NEW PROGRAM PROPOSAL FORM

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

Name of Program (include degree designation and all concentrations, options, or tracks): **B.S. Software 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., Ph.D. 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

Proposed Date of Implementation: **Fall 2024**

CIP Code: **14.0903**

Delivery Site(s): **USC Aiken, Aiken SC**

Delivery Mode:

☐ Traditional/face-to-face   ☒ Distance Education
*select if less than 25% online   ☐ 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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Institutional Approvals and Dates of Approval (include department through Provost/Chief Academic Officer, President, and Board of Trustees approval):

Department	**2/3/2023**
College Council	**2/7/2023**
Faculty Assembly	**4/25/2023**
Chancellor USCA	**5/2/2023**
BOT	**6/23/2023**

REACH Act Compliance: All USC Aiken students are required to take HIST 201, HIST 202 or POLI 201 to earn a degree. All courses' syllabi demonstrate compliance with the REACH Act and have been approved.

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 Software engineering discipline continues to be in very high demand. USCA is positioned to grow its marketable programs in these areas to better serve the region. According to the indicators below related to job outlook, number of programs, capacity, and existing expertise and facilities, Software Engineering is a good fit for USC Aiken in that it strongly complements our current programs to the extent that very few courses to no new courses would need to be added to provide the concentration to the B.S. in Applied Computer Science. However, adding this program will attract new students looking for this particular degree since it does have a high recognition status. Software engineering is typically housed in the computer science department, but its professional hiring job nomenclature is software engineering. USC Columbia recommended this one for USCA a few years ago as well.

The Bachelor of Science in Software Engineering program is designed to provide students with the knowledge and skills necessary to design, develop, test, and maintain software systems. The program will cover the entire software development lifecycle, including requirements analysis, design, implementation, testing, and maintenance. The program will also focus on the use of modern software development tools and methodologies, including agile development, object-oriented programming, and software testing.

To excel as a software engineer, it is crucial to possess analytical thinking skills and an understanding of all aspects of the development process. This includes a solid background in theoretical computer science, as well as knowledge of networking, software integration, and cybersecurity. This broad understanding allows new engineers to understand the overall scope of a project and effectively turn requirements into functioning applications.

USCA is growing fast in the area of computer science and especially in cyber. This degree is in alignment with the significant investment being made on the campus by the addition of the Advanced Manufacturing Collaborative by SRNL and the SC National Guard facilities that will include the cyber readiness center and the Dreamport. We have been tasked by not only these facilities but regional industry to help provide a sustainable workforce in cyber and computer science. This of course requires USCA to have strong programs in not only cyber but software engineering and machine learning.

Assessment of Need

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

The US Bureau of Labor & Statistics predicts the Software Engineering market to grow 25% faster than average nationally. More importantly, SC Works predicts strong demand through the decade for Software Engineering (see table below).

Aside from the very strong job market projections indicated in both the state and national US BLS data we often meet with Savannah River National Laboratory SRNL and Savannah River Mission Completion SRMC, and many regional industries who frequently request these professionals.

Transfer and Articulation

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

We are committed to providing viable pathways for students obtaining an AS degree to transfer to a four-year degree. We have recently partnered with Aiken Technical College in a 2+2 AS to BS transfer program for cybersecurity and we are working on a BAAS in information technology proposal for AS students. We will consider AS programs in software development for 2+2 transfers in the future if it is a viable curriculum for the students.

Employment Opportunities

Occupation	State		National		Data Type and Source
	Expected Number of Jobs	Employment Projection	Expected Number of Jobs	Employment Projection	
Software Developers, Quality Assurance, and Testers	2020 to 2030 expect 4,429 annual openings	Demand high supply medium	1,622,200	+25% much faster growth than average	SC Works: SC Works Online Services - Occupation Profile
Information Security Analysts. Many of our software developers will double with cybersecurity	1800 South Carolina - May 2021 OEWS State Occupational Employment and Wage Estimates (bls.gov)	16.6% South Carolina - May 2021 OEWS State Occupational Employment and Wage Estimates (bls.gov)	56,500	35% much faster than average	Information Security Analysts: Occupational Outlook Handbook: U.S. Bureau of Labor Statistics (bls.gov)

Supporting Evidence of Anticipated Employment Opportunities

Description of the Program

Projected Enrollment			
Year	Fall Headcount	Spring Headcount	Total Students Semesters
2024	8	6	14
2025	15	13	28
2026	25	23	48
2027	38	35	73
2028	50	46	96

Explain how the enrollment projections were calculated.

