New Program Proposal
Master of Science in Information Systems Technology
with a Concentration in Security and Analytics
Coastal Carolina University

Summary

Coastal Carolina University requests approval to offer a program leading to the Master of Science in Information Systems Technology with a Concentration in Security and Analytics, to be implemented in Spring 2016 through online instruction. The following chart provides the stages of review for the proposal. The Advisory Committee on Academic Programs (ACAP) voted to recommend approval of the proposal. The full program proposal is attached.

Stages of Consideration	Date	Comments
Program Planning Summary received and posted for comment	5/15/14	Not Applicable
Program Planning Summary considered by ACAP through electronic review	7/30/14	N.B. The following comments were in response to the original Program Summary titled *Information and Security Analytics* (2014). The official application*, Information Systems Technology with a Concentration in Security and Analytics,* includes helpful revisions (2015). <u>Comments and questions from ACAP members</u> • The importance of security issues warrants this type of degree. • Is the balance of core, elective, and thesis coursework adequate to cover the complexity of the subject? • The College of Charleston representative noted that the College offers a specialization in Cybersecurity within the M.S. in Computer and Information Science and has recently created a 12 credit graduate certificate of Cybersecurity.
Program Proposal Received	5/1/15	Not Applicable

Stages of Consideration	Date	Comments
ACAP Consideration	6/11/15	ACAP members discussed the need for the proposed program. The representative from USC Columbia stated the following: • USC Columbia is moving into this field of data analytics, and has a certificate already in Cybersecurity Studies). • USC faculty are concerned that there is no mention of graduate courses in the field. USC also operates the IBM Center for Innovation which includes data analytics and believes the proposal should include these.
Comments and suggestions from CHE staff sent to the institution	6/17/15	Staff requested the following revisions or explanations: • The change of name of the proposed degree • Credit hour requirements for elective courses and clarification of the concentration • Components of external programmatic assessments • The role of CSCI courses in the student learning assessment process Course titles that explain components of the curriculum taught or to be taught by individual faculty members.
Revised Program Proposal Received	6/25/15	The revised proposal satisfactorily addressed the requested revisions.

Recommendation

The staff recommends that the Committee on Academic Affairs and Licensing (CAAL) commend favorably to the Commission the program leading to the Master of Science in Information Systems Technology with a Concentration in Security and Analytics, to be implemented in Spring 2016.

Name of Institution

Coastal Carolina University (CCU)

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

Master of Science in Information Systems Technology with Concentration in Security and Analytics

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

Spring 2016

CIP Code

11.1003

Delivery Site(s)

Online Instruction

Delivery Mode

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

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

Sathish A.P. Kumar, Ph.D.
College of Science
Assistant Professor of Computer Science and Information Systems
skumar@coastal.edu
843-349-2810

Institutional Approvals and Dates of Approval

Curriculum Committee	November 17, 2014
Graduate Council	December 3, 2014
Faculty Senate	February 4, 2015
Provost	February 09, 2015
President	February 10, 2015
Board of Trustees	May 09, 2014

Background Information

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

The curriculum proposed for this new Online M.S. degree includes the necessary theory and principles, as well as the application and practice, to meet the user's secure information service and data analytics needs. The proposed M.S. degree program will prepare graduates to design, implement, and evaluate secure technology systems and infrastructure, as well as to derive knowledge/decisions from collected information to solve real world problems. While the curriculum is targeted towards industry needs, graduates will also be encouraged to pursue further research in the areas of Information Security and Data Analytics. For students who have a well-rounded background in Application Development, Networking, Databases and Statistics, the program is designed such that the balance of core, elective, and capstone coursework will help prepare them to be experts in the areas of Information Security and Data Analytics. This program will be designed to allow a student with a Bachelor's Degree in a related field to complete this Online Master's Degree at CCU in approximately 18 months. This degree proposal directly supports CCU's mission to offer graduate programs of national and regional significance in Science and Business. It further supports the institution's mission by preparing knowledgeable, productive, and responsible graduates to contribute positively to the economic development of the region, in this case through the design and development of secure information services and by creating actionable insights from data through expert use of information services.

