

**NEW PROGRAM PROPOSAL**

Name of Institution

University of South Carolina Aiken (USCA)

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

Applied Computer Science with concentrations in (1) Cyber Security and (2) Applied Gaming

Program Designation

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

Does the program qualify for supplemental Palmetto Fellows and LIFE Scholarship awards?

- Yes  
 No

Proposed Date of Implementation

Fall 2018

CIP Code

110101

Delivery Site(s)

University of South Carolina Aiken (USCA)

Delivery Mode

- Traditional/face-to-face\*                       Distance Education  
\*select if less than 50% online                       100% online  
 Blended (more than 50% online)  
 Other distance education

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

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Institutional Approvals and Dates of Approval

Department of Mathematical Sciences – September 18, 2017  
College Council – September 22, 2017  
Cabinet – September 25, 2017  
University Planning Committee – October 3, 2017  
Faculty Assembly – October 24, 2017  
Chancellor – November 1, 2017  
President –

Board of Trustees -

### **Background Information**

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

Currently the Department of Mathematical Sciences at USC Aiken offers a Bachelor of Science Degree in Math/Computer Science. Discussions with local business and industries indicate that this combined math/computer science degree no longer meet the needs of the area. As a result, USC Aiken proposes to sunset the current degree as soon as current majors graduate (projected May 2021). Working with local business and industry, the Department of Mathematical Sciences proposes a new program in Applied Computer Science that will help address the well-publicized need for computer professionals in our region, state, and nation and constitutes a reworking of our current degree in Mathematics/Computer Science. USC Aiken students desiring to focus on applied aspects of computer science will also receive fundamental computer science training and a high quality liberal arts foundation. Concentrations in *cybersecurity* and in *applied gaming* are also exciting options within this new degree. Additionally, the exclusion of advanced work in mathematics and the inclusion of specialty computer courses (e.g. cryptography, defense techniques, haptics, and information security) makes these degree options appealing and accessible to a broader array of students.

USC Aiken intends for all graduates to be ready to succeed in a “dynamic global environment,” and today’s computer professionals must be committed to continual learning and to adapting to new challenges. This shift in degree focus—from theoretical to applied—will enable our graduates to contribute meaningfully and ethically in a variety of technically demanding fields.

List the program objectives. (2000 characters)

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In the context of a liberal arts education, the Applied Computer Science degree will provide students with:

- [1] knowledge and technical skills in fundamental and applied computer science;
- [2] experience applying computer science knowledge and skills to analyzing and solving problems;
- [3] experience in communicating solutions to problems in applied computer science;
- [4] training in practice as computer professionals.

Success in this program will be shown through (a) attracting students into the degree, (b) reaching graduation numbers of 15 per year, (c) students mid-program obtaining internships in the field, (d) graduates of the program obtaining employment in the profession, especially in the region and state of SC.

### **Assessment of Need**

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

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The CHE Occupational Outlook study (Von Nessen, 2016) projects a 17.7% growth in computer science occupations between 2012 and 2022, and a deficit of skilled professionals in this area of 360 per year. The Talent Pipeline SC State Staffing Study predicts strong growth in computer occupations (see page 4), and the Cybersecurity Workforce Study (Harris, Hatcher, Meares, 2017) by Augusta University reports an expected increase of 138% within 5 years resulting in 4,662 new positions in our region.

Aiken is home to a number of industries who rely on technologically skilled employees, and also sits within the larger Central Savannah River Area (CSRA) and the developing Fort Gordon Cyber District which has US Cyber Command at the hub. Major industry growth and an aging workforce raises concerns for the future health of these industries. We have worked closely with professionals in the area to design these degrees and partnered with SC Cyber to help address the growing needs for computer professionals in our state and region. Applied Gaming is an emerging field and has direct application in industrial, medical, and military contexts with virtual and augmented reality environments especially useful for education and training.

Some relevant businesses in the area include Savannah River National Laboratory, Savannah River Nuclear Solutions, Savannah River Remediation, Tognum America Inc., BAE Systems, South Carolina Gas and Electric; Kimberly-Clark's Consumer Health Services; Bridgestone Passenger and Truck Tire Facility; AGY Materials Corporation; Shaw Industries; Washington Safety Management Solutions Corporation; Hubbell Power Systems; and Harvey Ignition Systems Engineering Corporation. Collectively these industries employ over 16,000 individuals.