We have approached this estimate very conservatively. We currently have 254 B.S. computer science majors and are growing rapidly. Minimally, we will have 300 by 2024. Incoming cohorts are estimated conservatively in years 1-5. Attrition of 2-3 students out of each cohort is expected. USCA is very fortunate to have some facilities coming to USCA (AMC and SC National Guard Cyber Facilities that will be help recruit students and faculty. The vast majority of our undergraduate students are from South Carolina and the contiguous counties in Georgia that have reciprocity.

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

☐Yes
☒No

Curriculum

Total Credit Hours Required: 122

Curriculum by Year					
Course Name	**Credit Hours**	**Course Name**	**Credit Hours**	**Course Name**	**Credit Hours**
Year 1					
Fall		**Spring**		**Summer**	
MATH A141 Calculus I	4	MATH A142 Calculus II	4		
CSCI A125 Introduction to Computer Science	3	ENGL A102 Rhetoric & Composition	3		
ENGL A101 Critical Reading & Composition	3	CSCI A145 Algorithmic Design I	4		
GEN ED HIST 101 or 102	3	CSCI A185 Computer Applications & Prog.	3		
MATH A174 Discrete Mathematics	3	GEN Ed Soc./Behavioral Sciences	3		
Total Semester Hours	**16**	Total Semester Hours	**17**	Total Semester Hours	
Year 2					
Fall		**Spring**		**Summer**	
CSCI A146 Algorithmic Design II	4	CSCI A220 Data Structures & Algorithms	3		
MATH A344 Linear Algebra for CS & Engineering	3	CSCI A 340 Mobile Application Development	3		
CSCI A255 Introduction to Information Security	3	CSCI A360 Software Engineering	3		
GEN ED Foreign Language	4	GEN ED Foreign Language	4		
GEN ED COMM A201/241	3	ELECTIVE CSCI Technical Elective	3		
Total Semester Hours	**17**	Total Semester Hours	**16**	Total Semester Hours	

Course Name	Credit Hours	Course Name	Credit Hours	Course Name	Credit Hours
Year 3					
Fall		Spring		Summer	
CSCI A460 Human-Computer Interaction	3	CSCI A462 Software Testing and Quality Assurance	3		
CSCI A225 Web Development	3	CSCI A320 Object-Oriented Programming	3		
CSCI A 465 Software Project Management	3	CSCI A415 Computer Network	3		
GEN ED Humanities	3	GEN ED Humanities	3		
GEN ED Soc./Behavior Science	3	GEN ED POLI A201, HIST A201/202	3		
Total Semester Hours	**15**	Total Semester Hours	**15**	Total Semester Hours	
Year 4					
Fall		Spring		Summer	
CSCI A520 Database System Design	3	CSCI A592 Capstone Seminar II	3		
CSCI A591 Capstone Seminar I	3	ELECTIVE CSCI Technical Elective	3		
CSCI A525 Secure Software Engineering	3	GEN ED Natural Science	4		
GEN ED Natural Science	4	GEN ED Humanities	3		
Total Semester Hours	**13**	Total Semester Hours	**13**	Total Semester Hours	

1. **General Education Requirements...**
    51-53

    A. **Knowledge of Human Cultures and the Physical and Natural World 32-34**

    At least three hours must be in **non-Western World Studies** unless an approved non-Western world studies course has been completed.

    elsewhere in the student's degree program. See definition and list of approved courses under Academic Affairs and Regulations.

