorology. This is a much broader program that still will not meet the minimal AMS or NWS requirements for programs in meteorology.
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. No path through the program that meets NWS or AMS requirements for programs in Meteorology.
Environmental Studies Major	Wofford College	Program includes some elements of Natural Science investigation to elements of Earth science.	Program not targeted to atmospheric science. Designed to be a blend of Social Science, Humanities, and Science courses within the Environmental designation. Doesn't meet NWS or AMS requirements for Meteorology.

Description of the Program

Projected Enrollment						
Year	Fall		Spring		Summer	
	Headcount	Credit Hours	Headcount	Credit Hours	Headcount	Credit Hours
2016-2017	10	40	15	60	2	6
2017-2018	25	100	27	108	5	15
2018-2019	37	148	38	152	7	21
2019-2020	45	180	46	184	8	24
2020-2021	50	200	50	200	9	27

Besides the general institutional admission requirements, are there any separate or additional admission requirements for the proposed program?

☐Yes

☒No

If yes, explain. (1000 characters)

Are there any special articulation agreements for the proposed program?

☐Yes

☒No

If yes, identify. (1000 characters)

Students from two-year institutions could take the one year of calculus and one year of basic physics courses required for this proposed degree as well as some of the elective courses at their institution (most two year institutions offer all these courses). Upon transferring to the College of Charleston, those students could take the remaining core courses, conceivably within a two-year timeframe if timed to coincide with biennial course sequencing, and graduate in four years. Also, graduates of the proposed program could potentially seek graduate study in related or unrelated fields at Clemson or USC.

Curriculum

Select one of the following charts to complete: Curriculum by Year **or** Curriculum by Category

Curriculum by Year					
Course Name	**Credit Hours**	**Course Name**	**Credit Hours**	**Course Name**	**Credit Hours**
Year 1					
Fall		**Spring**		**Summer**	
Total Semester Hours		Total Semester Hours		Total Semester Hours	
Year 2					
Fall		**Spring**		**Summer**	
Total Semester Hours		Total Semester Hours		Total Semester Hours	
Year 3					
Fall		**Spring**		**Summer**	
Total Semester Hours		Total Semester Hours		Total Semester Hours	
Year 4					
Fall		**Spring**		**Summer**	

Curriculum by Year					
Course Name	**Credit Hours**	**Course Name**	**Credit Hours**	**Course Name**	**Credit Hours**
Total Semester Hours		Total Semester Hours		Total Semester Hours	
Year 5					
Fall		**Spring**		**Summer**	
Total Semester Hours		Total Semester Hours		Total Semester Hours	

Curriculum by Category*							
B.A. in Meteorology Required Courses	**17+ hours**	**Required Math**	**8+ hours**	**Electives (Cont'd).**	**5+ hours**	**Concentration Elective Courses**	**6 hours**
**********	********	MATH 120	4	PHYS 298	1-3	PHYS 409	3
Base Experience	*3 or 9 hours*	AND 1 OF EITHER		PHYS 301	3	PHYS 340	3
PHYS 105 (Intro to Meteorology)	3	MATH 220	4	PHYS 320	3	BIOL 342	3
OR 3 of the Following		OR		PHYS 340	3	CHEM 111/111L	4
GEOL 438 (Hydrogeology)	3	MATH 229	4	PHYS 350	4	CSCI 220/220L	4
PHYS 405 (Thermal Physics)	3	**********	********	PHYS 381	1-3	GEOL 438	3
PHYS 415 (Fluid Mechanics)	3	**Electives**	**5+ hours**	PHYS 390	1-3	MATH 250	3
PHYS 459 (Cloud/Rain Physics)	3	ASTR 129/129L	4	PHYS 394/394L	4		
**********	********	ASTR 306	3	PHYS 399	3		
Emphasis Experience	*3 hours*	BIOL 204	3	PHYS 405	3		
PHYS 210 (Intro. to Air Pollution)	3	BIOL 342	3	PHYS 409	3		
OR		CHEM 101/101L	4	PHYS 410	3		
PHYS 215 (Synoptic Meteor.)	3	CHEM 111/111L	4	PHYS 412	1-3		
**********	********	CHEM 112/112L	4	PHYS 415	3		
PHYS 225 (Climate)	*3*	COMM 104	3	PHYS 425	3		
PHYS 370 (Experimental Physics)	*4*	CSCI 220/220L	4	PHYS 457	3		
PHYS 419 (Research Seminar)	*1*	ENGL 334	3	PHYS 459	3		
**********	********	ENVT 200	3	**********	**********		
Capstone Experience	*3 or 6 hours*	ENVT 395	1	**Concentration required courses**	**28 hours**		
PHYS 420 (Senior Research)	3	GEOL213	3	PHYS 215	3		
OR		GEOL288	3	PHYS 230	3		
PHYS 499 (Bachelor's Essay)	6	GEOL291	3	PHYS 301	3		
**********	********	GEOL438	3	PHYS 405	3		
Introductory Physics	*8 hours*	GEOL442	4	PHYS 415	3		
PHYS 111/111L/112/112L	8	HONS390	3-6	PHYS 425	3		
OR		MATH250	3	PHYS 459	3		
HONS 157/157L/158/158L	8	PHYS106L	2	MATH 221	4		
OR		PHYS210 or PHYS215	3	MATH 323 or PHYS272	3		
PHYS 101/101L/102/102L (grade req of C- or better in each course)	8	PHYS230	3				