List the program objectives. (2000 characters)

The mission of the proposed Online M.S. program in Information Systems Technology (IST) with Concentration in Security and Analytics is to prepare future leaders in the areas of Information Security and Data Analytics through critical examination of both academic and practical applications of various segments of the Information Security and Data Analytics industry. The faculty seeks to challenge, engage, and cultivate students in becoming skilled and knowledgeable Information Security and Data Analytics professionals. To that end, the program will prepare graduates to:

1) Engage with the IST (Information Systems Technology) professional or academic communities through superior communication and leadership skills to contribute to the knowledge bases of fields such as Information Security and Data Analytics.
2) Apply analytical approaches, critical thinking, and technical skills to a domain of work in the IST field, specifically Information Security and Data Analytics.
3) Explore and extend creative use of emerging Information System Technologies in a secure manner.
4) Analyze, evaluate, design and implement information services to enhance the value of information in a variety of professional and academic settings.
5) Derive and effectively communicate actionable insights from a vast quantity and variety of data.
6) Critically evaluate and manage information security policies, principles, processes, services and technologies to manage risks and security threats when applied to different IST settings, and evaluate the current state of IST infrastructure and architecture so as to design and implement solutions in order to ensure a *secure* IST infrastructure.

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)

There is a critical *shortage* of Information Security and Data Analytics specialists who can understand, develop, and maintain secure information infrastructure as well as convert the ever increasing data into valuable insights. The Bureau of Labor Statistics Occupational Outlook Handbook indicates about a 25% increase in demand for employment of Information Security/Data Analytics professionals over the next 10 years. Neighboring states such as AL, GA, NC and VA have few graduate programs in Information Security/Data Analytics/Information Systems/Information Technology. Currently, there are not any public institutions that offer a master's program specifically in Information Systems Technology or Information Security and Analytics in the state of South Carolina, although the Univ. of South Carolina (USC)-Columbia offers graduate courses in information security and data analytics as part of their graduate programs in Computer Science or graduate certificates in Information Security / Business Analytics. USC-Columbia has a Center for Information Assurance Engineering and, recently, USC-Columbia also has partnered with IBM to set up the IBM Center for Innovation, specializing in the areas of analytics and higher education industry solutions Also, no public institution offers a master's program in *both* Information Security and Data Analytics outside of South Carolina. Therefore, the applicant pool is potentially much larger. In a recent survey conducted by CCU's Office of Institutional Research, Assessment and Analysis, 114 current undergraduate students representing a cross-section of several different majors responded, and about 21.1% (n=24) of those who responded expressed interest in pursuing this program. About 49.2% (n=56) of the respondents indicated they would at least consider pursuing this program, if it were available. Given the documented undergraduate student interest in the proposed M.S. program, based on this recent survey, it is logical to assume that, with the increase in the state's capacity to serve students in this discipline, some of CCU's out-of-state students would opt to remain in SC for graduate study and contribute to the state's intellectual capital. The program may also attract SC residents who currently seek degrees in adjacent states with higher capacity. This Online program will also be attractive to the working adults who wish to advance their knowledge and careers in Information Security and Analytics.

Employment Opportunities

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

☒Yes

☐No

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

Employment Opportunities			
Occupation	**Expected Number of Jobs**	**Employment Projection**	**Data Source**
Information Security Architects/Engineers	18,600	17% (Faster than avg.)	Bureau of Labor Statistics Occupational Outlook Handbook 2012-13
Chief Information Security Officers/Chief Data Officers/Top Executives	261,500	11% (Faster than avg.)	Bureau of Labor Statistics Occupational Outlook Handbook 2012-13
IT Security Analyst/Consultant	27,400	37% (Much faster than avg.)	Bureau of Labor Statistics Occupational Outlook Handbook 2012-13
Computer and Information Research Scientists/ Data Scientists	4,100	15% (Faster than avg.)	Bureau of Labor Statistics Occupational Outlook Handbook 2012-13
ETL Engineer/Data Warehouse Specialists/ BI Specialists/Developers	222,600	22% (Much faster than avg.)	Bureau of Labor Statistics Occupational Outlook Handbook 2012-13
Database Administrators/Architects	17,900	15% (Faster than avg.)	Bureau of Labor Statistics Occupational Outlook Handbook 2012-13

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

As per the South Carolina Department of Employment and Workforce report (2013), there is a strong growth predicted for Information Security and Analytics professionals in the state. As per this report, between 2012 and 2022, it is expected that the need for these professionals will increase by 20%. A recent search from CareerBuilder website/SC Works Online job banks indicates that South Carolina employers had a total of 318 unique, open, unfilled positions related to Information Security and 239 unique, open, unfilled positions related to Data Analytics. This number is expected to increase significantly, as the SC Department of Labor and Workforce projects a 20% increase in demand for employment of Information Security/Data Analytics professionals over the next decade. According to the Bureau of Labor Statistics (2013) report, overall expected national growth for the Information Security and the Data Analytics/ Scientist related occupations will be about 35% and 15%, respectively. Clearly, there is a need for this kind of training.