    1. Natural Sciences[2].. 8

        Biology, Chemistry, Physics, Geology, Astronomy (2 Labs)

        Physics (PHYS A211, PHYS A212)

    2. History of Civilization 3

        (HIST A101 or HIST A102)

    3. Social and Behavioral Sciences (two areas) 6

        Psychology, Sociology, Anthropology, Economics,

Political Science, Geography, Honors (HONS acronym)

4. Languages…………………………………………………6-8

    (Two (2) semesters of the same language required)

5. Humanities[1] (at least two areas) 9

    Communication (last two digits must be in 50s or 60s)

    History, Art History, Music History, Theatre History,

    Literature, Philosophy (other than logic), Religion,

    Selected Language courses,

    Humanities (HSSI acronym)

    Honors (HONS acronym)

B.   Intellectual and Practical Skills....................................... 16

    1. English A101 and A102... 6

    Students should take English in their first semester of enrollment at USC Aiken (unless they have received credit or ENGL A101 and A102 through concurrent enrollment, AP, etc.). Students must complete English A101 and English A102 with a grade of C or better in order to fulfill general education requirements and before taking Writing Intensive courses (see #5) and other English courses.

    2. Oral Communication.. 3

    (COMM A201, or COMM A241)

    3. Math/Statistics/Logic[2].. 7
    (MATH A141 and MATH A174).

    5. Satisfactory completion of three courses designated as Writing Intensive, at least one of which is in the student's major.

    For more information, see Writing Intensive Course Definition under Academic Affairs and Regulations. Not all sections

    of WI-approved courses are offered in the WI format in a given semester. Sections approved as WI will be indicated.

    in the USC Aiken schedule of courses at the time of priority registration.

C.   Personal and Social Responsibility............................... 3

    1. American Political Institutions.................................... 3

(POLI A201, HIST A201, or HIST A202) – These courses satisfy the REACH Act

    2. Inter-Curricular Enrichment Program (ICE)

    Two approved events in each semester of enrollment.

    For more information, see ICE Program requirements under Academic Affairs and Regulations.

D.   Integrative Learning

While there are no specific course requirements in this category, students are strongly encouraged to include one or more integrative learning experiences in their academic programs, such as linked courses, study abroad internship, service learning, faculty-mentored research, capstone.

2. **Major Requirements[2]**.. **69**

Core Courses…………………………………………………….………54

    CSCI A125, CSCI A145, CSCI A146, CSCI A185…………………14

    CSCI A220, CSCI A225,……………………………6

    CSCI A320, CSCI A340, CSCI A360……………………………………9

    CSCI A415, CSCI A460, CSCI A462, CSCI A465,.12

    CSCI A520, CSCI A525……………………………………………6

    MATH A142, MATH A344……………………………….……7

Technical Electives…………………………………………………........6

    Two courses of:

    CSCI A255, CSCI A370, CSCI A411, CSCI A417, CSCI A418

Capstone……………………………………………………….………6

    CSCI A591, CSCI A592

Free Electives……………………………………………………   1-3

Total hours required **122**

[1] For a list of courses that will meet the Humanities general education requirement, see pages 30-31. The writing proficiency portfolio is a general education requirement that must be satisfied before any student attempts the senior thesis or senior seminar requirements.

[2] Students must earn a grade of C or better.

Course Descriptions (B.S. Software Engineering)

The descriptions for the new courses specifically for the BS Software Engineering are underlined below. The New courses are the following:

CSCIA460 Human-Computer Interaction (3)
CSCI A462 Software Testing and Quality Assurance (3)
CSCI A465 Software Project Management (3)
CSCI A520 Database System Design. (3)
CSCI A525 Secure Software Engineering (3)

CORE COURSES (all required)

CSCI A125 Introduction to Computer Science. (3)
The course is designed to help students with no prior exposure to computer science or programming learn to think computationally and write programs to solve useful problems. The focus of the course is on problem analysis and the development of algorithms and computer programs in a modern high-level language. This course is for students who want to pursue a major in computer science.

CSCI A145 Introduction to Algorithmic Design I. (4) (Pre-req: CSCI A125 with a grade of C or better for all applied computer science majors. MATH A111 with a grade of C or better for all other majors).
This is the first course in the two-semester programming course sequence for students majoring in computer science. It teaches program design, coding, debugging, testing, and documentation using good programming style in Java, and provides a foundation for further studies in computer science. Three hours of lectures and three hours of laboratory per week.

CSCI A146 Introduction to Algorithmic Design II. (4) (Pre-req: CSCI A145 with a grade of C or better)
A continuation of CSCI A145. Rigorous development of algorithms and computer programs; elementary data structures. Three hours of lectures and three hours of laboratory per week.

