New Program Proposal
Bachelor of Science in Engineering Science
Coastal Carolina University

Summary

Coastal Carolina University requests approval to offer a program leading to the Bachelor of Science in Engineering Science, to be implemented in Fall 2015 through traditional instruction. The following chart provides the stages of review for the proposal. The Advisory Committee on Academic Programs (ACAP) voted to recommend approval of the proposal. The full program proposal is attached.

Stages of Consideration	Date	Comments
Program Proposal Received	1/5/15	Not Applicable
ACAP Consideration	2/12/15	ACAP members discussed the need for the proposed program. From USC Columbia (via e-mail): • A similar program at USC Columbia was discontinued in 2013 due to insufficient student interest. • The section, *Assessment of Need*, should respond specifically to the proposed degree and not to engineering in general.
Comments and suggestions from CHE staff sent to the institution	2/18/15	Staff requested the following revisions or explanations: • A rationale for the generalized curriculum when new programs often move toward specialization • Clarification of immediate employment opportunities for degree-holders • Clarification of space allocation in the Smith Science Center • Clarification of related costs • Clarification of total credit hours and potential articulation agreements
Revised Program Proposal Received	2/24/15	The revised proposal satisfactorily addressed the requested revisions.

Recommendation

The staff recommends that the Committee on Academic Affairs and Licensing commend favorably to the Commission the program leading to the Bachelor of Science in Engineering Science, to be implemented in Fall 2015.

NEW PROGRAM PROPOSAL

Name of Institution
Coastal Carolina University

Name of Program (include concentrations, options, and tracks)
Bachelor of Science in Engineering Science

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 2015

CIP Code
14.1301

Delivery Site(s)
Coastal Carolina University Main 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)
Christopher Moore
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Institutional Approvals and Dates of Approval
Department of Chemistry and Physics (September 30th, 2014)
Curriculum Committee, College of Science (October 15th, 2014)
Board of Trustees (October 24th, 2014)
Academic Affairs Committee (November 11th, 2014)
Faculty Senate (December 3rd, 2014)
Provost (December 11, 2014)
President (December 11,2014)

NEW PROGRAM PROPOSAL

Background Information

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

We propose an Engineering Science B.S. program that will utilize existing faculty expertise in engineering and the applied sciences spread across multiple disciplines in the College of Science. The program has three main purposes: (1) to serve as a more effective pipeline to other state engineering schools through existing dual degree agreements; (2) to serve the local community through a potential A.A.S./B.S. dual degree agreement with Horry Georgetown Technical College (HGTC); and (3) to provide a regional program that combines the disciplines of engineering, applied science, and mathematics to train graduates to solve emerging technological challenges that require multidisciplinary approaches. The proposed program intends to attract three types of students: (1) under-prepared students who are otherwise talented but require an alternative path to traditional engineering due to deficiencies in math and/or science preparation out of high school; (2) students from the region who are interested in careers in engineering and desire to remain in the local area due to financial, familial, or other constraints; and (3) students who are interested in both the sciences and their applications to engineering. These three types of students will complete the program through three different paths: (1) via an existing or future dual-degree agreement with another state engineering school; (2) via a 2+2 dual-degree agreement with HGTC; or (3) via a 4-year program completed completely at CCU.

List the program objectives. (2000 characters)

Specific ABET Goals/SLOs are listed on p. 20.

A large number of students interested in engineering careers are unable to immediately relocate to complete a college degree due to financial constraints. CCU has met this challenge in the past with the existing dual-degree program in engineering in partnership with Clemson University (CU). This program has resulted in 2-8 students per year transferring into CU engineering departments. One objective of this program is to strengthen CCU's partnership with CU by providing a path whereby the entirety of the CU general engineering curriculum can be completed before transfer. We will also seek out new agreements with other engineering programs in the state. Also, many of the students that we attract at CCU are otherwise talented, though lacking in preparation. The proposed program combined with the existing agreement with CU is specifically designed to provide the preparation an under-prepared student needs to succeed in engineering, with increased retention a major goal.

