New Program Proposal Form

Name of Institution: **University of South Carolina Aiken**

Name of Program (include degree designation and all concentrations, options, or tracks): **Bachelor of Science in Electrical Engineering**

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., PhD and DMA)
☐ Doctoral Degree: Professional Practice (e.g., Ed.D., D.N.P., J.D., Pharm D., and M.D.)

Consider the program for supplemental Palmetto Fellows and LIFE Scholarship awards?

☒ Yes
☐ No

Estimated Date of Implementation: **Fall 2026**
CIP Code: 14.1001
Delivery Site(s): **University of South Carolina Aiken, Main Campus**
Delivery Mode:

☒ Traditional/face-to-face
*select if less than 25% online

☐ Distance Education
☐ 100% online
☐ Blended/hybrid (50% or more online)
☐ Blended/hybrid (25-49% online)
☐ Other distance education (explain if selected)

Program Contact Information (name, title, telephone number, and email address):

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Reach ACT

This program is REACH Act compliant through the inclusion of HIST 201 "History of the United States to 1865", HIST 202 "History of the United States 1865-Present", and POLI 201 "American National Government" as outlined in the curriculum. *REACH Act: As required by South Carolina statute (Sect. 59-29-120 and Sect. 59-29-130), all degree-seeking undergraduate students admitted or readmitted Fall 2021 forward must earn 3 credit hours from an approved course designated to satisfy the Founding Documents requirement as outlined in state law.

Institutional Approvals and Dates of Approval (include department through Provost/Chief Academic Officer, President, and Board of Trustees approval):

1. Department 08/30/2024

2. College Counsel 10/23/2024
3. C&C 11/15/2024
4. UPC 10/23/2024
5. Provost 01/17/2025
6. Faculty Assembly 12/04/2024
7. Chancellor, USC Aiken 01/17/2025

Background Information

State the nature and purpose of the proposed program, including target audience, centrality to institutional mission, and relation to the strategic plan.

The University of South Carolina Aiken, after consultation with the local business community, proposes the establishment of a Bachelor of Science degree in Electrical Engineering focused on educating students with the ability to design, build, test, analyze, implement, and maintain electrical and electronic systems within the context of the Central Savannah River Area industry application needs. Through a well-balanced and rigorous curriculum addressing current and future electrical engineering needs, students of this program will not only develop a theoretical foundation in the discipline's fundamentals but will also have multiple opportunities throughout to design, build, test, and implement complex, distributed electrical systems for automation, manufacturing, robotics, and specialized support of the area's strong nuclear industry, commercial manufacturing operations, and engineering support companies in a small classroom setting at a university that strives for excellence in undergraduate education.

The program leverages USC Aiken's strong liberal arts core curriculum to ensure that students obtain an educational breadth and depth to ensure that subjects such as written composition, technical writing, ethics, and oral communication, which are sought by local employers but often marginalized or eliminated from other programs, are fully addressed. This integration will ensure that students of the BSEE program are ready to perform in the real world upon graduation.

USC AIKEN Mission Statement
"*The University of South Carolina Aiken is a regional public comprehensive university that cultivates a diverse population of engaged citizens who provide lifelong contributions in their careers and communities. Our dedicated faculty, staff, and industry partners guide undergraduate and graduate students through a transformative educational journey that uses engaged, accessible teaching and learning practices to blend the liberal arts, sciences, and professional disciplines with research and experiential opportunities aligned with economic and societal needs. We are a* ***center for innovation*** *that serves the region through* ***entrepreneurial partnerships****, public service, community leadership,* ***relevant research****, educational outreach, the visual and performing arts, and intercollegiate athletics.*"

Key points from the Mission Statement for the proposed BSEE program emphasize the ***center for innovation***, ***entrepreneurial partnerships***, and ***relevant research***. USC Aiken's engineering programs have been actively engaged with local businesses in these areas since their inception. The Advanced Manufacturing Collaborative (AMC) is a significant example of an entrepreneurial partnership with the Department of Energy's (DOE) Savannah River National Laboratory (SRNL).

USC AIKEN Vision Statement
"*To create a campus community that values each act as a* ***vibrant hub of activity*** *in our region,* ***partners with government and industry*** *to address societal and economic issues and transforms undergraduate and graduate students into engaged global citizens.*"

Key points from the Vision Statement for the proposed BSEE program are the emphasis on ***a vibrant hub of activity and partnerships with government and industry. USC Aiken's engineering programs have fulfilled and continue to fulfill***

these roles, as evidenced by engineering student internships, capstone projects, and awards with local government and industry partner

Target Audience

The target audience consists primarily of traditional in-state and out-of-state high school graduates. Based on prior experience with the introduction and start-up of USC Aiken's B.S. in Process Engineering and subsequent expansion into a B.S. in Mechanical Engineering, it is expected that a minimum of 60 students will be enrolled by the fifth year of the program (see Section 7 for supporting details). The courses in the program will be delivered through traditional classroom-based, face-to-face instruction.

Assessment of Need

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

The CSRA currently does not have a college that offers a BSEE degree. Two local technical colleges have technology-based programs designed to support formal electrical engineers. These programs provide value but do not meet the academic demands of a BSEE program.

Aiken Technical College—The Associate in Applied Science (AAS) with a major in Electronic Engineering Technology degree prepares students for careers as technicians who support electrical engineers and other technical professionals in the design, development, modification, and testing of electronic circuits, devices, and systems.

Augusta Technical College—The Associate in Applied Science (AAS) program with a major in Electrical and Computer Engineering Technology is a planned sequence of carefully developed college-level courses designed to prepare students to work in the field of engineering technology. The program emphasizes applying scientific methods and mathematical knowledge to support engineering practices. Program graduates are **qualified as engineering technicians** specializing in computer engineering technology, electronics engineering technology, or instrumentation and control engineering technology. The MOU will be offered to community colleges in South Carolina and contiguous counties in Georgia.

In a May 2023 article titled "Shortage of Electrical Engineers to Power Labor Market Growth: Kiplinger Economic Forecasts," Kiplinger Staff Economist David Payne notes, "*U.S. colleges don't come close to producing enough talent. Foreign students without permanent resident status obtain a large share of degrees from U.S. colleges in the field. They are effectively barred from filling vital positions in the military and other national security-sensitive sectors, and many leave after graduation.*" He continues, "*Overall graduation rates for electrical engineering majors are disappointing, according to expert analysis.*"

Based on 2023 data, the Bureau of Labor Statistics (BLS) stated that there were 3,450 electrical engineering positions in South Carolina. Approximately 660 of those positions were in the Central Savannah River Area (CSRA). The BLS estimated that the need for electrical engineers is growing at approximately 9% over a 10-year period. Using a figure of merit of 9% growth over 10 years, the demand for electrical engineers in the Central Savannah Reginal Area CSRA can be estimated to increase by at least 6 positions per year through 2029. This does not account for retirements, changing jobs, relocations,

Transfer and Articulation

Identify any special articulation agreements for the proposed program. Provide the articulation agreement or Memorandum of Agreement/Understanding.

There are no transfer and articulation agreements in place.

Employment Opportunities

CSRA PROJECTED INCREASE IN ELECTRICAL ENGINEERING JOBS			
Year	**EE Positions**	**9% Increase (10 years)**	**Cumulative Increase**
2023	660	0	0
2024	700	6	6
2025	742	6	12
2026	786	6	18
2027	833	6	24
2028	883	6	30
2029	936	6	36

- BLS Data (2023): 660 electrical engineering positions in the Central Savannah Regional Area CSRA
- 9% Annual Increase (Bureau of Labor Statistics)
- Does not account for retirements, changing jobs, relocations, etc.

Supporting Evidence of Anticipated Employment Opportunities

Provide supporting evidence of anticipated employment opportunities for graduates.

According to the BLS:
"*Electrical and electronics engineers must have a bachelor's degree. Employers also value practical experience, such as internships or participation in cooperative engineering programs.*"

"*Overall employment of electrical and electronics engineers is projected to grow 5 percent from 2022 to 2032, faster than the average for all occupations.*"

"*About 17,800 openings for electrical and electronics engineers are projected each year, on average, over the decade. Many of those openings are expected to result from the need to replace workers who transfer to different occupations or exit the labor force, such as to retire.*"

In the context of USC AIKEN's engineering program, many engineering students engage in internships with local industries to gain practical experience. Some students interleave year-round internships with course schedules, and many local industries make such accommodations. The Senior Capstone also provides students with hands-on experience and interfaces with local industries.

As noted in several sections of this proposal, the projected growth of electrical and electronic engineering positions is projected to be 9% over the 2022 to 2032 period. This growth provides ample opportunities for employment upon graduation.

The BLS data notes, "*Many of those openings are expected to result from the need to replace workers who transfer to different occupations or exit the labor force, such as to retire.*" This is especially prevalent in the CSRA's nuclear industries, where significant numbers of engineers have reached retirement age. Some companies, like SRNS, reach out to contract retired engineers because the need is so great.

An August 22, 2024, search on SC Works revealed 54 electrical engineering positions within 25 miles of Aiken, SC. Some employers had multiple positions available, and many were targeted at entry-level engineers.