CSCI A185 Computer Applications and Programming (3) (Pre-req: MATH A108 or MATH A108L with grade of C or better, placement higher than MATH A108 or MATH A108L or consent of the department). This course introduces systematic computer problem solving using procedural language.
Emphasis is placed upon algorithm development and program implementation. The course is intended for students to learn computer Visual programming. Emphasis on the fundamentals of structured design, development, testing, implementation, and documentation. Includes language syntax, data and file structures, input/output devices, and files. This course also provides exposure to applications such as spreadsheets, database management, and web-page design leading to an advanced level of competency.

CSCI A220 Data Structures and Algorithms. (3) (Pre-req: MATH A174 and CSCI A146 with a grade of C or better, or consent of the department.)
Theory and advanced techniques for representation of information. Abstract data types: lists, stacks, queues, sets, trees, and graphs. Algorithms for sorting, searching, and hashing.

CSCI A225 Web Development (3) (Pre-req: CSCI A145 with a grade of C or better).
Introduction to web development. The course will explore prevailing technologies in three main components of web applications: client, server, and data. It will also provide practical experiences with large-scale interactive websites development project.

CSCI A255 Introduction to Information Security (3) (Pre-req: CSCI A125 with a grade of C or better). Introduction to basic security concepts and principles of information security. Topics will include history of information security; overview of system security, software security, and network security; security management.

CSCI A320 Object-Oriented Programming (3) (Pre-req: CSCI A145 with a grade of C or better).
An in- depth study for the object-oriented programming paradigm. Topics include abstraction, encapsulation, information hiding, classes, inheritance, polymorphism, and object-oriented programming applications for 2-D graphics, user interface design, events, exceptions, multithreading, multimedia, and animations.

CSCI A340 Mobile Application Development (3) (Prereq: CSCI A146 with a grade of C or better or consent of the Dept.). The study of basic concepts and programming skills of mobile computing. Topics include user interfaces, layouts, events and event handling, graphics, images, animations, multimedia, 2D game development, data persistence, and networking.

CSCI A360 Software Engineering (3) (Pre-req: CSCI A146 with a grade of C or better)
This course introduces basic knowledge about software engineering, including principles and techniques of software design, software construction, software testing, and software maintenance. For students who took CSCI A240, this class will not count as a technical elective.

CSCI A370 Information Technology Project Management (3)
This course introduces students to project management framework and project life cycle including project planning, monitoring, and controlling. Students will learn the initial need and justification through selection or development to installation and integration with existing systems to deployment and roll-out. Topics may include IT investments, digitization, design and implementation of IT architecture, IT governance, and business process engineering.

CSCI A411 Operating Systems. (3) (Pre-req: CSCI A220 with a grade of C or better)
Basic concepts and terminology of operating systems. Process implementation, synchronization, memory management, protection, resource allocation, system modeling, pragmatic aspects, and case studies.

CSCI A415 Data Communication and Computer Networks (3) (Pre-req: CSCI A220 with a grade of C or better).
The study of concepts and components in data communications and computer networks. Topics will include data transmission, reference models, common network protocols, network applications and technologies.

CSCI A417 Cloud Computing (3)
This course will introduce students to cloud computing and virtualization concepts and provide students with a practical introduction to cloud computing and virtualization with Amazon Web Services (AWS), Google Cloud, and MS Azure. Students will explore how to build applications using a variety of cloud services and understand cloud service level agreements.

CSCI 418 Cloud Security (3) (Pre-req: CSCI A417 with a C or better or consent of department)
This course will introduce students to cloud security design principles, cloud security architecture, design and implementation in AWS, Google Cloud and MS Azure. Topics also include cloud identity and access architecture, data storage security, cloud security compliance, and cloud security best practices.

CSCIA460 Human-Computer Interaction (3) (Pre-req: CSCI A360 with a grade of C or better)
This course covers the principles and practices of human-computer interaction, including user interface design, usability testing, and user-centered design.

CSCI A462 Software Testing and Quality Assurance (3) (Pre-req: CSCI A360 with a grade of C or better)
This course covers the principles and techniques of software testing and quality assurance, including unit testing, integration testing, regression testing, and test-driven development. Students will learn how to design and implement test plans and test cases to ensure the quality of software products.