* Add category titles to the table (e.g., major, core, general education, concentration, electives, etc.)

Total Credit Hours Required 38+ for BA; 61+ for BA and concentration in operational meteorology

Course Descriptions for New Courses

Course Name	Description
PHYS 106L (Exercises in Weather and Climate)	Exercises for important topics in meteorology, including clouds, forecasting, thunderstorms, tornadoes, hurricanes and climate change. Concepts will be learned primarily in group-based exercises, supplemented with recorded lecture to provide needed background. Course is intended to be taught in an online format.
PHYS 210 (Introduction to Air Pollution)**	Sources of air pollution, and the influence of anthropogenic and natural processes on air quality. Topics include the atmosphere's chemical composition, atmospheric chemical reactions, greenhouse gases, global warming and the roles of government in air pollution control.
PHYS 215 (Synoptic Meteorology)	Application of physical principles to synoptic-scale weather analysis and forecasting. Topics include weather observing techniques and weather map analysis; analysis of cyclones, fronts, and jets; temperature and precipitation forecasting techniques; and analysis of soundings and thermodynamic diagrams.
PHYS 225 (Climate)**	This course serves as an introduction to the study of Earth's climate. Topics may include global energy balance, atmospheric radiative transfer, the hydrologic cycle, environmental energy transport, climate sensitivity, and feedback mechanisms. Lecture three hours per week.
PHYS 425 (Mesoscale Meteorology)	Applications of dynamics and forecasting techniques in diagnosing the organization of mesoscale and convective phenomena. Topics include mesoscale instabilities; boundary layer dynamics; air mass boundaries; convective initiation; convective storms; mesoscale convective systems; tornadoes; flash flooding; and various orographic mesoscale phenomena.
PHYS 459 (Cloud and Precipitation Physics)**	Essential elements of the physics associated with the study of clouds and precipitation. Lectures three hours per week.
****Note: PHYS 210, 225 and 459 replace existing courses PHYS 456, 458 and 308, respectively**	