### Employment Opportunities

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

Yes

No

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

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<b>Employment Opportunities</b>			
<b>Occupation</b>	<b>Expected Number of Jobs</b>	<b>Employment Projection</b>	<b>Data Source</b>
Computer systems analysts	886 new jobs in SC	28% increase (2017-2027)	Talent Pipeline SC State Staffing Pattern
Information security analysts	143 new jobs in SC	20% increase (2017-2027)	Talent Pipeline SC State Staffing Pattern
Software developers	971 new jobs in SC	40% increase (2017-2027)	Talent Pipeline SC State Staffing Pattern
Computer Science	417 available September 2017		scworks.org
Information or Cyber Security	480 available September 2017		scworks.org
Software developer	127 available September 2017		scworks.org

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

As of September 2017, there were over 1,000 job postings in South Carolina in the areas of computer science, information or cyber security, and software development. In discussions with computer professionals in local industries, the consensus opinion on career outlook and continued job opportunities for applied computer science/information security was very positive. A recurring theme among our partners was the need to train the next generation of computer professionals not only for the increased demand in the job market, but also to replace those who are approaching retirement age. In all, there is no evidence that there will be difficulties for graduates of this program to find gainful employment in their field.

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

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

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

Yes

No

If yes, explain. (500 characters)

USC Aiken currently offers a Mathematics/Computer Science degree, which will be phased out. Additionally, some more theoretical courses will be replaced with applied courses, or taught on an every-other-year basis.

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**List of Similar Programs in South Carolina**

<b>Program Name</b>	<b>Institution</b>	<b>Similarities</b>	<b>Differences</b>
Applied Computer Science – BS	Southern Wesleyan University	The two programs have similar core computer science classes.	Almost the same Applied CS requirement (59 hours at USCA vs. 60 hours at SWV).
Computer and Information Sciences – BA	Charleston Southern University	The two programs have similar core computer science classes.	Stronger CS requirement at USCA (59 hours vs. 46 hours). Fewer tracks at USCA. USCA focused more on the CS practical side and its applications. CSU has a minor in Applied CS, a BS in CS, a BA in CIS and BT in CS that deals with the theoretical foundation, software development, and applications of computer science.
Computer Science – BS	The Citadel	The two programs have similar core computer science classes.	Stronger CS requirement at USCA (59 hours vs. 44 hours). USCA focused more on the CS practical side and its applications.
Computer Science – BS, BA	Clemson University	The two programs have similar core computer science classes.	USCA emphasizes the direct applications of computer science. Clemson deals with the theoretical foundation, software development, and applications of computer science.
Computer Science – BS, BA	College of Charleston	The two programs have similar core computer science classes.	USCA emphasizes the direct applications of computer science. College of Charleston deals with the software development and applications of computer science.
Computer Science	South Carolina State University	The two programs have similar core computer science classes.	USCA emphasizes the direct applications of computer science. South Carolina State University deals with the software development and applications of computer science.
Computer Science	USC Columbia	The two programs have similar core computer science classes.	USCA emphasizes the direct applications of computer science. USC Columbia deals with the theoretical foundation, software development, and applications of computer science.



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Computer Science	Coastal Carolina University	The two programs have similar required core courses.	Coastal Carolina University offers more diversified elective courses, including compiler design, algorithms in bioinformatics, parallel systems, artificial intelligence, and robotics, mainly at the introductory level.
Computer Science	Voorhees College	The two programs have similar required core courses.	USCA emphasizes the direct applications of computer science. Voorhees College is similar but with somewhat fewer CS options and more mathematics required.
Computer Science	Winthrop University	The two programs have similar required core courses.	USCA emphasizes the direct applications of computer science. Winthrop hosts a traditional computer science program focused on the theoretical side of computer science.
Computer Science	USC Upstate	The two programs have similar required core courses.	USCA has more variations in courses offered and is focused on general applications. USC Upstate has concentrations in scientific computing and enterprise solutions.
Computer Science	Francis Marion University	The two programs have similar required core courses.	USCA emphasizes the direct applications of computer science. Francis Marion hosts a traditional computer science program.
Computer Science, General	Benedict College	The two programs have similar required core courses.	USCA emphasizes the direct applications of computer science. Benedict College hosts a more theoretical computer science program.

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**Description of the Program**

Projected Enrollment						
Year	Fall		Spring		Summer	
	Headcount*	Student Credit Hours**	Headcount	Student Credit Hours	Headcount	Student Credit Hours
AY18-19	35	105	35	245		
AY19-20	50	325	50	400		
AY20-21	55	403	55	458		
AY21-22	60	435	60	465		
AY22-23	60	435	60	465		

\*Conservatively, we anticipate adding 15 new students each year into the program through year four. Then we anticipate graduating and adding 15 students each year thereafter, thus a total of 60 students in the program at max. When the program starts we anticipate that approximately 20 students in the current degree program will move to the new program. In 19/20, ten of the continuing students would graduate and the final 10 of the continuing students would graduate in 20/21. Therefore the numbers for the first three years reflect both new and continuing (from old degree program) students.