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.
Not Applicable. Employment Opportunities table and the component that follows the table are completed on page 4.

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)

CCU currently has about 320 undergraduate majors in Computer Science, Information Systems and Information Technology combined. It is anticipated that some of these existing students will likely select the new master's program to advance their education if it is a better fit for their interests, skills, and career goals. The proposed M.S. program will also likely interact with the existing graduate programs in Business offered at CCU with a possibility of future dual M.S.-MBA./M.S.-M.Acc. degree programs that offer interested students an opportunity to graduate with dual master's degrees. In short, the only impacts would be positive ones.

List of Similar Programs in South Carolina

Program Name/Courses	Institution	Similarities	Differences
Master of Science in Computer and Information Sciences	Program jointly offered by College of Charleston and Citadel (CofC-Citadel)	Cybersecurity and Information Systems related focus in the curriculum	CofC -Citadel graduate program is not an online program. Also, the curricular focus of the related program is not in the area of Data Analytics but in areas such as Computer Science and Software Engineering.
Graduate certificate in Cybersecurity	Program jointly offered by College of Charleston and Citadel (CofC-Citadel)	Cybersecurity related focus in the curriculum	Curricular focus of the CofC-Citadel program is not in the area of Data Analytics. Also, the program offered by CofC-Citadel is only a certificate program and not a full graduate program or a totally 100% online program.
Graduate certificate in Cybersecurity and Information Assurance	University of South Carolina at Columbia (USC-Columbia)	Cybersecurity related focus in the curriculum	Curricular focus of the USC-Columbia program is not in the area of Data Analytics. Also, the program offered by USC-Columbia is only a certificate program and not a full graduate program or a totally 100% online program.
Graduate certificate in Business Analytics	University of South Carolina at Columbia (USC-Columbia)	Analytics related focus in the curriculum	Curricular focus of the USC-Columbia program is not in the area of Information Security. Also, the program offered by USC-Columbia is only a certificate program and not a full graduate program or a totally 100% online program.
Graduate courses offered by USC in the area of Data Analytics	University of South Carolina at Columbia (USC-Columbia)	Graduate courses in a. Scientific/Data Visualization b. Data Mining and Warehousing c. Decision Support Systems d. Big Data Analytics	*Proposed CCU Courses*: Data Management and Analytics, Semantic Web Technologies and Data Fusion *Existing USC-Columbia Courses:* Machine Learning , Bayesian Networks and Pattern Recognition, Quantitative Methods in Business, CRM and Data Mining, Intelligent Information Systems Design for Business Decision Making, Neural Information Processing
Graduate courses offered by USC in the area of Information Security	University of South Carolina at Columbia (USC-Columbia)	Graduate courses in a. Digital Forensics b. Secure Networking c. Secure Software Development	*Proposed CCU Courses:* Secure Cloud Computing, Intro. to Cybersecurity and Information Assurance, Intelligence and Security Analysis, Security Patterns, Security Policy and Risk Assessment *Existing USC-Columbia Courses:* Information Security Principles, Intro. to Cryptography, Security and Privacy for Wireless Networks, Information Warfare, Secure Database Systems, Formal Methods in Computer Security, Distributed Systems Security

Description of the Program

Projected Enrollment						
Year	Fall		Spring		Summer	
	Headcount	Credit Hours	Headcount	Credit Hours	Headcount	Credit Hours
2015-2016	15	135	18	164	N/A	N/A
2016-1017	30	269	31	282	N/A	N/A
2017-2018	33	301	31	283	N/A	N/A
2018-2019	34	302	32	284	N/A	N/A
2019-2020	34	303	32	285	N/A	N/A

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)