Many of the following CSRA companies have current open listings for positions and internships that engineering majors, including electrical engineers can fill. These companies range from very small to very large. Several have multiple electrical engineering positions as well as student internships.

3D Corporate Solutions
AGY
Aiken Electric
Amentum
Autoneum
BAE Systems
Bridgestone Americas
Burns & McDonnell
Cardinal Health
CEDENT
Club Car LLC
CMT Services
Crane Payment Solutions
E2 Consulting
Edgewater Technical Associates
Emerson
Fluor Corporation
Enercon Services
Generac
Georgia Power
Gpac
Halocarbon
Howard Systems
Hubbell
Kimberly Clark
KPR US LLC
Longenecker
Morgan Advanced Materials
MTU America
Owens Corning
PQ
Prayon
Sargent & Lundy
Shaw Industries
SRMC
SRNL
SRNS
Strategic Management Solutions
Syensqo
The Judge Group
Trantech
Valmet
Value Added Solutions
Zeus

Description of Program

Explain how the enrollment projections were calculated.

Based on USC Aiken's historical engineering program enrollment, it is conservatively estimated that the BSEE program will enroll 39 students by year 5 of the offering. That equates to a minimum of about 6 students per academic year. A projection for the number of BSEE students enrolled each year is provided below.

USC AIKEN PROJECTED BSEE ENROLLMENT					
Major	**Fa 2026**	**Fa 2027**	**Fa 2028**	**Fa 2029**	**Fa 2030**
Electrical Engineering	15	21	27	33	39

The supporting data comes from USC AIKEN's growth of the Process Engineering (starting in 2016) and Mechanical Engineering (starting in 2021) programs. COVID-19 impacted the 2020 and 2021 academic years, but engineering enrollment has shown a strong recovery since then.

USC AIKEN ENGINEERING ENROLLMENT TABLE									
Major	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**
Process Engineering	17	59	109	116	109	84	40	38	38
Mechanical Engineering						10	82	115	138
Total Engineering Students	17	59	109	116	109	94	122	153	176
% Change in Engineering Enrollment		247.1%	84.7%	6.4%	-6.0%	-13.8%	29.8%	25.4%	15.0%

American Society of Engineering Education (ASEE) data shows a 5.1% growth in the number of BSEE degrees when offset by a decline suffered during COVID-19. The impact of COVID-19 on middle and high school students' mathematics scores has impacted, and continues to impact, students' abilities to perform in engineering majors. The ASEE data shows that some recovery is taking place. This promises to help electrical engineering enrollment, as well as other engineering programs, to grow.

ASEE "Engineering &Engineering Technology - By the Numbers" BSEE REPORT DATA											
	2013	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020***	**2021***	**2022**	**Average**
Number BSEE Awarded	10662	11261	11385	11892	12893	13767	14359	13976	13495	13331	
% Change Including COVID		5.6%	1.1%	4.5%	8.4%	6.8%	4.3%	-2.7%	-3.4%	-1.2%	2.2%
% Change Excluding COVID											5.1%
*Denotes years impacted by COVID-19 "% Change Excluding COVID" (5.1%) closely matches the 5% value developed by the BLS.											

Since companies in the CSRA have strong needs for electrical engineers, continued increases in the number of USC AIKEN students selecting electrical engineering as a major is expected to remain strong.

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

☐ Yes

☒ No

Curriculum

The curriculum was carefully designed to provide students with a breadth and depth of knowledge that continually builds upon itself as students progress. The curriculum also addresses input received from the USC Aiken's Engineering Advisory Board (EAB), notably the need for engineers to have written and oral communication skills, hands-on and practical experience, and exposure to electrical power systems and power electronics.

Several courses have distinct laboratory components. Many integrate in-class laboratory exercises. Most courses utilize industry-accepted software tools. This approach addresses the desire to produce students with hands-on experience, adding value for employers.

New Courses

List and provide course descriptions for new courses.

ELCT A101 – Introduction to Electrical Engineering I [Prerequisite(s): MATH A108, 3 Credit Hours]

This introductory course addresses the history of engineering, engineering fields, career paths, learning and creative thought, problem-solving, communications, calculations, case studies, and an introduction to Excel for use in science and engineering. Emphasis will include a focus on essential concepts in electrical engineering. In-class laboratory exercises will demonstrate the use of Excel as an engineering tool.

ELCT A102 – Introduction to Electrical Engineering II [Prerequisite(s): ELCT A101 with a grade of C or better, 3 Credit Hours]

This course will focus on using Excel, PSpice, and MATLAB for engineering projects and on introducing simple hardware and software integration using Arduino microprocessors in in-class labs. Students will also be exposed to writing lab reports to document in-class lab exercises.

ELCT A221 – Electrical Circuits I [Prerequisite(s): MATH A142 and ELCT A102 with a grade of C or better, 3 Credit Hours]

This course covers direct current (DC) linear circuit design and analysis, power sources, Ohm's Law, Kirchoff's Current and Voltage Laws, series and parallel resistance, wye/delta and delta/wye transformations, Thevenin and Norton Equivalent circuits, capacitance, inductance, and operational amplifiers. In-class laboratory exercises demonstrate the correspondence between formal calculations and actual circuit designs. PSpice and MATLAB are used to design and simulate circuits.

ELCT A222 – Electrical Circuits II [Prerequisite(s): ELCT A221 with a grade of C or better. Co-requisite(s): ELCT A222L, 3 Credit Hours]

A continuation of Electrical Circuits I covering first-order op-amp circuits, second-order circuits, sinusoids and phasors, sinusoidal steady-state analysis, AC power analysis, three-phase circuits, magnetically-coupled circuits, frequency response, Laplace transforms, and applications.

ELCT A222L – Electrical Circuits II Lab [Corequisite(s): ELCT A222, 1 Credit Hour]

Laboratory exercises demonstrate the correspondence between formal calculations and actual circuit designs. PSpice and MATLAB are used to design and simulate circuits.

ELCT A310 – Digital Logic and Design [Prerequisite(s): ELCT A102 with a grade of C or better, 3 Credit Hours]

This course introduces the fundamentals of digital design logic. Topics covered in this course are the binary number system, binary coded decimal (BCD), theory of logic circuits, logic gates, truth tables, programmable logic devices, analog to digital (A/D) and digital to analog (D/A) converters, addressing

circuits, data loading circuits, counters, shift registers, latches, and other circuits associated with microprocessor and computer design. PSpice and MATLAB are used to design and simulate circuits. This course includes report writing and qualifies as "writing intensive."

ELCT A320 – Electronic Devices [Prerequisite(s): MATH A242 and ELCT A221 with a grade of C or better. Co-requisite(s): ELCT A320L, 3 Credit Hours]

This is a fundamental course for the design and analysis of electronic devices and electronic circuits. The course includes semiconductor theory, p-n junction theory, diodes, bipolar transistors, amplifiers, MOSFET, CMOS, JFET transistors, operational amplifiers, and sensors. PSpice and MATLAB are used to design and simulate circuits.

ELCT A320L – Electronic Devices Lab [Corequisite(s): ELCT A320, 1 Credit Hour]

Laboratory exercises demonstrate the correspondence between formal calculations and actual electronic circuit designs. PSpice and MATLAB are used to design and simulate circuits.

ELCT A329 – Microprocessors and Controllers [Prerequisite(s): CSCI A125 with a grade of C or better, Co-requisite(s): ELCT A329L, 3 Credit Hours]

Fundamentals of microprocessors and microcontrollers and their use in embedded systems. Topics include basic architectures, address modes, memory and input/output interfacing, interrupt-driven processing, and C programming for embedded systems. Projects involving the use of microcontrollers to solve embedded system design problems, such as motor controls, display drivers, analog-to-digital conversion, etc., are integrated into both the laboratory and lectures.

ELCT A329L – Microprocessors and Controllers Lab [Corequisite(s): ELCT A329, 1 Credit Hour]

Laboratory exercises will demonstrate the techniques for programming and interfacing microprocessors and microcontrollers for industrial applications.

ELCT A342 – Signals and Systems [Prerequisite(s): MATH A242 with a grade of C or better, 3 Credit Hours]

This course introduces the Fourier and Laplace transforms as methods to model and analyze continuous-time linear systems (primarily first and second-order circuits) in the frequency domain. Parallels between the time and frequency domains are discussed, and sampling and filter design issues are developed. The course makes extensive use of MATLAB as a computational and visualization tool. In-class labs reinforce theory and develop hardware skills.

ELCT A346 – Electrical Power Systems [Prerequisite(s): ELCT A224 with a grade of C or better, 3 Credit Hours]

This course covers electric power systems, AC principles, transmission lines, polyphase systems, electrical and magnetic circuits, transformers, electromagnetic forces and loss mechanisms, synchronous machines, system analysis, and electromechanical machines.