\*\*Student Credit Hours is calculated by the number of Applied Computer Science Course credit hours taken multiplied by the number of students. (example, 1<sup>st</sup> semester freshman, take 3 hours of computer science, therefore 35 students x 3 credit hours = 105. In the spring semester of the freshman year they take 7 credit hours, therefore 35 students x 7 credit hours = 105. In years 2-5, calculations become a little more complicated because you have different levels of students taking a different number of content courses) Student credit hours reflect only computer science courses.

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

- Yes
- No

If yes, explain. (1000 characters)

Are there any special articulation agreements for the proposed program?

- Yes
- No

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If yes, identify. (1000 characters)

**Curriculum**

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

<b>Curriculum by Year</b>					
<b>Course Name</b>	<b>Credit Hours</b>	<b>Course Name</b>	<b>Credit Hours</b>	<b>Course Name</b>	<b>Credit Hours</b>
<b>Year 1</b>					
<b>Fall</b>		<b>Spring</b>		<b>Summer</b>	
Discrete Math	3	Survey of Calc	3		
Intro to CSCI	3	Intro to Algo Design 1	4		
HIST 101 or 102	3	Computer Appl and Programming	3		
ENGL 101	3	Social Behavior Science	3		
Critical Inquiry	1	ENGL 102	3		
Total Semester Hours	13	Total Semester Hours	16	Total Semester Hours	
<b>Year 2</b>					
<b>Fall</b>		<b>Spring</b>		<b>Summer</b>	
Intro to Algo Design 2	4	Data Structures and Algo	3		
Introduction to Information Security	3	Mobile Application Development	3		
Object-Oriented Programming	3	Web Development	3		
COMM 201 or 241	3	Linear Algebra for Computer Science	3		
Foreign Language	4	Foreign Language	4		
Total Semester Hours	17	Total Semester Hours	16	Total Semester Hours	
<b>Year 3</b>					
<b>Fall</b>		<b>Spring</b>		<b>Summer</b>	
System Level Programming	3	Programming Language Structures	3		
Introduction to Software Engineering	3	Computer Graphics	3		
Data Comm & Comp Network	3	Database Management Systems	3		
Social Behavior Science	3	Humanities	3		
Free Elective	3	POLI 201, HIST 201, 202	3		
Total Semester Hours	15	Total Semester Hours	15	Total Semester Hours	

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<b>Curriculum by Year</b>					
<b>Course Name</b>	<b>Credit Hours</b>	<b>Course Name</b>	<b>Credit Hours</b>	<b>Course Name</b>	<b>Credit Hours</b>
<b>Year 4</b>					
<b>Fall</b>		<b>Spring</b>		<b>Summer</b>	
Database Programming for CS	3	CSCI elective	3		
CSCI Capstone	3	CSCI elective	3		
Humanities	3	Humanities	3		
Natural Science	4	Natural Science	4		
		Free Elective	2		
Total Semester Hours	13	Total Semester Hours	15	Total Semester Hours	
<b>Year 5</b>					
<b>Fall</b>		<b>Spring</b>		<b>Summer</b>	
Total Semester Hours		Total Semester Hours		Total Semester Hours	

See following pages for comparisons of (1) Applied Computer Science, (2) Applied Computer Science with concentration in Cyber Security, and (3) Applied Computer Science with concentration in Applied Gaming.

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Curriculum by Category*					

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

Total Credit Hours Required      = 120 hrs

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Applied Computer Science Degree - no concentration – 120 credit hours