Faculty

Faculty and Administrative Personnel				
Rank	**Full- or Part-time**	**Courses Taught or To be Taught, Including Term, Course Number & Title, Credit Hours**	**Academic Degrees and Coursework Relevant to Courses Taught, Including Institution and Major**	**Other Qualifications and Comments (i.e., explain role and/or changes in assignment)**
B. Lee Lindner Associate Professor	Full time	PHYS 105, Introduction to meteorology, 3, spring PHYS 106L, Exercises in weather and climate, 2, summer PHYS 457, Satellite Meteorology, 3, biennial	Ph.D., Astrophysical, Atmospheric and Planetary Sciences, Univ. Colorado, Dissertation "Aeronomy and Radiative Transfer of the Atmosphere"	Primary program contact; no change in assignments; has taught 105 and 457 six times each already and 106L twice as a special topics course
Gabriel Williams Assistant Professor	Full time	PHYS 215, Synoptic meteorology, 3, biennial PHYS 425, Mesoscale meteorology, 3, biennial PHYS 405,ThermalPhysics,3,fall	Ph.D., Atmospheric Science, Colorado State Univ., Dissertation "Effects of environmental flow on internal dynamics of tropical cyclones"	Primary operational meteorology contact; has taught 405; has also taught 215 as a special topics course; 425 will cause a small change in assignment
Mike Larsen Associate Professor	Full time	PHYS 225, Climate, 3, biennial PHYS 415, Fluid Dynamics, 3, biennial PHYS 459, Cloud and Precipitation Physics, 3, biennial	Ph.D., Physics, Michigan Tech. Univ., Dissertation "Studies of discrete fluctuations in atmospheric phenomena"	Primary atmospheric physics contact; has taught 459 in its previous form as 308
Ian Rumsey Assistant Professor	Full time	PHYS 210, Introduction to Air Pollution, 3, biennial	Ph.D., Atmospheric Science, North Carolina State Univ., Dissertation "Sulfur emissions from swine feeding"	Primary environmental/air pollution contact; has taught 210 as a special topics course
Jeff Wragg Instructor	Full time	PHYS 370, Experimental Physics, 4, every term	Ph.D., Physics, Univ. of Missouri	Has taught 370 every year for a decade
All 18 faculty members of the department	Full time	PHYS419, Research Seminar, 1, every term PHYS420, Senior Research, 3, every term PHYS499, Bachelors Essay, 6, every term PHYS101/102/111/112, intro physics, 4, every term	Ph.D., Physics or Astrophysics or Atmospheric Physics	All courses are currently taught and have been taught for 20 years; 419/420/499 are all specific to the research of the faculty member

Note: Individuals should be listed with program supervisor positions listed first. Identify any new faculty with an asterisk next to their rank.

Total FTE needed to support the proposed program (i.e., the total FTE devoted just to the new program for all faculty, staff, and program administrators):

Faculty	Staff	Administration
0.8	0.1	0.04

Faculty /Administrative Personnel Changes

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

No new faculty will be required as the department currently has four tenure-track meteorologists. There are 6 new courses proposed for this program, totaling 15 hours, plus 2 hours in summer. 3 existing courses are discontinued, totaling 11 hours. Thus, only 4 hours are added, on a biennial basis (1 hour per semester). This will require an adjunct to teach one course every 3 semesters to replace the meteorologist teaching those new hours. Existing courses will easily absorb the additional meteorology students as all physics classes underutilize classroom space (thus no new sections are needed).

The department chair will assume the minor administrative duties. The only support personnel needed are lab managers; two already exist within the department and would assume the minor items needed for these courses. Additional clerical needs associated with the program are provided by student assistants, therefore there is a small expense for additional hours for the student assistant.

Library and Learning Resources

Identify current library/learning collections, resources, and services necessary to support the proposed program and any additional library resources needed. (1000 characters)

No new library resources are anticipated for this program. The only resources required are access to the scientific journals listed below, notably those of the American Geophysical Union (AGU) and American Meteorological Society (AMS). All of the required resources are currently available in the library; thus no new expense.

AGU: Geochem.Geophys.Geosyst., Geophys.Res.Lett., J.Adv.Model.Earth Sy., J.Geophys.Res., Rev.Geophys., Water Resour.Res., Nonlinear Proc.Geoph.,

AMS: Earth Interact., Bull.Am.Meteorol.Soc., J.Applied Meteorol.Climatol., J.Atmos.Oceanic Tech., J.Climate, J.Hydrometeorol., J.Phys.Oceanogr., J.Atmos.Sci., Mon.Weather Rev., Weather Forecast., Weather Clim.Soc.

Additional Journals (Various Publishers): Aerosol Sci.Tech., J.Aerosol Sci., J.Quant.Spectrosc.Ra., Q.J.Roy.Meteorol.Soc., J.Phys.Chem., Atmos.Res., Environ.Poll., Atmos.Chem.Phys., Environ.Res.Lett., J.Hydrol., J.Opt.Soc.Am., J.FluidMech., App.Opt., IEEE T.Geosci.Remote , Atmos.Environ., Environ.Sci.Tech.