CSCI A465 Software Project Management (3) (Pre-req: CSCI A360 with a grade of C or better)
This course covers the principles and techniques of software project management, including project planning, project scheduling, risk management, and project monitoring and control. Students will learn how to manage software projects from start to finish, including how to work effectively with stakeholders and team members.

CSCI A520 Database System Design. (3) (Pre-req: CSCI A220 with a grade of C or better)
Database organization; design and use of database management systems; database models, including network, hierarchical and relational; data description languages, data independence and representation.

CSCI A525 Secure Software Engineering (3) (Pre-req: Departmental Permission)
This course introduces the fundamentals for constructing secure software by applying security principles to the software development processes. Software vulnerabilities and possible attacks that exploit them will be covered.

CSCI A591 Capstone Seminar I (3) (Pre-req: Senior standing in Applied computer Science, CSCI A220 with a grade of C or better, CSCI A360 with a grade of C or better).
Each student is required to do an in- depth study of some topic or a team-based software design project in a student's final year of study. Lecture topics include project planning, software requirements analysis, design, specification, ethics, and social impact. Selection, specification, and feasibility study of an open-ended design project to be completed in CSCI A592.

CSCI A592 Capstone Seminar II (3) (Pre-req: CSCI A591 with a grade of C or better).
Continuation of CSCI 591. The final project design, computer system implementation, testing, verification, and validation of results will be completed by the end of the semester. Both written and oral reports are to be provided.

Mathematics (MATH)

MATH A141 Calculus I. (4) (pre-req: by placement, consent of the department, or MATH A111 and MATH A112 with a grade of C or better).
Differential calculus and introductory integral calculus concepts and skills needed for the successful study of upper-level science, mathematics, and engineering courses. Topics include limits and continuity, derivatives of the fundamental functions, differentiation rules, applications of derivatives, and an introduction to definite integrals. The course has 5 contact hours per week.

MATH A142 Calculus II. (4) (Pre-req: MATH A141 with a grade of C or better or consent of the department).
This course covers integral calculus and infinite series concepts and skills beyond those dealt with in MATH A141 (Calculus I) that are needed for the successful study of upper-level science, mathematics, and engineering courses. Topics include: substitution methods for indefinite and definite integrals, applications of definite integrals including finding solid volumes, arc lengths, surface areas of revolution and simple applications in physics, separable differential equations, integration by parts, trigonometric substitutions and other techniques to deal with integrals of trigonometric functions and rational functions, improper integrals, sequences, infinite series, convergence and divergence of number series and power series, and Taylor series. The course has contact hours per week.

MATH A174 Discrete Mathematics for Computer Science (3) (pre-req: by mathematics placement above MATH A111, completion of either MATH A111 or MATH A170 with a grade of C or better, or consent of the department).
Basic mathematics is needed for the study of computer science: Propositions and predicates; mathematical induction, sets, relations, Boolean algebra, automata, grammar and languages, computable functions.

MATH A344 Linear Algebra for Computer Science and Engineering (3) (Pre-req: MATH A122 or MATH A141 with a grade of C or better).
This course introduces preliminary concepts and basic computational techniques of linear algebra that are important to science and to different branches of computer science and engineering. Contents include vector spaces, linear transformations and matrices, determinants, systems of equations, inversion, matrix decomposition, and other topics applicable to computer science and engineering.

Similar Programs in South Carolina offered by Public and Independent Institutions
Identify similar programs offered and describe the similarities and differences for each program.

