

Meeting: ACAP Meeting
Meeting Date: March 28, 2024
Agenda Item: 4H

NEW PROGRAM PROPOSAL FORM

Name of Institution: Coastal Carolina University

Name of Program (include degree designation and all concentrations, options, or tracks):

M.Ed. in Science, Technology, Engineering, and Mathematics (STEM) Education

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: Summer 2025

CIP Code: 13.1213

Delivery Site(s): 85750

Delivery Mode:

- | | |
|--|---|
| ☐ Traditional/face-to-face
*select if less than 25% online | ☒ Distance Education |
| | ☒ 100% online |
| | ☐ Blended/hybrid (50% or more online) |
| | ☐ Blended/hybrid (25-49% online) |
| | ☐ Other distance education (explain if selected) |

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

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

Internal Institutional Unit	Approval Date	Internal Institutional Unit	Approval Date
Department:	5/15/2023	Faculty Senate:	11/1/2023
Board of Trustees:	9/8/2023	Provost:	11/14/2023
Spadoni College of Education and Social Sci.:	09/22/2023	President:	11/14/2023
Graduate Council:	10/4/2023		

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 proposed M.Ed. program supports the professional development of science, technology, engineering, and mathematics educators interested in advancing STEM pedagogy in PK-12 instructional settings. The 30-credit standards-based curriculum emphasizes project-based learning experiences that apply STEM content to solve relevant problems of practice and is aligned to South Carolina State Department of Education credentialing requirements for computer science, project-based learning, and Science, Technology, Engineering, Arts, and Mathematics (STEAM). The program has been developed as an interdisciplinary collaboration between university faculty in multiple colleges and is consistent with the institution's mission to serve the professional development needs of in-service teachers, especially those employed in the five county regional partnership districts, who account for 85% of existing graduate enrollments, thus aligning with the institution's goal to "reach" potential applicants across the region. This aligns with the Spadoni College goal of "providing applied and experiential learning opportunities, mentoring, professional development, and career advising for students so they are ready for their next steps after graduation", as well as the institution's mission to produce graduates that are knowledgeable in their chosen field and well-prepared for their professional careers.¹

Assessment of Need

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

The Spadoni College of Education and Social Sciences at Coastal Carolina University serves the northeast region of South Carolina and is in Horry County, which supports the state's third largest school district. The university has a strategic partnership with local school districts in five neighboring counties, including Horry, Georgetown, Marion, Florence, and Williamsburg. Approximately 85% of current teacher education graduate students work within these partner school districts. College faculty collaborate closely with district leaders to continually update curricular offerings. For example, data collected from a July 2022 survey (n=65) indicate that recent graduates are strongly interested in the proposed program; 57.6% of respondents indicated that they would be interested in a graduate program where they could earn a STEAM credential, 32.2% indicated that they would be interested in a program where they could earn the computer science credential, and 61% indicated that they were interested in earning a graduate degree in STEM.

According to recent national reports published by the Bureau of Labor Statistics, computer science (CS) jobs are one of the fastest growing career fields in the U.S. with over 900,000 current positions, and a ten-year projected growth

¹ <https://www.coastal.edu/aboutccu/mission/>

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rate of 25%. Gallup polls have reported that 91% of parents want their children to learn computer science skills and 56% of teachers think CS coursework should be required for graduation. Yet in 2019, only 45% of high schools reported teaching CS. Advocacy groups such as Code.org consistently identify a critical shortage of qualified teachers to explain this discrepancy. In response to these and other related data, South Carolina, like many other states, has recently taken important steps to address the shortage of computer science teachers, including a revision of the computer science curriculum standards and the development of new licensure options for currently certified teachers in other content areas to add an officially recognized credential in computer science such as the credential discussed here.

According to the most recent Center for Educator Recruitment, Retention, and Advancement (CERRA)² data, there are 14,424 high school teachers in South Carolina, and of those 3,932 are employed teaching in STEM-related fields. There are 9,252 early childhood (grades PK-2), 7,791 elementary (grades 3-5), and over 3,500 teaching middle school mathematics and science. Several districts, including Coastal's partner districts, are now offering STEM classes at the PK-12 level, as well as STEM-focused school programs. The proposed M.Ed. program would target teachers in these populations for enrollment.

Although primarily designed to serve teachers in the university's regional partner school districts, the proposed M.Ed. will have potential appeal statewide. According to the 2022-2023 Supply and Demand report published by CERRA, there are over 51,000 teachers employed in over 100 K-12 school districts in the state of South Carolina.³ Although 85% of CCU's current teacher education graduate students are employed in the university's partner school districts, teachers across the state may find the proposed program appealing to advance classroom performance, to qualify for higher (M, M+30) pay bands, and to pursue eligibility for additional teaching licensure credentials. Nationally, there is a 3.3% expected growth for K-12 teachers (48,000 new positions) further adding to the need for STEM education training (Economic Development and Employer Planning System, 2022).