ELCT A348 – Electromagnetic Fields [Prerequisite(s): ELCT A222/222L, MATH A242 and PHYS A212 with a grade of C or better, 3 Credit Hours]

This course covers Maxwell's equations, electrostatics, and magnetostatics, fields of charge distributions, fields near conductors, method of images, material polarization and dielectrics, fields of current distributions, electric and magnetic dipoles, power and energy in electromagnetism, electromagnetic work, electrodynamics, electromagnetic waves, wave polarization, wave propagation in isotropic and anisotropic media, wave propagation in plasmas, reflection, transmission, and refraction of waves at media interfaces, wave propagation in periodic structures and photonic bandgaps, guided waves in transmission lines, microwave circuits and smith charts, transients in transmission lines, metallic waveguides, dielectric waveguides, radiation and antennas, wire antennas, antenna arrays, diffraction, aperture antennas.

ELCT A412 – Communications Systems [Prerequisite(s): ELCT A342 and STAT A509 with a grade of C or better, 3 Credit Hours]

Principles of electronic digital communications theory and systems including AM, PAM, and PCM. Fourier analysis techniques are developed and broadly applied in class, as well as supporting laboratory exercises. Various digital modulation techniques, such as On-Off Keying, Phase Shift Keying, Frequency Shift Keying, and Quadrature Amplitude Modulation, are explored in both the classroom setting and laboratory exercises. Also included are introductions to information theory, encoding theory, and noise. Trade-offs among signal power, noise, and system bandwidth versus system channel capacity are thoroughly developed.

ELCT A434 – Power Electronics [Prerequisite(s): ELCT A320, ELCT A 346, MATH A242 with a grade of C or higher, 3 Credit Hours]

This course covers the technology required to interface electrical sources and loads to facilitate electrical power transfer. The topics covered include rectification, DC converters, Buck, Boost, Cuk, and SEPIC converters, voltage control, current control, frequency control, inverters, and power semiconductors such as diodes, transistors (MOSFET, BJT, IGBT), and thyristors. In-class laboratory exercises demonstrate the correspondence between formal calculations and actual circuit designs. PSpice and MATLAB are used to design and simulate circuits.

ENCP A220 – Mechanical Engineering Fundamentals [Prerequisite(s): MATH A142 with a grade of C or better, 3 Credit Hours]

This course presents the fundamental mechanical principles of engineering required for any course of study in the engineering sciences. The student will be introduced to the principles and applications of statics, dynamics, thermodynamics, and heat transfer. Students will study the interaction between mechanical and electrical systems and apply analogies between the two. Topics include technical problem-solving, forces in structures and machines, materials and stresses, fluid mechanics, thermal and energy systems, and motion and power transmission.

Need minimum 120 Credit Hours Total

Bachelor of Science in Electrical Engineering Curriculum Sheet

FRESHMAN (34)

FALL			SPRING		
ELCT A101	Introduction to Elect Engr I	3	ELCT A102	Introduction to Elect Engr II	3
CHEM A111	General Chemistry I & Lab	4	MATH A344	Linear Algebra for CS & Engr	3
ENGL A101	Critical Reading & Comp.	3	ENGL A102	Rhetoric & Composition	3
MATH A141	Calculus I	4	MATH A142	Calculus II	4
CSCI A125	Intro to Computer Science	3	MATH A174	Discrete Mathematics	3
			ENCP A300	Engineering Seminar	1
		17			17

SOPHOMORE (32)

FALL			SPRING		
ENCP A220	Mechanical Engr Fundamentals	3	ELCT A222	Electrical Circuits II	3
ELCT A221	Electrical Circuits I	3	ELCT A222L	Electrical Circuits II Lab	1
MATH A241	Vector Calculus	4	MATH A242	Elem. Differential Equations	4
PHYS A211	Essentials of Physics I & lab	4	PHYS A212	Essentials of Physics II & lab	4
GEN ED	Humanities	3	STAT A509	Statistics	3
		17			15

JUNIOR (33)

FALL			SPRING		
ENCP A368	Mechatronics	3	ELCT A342	Signals and Systems	3
ELCT A320	Electronic Devices	3	ELCT A310	Digital Logic Design	3
ELCT A320L	Electronic Devices Lab	1	ELCT A329	Microprocessors/Controllers	3
ELCT A348	Electromagnetic Fields	3	ELCT A329L	Micro/Controllers Lab	1
COMM A241	Public Speaking	3	ELCT A346	Electrical Power Systems	3
GEN ED	Hist A101/A102	3	ENGL A462	Technical Writing	3
			ENCP A300	Engineering Seminar	1
		16			17

SENIOR (30)

FALL			SPRING		
ELCT A498	Senior Capstone I	3	ELCT A499	Senior Capstone II	3
ELCT A434	Power Electronics	3	TECH ELEC	Technical Elective	3
ELCT A412	Communication Systems	3	GEN ED	Humanities	3
TECH ELEC	Technical Elective	3	GEN ED	API	3
ECON A221/2	Economics	3	PHIL A325	Engineering Ethics	3
		15			15

ADDITIONAL REQUIREMENTS

One 3-Credit Non-Western World Studies Course

TECHNICAL ELECTIVES

Any ENCP/ELCT course (A300 or higher not required by major), any CSCI course (A145 or higher not required by major), any MATH course (A300 or higher not required by major), or any department approved course.

*One of the humanities courses must be the REACH ACT requirement course before graduation. The REACH ACT selections options are circled. Either the REACH ACT course is taken at the community college or it will be taken at USCA before graduation.

HIST A201: History of the United States to 1865

HIST A202: History of the United States 1865 to Present

POLI A201: American National Government

Similar Programs in South Carolina offered by Public and Independent Institutions

Identify the similar programs offered and describe the similarities and differences for each program.

Curriculum information was obtained from school-specific electrical engineering web pages.

Program Name and Designation	Total Credit Hours	Institution	Similarities	Differences
BSEE	131	Anderson University	Some overlap with core electrical, mathematics, and science coursework.	Private school with a focus on Christian education. The electrical engineering program meets the introductory coursework for a BSEE program. Does not include Power Electronics. The USC AIKEN BSEE program leverages the on-campus AMC and HPC facilities.
BSEE	130	Benedict College	Some overlap with core electrical, mathematics, and science coursework.	Focus on computer programming as part of the degree. No provisions for technical electives. The program requires four electrical engineering labs: Circuits I and II, Electronics I and II. Does not include Power Electronics. The USC AIKEN BSEE program leverages the on-campus AMC and HPC facilities.
BS Engineering	129	Bob Jones University	Some overlap with core electrical, mathematics, and science coursework.	Private school with a focus on Christian education. Focus on controls and mechanical engineering, making it a more general engineering program specializing in electrical engineering. Does not include Power Electronics. The USC AIKEN BSEE program leverages the on-campus AMC and HPC facilities.
BSEE	127	The Citadel	Some overlap with core electrical, mathematics, and science coursework.	A foundational electrical engineering program that can focus on specialization in an area of interest. Requires six Leadership and eight ROTC courses. The USC AIKEN BSEE program leverages the on-campus AMC and HPC facilities.
BSEE	128	Clemson University	Some overlap with core electrical, mathematics, and science coursework.	A foundational electrical engineering program with three elective courses allowing for a level of specialization. The USC AIKEN BSEE program leverages the on-campus AMC and HPC facilities.
BSEE	132	College of Charleston	Some overlap with core electrical, mathematics, and science coursework.	The program focuses on the areas of robotics, autonomous vehicles, and nondestructive testing. Does not include traditional electrical courses for Signals and Systems or Electromagnetics. Does not include Power Electronics. The USC AIKEN BSEE program leverages the on-campus AMC and HPC facilities.
BS Mechatronics	136	South Carolina State University	Some overlap with core electrical, mathematics, and	Merges electrical and mechanical courses into the Mechatronics degree. The only school in South Carolina that offers this degree. Does not include

			science coursework.	Power Electronics. The USC AIKEN BSEE program leverages the on-campus AMC and HPC facilities.
BSE	127	University of South Carolina	Some overlap with core electrical, mathematics, and science coursework.	Standard electrical engineering program that allows five technical electives for specialization. The USC AIKEN BSEE program leverages the on-campus AMC and HPC facilities.

USC Aiken supports the BSEE program through the Advanced Manufacturing Collaborative (AMC) and the High-Performance Computing (HPC) Facility/Multi-scale Modeling Laboratory. These facilities have a broad impact on the region, state, and nation and provide significant applied research and economic development opportunities.

Faculty

Faculty, Staff, and Administrative Personnel

Discuss the Faculty, Staff, and Administrative Personnel needs of the program.

The faculty teaching courses in the BSEE program include current professors and three new tenure-track positions specifically for electrical engineering.