Program Name and Designation	Total Credit Hours	Institution	Similarities	Differences
B.S. Applied Software Development	120	Winthrop university	Software programming	Focused on 2+2 in software develop and less on engineering aspects
B.S. Software Engineering	120	College of Charleston	Software engineering content ugrad	Outcomes are more similar to our program. A strong program. The high demand and very strong employment growth projections +36% indicates the need for a program in the western part of the state to meet upcoming workforce demands.
No other related undergraduate programs found				

Faculty

Rank and Full- or Part-time	Courses Taught for the Program	Academic Degrees and Coursework Relevant to Courses Taught, Including Institution and Major	Other Qualifications and Relevant Professional Experience (e.g., licensures, certifications, years in industry, etc.)
Assistant Professor Full Time	CSCI A360, A460, A462, A525	Ph.D. Computer Science or related	Software Engineering faculty specialist to start in year 1 (fall 2024)
Assistant Professor Full Time	Additional FT load	Ph.D. in CS or related Field	New faculty in year 2 (2025) will pick up additional load
Professor Full time	CSCI A125, CSCI A145, CSCI A185, CSCI A520	PhD in Computer Science Illinois Institutes of Technology (IIT) MS in Computer Science Western Michigan University	current
Assistant Professor Full Time	CSCI A255, CSCI A360, CSCI A465, CSCI A525, CSCI A591, CSCI A592	DEng. Engineering Management MS IST George Washing University	CISA, CGEIT, TS/SCI/SSBI 14 years in industry in cyber consulting
Professor Full Time	CSCI A210, CSCI A350, MATH A142	PhD in Mathematics MS in Computer Science The University of Western Ontario, Canada	current
Professor Full Time	CSCI A146, CSCI A340, MATH A174	PhD in Mathematics	current

		MS in Computer Science	
		University of Memphis	
Professor Full Time	CSCI A220, CSCI A360, MATH A141	PhD in Mathematics MS in Computer Science The University of Western Ontario, Canada	current
Associate Professor	CSCI A125, CSCI A225, CSCI A415	PhD in Applied Mathematics MS in Computer Science University of Rochester	current
Assistant full-time vacant		Ph.D. Computer Science or related	To be filled in fall 2023

Total FTE needed to support the proposed program:

Faculty:
1 new faculty in software engineering will be added in year 1, 2024.
One additional FTE will be added in year 2, 2025.
Staff: Existing departmental administrative assistant
Administration: existing department chair

Faculty, Staff, and Administrative Personnel

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

Our faculty come from all parts of the country and world and bring a broad array of expertise to the program. They are not only respected scholars in their field but also excellent teachers and mentors. One new tenure-track faculty position in software engineering will be hired to start in year 1 (Fall 2024). One additional CS faculty will be added in year 2 to provide additional load. The areas of expertise will be diverse except the one specialist but will cover all the courses included in the curriculum.

<div align="center">

Resources

</div>

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.

Through the Gregg-Graniteville Library, the B.S. students in Computer Science with concentrations in Cybersecurity or Applied Gaming will have access to: over 130,000 print volumes, over 4,000 media materials, 232 electronic databases (most with full text), over 100,000 e-journals, and approximately 350,000 e-books as well as more than 14,000 print government documents and electronic access to many additional titles. The library provides access to an adequate number of science and math databases for the proposed program. 799 full-text computer science journal and 894 full-text mathematics journals are available in library databases. Monograph holdings in computer science total approximately 260 print titles and 5,718 electronic titles. The computer science holdings are strongest in the area of programming language and applications.

Additional resources are not required above what is already supported with our current programs.

We recently had a one-time federal appropriation of $850,000 to outfit additional laboratories for computer science and engineering. With those funds we have added an additional computer laboratory and virtual reality and cyber equipment. In addition, we have an annual recurring state appropriation of $650,000 to support our computer science and engineering programs. That will be used to make up for any expenditures required until the enrollment in the program reaches

cost neutrality. Most of the software engineering courses are used as electives or are core courses in other programs so the cost is minimal as the maximum occupancy of the courses are filled first.

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.

We have a fully integrated student success center that includes early alert, student advisement, and tutoring both online and face to face. These services are available to all USCA students.

Physical Resources/Facilities

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

We have several computer laboratories that have been recently updated with federal appropriations. We have several computer lecture/computer activity rooms and stand-alone student and search computer laboratories.

Equipment

Identify new instructional equipment needed for the proposed program.

We typically include $10,000 for operations of each program to include IT support, addition of new workstation seats, or if the faculty require a specific software for a learning project. However, the state's recurring appropriation will also pay for additional unforeseen expenditures.