Student Support Services

Identify academic support services needed for the proposed program and any additional estimated costs associated with these services. (500 characters)

No graduate assistants are needed for the proposed program. Minor additional clerical support is needed to handle the paperwork associated with the program, which requires additional hours for student assistants. The estimated costs associated with the support are $900 over 5 years. The program would also utilize existing college academic support services such as the college skills lab, advising, counseling, snap, academic experience, etc., but no new resources would be required.

Physical Resources

Identify any new instructional equipment needed for the proposed program. (500 characters)

There is no new instructional equipment needed for the proposed program. The physics and astronomy department currently has all the instructional equipment that would be required for the courses in the proposed program.

Will any extraordinary physical facilities be needed to support the proposed program?

☐ Yes

☒ No

Identify the physical facilities needed to support the program and the institution's plan for meeting the requirements, including new facilities or modifications to existing facilities. (1000 characters)

No new classroom or lab space is required for this program. All normally utilized Physics classrooms should be suitable for all new courses in this major. Some of the courses in the program (e.g. Climate, Experimental Physics, Synoptic Meteorology) are best taught in classrooms with lab or computational equipment, but our standard Physics classrooms have those facilities already.

The only formal lab space that will be required for this program is the upper division undergraduate lab class space (e.g. the space utilized for PHYS 370/Experimental Physics – which already exists) and faculty research labs, which already exist.

No extra modifications of existing facilities should be necessary.

Financial Support

Estimated New Costs by Year						
Category	**1st**	**2nd**	**3rd**	**4th**	**5th**	**Total**
Program Administration	0	0	0	0	0	0
Faculty and Staff Salaries	1867	1967	1967	1967	1967	9735
Graduate Assistants	0	0	0	0	0	0
Equipment	50	150	200	200	200	800
Facilities	0	0	0	0	0	0
Supplies and Materials	100	100	100	100	100	500
Library Resources	0	0	0	0	0	0
Other*	200	300	300	300	300	1400
Total	2217	2517	2567	2567	2567	12435
Sources of Financing						
Category	**1st**	**2nd**	**3rd**	**4th**	**5th**	**Total**
Tuition Funding	33240	72020	102490	124650	138500	470900
Program-Specific Fees	0	0	0	0	0	0
State Funding (i.e., Special State Appropriation)*	0	0	0	0	0	0
Reallocation of Existing Funds*	0	0	0	0	0	0
Federal Funding*	0	0	0	0	0	0
Other Funding*	0	0	0	0	0	0
Total	33240	72020	102490	124650	138500	470900
Net Total (i.e., Sources of Financing Minus Estimated New Costs)	31023	69503	99923	122083	135933	458465

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

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.

Most of the courses in the proposed program would utilize many existing physics courses that will be modified slightly to serve both the physics students and the meteorology students (as there is significant overlap in many concepts). Also, three new meteorology courses replace three existing meteorology courses; thus no cost associated with those. Finally, the remaining new courses are taught biennially, minimalizing cost. Thus, the net increase is only one contact hour per semester, resulting in the small expense shown. Equipment/supplies are minimal as the physics department has most everything already. The “other” new costs are associated with additional teaching aid and computing costs. While many concepts in meteorology can utilize teaching aids and computing costs already purchased by physics, additional demonstrations and computer software are required. Prices for these are similar to that for existing physics versions, which forms the basis for this cost estimate.

Evaluation and Assessment

Programmatic Assessment: Provide an outline of how the proposed program will be evaluated, including any plans to track employment. Identify assessment tools or software used in the evaluation. Explain how assessment data will be used. (3000 characters)

There will be six modes of assessment: program assessment exams, course final exams, evaluation of written capstone reports, evaluation of research oral presentations, exit survey/interviews, and alumni surveys.

The first assessment exam will be given at the end of the term in the normal entry-level course, 105, and will assess students when they are being introduced to ideas and skills. The second assessment exam will be given in 225, which is normally halfway through the major. This exam will assess students when core ideas and skills are being reinforced and applied to more complex atmospheric phenomena. The third assessment exam will be given in 419/420/499, which is the capstone project for the major. This exam will assess students when they should be proficient in the core ideas and skills that were developed throughout the program.