Additionally, three of our partner districts have expressed interest in having their teachers earn the STEAM and Computer Science Education credentials; these include Horry, Georgetown, and Marion Counties. See Appendix A for correspondence.

Transfer and Articulation

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

Not applicable

² CERRA. (2022). South Carolina Annual Educator Supply and Demand Data Tables, 2022-2023.
https://www.cerra.org/uploads/1/7/6/8/17684955/supply_demand_data_tables_2022-23.pdf

³ CERRA. (2022). South Carolina Annual Educator Supply and Demand Data Tables, 2022-2023.
https://www.cerra.org/uploads/1/7/6/8/17684955/supply_demand_data_tables_2022-23.pdf

Employment Opportunities

Occupation	State		National		Data Type and Source
	Expected Number of Jobs	Employment Projection	Expected Number of Jobs	Employment Projection	
Education Instruction and Library, All	11,075	12% (Annually)	125,600	5.7% (2018-2028)	SC Works Online ⁴ ; Economic Development and Employer Planning System ⁵
High School Teacher	1,153	11% (Annually)	1,058,300	5% (2021-2031)	SC Works Online; US Bureau of Labor Statistics ⁶
Middle School Teachers	707	11% (Annually)	606,500	4% (2021-2031)	SC Works Online; US Bureau of Labor Statistics
Elementary School Teachers	1,689	11% (Annually)	1,487,000	4% (2021-2031)	SC Works Online; US Bureau of Labor Statistics

Supporting Evidence of Anticipated Employment Opportunities

Provide supporting evidence of anticipated employment opportunities for graduates.

There are several indicators that there is and will remain a high demand for the M.Ed. in STEM Education program at Coastal Carolina University. The United States Department of Education's *Raise the Bar: STEM Excellence for All Students*⁷ initiative is designed implement high-quality STEM education for all students from PreK to post-secondary education, and to ensure that teachers are well-prepared to teach STEM to all students. With an emphasis on the importance of STEM education at a national level, and the goal of creating students that are college- and career-ready both in South Carolina and across the nation, the need for training and teachers that can implement such practices is strong.

⁴ <https://jobs.scworks.org/vosnet/Default.aspx>

⁵ <https://www.dew.sc.gov/>

⁶ Bureau of Labor Statistics, U.S. Department of Labor, *Occupational Outlook Handbook*, at <https://www.bls.gov/ooh/education-training-and-library/high-school-teachers.htm>

⁷ U.S. Department of Education. (December 7, 2022). U.S. Department of Education Launches New Initiative to Enhance STEM Education for All Students. <https://www.ed.gov/news/press-releases/us-department-education-launches-new-initiative-enhance-stem-education-all-students>

Description of the Program

Projected Enrollment			
Year	Fall Headcount	Spring Headcount	Summer Headcount
	Total	Total	Total
2024-2025	0	0	15
2025-2026	29	42	54
2026-2027	54	54	54
2027-2028	54	54	54
2028-2029	54	54	54

Explain how the enrollment projections were calculated.

The table is based on enrollment beginning summer 2025 with 15 new students each summer, 15 new students each fall, and 15 new students each spring. Years one through four total headcounts are based on 95% returning summer to fall, 95% returning fall to spring, and 95% returning spring to fall. Year three headcount is additionally based on 80% graduation rate of returning students.

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

☒ Yes

☐ No

Per the South Carolina State Department of Education requirements to add licensure or teaching endorsements in Computer Science, Project-Based Learning, or STEAM, applicants must have a bachelor's degree or higher and an Initial, Professional, or Alternative Route teaching certificate at the early childhood, elementary, middle, secondary, or PK–12 level. To facilitate advising, all applicants must submit a brief written statement summarizing how program completion will contribute to realizing their professional goals.

Curriculum

The M.Ed in STEM Education is comprised of 30 credit hours; nine Foundations hours taken by all students, three capstone hours required of all students, and 18 credit hours (6 courses) of electives taken by students. It is recommended that students complete the electives aligned with their desired teaching endorsements/licensure (Computer Science Education, Project Based Learning, and/or STEAM). As part of their coursework, students will complete practicum hours, an online portfolio, and a comprehensive exam. See Appendix B for the complete catalog description.

All new courses are denoted by an asterisk and have gone through the institution’s approval process.

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Foundations (9 credits)

EDST 685: Robotics Education* (3 credits)

This course focuses on knowledge and practical skills related to robotics education. Through this course, students deepen their understanding of robotics through the lens of education. Students learn core programming concepts and participate in practical programming activities and challenges in an online robotics simulator. These activities and challenges require students to apply their programming, science, and mathematics knowledge and skills to solve problems. Students develop lesson ideas for integrating robotics into core curriculum area courses and develop a plan for starting a robotics team or club at an educational organization.