Admission criteria for this program are similar to those for other graduate programs at CCU. However, for Undergraduates (UG) with non-CS/IS/IT majors, UG course credits (equivalent to the required coursework for CCU UG CS/IS/IT Majors) in: (a) Computer Networks or Information Security, (b) Programming or Web Development, (c) Database Design or SQL Development and (d) Elementary Statistics or Business Statistics are required. Such students may come from other Science/Math/Business majors, perhaps with a minor in CS/IS/IT, or they may have related work experience. If the prospective student doesn't have the above UG credits but all other admission criteria are satisfactory, the student can be accepted on a *probationary* basis with the condition that the student needs to obtain undergraduate credits with grades of `C' or better in the above mentioned courses prior to taking any graduate coursework for the program. Candidates seeking admission to this program will submit the following materials in addition to the standard admission requirements:

1. Resume/Vitae; and
2. A personal statement indicating career goals and reasons for interest in this specific program.

Are there any special articulation agreements for the proposed program?

☐Yes

☒No

If yes, identify. (1000 characters)

No special articulation agreements are proposed. CCU is interested in establishing cooperative relationships with other institutions across the state, as they have the potential to serve as feeder programs for this proposed Information Security and Data Analytics-centric Master of Science in Information Systems Technology degree program. In turn, this program could also serve as a feeder program to other doctoral programs in the state. Coursework taken at other accredited programs would be open to review for transferability. The current Computer Science and Information Systems faculty have established a record of collaborative work with other individuals and programs throughout the state, and this is expected to continue.

Curriculum

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

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

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

Curriculum by Category*					
I. CORE COURSES	**15 Credit Hours**	**II. ELECTIVE COURSES**	**12 Credit Hours**	**III CAPSTONE COURSES**	**6 Credit Hours**
IST 650 – Information Systems Technology in Context	3 Credit Hours	**Security Concentration Elective Courses**	**6 Credit Hours Required**	**Thesis Option**	**6 Credit Hours**
IST 660-Intro to Cybersecurity and Information Assurance	3 Credit Hours	IST 665-Secure Networking	3 Credit Hours	IST 799 Research Thesis	6 Credit Hours
IST 661- Security Policy and Risk Assessment	3 Credit Hours	IST 666 Secure Software Development	3 Credit Hours	**Non-Thesis Option**	**6 Credit Hours**
IST 670-Data Management and Analytics	3 Credit Hours	IST 667 Intelligence and Security Analysis	3 Credit Hours	IST 659-Sp. Topics in Information Systems Tech.	3 Credit Hours
IST 671-Data Mining and Knowledge Discovery	3 Credit Hours	CSCI 534-Digital Forensics	3 Credit Hours	IST 669-Sp. Topics in Information Security	3 Credit Hours
		Analytics Concentration Elective Courses	**6 Credit Hours Required**	IST 679-Sp. Topics in Data Analytics	3 Credit Hours
		IST 675-Semantic Web Technologies	3 Credit Hours		
		IST 676-Data Fusion	3 Credit Hours		
		IST 677-Data Visualization	3 Credit Hours		
		CSCI 575-Decision Support Systems	3 Credit Hours		