With the rising cost of a college education, many students in the local region find it difficult to fund a 4-year degree, even without relocation. We have recently partnered with HGTC to offer a 2+2 dual degree program with their engineering technology disciplines through our existing Applied Physics B.S. program. The Engineering Science B.S. could be the primary degree future students would pursue through this agreement, providing a pathway for a 4-year engineering degree accredited by the Accreditation Board for Engineering and Technology (ABET) that could be completed locally with a total tuition cost under $30,000 for all four years combined. The goal here is to provide an option for students that would otherwise not have access to a four-year college degree.

Many engineering degree programs focus training via a specialized curriculum for students, whereas this academic program proposes a generalized engineering science approach. For the students described above (CU and HGTC dual-degree), the degree pathway does result in a specialized curriculum leading to a specialized engineering/technical career. For students completing the program entirely at CCU, the proposed program will integrate the sciences with engineering practice to meet the demand of a fast-evolving engineering workplace. As one example, there are increasing opportunities in the field of electronic devices, specifically research and development, fabrication, and quantitative analysis, where the nature of modern devices requires preparation in both engineering practice and quantum and solid state physics. It is also possible for CCU to leverage existing and unique programs, such as Marine Science and the recently launched School of Coastal and Marine Systems Science (CMSS). This allows students to combine their interests in the applied sciences with engineering education, providing the foundation for a program that could serve students interested in applications of civil engineering to the coastal region, or environmental effects of emerging nano-materials and remediation engineering, as just two examples.

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 rapidly developing South Carolina coastal zone continues to be an important region of economic and population growth. In particular, the manufacturing and technology sectors in the Horry-Georgetown region are rapidly expanding, as reported by the Grand Strand Technology Council. New technology related jobs are being created daily, specifically in manufacturing, computational fields, and technology service areas. A search of job postings within a two-week period in September for just the Horry-Georgetown region indicated 23 open engineering positions for which graduates of this proposed program could be qualified. A search of recent job postings across South Carolina indicated 616 open engineering positions. A unique feature of the proposed program is its potential partnership with HGTC. Combining an A.A.S. degree with a B.S. in Engineering Science would prepare some students to become Professional Land Surveyors (after accreditation). With recent legislation changes, a 4-year undergraduate degree from an ABET accredited program is now required for PLS consideration. This recent change in legislation has provided an even greater barrier for entry into a field already struggling to meet demand for new employees. From 2010-2020, the statewide job outlook for surveyors is expected to grow by 31%. Graduates with a major in Engineering Science will be looking for jobs in fields for which there is a strong and growing demand.

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.”

NEW PROGRAM PROPOSAL

Employment Opportunities			
Occupation	**Expected Number of Jobs**	**Employment Projection**	**Data Source**
Surveyors	+4,400 (10 year)	+10% national +31% state	BLS Occupational Outlook Handbook, 2014
Materials Engineer	+200 (10 year)	+1%	BLS Occupational Outlook Handbook, 2014
Computer Specialists	+1.5 million (10 year)	+25.2%	BLS Occupational Outlook Handbook, 2014
General Engineer	+500,000 (10 year)		BLS Occupational Outlook Handbook, 2014
Chemical Engineer Mechanical Engineer Electrical Engineer	+1,500 +11,600 +12,600	+4% +5% +5%	BLS Occupational Outlook Handbook, 2014
Environmental Engineer	+8,100	+15%	BLS Occupational Outlook Handbook, 2014

Provide additional information regarding anticipated employment opportunities for graduates. (1000 characters)
The US Bureau of Labor Statistics (BLS) projects a need for ~500k new engineers in all disciplines for the decade leading up to 2016. Similarly, the BLS projects a need for ~1.5 million new computer specialists, with computing and technology related jobs expected to increase by 25.2%. Significant growth is also anticipated for fields requiring a blend of physics principles with engineering practice, such as nanotechnology, materials science, and emerging device physics/engineering. As one example of the types of jobs available to engineers with integrated science training, materials scientists earn an average of $85,150 per year, which far exceeds the median salary for the region. Materials companies Metglas Inc. and Wellman Engineering Resins are currently hiring in the region, and recent CCU graduates have worked or are working for both local industry leaders.