Sophomore Year:
1. Mobile Development Platforms: Tools for creating mobile applications, such Xcode or Android Studio.
2. Tools for web development: Students should become familiar with HTML/CSS, JavaScript, and frameworks like Angular or React.
3. Data Modeling Tools: Programs like MySQL Workbench or ERwin are used to design and model databases.
4. Team collaboration and communication tools: Slack or Microsoft Teams, for example.

Junior Year:
1. Project management software: For managing software development projects, try Jira, Trello, or Asana.
2. Network Simulation Software: Tools like GNS3 or Cisco Packet Tracer for learning and practicing networking.
3. Security Tools: An introduction to cybersecurity tools and software for network analysis, such as Wireshark.

Senior Year:
1. Database management systems: Software for learning complex database topics, such as Oracle Database or Microsoft SQL Server.

2. Capstone Project Tools: Depending on the needs of their projects, students may use a variety of tools, including cloud services like AWS, Azure, or Google Cloud.
3. Software Testing Tools: Overview of frameworks and tools for software testing, such as Selenium or JUnit.

Technical Electives:
1. Cloud Computing Platforms: Using cloud platforms like Amazon Web Services (AWS), Microsoft Azure, or Google Cloud Platform, students can obtain practical experience.
2. Tools for operating systems: These include programs that can be used to learn about and experiment with operating system ideas like virtual machines and Docker.
3. Software for managing IT projects and workflows: IT project management tools.
4. Security Tools: Additional resources for studying software security, including Burp Suite for evaluating the security of online applications.

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, explain.

☐Yes

☒No

Not substantially but many of the courses in this program are already part of the other concentrations and parent BS program so, this will increase the occupancy and efficiency of providing these courses. However, we will add faculty to accommodate the increased demand for these courses as the cost is offset by tuition revenues and cost recoveries. One faculty member is being allocated to accommodate new and/or unique courses in the curriculum.

Financial Support

Sources of Financing for the Program by Year												
	1st		**2nd**		**3rd**		**4th**		**5th**		**Grand Total**	
Category	New	Total	New	Total	New	Total	New	Total	New	Total	New	Total
Tuition Funding		72,786		145,572		249,552		379,527		499,104		1,346,541
Special State Appropriations		50,814		91,628								142,442
Reallocation of Existing Funds												
Federal, Grant, or Other Funding												

	New	Total	New	Total	New	Total	New	Total	New	Total	New	Total
Total		123,600		237,200		249,552		379,527		499,104		1,488,983

Estimated Costs Associated with Implementing the Program by Year												
	1st		2nd		3rd		4th		5th		Grand Total	
Category	New	Total	New	Total	New	Total	New	Total	New	Total	New	Total
Program Administration and Faculty/Staff Salaries	113,600	113,600	113,600	227,200		227,200		227,200		227,200		1,022,400
Facilities, Equipment, Supplies, and Materials	10,000	10,000		10,000		10,000		10,000		10,000		50,000
Library Resources												
Total	123,600	123,600	113,600	237,200		237,200		237,200		237,200		1,072,400
Net Total (Sources of Financing Minus Estimated Costs)		0		0		+12,352		+122,327		+261,904		+396,583

Note: New costs - costs incurred solely as a result of implementing this program. Total costs - new costs; program's share of costs of existing resources used to support the program; and any other costs redirected to the program.

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 to tuition, other programs, services, facilities, and the institution overall.

CHG and Tuition Estimates per Year				
Year	Fall Headcount	Spring Headcount	Total Students Semesters	Tuition revenues
2024	8	6	14	72,786
2025	15	13	28	145,572
2026	25	23	48	249,552
2027	38	35	73	379,527
2028	50	46	96	499,104

The vast majority of our undergraduate students are from South Carolina and the contiguous counties in Georgia that have reciprocity in-state tuition fees. We will assume primarily since the vast majority of our undergraduate students are from South Carolina and the contiguous counties in Georgia that have reciprocity in-state tuition reciprocity. in-state tuition rate for students for conservative estimates This will provide an appropriate conservative tuition revenue projection.

Software engineering faculty salary estimated at $80,000 salary + 42% fringe and benefits $33,600 = $113,600. Need 1 new faculty in year 1 (Fall 2024). A second FTE in CS in year 2 at $113,600 will be added to pick additional sections and load in year two. Other courses will be taught by existing faculty. This new faculty line will also provide support for growth in related degrees. The first two years a special annual state appropriation will provide the deficit and in the third year the tuition only will be cover expenditures by itself… breakeven point with tuition revenues only.