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

Total Credit Hours Required 33 Credit Hours

Course Descriptions for New Courses

Course Name	Description
IST 650: Information Systems Technology in Context	This course introduces the issues that impact the design, development, and use of secure information systems. Organizational, social, legal, and ethical topics include: secure systems analysis and design, privacy issues, and the current legal landscape of information security and privacy.
IST 660: Intro to Cybersecurity and Information Assurance	This course is designed to provide an introduction to Cybersecurity and Information Assurance. It covers the fundamental concepts necessary to understand the security threats and technical defenses. The course includes an overview of security planning and implementing security technology.
IST 661: Security Policy and Risk Assessment	Prereq: IST 660. This course addresses ethical, legal and risk analysis/assessment/management policies and issues within which professionals shall practice and studies how they impact privacy, fair information practices and content control.
IST 665: Secure Networking	Prereq: IST 660. This course covers the applications and practice of Cryptography in securing wired/wireless networks and Internet. Cryptography related techniques would be studied to secure network infrastructure, firewalls and related topics.
IST 666: Secure Software Development	Prereq: IST 660. This course covers development of security requirements and the design, development and implementation of secure mobile and web applications. Principles of Secure Development Lifecycle, application vulnerabilities, secure design and coding will be covered in depth.
IST 667: Intelligence and Security Analysis	Prereq: IST 660. This course offers an advanced overview of the various structured analytical techniques used in the intelligence and security professions for conducting in-depth analysis and assessment. Emphasis will be placed on application of computer based models/applications for analysis.
IST 670: Data Management and Analytics	This course deals with the data management process for analytics, including analysis, design, data acquisition, cleaning, transformation, quality, structure, and security of the databases. Course also explores how the data relate and aggregate in analytic databases that could then be used by analytical tools.
IST 671: Data Mining and Knowledge Discovery	Prereq: IST 670. This course covers the techniques, the principles and methodologies involved in data mining. The course covers the ability to apply, analyze and evaluate different machine learning schemes and data mining algorithms.
IST 675: Semantic Web Technologies	Prereq: IST 670. This course provides an introduction to transition from Traditional Web to Semantic Web Technologies. Topics covered include the representation of structured web documents/resources in XML and RDF, Ontology Engineering, Web Ontology Language, and Semantic Web applications.
IST 676: Data Fusion	Prereq: IST 670. This course covers the introduction to the concepts, techniques, and issues surrounding distributed data access, collection, fusion and delivery techniques of information from multiple sensors and sources of data.
IST 677: Data Visualization	Prereq: IST 670. The course covers the visualization tools, concepts and representations for the analysis and understanding of complex data/insights visually and how to design and create effective interactive visualizations.
IST 659:Sp. Topics in Information Sys. Tech (IST)–Security Patterns	Prereq: Completion of Core Courses. This course examines the field of security design patterns. Students will survey a set of security patterns, study implementation options for selected patterns, and contribute additional pattern documentation to improve the effectiveness and usability of selected patterns for the general community.
IST 669:Sp Topics in Info Security – Secure Cloud Computing	Prereq: Completion of Core Courses. This course explores the fundamentals of cloud computing and addresses the cloud security related risks, issues and challenges associated with the cloud by exploring the security architectures, cloud software security, and cloud networking security tools and techniques.
IST 679:Sp. Topics in Data Analytics - Big Data Analytics	Prereq: Completion of Core Courses. This covers the fundamental concepts of Big Data management and analytics. This course is designed to equip students with the analysis, design and development of the applications that deal with very large volumes of data as well as in proposing scalable solutions for business and scientific applications.
IST 799: Research Thesis	Prereq: Completion of Core Courses. In this course, students design, implement, and present, both orally and in writing, an original research project. Specifically, the student will have delineated a research topic; conducted a literature review; developed appropriate methodology for investigating a topic; collected and analyzed data; and interpreted the results.