It should be pointed out that some engineering careers would require additional work either before or after completion of the proposed program. For example, a career as a professional land surveyor would require the student to complete a proposed 2+2 program with HGTC, and a career as a civil engineer would require the student to complete the dual-degree program with CU. Depending on the nature of the work and the specific technical electives taken, a student could be prepared for immediate employment in fields such as mechanical, electrical, chemical, environmental, and computer engineering. However, using electrical engineering as an example, this program would not necessarily prepare a student for immediate employment with Santee Cooper, but it would prepare a student for immediate employment with Intel.

NEW PROGRAM PROPOSAL

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.

NEW PROGRAM PROPOSAL

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 proposed program will require the use of some specific courses that are currently being taught on a regular basis by the Department of Chemistry and Physics, the Department of Computer Science and Information Systems, and the Mathematics Department. Many courses in applied physics and engineering are already taught as part of the Applied Physics program's Engineering Physics concentration. Some introductory engineering coursework is already taught due to the existing dual-degree program with CU.

NEW PROGRAM PROPOSAL

List of Similar Programs in South Carolina

Program Name	Institution	Similarities	Differences
Engineering	Bob Jones University	Bob Jones University offers a general engineering degree with concentrations in mechanical, electrical, and computer engineering.	BJU is a private institution. The proposed program is also designed to complement other state programs and has a focus on the integration of engineering and applied science.
Engineering (multiple programs)	Clemson University	CU offers engineering degrees through multiple programs leading to the ability to sit for the FE exam.	The proposed program is designed to complement other programs in the state and provides the opportunity to integrate engineering with the science of coastal regions.
Engineering (multiple programs)	University of South Carolina	USC offers engineering degrees through multiple programs leading to the ability to sit for the FE exam.	The proposed program is designed to complement other programs in the state and provides the opportunity to integrate engineering with the science of coastal regions.
Engineering (multiple programs)	The Citadel	The Citadel offers engineering degrees through multiple programs leading to the ability to sit for the FE exam.	The proposed program is designed to complement other programs in the state and provides the opportunity to integrate engineering with the science of coastal regions.
Industrial Engineering	Francis Marion University	FMU offers a degree program in Industrial Engineering.	The proposed program is designed to complement other programs in the state and provides the opportunity to integrate engineering with the science of coastal regions.

NEW PROGRAM PROPOSAL

Description of the Program

Projected Enrollment						
Year	Fall		Spring		Summer	
	Headcount	Credit Hours	Headcount	Credit Hours	Headcount	Credit Hours
2015-2016	40	600	45	678	NA	NA
2016-2017	57	856	60	903	NA	NA
2017-2018	57	860	60	907	NA	NA
2018-2019	57	862	61	909	NA	NA
2019-2020	58	863	61	910	NA	NA

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)

NEW PROGRAM PROPOSAL

Are there any special articulation agreements for the proposed program?

☒Yes

☐No

If yes, identify. (1000 characters)

CCU currently has a signed memorandum of understanding (MOU) with HGTC that provides a path for students completing an A.A.S. in an engineering technology discipline to complete a B.S. in Applied Physics with a concentration in Engineering Physics at CCU within 2 years. The existing agreement is attached to this proposal. This particular pairing is attractive but does not completely meet the needs of many of these students or some of the community's employment needs. A new MOU between HGTC and CCU concerning this new program in Engineering Science will be completed with approval of the new program. Discussions with HGTC have already begun concerning this agreement. Although a MOU establishing a 2+2 agreement with HGTC is not necessary for the success of the Engineering Science B.S. program, it will strengthen the program. Also, CCU maintains an agreement with CU establishing a 3+2, dual-degree engineering program. This agreement would not need to change to accommodate the new program.