BSEE Faculty			
Rank	**Courses Taught for BSEE**	**Relevant Degree(s)**	**Other Qualifications**
Associate Professor Engr.	ELCT A221, ENCP A220, ENCP A300	PhD Mechanical Eng.	
Associate Professor Engr.	ELCT A221, ENCP A220, ENCP A300	PhD Mechanical Eng	
Associate Professor Engr.	ENCP A220, ENCP A368	PhD Mechanical Eng	
Instructor Engr.	ENCP A220	PhD Mechanical Eng	
Assistant Professor Cyber and Engineering	ELCT A221, ELCT A222	PhD Electrical Eng	
New Hire – Tenure Track Asst. Prof. Engr.	ELCT A320, ELCT A348, ELCT A342, ELCT A310, ELCT A 329, ELCT A346 ELCT A434, ELCT A412, ELCT A498, ELCT A499	PhD Electrical Eng	
New Hire – Tenure Track Asst. Prof. Engr.	ELCT A320, ELCT A348, ELCT A342, ELCT A310, ELCT A 329, ELCT A346 ELCT A434, ELCT A412, ELCT A498, ELCT A499	PhD Electrical Eng	
New Hire – Tenure Track Asst. Prof. Engr.	ELCT A320, ELCT A348, ELCT A342, ELCT A310, ELCT A 329, ELCT A346 ELCT A434, ELCT A412, ELCT A498, ELCT A499	PhD Electrical Eng	
The ELCT courses taught will be split up among the New Hire Tenure Track professors.			

Three new tenure-track assistant professors will be hired to teach electrical engineering courses. The hiring of additional electrical engineering faculty members will be carried out over five years. In addition,

engineers with MS and PhD degrees from local industries have previously served as adjunct engineering faculty at USC Aiken. If the course requires a specialty, then the instructor, adjunct or faculty will have that specialty.

A program coordinator will be appointed to oversee the program. The Program coordinator will be a faculty member whose secondary role is supervising the program and reporting to the Department of Computer Science, Engineering, and Mathematics Chair. Other duties will include recruiting faculty to teach engineering courses, working with department chairs to ensure adequate sections of courses are available each semester to support the timely completion of degree requirements by students in the program, being involved with student recruitment and retention planning, and creating and overseeing an assessment plan.

BSEE STAFFING PLAN						
Administration						
YEAR	**NEW**		**EXISTING**		**TOTAL**	
	Headcount	FTE	Headcount	FTE	Headcount	FTE
2026-27	0	0	2	0.25	2	0.50
2027-28	0	0	2	0.25	2	0.50
2028-29	0	0	2	0.25	2	0.50
2029-30	0	0	2	0.25	2	0.50
Faculty						
YEAR	**NEW**		**EXISTING**		**TOTAL**	
	Headcount	FTE	Headcount	FTE	Headcount	FTE
2026-27	2	2	7	0.25	9	3.75
2027-28	3	3	7	0.25	10	4.75
2028-29	3	3	7	0.25	10	4.75
2029-30	3	3	7	0.25	10	4.75
Staff						
YEAR	**NEW**		**EXISTING**		**TOTAL**	
	Headcount	FTE	Headcount	FTE	Headcount	FTE
2026-27	0	0	1	0.25	1	0.25
2027-28	0	0	1	0.25	1	0.25
2028-29	0	0	1	0.25	1	0.25
2029-30	0	0	1	0.25	1	0.25

"New" staffing comprises personnel hired specifically for the BSEE program.
"Existing" staffing comprises current program administration, professors teaching supporting technical courses, and current program support staff such as the program administrative assistant.
*Administration – Department Head and Coordinator of Engineering
*Faculty – Faculty members supporting the BSEE program.
*Staff – Department Head Administrative Assistant

An enrollment analysis of courses that will now be required in the program was conducted to show that sufficient capacity is available to accommodate the new electrical engineering students. The data in the following table was taken from the USC Aiken Class Selection Tool.

ENROLLMENT ANALYSIS OF SUPPORT COURSES – SEATS AVAILABLE							
Course	**Fa22**	**Sp23**	**Total**	**Fa23**	**Sp24**	**Total**	**Average**
MATH A141	2	12	14	0	10	10	12
MATH A142	0	5	5	10	8	18	11
MATH A241	16	11	27	13	13	26	26
MATH A242	22	11	33	12	5	17	25
MATH A344	2	*	2	0	*	0	1
CHEM A111	58	15	73	29	17	46	59
CSCI A125	9	15	24	7	10	17	20
PHYS A211	7	0	7	6	0	6	6
PHYS A212	0	16	16	0	17	17	16
STAT A509	21	14	35	0	18	18	26

- Available seats in key USC AIKEN classes supporting electrical engineering.
- Yellow highlight denotes the semester electrical engineering students take each course.

Another section of MATH A141 **will be required** to accommodate the additional load created by the influx of students majoring in electrical engineering (Fall semester 2026

Another section of MATH A142 **may be required** to accommodate the additional load created by the influx of students majoring in electrical engineering (Spring semester 2027).

Another section of MATH A242 **may be required** to accommodate the additional load created by the influx of students majoring in electrical engineering (Spring semester2028).

A section of MATH A344 **will be required** for the Spring semester 2027. Currently, it is only offered in the fall.

Another section of CSCI A125 **may be required** to accommodate the additional load created by the influx of students majoring in electrical engineering (Fall semester 2026).

Another section of STAT A509 **may be required** to accommodate the additional load created by the influx of students majoring in electrical engineering (Fall semester 2027).

Resources

Library and Learning Resources

Explain how current library/learning collections, databases, resources, and services specific to the discipline, including those provided by PASCAL, can support the proposed program. Identify additional library resources needed.

The Gregg-Graniteville Library of the University of South Carolina Aiken creates a safe and welcoming environment that nurtures and promotes intellectual growth, critical thinking, and success through connecting people with knowledge, innovative instruction, and quality library services.

It is a two-story, 40,000-square-foot facility with an extensive book, periodical, and microform collection. Services offered include:

- Ask a Librarian
- Book a Librarian
- Book a Room
- E-Resource Login
- Citation Help
- Research Guides
- Inter-Library Loans
- PASCAL Delivers

Minimum additional resources will be requested for the electrical engineering program. The library has access to databases supporting electrical engineering literature.

The library will be supplemented with two copies of each textbook and course materials required for the program.

The following is a listing of the proposed textbooks for the electrical engineering courses; however, professors hired by USC AIKEN may choose to select alternative textbooks.

Introduction to Engineering, Paul Wright (ISBN-13: 978-0471059292) [ELCT A101]

Excel Scientific Cookbook: Adding Excel to Your Analysis Arsenal, by David M. Bourg (ISBN-13: 978-0596008796) [ELCT A101 and ELCT A102]

Analog Design and Simulation Using OrCAD Capture and PSpice, Dennis Fitzpatrick (ISBN-13: 978-0081025055) [ELCT A102]

Getting Started with MATLAB: A Quick Introduction for Scientists and Engineers, Rudra Pratap (ISBN-13: 0190602062) [ELCT A102]

Fundamentals of Electric Circuits, 7th Edition, by Charles Alexander and Matthew Sadiku (ISBN 978-1-260-22640-9) [ELCT A221, ELCT A222]

Linear Circuits: Time Domain, Phasor, and Laplace Transform Approaches, Raymond DeCarlo and Pen Lim (ISBN-13: 978-0757564994) [ELCT A221 and ELCT A222]

Digital Logic Design, Brian Holdsworth and Clive Woods (ISBN-13: 978-0750645829) [ELCT A310]

Physics of Semiconductor Devices, Simon Sze and Yiming Li (ISBN-13: 978-1119429111) [ELCT A320]

Microcontrollers and Microcomputers Principles of Software and Hardware Engineering, Frederick Cady (ISBM-13: 978-0195371611) [ELCT A329]

Arduino Cookbook: Recipes to Begin, Expand. And Enhance Your Projects, Michael Margolis and Brian Jepson (ISBN-13: 978-1491903520) [ELCT A329]

Signals and Systems: Pearson New International Edition, Alan Oppenheim (ISBN-13: 978-1292925902) [ELCT A342]

Principles of Power Engineering Analysis, Robert Degeneff and M. Harry Hesse (ISBN-13: 978-1138075061) [ELCT A346]

Electromagnetic Fields and Waves, Vladimir Rojansky (ISBN-13: 978-0486638348) [ELCT A348]

Fundamentals of Power Electronics, Robert Erickson and Dragan Maksimovic (ISBN-13: 978-3030438791) [ELCT A434]

Principles of Communications, Rodger E. Ziemer and William H. Tranter (ISBN-13-978-1118078914) [ELCT A412]

Student Support Services

Explain how current academic support services will support the proposed program. Identify new services needed and provide any estimated costs associated with these services.

Technology Services: The Technology Services Division (TSD) provides technology support to students, faculty, and staff in the areas of computing, networking, instructional technology, and voice communication tools necessary to support the university's academic and administrative missions.

Disability Services: The mission of Disability Services is to facilitate the transition of students with disabilities to the University environment and act to provide appropriate accommodations for each student's unique needs to ensure equal access to all programs, activities, and services at USC Aiken.

Center for Research Excellence: At USC Aiken, there are many opportunities for students and faculty to connect through research. Whether it be collaborating on a biological study or conducting a research project in psychology, students and faculty are working together to make discoveries. Students interested in participating in research may do so in a number of disciplines throughout the sciences and humanities.

The *Connections* Award promotes the formation of research and creative interactions between our students and faculty. The *Connections* program will provide funding, up to $1000, for mentored undergraduate scholarly/creative activities.