<b>Freshman Fall</b>			<b>Freshman Spring</b>		
<b>Courses</b>	<b>Description</b>	<b>Hours</b>	<b>Courses</b>	<b>Description</b>	<b>Hours</b>
MATH 174	Discrete Math	3	MATH 122	Survey of Calc	3
CSCI 125	Intro to CSCI	3	CSCI 145	Intro to Algo Design 1	4
HIST 101 or 102		3	CSCI 185	Computer Appl and Programming	3
ENGL 101		3	1 Social Behavior Science		3
Critical Inquiry		1	ENGL 102		3
		13			16
<b>Sophomore Fall</b>			<b>Sophomore Spring</b>		
<b>Courses</b>	<b>Description</b>	<b>Hours</b>	<b>Courses</b>	<b>Description</b>	<b>Hours</b>
CSCI 146	Intro to Algo Design 2	4	CSCI 220	Data Structures and Algo	3
CSCI 255	Introduction to Information Security	3	CSCI 340	Mobile Application Development	3
CSCI 320	Object-Oriented Programming	3	MATH 344	Linear Algebra for Computer Science	3
COMM 201 or 241		3	CSCI 225	Web Development	3
Foreign Language		4	Foreign Language		4
		17			16
<b>Junior Fall</b>			<b>Junior Spring</b>		
<b>Courses</b>	<b>Description</b>	<b>Hours</b>	<b>Courses</b>	<b>Description</b>	<b>Hours</b>
CSCI 325	System Level Programming (Unix & C)	3	CSCI 330	Programming Language Structures	3
CSCI 360 (240)	Introduction to Software Engineering	3	CSCI 350	Computer Graphics	3
CSCI 415	Data Comm & Comp Network	3	CSCI 520	Database Management Systems	3
Elective	Free	3	1 Humanities		3
1 Social Behavior Science		3	POLI 201, HIST 201, 202		3
		15			15
<b>Senior Fall</b>			<b>Senior Spring</b>		
<b>Courses</b>	<b>Description</b>	<b>Hours</b>	<b>Courses</b>	<b>Description</b>	<b>Hours</b>
CSCI 521	Database Programming for CS	3	CSCI 590	Capstone	3
CSCI aaa	CSCI elective	3	CSCI bbb	CSCI Elective	3
1 Humanities		3	1 Humanities		3
1 Natural Science		4	1 Natural Science		4
		13	Elective	Free	2
					15

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Applied Computer Science Degree - Cybersecurity Concentration - 120 credit hours

<b>Freshman Fall</b>			<b>Freshman Spring</b>		
<b>Courses</b>	<b>Description</b>	<b>Hours</b>	<b>Courses</b>	<b>Description</b>	<b>Hours</b>
MATH 174	Discrete Math	3	MATH 122	Survey of Calc	3
CSCI 125	Intro to CSCI	3	CSCI 145	Intro to Algo Design 1	4
HIST 101 or 102		3	CSCI 210	Intro to Comp Org	3
ENGL 101		3	CSCI 215	Ethics and Professional Issues	3
Critical Inquiry		1	ENGL 102		3
		<u>13</u>			<u>16</u>
<b>Sophomore Fall</b>			<b>Sophomore Spring</b>		
<b>Courses</b>	<b>Description</b>	<b>Hours</b>	<b>Courses</b>	<b>Description</b>	<b>Hours</b>
CSCI 146	Intro to Algo Design 2	4	CSCI 220	Data Structures and Algo	3
CSCI 255	Intro to Information Security	3	CSCI 285	Intro to Cryptography	3
COMM 201 or 241		3	1 Social Behavior Science		3
Foreign Lanuage		4	POLI 201, HIST 201, 202		3
		<u>14</u>	Foreign Langauge		4
					<u>16</u>
<b>Junior Fall</b>			<b>Junior Spring</b>		
<b>Courses</b>	<b>Description</b>	<b>Hours</b>	<b>Courses</b>	<b>Description</b>	<b>Hours</b>
CSCI 360 (formerly CSCI 240)	Software Engineering	3	CSCI 425	Network Security	3
CSCI 411	Operating Systems	3	CSCI 520	Database System Design	3
CS 415	Data Comm and Comp Networks	3	CSCI aaa	CSCI elective	3
1 Social Behavior Science		3	1 Humanities		3
Elective	Free	3	Elective	Free	3
		<u>15</u>			<u>15</u>
<b>Senior Fall</b>			<b>Senior Spring</b>		
<b>Courses</b>	<b>Description</b>	<b>Hours</b>	<b>Courses</b>	<b>Description</b>	<b>Hours</b>
CSCI 515	Ethical Hacking	4	CSCI 545	Cyber Defense and Digital Forensics	3
CSCI 525	Secure Software Engineering	3	CSCI 590	Capstone	3
1 Humanities		3	1 Humanities		3
1 Natural Science		4	1 Natural Science		4
Elective	Free	3	Elective	Free	1
		<u>17</u>			<u>14</u>

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Applied Computer Science Degree - Applied Gaming concentration - 120 credit hours