With respect to credit hours required, students completing the 2+2 program with HGTC will complete an excess of the 120 credit hours required for the Engineering Science degree. This is because not all courses taken as part of the A.A.S. in Civil or Electronic Engineering Technology transfer as courses satisfying the B.S. degree program. CCU will accept up to 76 hours in transfer from any regionally accredited two-year college transfer program, but at least 25% of the degree program's requirements must be completed in residence at CCU. It should be noted that course credit hours are approximately one-third the cost at HGTC in comparison to CCU. Therefore, even with an increased number of credits, the total cost for a 4-year degree is still significantly less expensive. We estimate that a student residing in the area can complete the 2+2 program for less than $30,000 for the entire four years. With a new agreement where Engineering Science is the final B.S. degree, the total credit hours will actually be reduced, since significantly more HGTC coursework will be applicable to the Engineering Science curriculum. This new MOU is currently under discussion, and finalization is anticipated shortly after program approval.

NEW PROGRAM PROPOSAL

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**	
Total Semester Hours		Total Semester Hours		Total Semester Hours	

NEW PROGRAM PROPOSAL

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

NEW PROGRAM PROPOSAL

Curriculum by Category*					
CORE CURRICULUM	**34-41**	Choose One:			
FRESHMAN GRAD. REQ.	**0-3**	Fundamentals of Physics/Lab	4	**ELECTIVES**	**0-20**
		Intro. to Comp. Sci./Alg. Think.	4		
FOUNDATION COURSES	**23-41**	General Chemistry II/Lab	4	**Total Credits Req.**	**120**
Introduction to Engineering	3	Intro to Marine Science/Lab	4		
Essentials of Physics I/Lab	4	Intro. to Geology/Lab	4		
Essentials of Physics II/Lab	4	Intro. to Biology/Lab	4		
General Chemistry I/Lab	4				
Calculus I	4	**MAJOR REQUIREMENTS**	**43-48**		
Calculus II	4	Engineering Problem Solving	3		
Multivariate Calculus	4	Engineering Graphics	3		
Differential Equations	3	Statics	3		
Introduction to Ethics	3	Electric Circuits	3		
		Mathematical Methods	3		
Choose one:		Computational Methods	3		
Discrete Mathematics	3	Experimental Methods	3		
Modeling For Scientists/Lab	4	Project Manag. and Comm.	1		
Linear Algebra	3	Integrated Science and Design	3		
Elementary Statistics/Lab	4	Senior Design	3		
		Technical Electives (5 courses)	15-20		

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

Total Credit Hours Required
120

NEW PROGRAM PROPOSAL

Course Descriptions for New Courses

Course Name	Description
Engineering Problem Solving	In this course, students work in multi-disciplinary teams to formulate and solve engineering problems using robotics systems and MATLAB. The course covers reading, interpreting, and writing programs, debugging, loops, and conditional statements. Project management principles are also introduced as the framework in which group members cooperate. The course culminates in a design challenge that requires teams to devise a system, component, or process to meet desired needs with given constraints.
Engineering Graphics	This course is a project-based introduction to engineering graphics using SolidWorks. Topics include sketching, 3D part and assembly creation, and documented drawings. Students will utilize the principles of engineering graphics to visualize, communicate, and analyze solutions to engineering problems.
Project Management and Communication	This course focuses on effective participation, communication, and collaboration in engineering and other applied science fields. The professional and ethical responsibilities of applied scientists and engineers will be discussed, along with project management principles and current topics of importance in the field.
Integrated Science and Design	In this independent study course, students take concepts of their choosing learned in advanced applied science elective courses and use an engineering approach to either design a solution to a problem integrating those science principles, or study in depth an existing engineering solution. This student experience serves as a bridge between mathematics, the basic sciences and engineering practice.
Senior Design	Students will engage in a structured project either under the direction of a faculty member, via an external internship, or through a project of their own design with instructor permission and supervision. This major design experience serves to integrate the knowledge and skills that students have developed in earlier course work through the completion of an original project. Students will be required to utilize project management principles throughout the experience and develop a detailed report to be presented both orally in a public forum and in written form.
	(These course descriptions are those that will appear in the catalog. On the previous proposal, the descriptions had to be shortened due to space limitation, which may have caused some lack of clarity.)