The USC AIKEN Passport to Research Opportunities in Biomedicine (PROBe) program is funded by the National Institutes of Health through the South Carolina IDeaA Networks of Biomedical Research Excellence (INBRE). The PROBe program is a multi-pronged strategy to expand and enhance biomedical research on the USC Aiken campus.

The WORC Scholars Program is a systematic, holistic, multi-faceted, intentional approach to workforce development designed to recruit, retain, and develop STEM majors from high school to career. This program is funded by the Workforce Opportunities in Regional Careers grant provided through our partnership with the Savannah River Site Reuse Organization (SRSCRO) and the Department of Energy.

The College of Sciences and Engineering and the **Center for Research Excellence** provide the USC AIKEN *Summer Scholars Institute (SSI)* in support of student-faculty summer research. External funding from ADP, SC INBRE, and WORC has enabled SSI to increase STEM undergraduate research activity at USC AIKEN.

Center for Student Achievement: The Center for Student Achievement offers numerous academic success services and resources for USC Aiken students. From workshops to individual tutoring and handouts to Supplemental Instruction, all the services included on this site are free for enrolled USC-Aiken students.

Career Services: Career development is an integral part of university life and provides students and alumni with the guidance, knowledge, experiences, skills, and connections that will lead to successful, lifelong career management. To take full advantage of the many resources and services available requires some initiative on the part of the student. In this rapidly changing, competitive global market, the Career Services staff invites students to empower themselves by taking charge of their career futures. The staff is available to assist students through this process. Students can begin taking charge of their futures by applying for job positions and internships in the community. Many job openings are posted on **Handshake**, USC Aiken's online job board. Career Services can also assist alumni in their search for full-time employment. Individual career counseling appointments are available upon request.

Bookstore: The USC Aiken Bookstore is located inside the Student Activity Center (SAC). Students can purchase textbooks and course materials, order textbooks, sell used textbooks, and register for textbook rental.

Carolina Card: All students must have a USC Aiken ID card. The CarolinaCard will allow use of university facilities and services and is designed to be checked by computer for validity. This is a permanent card and is valid as long as a student is officially registered. The card is the property of USC Aiken and is intended solely for its use. Each time a purchase is made, the amount of the purchase is deducted from the student's account balance. It can be used at the Pacer Shoppe, at any campus dining facility, vending machines, and for PacerPrint.

Dining Services: USC Aiken offers students four dining options on campus: (1) the Pacer Market, (2) the SAC Café, (3) Starbucks, and (4) The Station.

Campus Recreation and Wellness: The Wellness Center includes a large fitness area with cardiovascular equipment (bikes, rowers, treadmills, ski machines, elliptical cross trainers, and stair steppers), selectorized and plate-loaded weight equipment, dumbbells, and a 1/16-mile walking track. There is a studio with wall-to-wall mirrors, a gymnasium, locker rooms, an exercise physiology laboratory, and an instructional classroom. The facility is supervised by CPR-trained staff. The Natatorium includes a six-lane pool and locker rooms. Certified lifeguards supervise this facility during open swim hours and special programs. One-on-one swimming lessons are available through our personal training program. The main outdoor intramural fields are located by the Varsity Softball complex, with the intramural softball field behind the Residence Halls. A Disc Golf Course and Cross-Country path is also near the Varsity Baseball Complex. Indoor sports are played in the SAC Gym.

Counseling Center: The Counseling Center shares expertise in the areas of human behavior and development through consultation and outreach services. Professional counselors are available to assist students with various academic and emotional issues of concern. Counselors are also available to consult with faculty and staff on student-related issues. Counselors can provide referral resources for faculty and staff who need counseling services.

Student Health Center: The mission of the USC Aiken Student Health Center (SHC) is to provide assessment, treatment, and/or referral for common health issues experienced by the USC Aiken student community.

Office of Institutional Culture and Belonging: The primary mission of the Office of Institutional Culture and Belonging is to develop a strong sense of belonging in the students, staff, and faculty that make up the USC Aiken community. The Office's role on campus is to engage and educate students on topics that revolve around diversity, equity, and inclusion. In conjunction with a coalition of faculty and staff members, campus partners, and community leaders, we seek to increase students' involvement in their development and maturation as productive members of society.

Veteran and Military Student Success: The mission of the Office of Veteran and Military Student Success (VMSS) is to champion veterans, Service Members, and the family members of our country's Armed Forces in their educational pursuits as they transition from their military service through the university, and on to becoming vital community members. It offers a meeting space where students can study for exams, learn from current students, and find a sense of community during their transition back into civilian life.

Physical Resources/Facilities

Identify the physical facilities needed to support the program and the institution's plan for meeting the requirements.

Lecture, Labs, and Administration:

Currently, the engineering classes are held primarily on the second floor of the Penland Building. Plans are to construct additional classroom/laboratory space on the first floor of Penland. Details on the new engineering facilities have not been fully defined at this point.

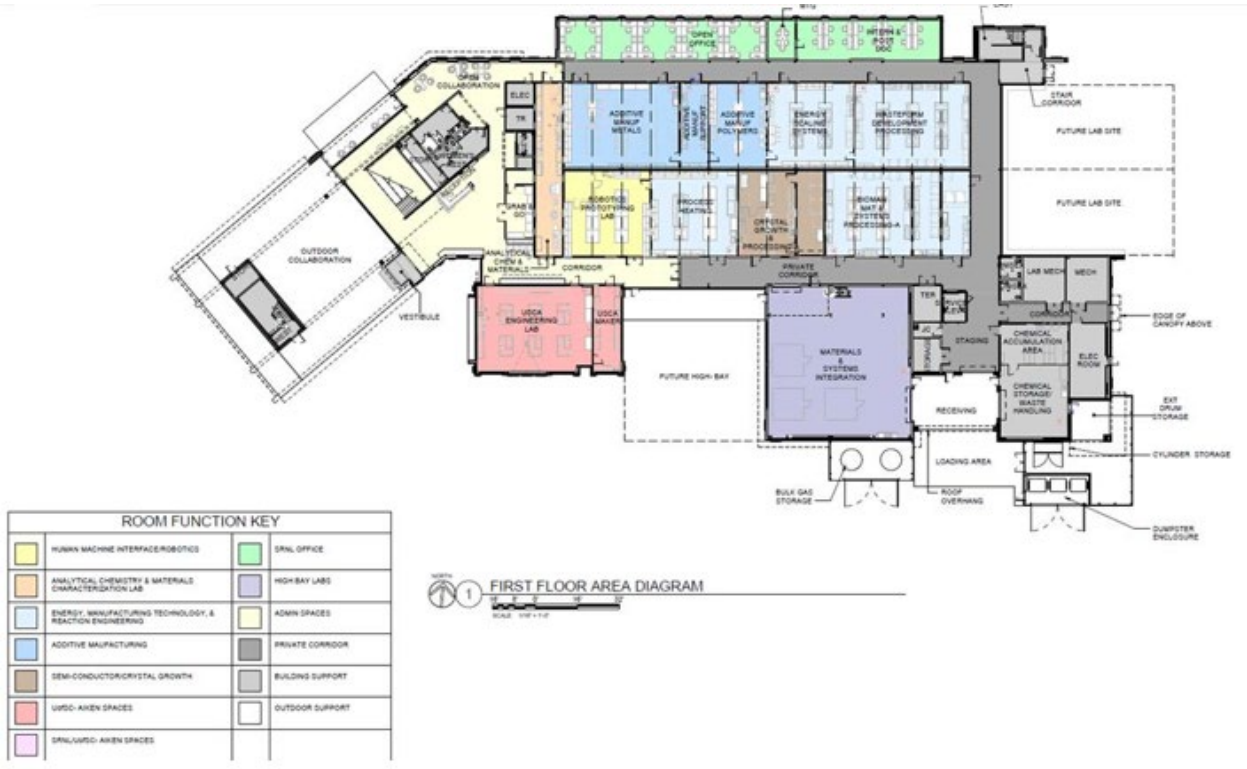
The current lecture, lab, and administrative spaces in Penland are:

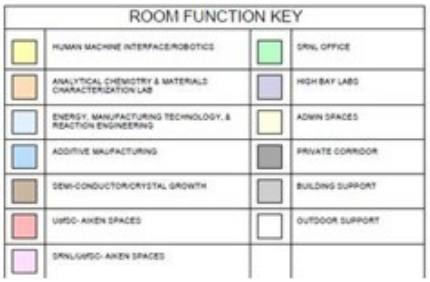
- Penland Room 106 – Auditorium with 143 seats
- Penland Room 112 – 3D Printing and Prototyping Laboratory
- Penland Room 213 – Lecture room with 24 student computer stations
- Penland Room 215 – Lecture room with 24 student computer stations
- Penland Room 219A – Engineering faculty office
- Penland Room 219B – Engineering faculty office
- Penland Room 221 – Lecture room with a seating capacity of approximately 30 students
- Penland Room 223 – Lecture room with 30 student computer stations
- Penland Room 224 – Mechanical Engineering Lab
- Penland Room 225 – Conference Room with 10 seats
- Penland Room 227 – Computer Science, Engineering, & Mathematics Administrative Assistant
- Penland Room 231 – Computer Science, Engineering, &Mathematics Department Chair
- Penland Room 232 – Lecture room with 24 student computer stations
- Penland Room 237K – Computer Science faculty office
- Penland Room 237R – Engineering faculty office

Advanced Manufacturing Collaborative (AMC): The AMC has spaces designated for engineering offices, an engineering laboratory, a conference room, and classrooms. The following details the AMC facility, including facility data and floorplans.