<b>Freshman Fall</b>			<b>Freshman Spring</b>		
<b>Courses</b>	<b>Description</b>	<b>Hours</b>	<b>Courses</b>	<b>Description</b>	<b>Hours</b>
MATH 174	Discrete Math	3	MATH 122	Survey of Calc	3
CSCI 125	Intro to CSCI	3	CSCI 145	Intro to Algo Design 1	4
HIST 101 or 102		3	CSCI 210	Intro to Comp Org	3
ENGL 101		3	ENGL 102		3
Critical Inquiry		1	Elective	Free	3
		13			16
<b>Sophomore Fall</b>			<b>Sophomore Spring</b>		
<b>Courses</b>	<b>Description</b>	<b>Hours</b>	<b>Courses</b>	<b>Description</b>	<b>Hours</b>
CSCI 146	Intro to Algo Design 2	4	CSCI 220	Data Structures and Algo	3
CSCI 255	Intro to Information Security	3	CSCI 275*	Physics Engine Integration	3
1 Natural Science	Physics 201	4	1 Humanities	ARTS 380 3D and Animation	3
MATH 344	Linear Algebra for Computer Science	3	1 Natural Science	Physics 202	4
		14	1 Social Behavior Science	PSYC 101	3
					16
<b>Junior Fall</b>			<b>Junior Spring</b>		
<b>Courses</b>	<b>Description</b>	<b>Hours</b>	<b>Courses</b>	<b>Description</b>	<b>Hours</b>
CSCI 320	Object-Oriented Programming (Java)	3	CSCI 350	Computer Graphics	3
CSCI 360 (240)	Intro to Software Eng	3	CSCI 375	Intro to Haptics	3
PSYC 450	Sensation and Perception	3	EDET 652	Design and Evaluation of Games and Sims	3
EDET 603	Design and Dev Tools 1	3	1 Humanities		3
COMM 201/241		3	Elective	Free	3
		15			15
<b>Senior Fall</b>			<b>Senior Spring</b>		
<b>Courses</b>	<b>Description</b>	<b>Hours</b>	<b>Courses</b>	<b>Description</b>	<b>Hours</b>
CSCI aaa	CSCI elective	3	CSCI 590	Capstone	3
POLI 201, HIST 201, 202		3	1 Humanities		3
1 Social Behavior Science (3hrs)		3	Foreign Language		4
Foreign Lanuage		4	Elective	Free	3
Elective	Free	3	Elective	Free	2
		16			15



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The table below helps illustrate the similarities and differences between the three tracks. (\* = course required)

		Applied Comp Sci	Cyber Security	Applied Gaming
CSCI 125	Intro to CSCI/python	*	*	*
CSCI 145	Intro to Algo Design 1	*	*	*
CSCI 146	Intro to Algo Design 2	*	*	*
CSCI 220	Data Structures and Algo	*	*	*
CSCI 255	Introduction to Information Security	*	*	*
CSCI 360	Software Engineering	*	*	*
CSCI 590	Capstone	*	*	*
CSCI 205	Computer Appl and Programming	*		
CSCI 225	Web Development	*		
CSCI 320	Object-Oriented Programming	*		*
CSCI 325	System Level Programming	*		
CSCI 330	Programming Language Structures	*		
CSCI 340	Mobile Application Development	*		
CSCI 350	Computer Graphics	*		*
CSCI 415	Data Comm & Comp Network	*	*	
CSCI 520	Database Management System Design	*	*	
CSCI 521	Database Programming for CS	*		
CSCI 210	Introduction to Computer Organization		*	*
CSCI 215	Ethics and Professional Issues		*	
CSCI 285	Intro to Cryptography		*	
CSCI 411	Operating Systems		*	
CSCI 425	Network Security		*	
CSCI 515	Ethical Hacking		*	
CSCI 525	Secure Software Engineering		*	
CSCI 545	Cyber Defense and Digital Forensics		*	
CSCI 275	Physics Engine Integration			*
CSCI 375	Introduction to Haptics			*
ARTS 381	3D and Animation			*
EDET 603	Design and Development Tools 1			*
EDET 652	Design and Evaluation of Games and Simulations			*
PHYS 201	Physics 1			*
PHYS 202	Physics 2			*
PSYC 101	Intro Psych			*
PSYC 450	Sensation and Perception			*

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**Course Descriptions for New Courses**