Faculty

Faculty and Administrative Personnel				
Rank	**Full- or Part-time**	**Courses Taught or To be Taught, Including Term, Course Number & Title, Credit Hours**	**Academic Degrees and Coursework Relevant to Courses Taught, Including Institution and Major**	**Other Qualifications and Comments (i.e., explain role and/or changes in assignment)**
Assistant Professor	Full Time	IST 670- Data Management and Analytics (3) F, S IST 671-Data Mining and Knowledge Discovery (3) F, S IST 675-Semantic Web Technologies (3) F, S IST 665-Secure Networking (3) F, S	PhD CSE., University of Louisville, KY EMCS 630 - Data Base Design (3) EMCS 694 - Internet App Dev (3) CECS 694 - Data Warehousing and Data Mining (3) CIS 675 - Management Info Systems (3) CECS 508 - Numerical Analysis (3) CECS 542 - Comp Control and Real-Time Programming (3)	Prior teaching / research experience in these areas Dissertation – Intrusion Detection and Response Model for Mobile Ad hoc Networks (Utilizing Data Analytics for Network Security)
Assistant Professor	Full Time	IST 650- Info Systems Tech in Context (3) F, S IST 660- Intro to Cybersecurity and Assurance(3) F, S IST 666- Secure Software Development(3) F, S IST 659- Sp. Topics in Info Sys Tech (3) F, S	PhD CIS Nova Southeastern University, FL MCIS 0652: Computer Security (3 hours) DCIS 0770: Software Engineering (3 hours) DCIS 765: Secure Systems Analysis & Design (3 hours) DCIS 730: Information Security (3 hours) MCIS 623: Legal & Ethical Aspects of Computing (3 hours) MCIS 680- Human Computer Interaction (3 hours)	Prior teaching / research experience in these areas DCIS 0830: Project in Info Security (4) DCIS 0875: Project in Privacy (4)
Associate Professor	Full Time	CSCI 575-Decision Support Systems(3) S IST 679-Sp. Topics in Data Analytics – Big Data Analytics (3) S	PhD CIS Nova Southeastern University, FL DCIS 735 Knowledge Management (3) DCIS 710 Decision Support Systems(3) DCIS 750 Database Systems (3) MBAMS 630 Stats Analysis Managers(3) – Univ of Mass - Boston MBA 600 Math Analysis – Managers (3) – Univ of Mass - Boston MBAMS 650 Object Orient Info Sys (3) – Univ of Mass - Boston	Prior teaching experience in these areas
Assistant Professor	Full Time	IST 669 – Sp. Topics in Information Security – Secure Cloud Computing (3) F, S CSCI 534 – Digital Forensics (3) F,S	PhD Computer Science., Clemson University, SC CPSC 851: Software Systems for Data Communications (3) CPSC 881: Selected Topics (Wireless Sensor Networks) (3) CPSC 881: Selected Topics (Cyberinfrastructure) (3) CPSC 622: Operating Systems (3) CPSC 852: Internetworking (3) CIS 657: Operating Systems (3) - Syracuse University, NY	Prior research/teaching experience in these areas
Assistant Professor	Full Time	IST 661 – Security Policy and Risk Assessment (3) F, S IST 667 – Intelligence and Security Analysis(3) F, S	PhD Foreign Affairs [Intel] University of Virginia, VA GFAG 509 Introduction to Quantitative Methods (3) GFAG 809 Political Applications of Applied Multivariate Analysis (3) GFIR 833 Science and Philosophy in International Relations (3) GFIR 511 International Law (3) GFIR 507 Ideological Influence on International Relations (3) GFIR 505 Theories of International Relations (3)	Prior teaching and Military experience in these areas
Assistant Professor*	Full Time	IST 676 – Data Fusion (3) F, S IST 677 – Data Visualization (3) F, S IST 679 – Sp. Topics in Data Analytics – Big Data Analytics (3) F, S	TBD	TBD

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

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

Faculty **2.5** Staff **0.25** Administration **0.25**

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)

Current Computing Sciences (CS) department faculty and Intelligence and Security program faculty will staff the proposed new program. One member of the CS faculty may be reassigned one course release per semester to recruit, retain and advise graduate students, as well as to fulfill the duties of scheduling courses and assisting the Department Chair and Dean with budget and resource management. Additional administrative support may be necessary to assist with the new program, which could be fulfilled with a part-time position. One additional faculty line has been accounted for in the budget supporting the new hire during the second year of the program. As enrollments increase in the degree programs offered by the CS department, it may be necessary to increase the number of full-time faculty in the future to maintain the student-to-faculty ratio. However, any future hires will be triggered by student demand and justified by increased tuition revenues. New faculty hires should possess a Ph.D. and/or relevant experience in the area of CS/IS/IT.

Library and Learning Resources

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

Kimbel Library provides access to 1,091 print and online periodicals relevant to the proposed program. Of these, 37.9% represent core titles in the relevant subject areas. A minimum 37 subject areas were identified for the proposed M.S program. In the Library of Congress Classification areas reviewed, Kimbel library holds 4,148 titles in all supporting areas. Of the 4,148 total titles owned, 948 (22.9%) are print, 3,197 (77%) are e-books, and 3 (0.1%) are media items. Of the 4,148 titles analyzed, 563 (13.6%) were published prior to 2000. Average publication year of the collection is 2004 (or average age eight years); median publication year is 2007 (or median age 5 years); and the most frequent publication year is 2009.

Based on the budget allocated to the library in this proposal ($6,775 per year), the library is likely to be expected to reach a sufficient percentage of core titles within the first five years of the program, and it can also make judicious use of electronic resources and resources, such as PASCAL Delivers or interlibrary loan, to supplement the program's needs as it develops.

Student Support Services

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

The proposed program will leverage the existing student support services, such as the Learning Assistance Center, Counseling Services, Moodle support and Technical Support from Student Computing Services, among others. The students who would require accommodations due to a disability, whether it is physical, learning or mental, will be provided with the means necessary to achieve their goals, such that each student becomes successful and is given equal opportunity to achieve his/her fullest potential. The program will also leverage CCU's Center for Teaching Excellence to Advance Learning with respect to any special support that may be needed for instruction within distance learning environments. No new support services are needed or requested.