NEW PROGRAM PROPOSAL

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)**
Associate Professor	Full	Foundation, Major, and Elective ENGR courses. All terms	Ph.D. Chemical Physics M.S. Applied Physics	CORE FACULTY. Program Director. Materials Engineering background. Reassigned from Applied Physics program.
Assistant Professor*	Full	Foundation, Major, and Elective ENGR courses. All terms	Ph.D. in engineering or engineering physics	CORE FACULTY. To be hired during 2014-2015 academic year. Begins Fall 2015. Line currently assigned to Applied Physics. Will be reassigned to Engineering Science program.
Assistant Professor*	Full	Foundation, Major, and Elective ENGR courses. All terms	Ph.D. in engineering discipline	CORE FACULTY. To be hired during 2015-2016 academic year. Begins Fall 2016. New line dedicated to Engineering Science program.
Professor	Full	Technical electives in environmental/coastal. 1 course per year	Ph.D. Atmospheric Science	AFFILIATE FACULTY. School of Coastal and Marine Systems Science.
Associate Professor	Full	Technical electives in fluids, Intro Engr. 1 course per year	Ph.D. Mech. Engineering, M.S. Agri. Engineering	AFFILIATE FACULTY. School of Coastal and Marine Systems Science.
Assistant Professor	Full	Technical electives in environmental/coastal, Intro. Engr. 1 course per year	PhD Phys. Oceanography, MCE Civil Eng.	AFFILIATE FACULTY. School of Coastal and Marine Systems Science.
Associate Professor	Full	Technical electives in computer engineering. 1 course per year.	Ph.D. Computer Engineering	AFFILIATE FACULTY. Department of Computer Science.
Associate Professor	Full	Technical electives in computer engineering. 1 course per year.	Ph.D. Computer Engineering, M.Eng. Electrical Engineering	AFFILIATE FACULTY. Department of Computer Science.
Assistant Professor	Full	Technical electives in computer engineering. 1 course per year.	Ph.D. Computer Engineering	AFFILIATE FACULTY. Department of Computer Science.

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	4	Staff	0.33	Administration	0.33

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)

Two lines in the current Applied Physics program will be reassigned to the new program. These lines correspond to the top two in the table on page 14. A new line will be necessary to offer all of the new courses being proposed assuming estimated enrollment is met. With the reassignments from Applied Physics, and the expected increased enrollment in service-level physics courses associated with the proposed program, the Applied Physics program will also require a new faculty line. Faculty designated as "Affiliate Faculty" remain in their current assignments. The director will coordinate Engineering Science and the dual-degree programs specific to this program and will provide leadership towards receiving and maintaining ABET accreditation. Due to the existing Engineering Physics concentration within the Applied Physics major, as well as existing courses taught in other related programs, it is possible to begin the program immediately and handle potential enrollment growth in the future.

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)
Kimbel Library owns approximately 6,940 titles relevant to the proposed program; of these, 16% are considered “core” titles for an academic collection. The percent of core titles held is below the library’s average for all subjects and is especially low in general engineering but somewhat better for hydraulic and oceanic engineering due to a strong marine science program. To match core title holdings of 20% of core titles available, the library would need to purchase 124 titles in technology, engineering and hydraulic/oceanic engineering. The 2014 cost of titles is $20,213.60, or $4,043 per year for the first five years of the program. This estimate is based on the resources currently available and may change accordingly. Established programs in physics, marine science, mathematics and computer science will further support the program, as will resources provided by PASCAL via PASCAL Delivers and the PASCAL electronic resources.