USC-A Office and Lab			
Room Name	Area (SF) New	Quantity New	Total New
Office			
USC-A Private Offices	108 - 131	4	458
Laboratory			
USCA Engineering Lab	1,391	1	1,391
USCA AMC Maker Spacer	338	1	338
Total			**2,187**

SRNL/USC-A Shared Office and Lab			
Room Name	Area (SF) New	Quantity New	Total New
Office Space			
Large Conference/Classroom Space	1,390	1	1,390
Entrepreneurship offices	102-118	3	338
Laboratory			
VR/Computational Lab	691	1	691
Total			**2,419**





Math Lab: The Math Lab, located in the Gregg-Graniteville Library, is a free tutoring service offered to students. Faculty and student tutors support math courses ranging from College Algebra to Calculus II. In addition, students can request tutoring for the math portions of Chemistry, Physics, and introductory engineering courses.

Writing Center: The Writing Center is staffed by undergraduate students, professional tutors, and professors trained to provide feedback on a wide range of writing genres. We offer in-person and online appointments and walk-ins based on availability. The services are free of charge for all members of the USC AIKEN community. The Center offers assistance in all facets of writing and composition at the college level.

Study Areas: Study areas are located on both floors of the Gregg-Graniteville Library. They include open spaces, meeting rooms, computer workstations, and reserved quiet study rooms.

Ruth Patrick Science Education Center: The Ruth Patrick Science Education Center (RPSEC) is a cooperative effort between the University of South Carolina Aiken, business, industry, the South Carolina Department of Education, and schools in the Central Savannah River Area of South Carolina and Georgia. Although not specifically a part of the Department of Computer Science, Engineering, & Mathematics, the RPSEC has equipment for classroom demonstrations applicable to engineering courses.

Equipment

Identify new instructional equipment needed for the proposed program.

Electrical Engineering Laboratory: An electrical engineering laboratory will provide the materials and capabilities to conduct all course-associated laboratories, Capstone projects, and undergraduate research.

Pacer Maker Space and Machine Shop: The Pacer Maker Space and Machine Shop is a workspace that will give engineering students hands-on experience and support applied research projects. The space includes 3D printers, laser cutters, and woodworking tools. The facility offers a fabrication space to create physical artifacts like sensors and electronic and mechanical devices that can be leveraged for commercialized solutions and product advances.

The following is a listing of new equipment required for the BSEE program.

Equipment	Manufacturer	Model	Unit Price	Qty	Total
Oscilloscope	Tektronix	MSO24 2-BW-70	$ 2,870.00	11	$ 26,834.50
Multimeter	Keithley	DMM6500	$ 1,670.00	11	$ 15,614.50
Power Supply	Keithley	2231A-30-3	$ 1,040.00	11	$ 9,724.00
Arbitrary Function Generator	Tektronix	AFG31102	$ 8,070.00	1	$ 6,859.50
Tektronix Software Bundle	Tektronix	2-Ultimate	$ 1,370.00	11	$ 12,809.50
Tektronix Kickstart Application SW	Tektronix	KickStart I-V Characterizer	$ 551.00	1	$ 468.35
Dual Channel System Source Meter	Tektronix	2602B	$ 14,400.00	1	$ 12,240.00
Handheld Multimeter	Fluke	15B+	$ 129.99	10	$ 1,299.90
Batteries for Handheld Multimeter	Duracell	AA, 48 pack	$ 38.71	1	$ 38.71
Power Electronics Trainer	Global Specialties	PB-600	$ 554.00	10	$ 5,540.00
Analog/Digital Trainer	Global Specialties	PB-507	$ 1,360.00	10	$ 13,600.00
Fixed Resistors	BOJACK	1000 piece, .25 W	$ 9.99	2	$ 19.98
Variable Resistors	BOJACK	60 piece , multiturn	$ 12.99	2	$ 25.98
Fixed Capacitors	BOJACK	300 piece 0.1uF to 10 uF	$ 9.99	2	$ 19.98
Fixed Capacitors	BOJACK	600 piece, 10 pF to 10 nF	$ 12.99	2	$ 25.98
Electrolytic Capacitors	BOJACK	630 piece, 0,1 uF to 1000 uF	$ 16.99	1	$ 16.99
Fixed Inductors	BOJACK	200 piece, 10 uH to 10 mH	$ 13.99	1	$ 13.99
Transistors	BOJACK	750 piece, assorted	$ 13.99	2	$ 27.98
Digital Logic Integrated Circuits	BOJACK	50 piece, SN74LS Series	$ 15.99	4	$ 63.96
Analog Integrated Circuits	BOJACK	120 piece, Op Amp, Timers	$ 18.99	2	$ 37.98
Arduino Boards	Ardunio	Arduino UNO3 Rev 3	$ 23.50	20	$ 470.00
Sensors	Keystudio	37 in 1 Sensor Kit	$ 32.00	10	$ 320.00
Servo Motors	Smaraza	10 piece, SG 90 Servo Motor	$ 17.99	2	$ 35.98
Stepper Motors	ELEGOO	5 piece	$ 14.99	4	$ 59.96
Breadboard Jumpers	BOJACK	840 piece	$ 13.99	3	$ 41.97
Breadboards	ELEGOO	4 piece, 830 and 400 point	$ 8.99	5	$ 44.95
Mini Pliers Set	Workpro	6 piece	$ 26.99	5	$ 134.95
Wire Strippers	Irwin	Vice Grip	$ 13.99	10	$ 139.90
Jewelers' Screwdrivers	Klein Tool	Model 85617	$ 29.97	10	$ 299.70
Alligator Clip Wires	Sway Tail	120 pieces, 5 colors	$ 38.99	2	$ 77.98
Banana Plug to Alligator Clip Wires	Goupchn	5 pieces	$ 12.99	20	$ 259.80
Safety Glasses	3M	Virtua, 20 pair	$ 25.00	2	$ 50.00
Laboratory EE Benches	Uline	H2043 Antistatic workbench	$ 1,999.00	10	$ 19,990.00
Laboratory Intructor Bench	Uline	H-1135-ESD	$ 535.00	1	$ 535.00
Laboratory Work Stools	Uline	H3971 Polyeuthethane	$ 525.00	21	$ 11,025.00
Laboratory Storage Cabinets	Uline	H-8346W	$ 1,565.00	2	$ 3,130.00
MatLab Software			$ -	25	$ -
PSPICE Software			$ -	25	$ -
Miscellaneous					$ -
Total					$ 200,000.00

Impact on Existing Programs

Will the proposed program impact existing degree programs or services at the institution (e.g., course offerings or enrollment)? If yes, please explain.

The BSEE Program is expected to consist of a new group of students interested in Electrical Engineering, specifically at a regional university. USC Aiken has sufficient faculty to support the required engineering, mathematics, and science courses.

Financial Support

The funding received to date will cover the equipment and salaries for three faculty for the critical feasibility time.

Total Sources of Financing for the Program by Year

Category	Year1	Year 2	Year 3	Year 4	Year 5	Total
Tuition Funding	139,620	279,240	418,860	511,940	558,480	1,908,140
Engr. Fee	450	900	1,350	1,650	1,800	6,150
CSE Fee	450	900	1,350	1,650	1,800	6,150
State Appropriations.	100,000	100,000	10,000	10,000	10,000	230,000
Engineering Endowment	1,500	1,500	1,500	1,500	1,500	7,500
Reallocation of existing funds						
Federal Grants or other funds	257,746	257,746	257,746			773,238
Total	**499,766**	**640,286**	**690,806**	**526,740**	**573,580**	**2,931,178**

Estimated Costs Associated with Implementing the Program by Year

Category	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Total**
Faculty	257,746	360,025	360,025	360,025	360,025	1,697,846
Equipment supplies	100,000	100,000	10,000	10,000	10,000	230,000
Library resources	1,500	1,500	1,500	1,500	1,500	7,500
Total	359,246	461,525	371,525	371,525	371,525	1,935,346
Net Total Sources minus estimated costs	**140,520**	**178,761**	**319,281**	**155,215**	**202,055**	**995,832**

BSEE Faculty - 3 Tenure Track @ $90,000 +32.97% +$9,200 Campus Health Average = $128,873

Salary Table for Tenure Line Faculty

Current Proposal	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Total**
Tuition	$145,572	$306,741	$436,716	$551,094	$597,885	$2,038,008
Updated Tuition	$139,620	$279,240	$418,860	$511,940	$558,480	$1,908,140

+ Engineering Fee	$450	$900	$1,350	$1,650	$1,800	$6,150

Budget Justification

Provide an explanation for all costs and sources of financing identified in the Financial Support table. Include an analysis of cost-effectiveness and return on investment and address any impacts on tuition, other programs, services, facilities, and the institution overall.