We typically include $10,000 for operations of each program to include IT support, addition of new workstation seats, or if the faculty require a specific software for a learning project. However, the state's recurring appropriation will also pay for additional unforeseen expenditures.

Evaluation and Assessment

Program Objectives	Student Learning Outcomes Aligned to Program Objectives	Methods of Assessment
Technical Competence: Graduates of the program possess a solid grounding in computer science, programming, and software engineering principles, with an emphasis on creating dependable, effective, and scalable software systems.	**SLO1:** Students should be able to develop, implement, and maintain dependable, effective, and scalable software systems using core concepts from computer science, programming, and software engineering.	Embedded questions in (**CSCI A125 Introduction to Computer Science, CSCI A145 Algorithmic Design I, CSCI A146 Algorithmic Design II**) Project Work Exit Survey
Professional Development: Graduates should possess good	**SLO2:** Students should be able to show that they have excellent	Embedded questions in (**CSCI A220 Data Structures &**

communication, teamwork, and project management skills as well as a grasp of their professional and ethical duties in order to be ready to enter the workforce as software engineers.	communication, teamwork, project management, and ethical and professional responsibility understanding.	**Algorithms, CSCI A415 Computer Network**) Exit Survey
Problem Solving: Graduates should be capable of locating, analyzing, and resolving challenging issues pertaining to software engineering by making use of the proper resources, methods, and tools.	**SLO3:** Students should be able to assess difficult software engineering-related problems, choose the right tools, techniques, and strategies to handle them, and create workable solutions.	Embedded questions, Group projects and assignments, Exams and quizzes in (**CSCI A360 Software Engineering & CSCI A460 Human-Computer Interaction**) Exit Survey
Lifelong Learning: Graduates should have the knowledge and attitude to keep learning throughout their careers and adjusting to new techniques, approaches, and business trends.	**SLO4:** Students should be able to learn on their own, adapt to new techniques, approaches, and business trends, and show a dedication to lifelong learning and ongoing professional growth.	Independent project/laboratory assignment and Embedded questions in (**CSCI A462 Software Testing and Quality Assurance, CSCI A465 Software Project Management, & CSCI A525 Secure Software Engineering**) Exit Survey
Innovation and Entrepreneurship: Graduates should possess the skills necessary to innovate, create, and contribute to the creation of new software products and services. They should also possess a solid understanding of business and entrepreneurial principles.	**SLO5:** Students should be able to use their critical and creative thinking abilities to invent, design, and build new software products and services, as well as to show that they have a grasp of entrepreneurship and business principles.	Case studies, Written assessments, independent project/laboratory, Group projects, Presentations, in (**CSCI A591 Capstone Seminar I & CSCI A592 Capstone Seminar II**) Exit Survey

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.

There are several ways to monitor the employment of bachelor's in science in software engineering graduates. Here are a few techniques/plans that can be used:

We have an extensive assessment plan that requires assessment of all degree SLOs and KPIs annually and then each degree is reviewed every three years by the Academic Assessment Committee.

We will provide employment and needs surveys to regional employers. We keep in contact with employers and stakeholders through advisory boards, career fairs, internships and industry / USCA capstone projects.

We have an extensive assessment plan that requires assessment of all degree SLOs and KPIs annually and then each degree is reviewed every three years by the University Academic Assessment Committee.

Annually, faculty will assess student achievement of learning outcomes which will be included in the academic program's annual report. Triennially, the Academic Assessment Committee will measure students' achievement of learning outcomes and designate quality improvement actions to modify the program."

We will provide employment and needs surveys to regional employers. We keep in contact with employers and stakeholders through advisory boards, career fairs, internships and industry / USCA capstone projects. We also survey regional employers and conduct focus groups with our advisory boards to determine if our program is meeting employer needs as we do during the development of the programs. Feedback from all sources will be used for continual program improvement. This data is kept and archived by the dean of the college.

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.

The program does not require ABET accreditation.

☐Yes

☒No

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

☐Yes

☒No

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

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