NEW PROGRAM PROPOSAL

Student Support Services

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

The department currently has a staffed tutoring center dedicated to lower-level physics courses. The Mathematics Department also staffs a tutoring center with expertise in calculus courses available. These student services combined with offerings already available at the university are sufficient to support the proposed program. No new academic support services are expected.

Physical Resources

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

The program will need to purchase a bench-top scanning electron microscope (SEM) system and a powder x-ray diffraction (XRD) system for materials characterization. The number of training systems for the electric circuits and electronics laboratories will need to be expanded. Classroom sets of robotics kits will be required along with expanded software licenses for Matlab, and new licenses for SolidWorks will be necessary. Bench-top materials testing instrumentation will also need to be procured.

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)

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Current facilities are adequate for the initial cohort of students. However, with increasing enrollment, the program will require facilities for engineering laboratories not currently available on campus. Specifically, a 24-seat combined computer and electronics laboratory will need to be constructed. Furthermore, a dedicated machine shop of sufficient size for multiple students, and dedicated design project space, will be required. The current 40,000 sq. ft. Smith Science Center will undergo $6.5 million in renovations during the program's 2nd year. Approximately 9,000 sq. ft. are currently scheduled for use by physics and engineering, with the proposed engineering program receiving a 900 sq. ft. teaching lab, a 650 sq. ft. machine shop, ~1,600 sq. ft. dedicated for project space and advanced instrumentation, and ~350 sq. ft. in expanded office space for new engineering faculty. This facility is expected to be available at the beginning of the program's 3rd year.

NEW PROGRAM PROPOSAL

Financial Support

Estimated New Costs by Year						
Category	**1st**	**2nd**	**3rd**	**4th**	**5th**	**Total**
Program Administration	$25,974	$26,493	$27,023	$27,564	$28,115	$135,169.00
Faculty and Staff Salaries	$203,904	$314,035	$320,316	$326,722	$333,257	$1,498,234.00
Graduate Assistants	$0	$0	$0	$0	$0	$0
Equipment	$100,000	$60,000	$15,000	$10,000	$10,000	$195,000.00
Facilities	$0	$0	$568,750	$0	$0	$568,750.00
Supplies and Materials	$0	$0	$0	$0	$0	$0
Library Resources	$4,043	$4,043	$4,043	$4,043	$4,043	$20,215.00
Other*	$0	$2,000	$4,000	$12,000	$1,000	$19,000.00
Total	$333,921.00	$406,571.00	$939,132.00	$380,329.00	$376,415.00	$2,436,368.00
Sources of Financing						
Category	**1st**	**2nd**	**3rd**	**4th**	**5th**	**Total**
Tuition Funding	$769,040	$1,065,762	$1,077,706	$1,087,735	$1,096,781	$5,097,024.00
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	$769,040.00	$1,065,762.00	$1,077,706.00	$1,087,735.00	$1,096,781.00	$5,097,024.00
Net Total (i.e., Sources of Financing Minus Estimated New Costs)	($435,119)	($659,190)	($138,574)	($707,406)	($720,366)	($2,660,656)

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

NEW PROGRAM 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.

Administration is based upon summer salary support consisting of 0.33 of director's salary plus 28% fringe with a 2% annual increase. Salary costs for all years include one new Assistant Professor and reassignment of the director to the proposed program, with a change in salary associated with change in assignment. Beginning in the second year, a second new Assistant Professor is included. Salaries are based on the 2014 CUPA averages for Bachelor Granting Institutions, discipline 14 (engineering). 28% fringe benefits are included with faculty salaries, with a 2% annual increase. The "other" category shows estimated costs associated with ABET accreditation, such as annual maintenance fees, readiness reviews, on-site reviews, and interim reviews. New equipment is detailed on page 16.

NEW PROGRAM PROPOSAL

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)

The Engineering Science program will prepare students to: (1) obtain a range of positions in industry or government facilities, or pursue graduate education in engineering, science or related fields; (2) participate, communicate and collaborate effectively and ethically within the criteria of their chosen careers; and (3) continually integrate science with engineering practice to solve technical problems, contributing to the benefit of society. Specific Student Learning Outcomes are detailed on the next page.