The following tables address this proposal's income, expenses, and net totals. Please note that due to external funding, the program is not expected to be negative at any time.

FINANCIAL SUPPORT			
Est. Amount*	**Source**	**Coverage**	**Status**
$ 1,600,000	Batelle SRNL/BSRA WFD	salaries for engineering and equipment	Funded
$ 870,000	Appropriations (one-time)	Equipment for cyber and engineering	Funded
$ 100,000	Aiken County Commission for Higher Education AACHE	Build Pacer Maker Space	Funded
$ 849,560	USC Aiken Endowed Chair in Engineering	Faculty chair in Engineering	Funded
$ 149,194	Endowment Gail and Reggie Ebner Engineering Program Endowment Fund	Program support in Chair	Funded
See below	Multiple endowed scholarships for engr.	Student support	Funded

*some totals are estimated from annual available balances.

$450,000 of the appropriations is specifically for engineering equipment,

The three equivalent salaries will be provided from the Batelle Work Force Development grant.

First year the appropriations for cyber and engineering will provide 100K for equipment.

Second year Batelle WFD grant will provide $100,000 for equipment.

Additional Resources Total amount and/or current balances which is typically 5% of total endowment value.

Engineering endowed chair $849,560. USC Aiken Endowed Chair in Engineering. $144,366 currently available.

ACCHE Aiken County Commission for higher education maker space/machine shop construction $100,000. This cost was covered by a grant from the ACCHE

Engineering endowed program support N/A URS/SRR Engineering Fund at USCA . currently $2,356.66 available.

Multiple engineering-specific student scholarships Gail and Reggie Ebner Engineering Program Endowment Fund total $149,194, $19,029 currently available.

Fees and program support monies will cover library and annual perpetual supplies costs.

Evaluation and Assessment

ABET Program Educational Objectives

Within three to five years of graduation, graduates of the Electrical Engineering program will:

- Successfully apply mathematics, science, and engineering principles to analyze and solve engineering problems.
- Practice engineering in a global and societal context utilizing a strong liberal arts foundation.
- Pursue lifelong learning and continuous improvement of their knowledge and skills in designing physical systems, components, or processes.

ABET Student Learning Outcomes

In the context of electrical engineering, students will demonstrate:

1: An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.

2: An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.

3: An ability to communicate effectively with a range of audiences.

4: An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.

5: An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.

6: An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.

7: An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

Accreditation and Licensure/Certification

Will the institution seek program-specific accreditation (e.g., CAEP, ABET, NASM, etc.)? If yes, describe the institution's plans to seek accreditation, including the expected timeline.

☒
Yes
☐
No

The mission of the BSEE program is to provide students with strong foundations in theory, experimentation, computation, and effective communication (both written and oral) to solve complex electrical and related problems. The program will seek ABET (Accreditation Board for Engineering and Technology) accreditation upon the graduation of the first BSEE student.

The Engineering Accreditation Commission (EAC) of ABET is the accrediting agency for engineering programs, and the proposed Electrical Engineering programs adopt the EAC/ABET accreditation criteria. As stipulated by ABET, the program curriculum must provide adequate content for each area, consistent with the student outcomes and program educational objectives, to ensure that students are prepared to enter the practice of engineering. The program must include:

a) A minimum of 30 semester credit hours (or equivalent) of a combination of college-level mathematics and basic sciences with experimental experience appropriate to the program. The curriculum must include probability and statistics, including applications to the program name; mathematics through differential and integral calculus; and sciences (defined as biological, chemical, or physical science). The proposed program provides 12 hours in the sciences, 19 hours in mathematics, 3 hours in probability and statistics, and 3 hours of experimental experience for 37 hours.

b) A minimum of 45 semester credit hours (or equivalent) of engineering topics appropriate to the program, consisting of engineering and computer sciences. Electrical engineering topics (including computer science) necessary to analyze and design complex electrical and electronic devices, software, and systems containing hardware and software components must be included in the curriculum. The proposed program provides 53 hours of engineering and 3 hours of computer sciences, meeting this criterion. In addition, 6 hours of technical electives will be taken.

c) A broad education component that compliments the technical content of the curriculum and is consistent with the program's educational objectives. The proposed program provides 30 hours of liberal arts courses to meet this criterion.

d) A culminating major engineering design experience that 1) incorporates appropriate engineering standards and multiple constraints and 2) is based on knowledge and skills acquired in earlier coursework. The Senior Engineering Capstone I and II courses (6 hours total) meet this criterion.

Based on the regulations published by ABET, programs requesting an initial accreditation review must have at least one graduate before the on-site review occurs. The first BSEE program graduate is projected to be during the 2028-29 academic year.

Will the proposed program lead to licensure or certification? If yes, identify the licensure or certification.

Based on information provided by the National Society of Professional Engineers website, to use the Professional Engineer (PE) seal, engineers must complete the following steps to ensure their competency:

1. Earn a four-year degree in engineering from an accredited engineering program.
2. Pass the Fundamentals of Engineering (FE) exam.
3. Complete four years of progressive experience under a PE.
4. Pass the Principles and Practice of Engineering (PE) exam.

If a student graduates before the USC Aiken BSEE program receives ABET accreditation, he/she can still take the FE and PE exams upon completing an education evaluation by the South Carolina State Board of Registration for Professional Engineers and Surveyors.

Explain how the program will prepare students for this licensure or certification.

The program will result in the award of a four-year engineering degree, positioning students to take the Fundamentals of Engineering (FE) course either at USC Aiken or after graduation.

ABET STUDENT LEARNING OUTCOMES CORRELATION TABLE (I = Introduce, R = Reinforce, M = Master)							
Course	**1**	**2**	**3**	**4**	**5**	**6**	**7**
ELCT A101 – Intro to Electrical Eng I	I	I	I	I	I	I	I
ELCT A102 – Intro to Electrical Eng II	I				I	I	
ENCP A220 – Mechanical Engineering Fund.	I					I	I
ELCT A221 – Electrical Circuits I	R	R	R	R	R	R	R
ELCT A222 – Electrical Circuits I	R	R	R	R	R	R	R
ELCT A310 – Digital Logic Design	R	R					
ELCT A320 – Electronic Devices	R	R	R	R	R	R	R
ELCT A329 – Microprocessors/Controllers	R	R	R	R	R	R	R
ELCT A342 – Signals and Systems	R	R					
ELCT A346 – Electrical Power Systems	R	R					
ELCT A348 – Electromagnetic Fields	R	R					
ELCT A412 – Communication Systems	R	R					
ELCT A434 – Power Electronics	R	R	R	R	R	R	R
ELCT A498 – Senior Capstone I	M	M	M	M	M	M	M
ELCT A499 – Senior Capstone II	M	M	M	M	M	M	M

Explain how the proposed program, including all program objectives, will be evaluated, along with plans to track employment. Describe how assessment data will be used.

According to the ABET "Criteria for Accrediting Engineering Programs" document, under Criterion 4: Continuous Improvement, all ABET accredited programs must "regularly use appropriate, documented processes for assessing and evaluating the extent to which the student outcomes are being attained. The results of these evaluations must be systematically utilized as input for the continuous improvement of the program."

To this end, USC Aiken has established the Engineering Advisory Board (EAB). This group will consist of industry partners and stakeholders to help our faculty, college, and university assess the engineering programs. Many of the EAB members so help to provide information on internships and more so with providing capstone projects.

As part of the EAB's mission, the team reviews assessment metrics and reports regarding the engineering programs and provides timely feedback that can be provided to ABETLocal industry participates in and supports both the review and quality assurance assessment of USC Aiken engineering programs through a BSEE Ad-hoc Planning Advisory Group and an Engineering Advisory Board (EAB).

The BSEE Ad-hoc Planning Advisory Group is composed of representatives from the following organizations that reviewed our curriculum as it was developed. The primary EAB was the driving force for the BSEE. We have added a letter of support from the EAB to the proposal package upon request.

- Bridgestone-Firestone USA
- Savannah River Nuclear Solutions
- Valmet
- USC AIKEN Engineering Faculty
- USC AIKEN Mathematics Faculty
- USC AIKEN Dean of Sciences and Engineering

The EAB is composed of representatives from the following organizations:

- Rolls Royce
- Amentum
- Valmet
- Savannah River National Laboratory
- Savannah River Mission Completion
- Savannah River Nuclear Solutions
- Bridgestone-Firestone USA
- USC AIKEN Dean of Sciences and Engineering
- USC AIKEN Engineering and Mathematics Faculty
- USC AIKEN Head of Mathematics and Engineering

Regular assessment of student outcomes will occur at the course level through direct and indirect measures. All engineering, mathematics, and science courses require a grade of C or better for credit. As a result, fewer direct assessment measures are collected to enhance the sustainability of continuous improvement.

Individual faculty and the ABET committee chair will keep copies of student work in every collection and maintain them in course portfolios. The ABET committee chair will organize these assessments by course, keep them in the department office, and maintain them.

Electronic PO and SO portfolios will be created and used for continuous improvement at the end of each academic semester. The evaluation results for assessment processes are organized by academic year. These results will be evaluated annually with respect to continuous improvement.