<b>Course Name</b>	<b>Description</b>
CSCI 125: Intro to Computer Science	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 major in computer science.
CSCI 185: Computer Applications and Programming	This course provides an introduction to systematic computer problem-solving using a 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 215: Ethics and Professional Issues	Covers the impact of computer use on society, the ethical use of software, and the protection of intellectual property rights. The responsibility of professionals will be discussed in the context of the IEEE/ACM professional code of ethics.
CSCI 225: Web Development	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 255: Introduction to Information Security	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 275: Physics Engine Integration	Few computer gaming companies write their entire code from scratch. They often use commercially available physics engines which control the way objects interact with the environment. They control characteristics such as gravity, collision detection, fabric movement, wind, etc. Understanding how to apply the engines to a scenario is a key skill.
CSCI 285: Intro to Cryptography	An introductory study for Cryptography. Topics include: symmetric cryptography, historical ciphers, the data encryption standard, the advanced encryption standard, asymmetric cryptography, topics in number theory for public-key cryptography, RSA cryptosystem, and the RSA digital signature scheme.
CSCI 325: System Level Programming	Basic concepts of Unix-like systems. Shells and scripting. System-level programming in the C language. Software development tools and techniques

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CSCI 375: Intro to Haptics	Adding force feedback, or haptics, is a method to make an AR/VR/SG scenario even more realistic. Haptics can include the ability to feel the weight of a virtual object being lifted, the torque on a steering wheel, or the resistance when contacting a rigid object. Understanding how to make a scenario physically interact with the user will lead to more immersive scenarios.
CSCI 425: Network Security	Deals with tools and techniques used to defend networks including IPS/IDS, traffic flow analysis, segregation, network architecture.
CSCI 515: Ethical Hacking	This course teaches how computers can be exploited and along with that how those techniques can be selected and countered (e.g. scanning, mapping, and password attacks, and more advanced attacks if time allows).
CSCI 525: Secure Software Engineering	This course introduces the fundamentals for constructing secure software by applying security principles to the software development processes. Some software vulnerabilities and possible attacks that exploit them will be considered.
CSCI 545: Cyber Defense and Digital Forensics	This course introduces the tools and techniques for monitoring and preventing illegal accesses to computer systems that contain confidential or sensitive information. In addition, this course also introduces digital forensic tools and techniques to collect, analyze, document, and present evidences for malicious activities or computer-related crimes.
MATH 344: Linear Equations for Computer Science	This course introduces preliminary concepts and basic computational techniques of linear algebra that are important to science and to different branches of Computer Science. Contents include Vector spaces, linear transformations and matrices, Determinants, Systems of equations, Inversion, matrix decomposition and other topics applicable to Computer Science.

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**Faculty**

<b>Faculty and Administrative Personnel</b>				
<b>Rank</b>	<b>Full- or Part-time</b>	<b>Courses Taught or To be Taught, Including Term, Course Number &amp; Title, Credit Hours</b>	<b>Academic Degrees and Coursework Relevant to Courses Taught, Including Institution and Major</b>	<b>Other Qualifications and Comments (i.e., explain role and/or changes in assignment)</b>
1: Professor of Mathematics and Computer Science	Full Time	CSCI 145 Intro to Algorithmic Design I (4) CSCI 146 Intro to Algorithmic Design II (4) MATH 174 Discrete Math (3) CSCI 220 Data Structures and Algorithms (3) CSCI 285 Intro to Cryptography (3) CSCI 320 Object-Oriented Programming (3) CSCI 330 Programming Language Structures (3) CSCI 340 Mobile Application (3)	PhD in Mathematical Sciences (Graph Theory) MS in Mathematical Sciences (Computer Science) The University of Memphis	Taught the following computer science or computer information science courses at Georgia Southwestern State University: -The Theory of Computation -Information Storage and Retrieval -Design and Analysis of Algorithms -Concepts of Programming Languages -File Processing -Discrete Structures -Introduction to Structured Programming (C++) -Special Problems in Computer Science

**NEW PROGRAM PROPOSAL**

<p>2: Professor of Computer Science</p>	<p>Full Time</p>	<p>CSCI 125 Intro to CSCI (3)                  CSCI 145 Intro to Algorithmic Design I (4)                  CSCI 185 Computer Applications and Programming (3)                  CSCI 325 System Level Programming (3)                  CSCI 520 Database System Design (3)                  CSCI 521 Database Programming for CS (4)</p>	<p>PhD in Computer Science                  Illinois Institutes of Technology(IIT)                  MS in Computer Science                  Western Michigan University</p>	
<p>3: Professor of Mathematics and Computer Science</p>	<p>Full Time</p>	<p>CSCI 145 Intro to Algorithmic Design I (4)                  CSCI 210 Introduction to Computer Organization (3)                  CSCI 220 Data Structures and Algorithms (3)                  CSCI 350 Computer Graphics (3)                  CSCI 411 Operating Systems (3)</p>	<p>PhD in Mathematics                  MS in Computer Science                  The University of Western Ontario, Canada</p>	
<p>4: Professor of Mathematics and Computer Science</p>	<p>Full Time</p>	<p>CSCI 220 Data Structures and Algorithms (3)                  CSCI 360 Software Engineering (3)                  CSCI 590 Capstone (3)</p>	<p>PhD in Mathematics                  MS in Computer Science                  The University of Western Ontario, Canada</p>	