Physical Resources

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

For the security-related courses, the students can use freely available virtualization software and open source tools such as Network Security Toolkit, OWASP tools, Nessus, Metasploit and Wireshark. For analytics-related courses, students can utilize open source tools such as R, MySQL, Knime, Hadoop, Protégé, Jena, SPARQL, and FLORA-2. For tools such as SAS, Oracle, Matlab, Tableau, and Globalytica, we will leverage the industry's academic alliances program to obtain free time-limited licenses. Sufficient instructional resources are currently available to support this Online program.

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

☐Yes

☒No

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

The CS department already has 6,513 square feet of office and lab space. Since the proposed M.S program would be offered as an Online program, we will leverage the existing resources from CCU's Coastal Office of Online Learning (COOL) center for the synchronous and asynchronous delivery of the Online courses in the proposed M.S program. We will work with the COOL Center to develop high quality, high value Online courses, Online course components, and the Online curriculum. We will leverage the collaboration of COOL with Information Technology Services and Media Services to advance the Online learning resources and infrastructure.

The proposed program will make use of a dedicated lecture capture room and a dedicated video conferencing room available in the University to provide for and meet the distance learning needs of the students. The proposed M.S program requires no additional physical plant requirements. Any further changes will be dictated by growth in enrollment.

Financial Support

Estimated New Costs by Year						
Category	**1st**	**2nd**	**3rd**	**4th**	**5th**	**Total**
Program Administration	$34,971	$35,671	$36,384	$37,112	$37,854	$181,992
Faculty and Staff Salaries	$128,574	$131,146	$147,681	$150,635	$153,648	$711,684
Graduate Assistants	$15,000	$65,000	$65,000	$65,000	$65,000	$275,000
Equipment	$0	$0	$0	$0	$0	$0
Facilities	$0	$0	$0	$0	$0	$0
Supplies and Materials	$1,000	$1,000	$1,000	$1,000	$1,000	$5,000
Library Resources	$6,775	$6,775	$6,775	$6,775	$6,775	$33,875
Other*	$0	$0	$0	$0	$0	$0
Total	$186,320	$239,592	$256,840	$260,522	$264,277	**$1,207,551**
Sources of Financing						
Category	**1st**	**2nd**	**3rd**	**4th**	**5th**	**Total**
Tuition Funding	$187,276	$345,542	$366,469	$367,694	$368,578	$1,635,559
Program-Specific Fees						
State Funding (i.e., Special State Appropriation)*	$0	$0	$0	$0	$0	$0
Reallocation of Existing Funds*	$0	$0	$0	$0	$0	$0
Federal Funding*	$0	$0	$0	$0	$0	$0
Other Funding*	$0	$0	$0	$0	$0	$0
Total	$187,276	$345,542	$366,469	$367,694	$368,578	**$1,635,559**
Net Total (i.e., Sources of Financing Minus Estimated New Costs)	$956	$105,950	$109,629	$107,172	$104,301	**$428,008**

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

Budget Justification

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

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

NOTE: Faculty salaries in the cost section of the budget include the salary for a new faculty hire, in addition to the salaries for the existing faculty corresponding to their load. The Administrative Support (AS) of the unit will also need to be increased somewhat and is reflected in the budgeted cost. The need for AS is, in part, related to the rapid growth of the current programs at the undergraduate level. With the addition of a graduate program, AS will need to be augmented with a .25 hire. The new program would also require some graduate assistants (GAs) to ensure the quality of the program. Fringe Benefits (24% of the salary) are included in the salaries. Program administration costs are based on 25% of Director's salary plus fringe benefits. Years 2 to 5 costs are based on a 2% increase in salaries. Cost is also allocated for procuring the library resources mentioned in this proposal, such that the library is likely to be expected to reach a sufficient percentage of core titles within the first five years of the program. Tuition funding is based on the enrollment trend survey that was conducted internally within the University and on the average of in-state and out-of-state tuition rates. Tuition fees are estimated to cover the cost of this new program. No funding will be requested from the state.

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 program will perform continuous assessment of Student Learning Outcomes (SLO) and of the program itself. SLO's are assessed using both direct and indirect methods, with at least one direct method of assessment per objective. Direct assessment methods generally evaluate the skills of students by testing factual knowledge (e.g.: test questions). Indirect methods generally evaluate the interpretation of learning achieved (e.g.: survey questions). The main data sources (each with numerous individual data points) for the assessment include: Course data reported via Faculty Course Assessment Reports (FCARs) and survey-based questions from the exit evaluations. Assessment of these outcomes will come from a variety of sources: both inside and outside of normal graded material. For example, the exit survey/evaluations and student assignment performance are examples of outside and inside of the normal graded material, respectively.