If the program is an Educator Preparation Program, does the proposed certification area require national recognition from a Specialized Professional Association (SPA)? If yes, describe the institution's plans to seek national recognition, including the expected timeline.

☐ Yes

☒ No

Rolls-Royce Solutions America Inc.

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T +1 248 560 8000

660 Bettis Academy Rd.
Graniteville, SC 29829, USA
T +1 803 232 6226

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Dr. Jessica Berry
Acting Director of Academic Affairs
South Carolina Commission on Higher Education
1122 Lady Street
Columbia, SC 29201

Dear Dr. Berry,

This letter is in support of USC Aiken's (USCA) proposal to establish a new B.S. in electrical engineering degree program.

The growth of technology and manufacturing industries in our region creates a clear demand for highly skilled talent. This program will ensure our workforce is ready to take on the needs of rapidly evolving economic opportunities.

Rolls-Royce Solutions America's Aiken campus is committed to hiring local talent. We value our local colleges and universities, including USCA, and we rely on them to provide the necessary training and education to meet the needs of our business for today and tomorrow.

Establishing the electrical engineering program will allow us to strengthen our relationship with USCA. Thank you for your consideration of this proposal. Please feel free to contact me at joerg.klisch@ps.rolls-royce.com if you have any questions.

Sincerely,

Joerg Klisch

Joerg Klisch

Director - Operations, Aiken

AIKEN COUNTY
PUBLIC SCHOOLS

October 23, 2024

Mr. Wes Hayes
Chair of the Board of Commissioners
South Carolina Commission on Higher Education
1122 Lady Street Ste 400
Columbia, South Carolina 29201

Dear Mr. Hayes,

I am writing to express my strong support for a Bachelor of Science degree in Electrical Engineering at the University of South Carolina Aiken (USCA). I fully understand that the demand for electrical engineers and other skilled workers in our state has reached critical levels, impacting our region's ability to expand.

According to the Bureau of Labor Statistics, the demand for electrical engineers will increase nine percent nationally and 12.5 percent in South Carolina in the next ten years (2023-33). In our region we have an urgent need for a locally trained workforce in critical areas, and electrical engineering certainly is one of them. It has been my observation that USCA has a proven track record of preparing highly trained graduates to meet regional demands, and the expansion of its engineering programs to include electrical engineering would significantly alleviate recruitment challenges and ensure the CSRA and our state remain competitive in advanced industries.

With the opening of the Department of Energy's Advanced Manufacturing Collaborative (AMC) in June 2025 on the USCA campus, the university will be well-positioned to support industry-aligned research and foster direct collaboration with world-class engineers to the benefit of our industries and businesses. This alignment between our local university, Savannah River National Laboratory, and industry will create long-term benefits, ensuring employers in our region have access to electrical engineering graduates that not only are well trained but more likely to remain in our region and contribute to our economic and industrial expansion.

In closing, I again reaffirm my ardent support for the creation of a Bachelor of Science Program in Electrical Engineering at the University of South Carolina Aiken.

Sincerely,

Dr. Corey Murphy
Superintendent

Dr. Corey Murphy, Superintendent
1000 Brookhaven Drive · Aiken, South Carolina 29803
803.641.2430 · 803.642.8903 fax
acpsd.net

aiken
CHAMBER OF COMMERCE

October 23, 2024

Mr. Wes Hayes
Chair of the Board of Commissioners
South Carolina Commission on Higher Education
1122 Lady Street Ste 400
Columbia, South Carolina 29201

Dear Mr. Hayes,

I am writing to express my strong support for a Bachelor of Science degree in Electrical Engineering at the University of South Carolina Aiken (USCA). In my role, I fully understand that the demand for electrical engineers and other skilled workers in the Central Savannah River Area (CSRA) and our state has reached critical levels, impacting our region's ability to expand.

According to the Bureau of Labor Statistics, the demand for electrical engineers will increase nine percent nationally and 12.5 percent in South Carolina in the next ten years (2023-33). In our region we have an urgent need for a locally trained workforce in critical areas, and electrical engineering certainly is one of them. It has been my observation that USCA has a proven track record of preparing highly trained graduates to meet regional demands, and the expansion of its engineering programs to include electrical engineering would significantly alleviate recruitment challenges and ensure the CSRA and our state remain competitive in advanced industries.

With the opening of the Department of Energy's Advanced Manufacturing Collaborative (AMC) in June 2025 on the USCA campus, the university will be well-positioned to support industry-aligned research and foster direct collaboration with world-class engineers to the benefit of our industries and businesses. This alignment between our local university, Savannah River National Laboratory, and industry will create long-term benefits, ensuring employers in our region have access to electrical engineering graduates that not only are well trained, but more likely to remain in our region and contribute to our economic and industrial expansion.

I firmly believe that establishing a Bachelor of Science degree in Electrical Engineering at USCA is not only a timely investment in our students' futures, but also a crucial step toward meeting the pressing workforce demands of our region.

Sincerely,

Jim Tunison
President/CEO
Aiken Chamber of Commerce

121 Richland Ave. E
Aiken, SC 29801
(803) 641-1111
AikenChamber.net

October 24, 2024

Mr. Wes Hayes
Chair of the Board of Commissioners
South Carolina Commission on Higher Education
1122 Lady Street Ste 400
Columbia, South Carolina 29201

Dear Mr. Hayes,

I would like to share my full support for the University of South Carolina Aiken's (USCA) proposal to develop and offer a Bachelor of Science degree in Electrical Engineering.

According to the Bureau of Labor Statistics, the demand for electrical engineers will increase nine percent nationally in the next ten years (2023-33), which is "much faster" than other occupations. In South Carolina, it is projected the need for electrical engineers will increase 12.5 percent.

As President and Program Manager of Savannah River Mission Completion (SRMC), one of the prime contractors for the U.S. Department of Energy (DOE) at the Savannah River Site (SRS), I can personally attest to these statistics. We need highly skilled electrical engineers now, and that need will continue to grow. This new electrical engineering program will enable our region to meet the immediate needs for electrical engineers while fostering an even stronger collaboration between USCA and SRMC.

Toward that end, we continue to see a positive trend of retention among our employees with connections, such as education, to the area surrounding SRS, which is why SRMC places great priority on partnering with USCA, especially on developing degree programs.

USCA's Engineering Advisory Board, alongside key industry stakeholders, has thoroughly evaluated the need for this program and its potential to enhance workforce readiness in areas critical to SRS missions. With the DOE's Advanced Manufacturing Collaborative set to open in 2025 on the USCA campus, the university's engineering students will have unmatched access to world-class facilities that will provide hands-on training and research opportunities that will make them job ready immediately after graduation.

As you can see, SRMC has a vested interest in the outcome of USCA's proposal to develop a Bachelor of Science in Electrical Engineering. The university has my complete support.

Regards,

L. David Olson

Dr. L. David Olson
SRMC President and Program Manager

SRMC

To: South Carolina Commission on Higher Education (SCCHE)
Re: USC Aiken (USCA) BS in Electrical Engineering (BSEE) Program
Date: February 24, 2025

Dear Commission Members,

I am Dr. Thomas D. Burns, Jr., the current Vice President and Chief Engineer for Savannah River Mission Completion, LLC (SRMC). SRMC is the Department of Energy contractor responsible for the stabilization and closure of the legacy radioactive liquid wastes from historic defense nuclear weapons programs at the Savannah River Site (SRS). The SRMC annual funding is in excess of $1B and we have approximately 4,000 employees, including approximately 600 Engineers. As a member of the USCA Engineering Advisory Board (EAB), I have been a strong advocate of cooperative programs to establish an enduring pipeline for USCA Engineering students with our company (and other SRS contractors). This effort has been successful to date and is poised for growth.

One of the key enhancements to the USCA Engineering program that would further facilitate a strong career pipeline is the implementation of a BSEE Program. This was a recommendation to USCA from the EAB based on the strong need for Electrical Engineers in industry in general and in the EAB member's companies in specific. Based on the strong performance of the USCA graduates from the current Engineering program offerings, the EAB has high confidence that the USCA Engineering faculty and administration understand what is needed to execute a successful and effective BSEE program.

Additionally, there are many tailwinds in place at USCA that the EAB expects will have a synergistic positive effect on the success of their BSEE program. The USCA Engineering Department is well-funded and will be moving into the state-of-the-art Savannah River National Laboratory-Advanced Manufacturing Center (SRNL-AMC) building in July 2025. It is the understanding of the EAB that the USCA funding posture is sufficient to add three (3) additional Electrical Engineering faculty to support the BSEE program and many of EAB member companies are interested in having their staff support as adjunct faculty if desired.

In summary, the EAB is in strong support of the implementation of a BSEE program within the USCA Engineering Department. This will represent a properly paced growth opportunity for USCA and one which will produce a sorely needed pipeline of Electrical Engineering graduates with the skill sets needed and desired by the EAB's member companies.

Sincerely,

Dr. Thomas D. Burns, Jr.
Vice President – Chief Engineer
Savannah River Mission Completion, LLC