Randomly selected final exams in 105, 106L, 210 and 225 will be assessed for understanding of the fundamental principles of meteorology and for student ability to connect concepts in meteorology to broader societal, environmental, political, business or ecological issues**.** One laboratory assignment and laboratory report from three random meteorology majors in 370, and the final report in either 420 or 499 for all meteorology majors, will be assessed for ability to demonstrate a basic level of proficiency in designing, conducting, and reporting results from experiments relevant to topics in meteorology.

Because technical writing and oral communication are an integral part of any scientific degree, the assessment checks that all sections of the written portion of the capstone project are thoroughly and insightfully completed. Furthermore, all narratives, profiles, and relevant sections are factually accurate and documented to support the claims. Finally, a superior level of analytical reasoning and critical thinking based on the student's analysis is demonstrated.

The program will also assess the oral portion of the capstone project. For a successful completion of the oral presentation, the student strives for a high standard of professionalism. This is determined by examining body language (i.e. the student appears poised and comfortable and uses appropriate gestures to emphasize points), vocal presentation (i.e. the student exhibits excellent vocal tone, volume, and pace), eye contact, word choice and tone, use of visual aids, organization (i.e. the student presents information in an organized, logical fashion), and content (i.e. the student uses multiple forms of evidence to support key points).

Finally, in order to track future employment of majors, the program will perform an exit survey/interview in order to count students considering graduate school, teaching, operational meteorology, and other related fields. Furthermore, the program will use alumni surveys conducted by the Office of Institutional Effectiveness to determine the employment success of our students.

Student Learning Assessment

Expected Student Learning Outcomes	Methods of/Criteria for Assessment
1. Demonstrate an understanding of the fundamental principles of meteorology, which includes climate and either synoptic meteorology or introduction to air pollution.	Three final exams in PHYS225 and either 210 or 215; also program assessment exams for all majors (offered in 105, 225 and either 419 or 420); 80% proficiency
2. Demonstrate an ability to connect concepts in meteorology to broader societal, environmental, political, business or ecological issues**.**	Three final exams in PHYS105, 106L and 210; also program assessment exams for all majors (offered in 105, 225 and either 419 or 420); 80% proficiency
3. Successful student will be able to demonstrate a basic level of proficiency in designing, conducting, and reporting results from experiments relevant to topics in meteorology.	One laboratory assignment and laboratory report from three meteorology majors in PHYS370, and the final report in either 420 or 499 for all meteorology majors; 80% proficiency
4. Successful students will be able to synthesize core knowledge and analytical tools to design a research project relevant to meteorology.	Research project in PHYS 419/420/499 for all meteorology majors; passing grade
5. Successful students will be able to demonstrate the ability to communicate weather information effectively in written and oral form.	Program assessment exams for all meteorology majors (offered in 105, 225 and either 419 or 420); see rubrics below; 80% proficiency

Will the proposed program seek program-specific accreditation?

☒Yes

☐No

If yes, provide the institution's plans to seek accreditation, including the expected timeline for accreditation. (500 characters)

The AMS and Federal Civil Service do not conduct on-site accreditation, but rather review the curriculum of each program to ensure their stringent standards are met. We have already contacted their staff with our proposed curriculum and they have stated it would meet their requirements. Furthermore, the AMS requires four faculty members have the appropriate credentials, which they have confirmed we possess. Thus, accreditation with the AMS and Federal Civil Service should be instantaneous.

Will the proposed program lead to licensure or certification?

☒Yes

☐No

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

The American Meteorological Society offers two certificates: in Consulting Meteorology and in Broadcast Meteorology. These require taking a few courses beyond the BA degree and/or operational meteorology concentration. The College offers all the additional required coursework, and interested students will be advised of these requirements. However, most students will not pursue these certificates, as only a small fraction of meteorology jobs require them (notably TV weathermen).

Teacher or School Professional Preparation Programs

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

☐Yes

☒No

If yes, complete the following components.

Area of Certification

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