**NEW PROGRAM PROPOSAL**

<p>5: Associate Professor of Applied Mathematics and Computer Science</p>	<p>Full Time</p>	<p>CSCI 125 Intro to CSCI (3)                  CSCI 146 Intro to Algorithmic Design II (4)                  CSCI 185 Computer Applications and Programming (3)                  CSCI 210 Comp Org and Assembly Lang (3)                  CSCI 220 Data Structures and Algorithms (3)                  CSCI 225 Web Development (3)                  CSCI 330 Programming Language Structures (3)                  CSCI 411 Operating Systems (3)                  CSCI 415 Data Comm and Comp Networks (3)</p>	<p>PhD in Applied Mathematics                  MS in Computer Science                  University of Rochester</p>	<p>Associate Professor of Applied Mathematics and Computer Science (Yilian Zhang)</p>
<p>*6: Assistant Professor of Computer Science – Cybersecurity</p>	<p>Full-time</p>	<p>CSCI 125 Intro to CSCI (3)                  CSCI 215 Ethics and Professional Issues (3)                  CSCI 255 Introduction to Information Security (3)                  CSCI 425 Network Security (3)                  CSCI 515 Ethical Hacking (4)                  CSCI 525 Secure Software Engineering (3)                  CSCI 545 Cyber Defense and Digital Forensics (3)                  CSCI 590 Capstone (3)</p>		

**NEW PROGRAM PROPOSAL**

*7: Assistant Professor of Computer Science – Applied Gaming	Full-Time	CSCI 255 Introduction to Information Security (3) CSCI 275 Physics Engine Integration (3) CSCI 375 Intro to Haptics (3) CSCI 590 Capstone (3)		
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Note: Individuals should be listed with program supervisor positions listed first. Identify any new faculty with an asterisk next to their rank.

## NEW PROGRAM PROPOSAL

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

Faculty	Staff	Administration
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### Faculty /Administrative Personnel Changes

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

A majority of the faculty are currently teaching MATH and CSCI courses within the department. Distribution of courses will be altered as the new degree comes on line and the existing degree is phased out. Two new faculty in Computer Science are necessary having areas of expertise not already covered in the department: one with expertise in cybersecurity; one in applied gaming/virtual reality. Ideally the cybersecurity professor will be added for Year 1, and the applied gaming professor will be added for Year 3.

### Library and Learning Resources

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



## NEW PROGRAM PROPOSAL

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 and relatively weak in the areas of Cybersecurity and Gaming (with approximately 100 e-book and print titles in each area with many out of date). The collection needs to be strengthened in these two areas to meet the needs of the proposed concentrations. The average cost of North American Academic books in the field of computer science is \$111.47. More scholarly monograph titles in the areas of need listed above should be acquired to adequately meet student need and would require an annual addition of \$5,500 annually.

### Student Support Services

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

No additional academic support services are expected for this program.

### Physical Resources

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

A small, dedicated computer lab that can be isolated from the network: existing desktop computers (10), servers (2), network switch (1), routers (2), firewall (1). Estimated cost = \$10,000. To be added in Year 2.

Some VR/AR equipment is required, with holdings built up over time: computers with high level video card (5), VIVE VR headset kits (5), Oculus Rift VR headset kit (1), Hololens AR headset kit (2), 3D Geomagic Touch for haptics (2). Estimated cost \$24,800.