The SLO's can be mapped to the Program Objectives (PO) and are evaluated using the same process employed to evaluate the PO. Evaluation methods at the course level include evaluating at least two sources from appropriate assessments in the courses; in addition, exam questions, assignments, and course surveys may be used. Department-level evaluation methods include an exit survey.

The department will assess the program on an annual basis at the end of each academic year. The initial program assessment will include the following:

1. Review of admission criteria, particularly scores and written materials;
2. Review of student course survey/course evaluations;
3. Review of FCARs and faculty reflections;
4. Review of exit evaluations related to the program;
5. Review of post-programmatic surveys, including surveying recent graduates or alumni and their employers.

The assessment data will be reviewed annually and findings reported to the program faculty as well as to the University Assessment Committee for review. In addition, the program will use the findings to assess and recommend any program changes that may improve the overall quality and operation of the program.

Student Learning Assessment

Expected Student Learning Outcomes	Methods of/Criteria for Assessment
Write and present: (1) review (2) architecture, or (3) methodology that is potentially applied in IST professional practice or publishable in academic outlets.	Portfolio, Comprehensive exam, Thesis Report and Project Report collected in the courses: IST 659, IST 799, IST 669 and IST 679
Ability to analyze and implement processes and systems to transform raw business data to useful information and knowledge for a given problem.	Case briefs, Special applied project and Exams collected in: IST 660, IST 670, IST 676, and CSCI 575
Develop innovative technology approaches to solve problems in a novel manner.	Project Report and Thesis Report collected in the courses: IST 659, IST 799, IST 669 and IST 679
Effectively evaluate and communicate the threats/vulnerabilities of IST infrastructure and the effectiveness of technologies and systems available to secure an organization's IST infrastructure.	Case briefs, Exams and Written assignments collected in: IST 665, IST 666 and IST 660
Effectively apply the policies and principles of risk management as they get implemented in IST industry.	Exams, Case briefs and Written assignments collected in: IST 650, IST 661 and CSCI 534
Effectively communicate the knowledge discovered or the decision obtained by applying analytics/data mining methods/visualization techniques for a given problem.	Exams, Written assignments and Special applied projects collected in: IST 675, IST 676 and IST 671.

CSCI 534 Digital Forensics: Study of techniques, tools and processes used to discover digital evidence. Topics include collection, preservation, presentation, and preparation of computer based evidence for the purpose of criminal law enforcement and civil litigation. Role in proposed curriculum: This course is a possible elective of the security concentration in the curriculum. Student performance on term projects, written assignments and case briefs from this course will be used to assess the program learning outcomes. Effective application of the policies and principles of risk management as they get implemented in IST industry will be emphasized.

CSCI 575 Decision Support Systems: A study of decision support systems. Topics include computerized decision support and business intelligence systems, modeling, and methodologies. Course will cover data and web mining concepts, knowledge management technologies, collaboration techniques, and intelligent systems. Course includes a research-based focus to explore current advances in the field. Role in the proposed curriculum: This course is a possible elective of the analytics concentration. As above, student term projects, exams and case briefs will be used to assess the program learning outcomes. The emphasis is on transforming raw business data into useful information and knowledge for a given problem.

Will the proposed program seek program-specific accreditation?

☐Yes

☒No

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

The Information Security aspect of the program's curriculum is aligned with the current Information Assurance Education content standards outlined by the National Center of Academic Excellence (NCAE). The NCAE accreditation is optional, but once this M.S. program is established, CCU will most likely seek accreditation through NCAE within two years. This accreditation will allow for an additional element of quality for the program and improve the career prospect of the students graduated from the program, but it is not required.

Will the proposed program lead to licensure or certification?

☐Yes

☒No

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

The curriculum is designed such that it will expose students to the Common Body of Knowledge prescribed for the International Information Systems Security Certification Consortium (ISC)² certifications and Institute for Operations Research and Management Science - Certified Analytics Professional (INFORMS CAP) certification, that are accepted widely in the Industry. However, such certification is not required.

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.