Each Program Objective is assessed using both direct and indirect methods. To assess program objectives, we will use senior exit interviews, placement data where available, follow-up surveys of graduates, and feedback from a community advisory board. The community advisory board will be composed of engineers and managers from local businesses who will provide annual feedback on the curriculum, objectives, student learning outcomes, facilities, and success of graduates entering the workforce.

A triangulation strategy of data collection is used to validate the assessment data for each Student Learning Outcome assessed. Triangulation requires us to collect data from multiple sources using both direct and indirect methods. Direct assessment methods generally evaluate the skills of students by testing factual knowledge or skills (e.g.: test questions, rubrics). Indirect methods generally evaluate the interpretation of learning achieved (e.g. survey questions). We achieve triangulation by targeting three main data sources (each with numerous individual data points): Course data reported via Faculty Course Assessment Reports (FCARs), knowledge-based questions on a Senior Exit Exam, and survey-based questions on a Senior Exit Exam. We will also conduct Senior Exit Interviews in concert with the exit exams to measure affect in several areas. (Affect is the correct word choice here. As an example, we are assessing student motivation for life-long learning, which represents one aspect of Objective 3, and of several SLOs listed on the next page.)

The Student Learning Outcomes can be mapped to the Program Objectives but are individually assessed as they relate to current students, as required by ABET. These outcomes are evaluated twice within each evaluation cycle, using the same process employed to evaluate the Program Objectives. After gathering assessment results in the first year of the cycle, they are evaluated during the second year, which may result in curricular changes. This assessment is repeated a second time within each cycle, so that prior changes can be evaluated and any additional modifications can be recommended. In addition to a program-level evaluation, Student Learning Outcomes are also evaluated at the course level. Evaluation methods at the course level include individual embedded exam questions, assignments scored via rubric, and course surveys. Program-level evaluation methods include exit exams and surveys. Because we will have a set assessment schedule, we have opportunities to make modifications in our program after our analysis and evaluation, yet before the next data collection cycle.

NEW PROGRAM PROPOSAL

Student Learning Assessment

Expected Student Learning Outcomes	Methods of/Criteria for Assessment
(a) apply knowledge of mathematics, science, and engineering (b) design and conduct experiments, as well as to analyze and interpret data	(a) FCARs and Senior Exit Exam (b) FCARs and Senior Exit Exam
(c) design a system, component, or process to meet desired needs within realistic constraints	(c) FCAR in Senior Design
(d) function on multidisciplinary teams (e) identify, formulate, and solve engineering problems	(d) FCARs (e) FCARs and Senior Exit Exam
(f) demonstrate professional and ethical responsibility (g) communicate effectively	(f) FCAR in Project Management and Communication (g) Presentation rubric in Senior Design and Senior Exit Interview
(h) understand the impact of engineering solutions in a global, economic, environmental, and societal context (i) engage in life-long learning	(h) Senior Exit Interview (i) Senior Exit Interview
(j) apply knowledge and skills to contemporary issues (k) use the techniques, skills, and modern engineering tools necessary for engineering practice	(j) FCAR in Integrated Science and Design (k) FCARs

NEW PROGRAM PROPOSAL

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)

During the 4th year, the program will seek accreditation by the Engineering Accreditation Commission (EAC) of ABET. ABET accreditation requires programs to have produced graduates before being awarded accreditation. With this program, we anticipate having graduates within the first two years of the program. This can be accomplished due to students in the existing 2+2 program pipeline with HGTC, as well as some existing Applied Physics students changing majors.

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)

After ABET accreditation, students will be able to sit for the Fundamental of Engineering exam, which is the first step in obtaining professional engineering licensure. Also, students completing the A.A.S. in Civil Engineering Technology and the B.S. in Engineering Science through a potential 2+2 program with HGTC will be able to apply for the State's Professional Land Surveyor (PLS) license.

NEW PROGRAM PROPOSAL

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.