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

Yes

No

**NEW PROGRAM PROPOSAL**

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

**NEW PROGRAM PROPOSAL**

**Financial Support**

<b>Estimated New Costs by Year</b>						
<b>Category</b>	<b>1<sup>st</sup></b>	<b>2<sup>nd</sup></b>	<b>3<sup>rd</sup></b>	<b>4<sup>th</sup></b>	<b>5<sup>th</sup></b>	<b>Total</b>
Program Administration						
Faculty and Staff Salaries	110726	114048	228195	235041	242092	930102
Graduate Assistants						
Equipment	0	34800	0	0	0	34800
Facilities						
Supplies and Materials	3000	3000	3000	3000	3000	15000
Library Resources	5500	5500	5500	5500	5500	27500
Other*						
<b>Total</b>	119226	157348	236695	243541	250592	1007402
<b>Sources of Financing</b>						
<b>Category</b>	<b>1<sup>st</sup></b>	<b>2<sup>nd</sup></b>	<b>3<sup>rd</sup></b>	<b>4<sup>th</sup></b>	<b>5<sup>th</sup></b>	<b>Total</b>
Tuition Funding	362880	528768	593278	660156	673359	2818441
Program-Specific Fees	1050	1500	1650	1800	1800	7800
State Funding (i.e., Special State Appropriation)*						
Reallocation of Existing Funds*						
Federal Funding*						
Other Funding*						
<b>Total</b>	363930	530268	594928	661956	675159	2826241
<b>Net Total</b> (i.e., Sources of Financing Minus Estimated New Costs)	244704	372920	358233	418415	424567	1818839

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

## NEW PROGRAM PROPOSAL

### Budget Justification

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

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

Tuition is calculated using the number of students times the full-time student tuition rate per semester which in year 1 is \$5,184/semester. For subsequent years we estimate a 2% increase in tuition so for years 2-5 the tuition rates uses are \$5,288/semester/student, \$5393/semester/student, \$5,501/semester/student and \$5,611/semester/student, respectively.

For this program, there is also a \$15/student/semester fee assessed.

A new faculty member with expertise in Cyber Security will be hired in year one (Salary \$82,631 + 34% fringe benefits). Another new faculty member with expertise in advanced gaming/virtual reality will be hired in year 3 (Salary \$82,631 + 34% fringe benefits).

A small, dedicated computer lab that can be isolated from the network: existing desktop computers (10), servers (2), network switch (1), routers (2), firewall (1). Estimated cost = \$10,000. To be added in Year 2.

Some VR/AR equipment is required, with holdings built up over time: computers with high level video card (5), VIVE VR headset kits (5), Oculus Rift VR headset kit (1), Hololens AR headset kit (2), 3D Geomagic Touch for haptics (2). Estimated cost \$24,800.

### Evaluation and Assessment

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

The department's assessment plan and results for program objectives and student learning outcomes are currently reviewed on a three-year rotation by USC Aiken's Academic Assessment Committee. This practice will continue as we shift between degree programs. Additionally, our assessment data is reviewed annually by the unit head. Annual oversight of the department's assessment results is carried out by the Dean of the College of Sciences and Engineering and by the university's Executive Vice Chancellor for Academic Affairs.

TracDat has been the repository for assessment reports, though the university is migrating to TaskStream. Relevant data and reports for this new degree program will be uploaded to and available from TaskStream. Continuous improvement to both courses and program will be pursued in response to assessment findings.

Internships for students and employment of graduates will be tracked through the cooperative efforts of the department, Office of Career Services, and the Alumni Office.

**NEW PROGRAM PROPOSAL**

**Student Learning Assessment**

<b>Expected Student Learning Outcomes</b>	<b>Methods of/Criteria for Assessment</b>
SLO1: Develop understanding of general systems principles, computer systems and architecture, and networking.	Embedded questions in CSCI 125 (Introduction to Computer Science) Senior Exit Survey
SLO2: Demonstrate proficiency in using algorithms to solve problems.	Independent project/laboratory assignment in CSCI 146 (Introduction to Algorithmic Design 2) Senior Exit Survey
SLO3: Identify the social and ethical issues in the professional practice of computer technology.	Embedded questions in CSCI 255 (Introduction to Information Security) Senior Exit Survey
SLO4: Demonstrate proficiency of software development principles and their applications in design and development of practical software systems.	Independent project in CSCI 360 (Software Engineering) Senior Exit Survey
SLO5: Demonstrate problem solving skills in real-life computer science settings and be able to communicate solutions.	Oral presentation of capstone project in CSCI 590 (Capstone Seminar) Senior Exit Survey
SLO6: demonstrate proficiency in using a high-level programming language	Independent project in CSCI 320 (Object-Oriented Programming) and CSCI 521 (Database Programming for Computer Science) Senior Exit Survey

**NEW PROGRAM PROPOSAL**

Will the proposed program seek program-specific accreditation?

Yes

No

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

Will the proposed program lead to licensure or certification?

Yes

No

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

**NEW PROGRAM PROPOSAL**

**Teacher or School Professional Preparation Programs**

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

Yes

No

If yes, complete the following components.

Area of Certification

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