STEM 600: Introduction to Project Based Learning* (3 credits)

Introduces theory, technology, and practices that support effective project-based learning (PBL) for STEM educators. This course is required by the South Carolina Department of Education for licensed teachers applying for the add-on PBL endorsement.

STEM 660: Trends and Issues in STEM* (3 credits)

This course examines current and emerging issues and trends impacting STEM education. Topics may include socially and culturally responsive teaching, differentiation, emerging technologies, data-based decision-making, student achievement, and cultivating creativity. Topics will be dependent upon student interests and current national trends. Emphasis will be on developing, analyzing, and clarifying beliefs and practices as they relate to STEM education.

Required Capstone (3 credits)

STEM 690: Practicum in Project Based Learning* (3 credits)

This M.Ed. capstone course requires candidates in their final semester to (1) conduct a supervised field experience in which they design, develop, implement, manage, and evaluate STEM project-based learning training for education professionals, (2) produce an online portfolio documenting achievement of all program learning outcomes, and (3) complete the M.Ed. comprehensive exam.

Electives (18 credits)

CSED 605: Foundations of Computing Systems (3 credits)

This course examines the ecology of modern computing through the lens of abstraction, a technical concept that explains how the relationships among hardware and software components impact device functionality. Students are challenged to analyze use cases and identify strategies to design, manage, and troubleshoot computing systems to solve real-world problems.

CSED 607: Introduction to Data Science (3 credits)

This course explores fundamental tools and methods for collecting, managing, and processing big data using computational models, statistical inferencing, and machine learning to identify trends, support claims, and solve real-world problems in varied disciplines. Data visualization and storytelling techniques are also emphasized. Prior experience in programming or statistical analysis is not required.

CSED 608: Computational Thinking and Programming (3 credits)

The course promotes understanding of computer programming and logic by teaching students to “think like a computer”. This course explores skills needed to develop and design language-independent solutions to solve

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computer-related problems. This course also covers development and design basics, including use of variables, control and data structures, principles of command-line, and object-oriented languages.

EDIT 604: Teaching with Technology (3 credits)

This course explores various models of instructional storytelling to create effective teaching and training videos for educational and professional settings. Students will improve their technical understanding of video production tools, concepts and workflows as they apply instructional design skills to visualize specific instructional messages. The course presents best practices in production planning, storyboarding, script writing, set design, talent management, camera operation, shot composition, audio capture, lighting design, continuity editing, accessibility features and digital deployment. Course assessment includes quizzes, homework exercises and a final project video produced for a specific clinical audience.

EDIT 610: Instructional Design and Technology Integration (3 credits)

This course introduces seminal models of instructional design within the context of planning effective learning materials and experiences supported by technology for education and training environments. Research-based best practices in technology integration are carefully analyzed, as well as strategies for evaluating instructional technologies and materials, including those that are designed to meet the needs of diverse learners. Students conduct literature reviews of current topics in the field.

EDIT 630: Development of Instructional Multimedia (3 credits)

This course explores the application of research-grounded design principles to the development of multimedia learning objects for professional settings. Students will improve understanding of modern authoring tools, concepts and workflows as they produce graphic, audio, video, screencast and animation materials that meet rigorous evaluation criteria derived from modern learning theories. The course also analyzes legal and ethical issues relevant to multimedia development and presents practical strategies for compliance with current accessibility and copyright laws. Course assessment includes quizzes, homework exercises and a final project developed for a specific clinical audience.

EDIT 640: Instructional Video Production (3 credits)

This course explores various models of instructional storytelling to create effective teaching and training videos for educational and professional settings. Students will improve their technical understanding of video production tools, concepts and workflows as they apply instructional design skills to visualize specific instructional messages. The course presents best practices in production planning, storyboarding, script writing, set design, talent management, camera operation, shot composition, audio capture, lighting design, continuity editing, accessibility features and digital deployment. Course assessment includes quizzes, homework exercises and a final project video produced for specific clinical audience.

EDIT 650: Teaching and Learning Online (3 credits)

This course explores various theories and best practices for the design, development, and implementation of online instruction for blended and distance-based applications. Students will design effective online formative and summative assessment strategies for evaluating student learning, select and build instructional content to meet the need of students with different learning styles, demonstrate proficiency utilizing web production tools to develop online instructional environments, utilize effective online teaching strategies and technology tools to promote communication and collaboration, use information resources for effective online teaching, use diverse instructional

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strategies, reflect on their course experience, and offer suggestions for online course improvement. Course assessment includes quizzes, forum discussions, and homework assignments.

EDIT 670: Educational Games and Simulations (3 credits)

This course introduces theories and strategies supporting the use of educational games, simulations, and virtual environments to improve learner performance and engagement in education and training settings. A variety of tools and methodologies for building implementing and evaluating website and mobile gaming models will be explored. Students will analyze research literature to identify key characteristics of games and simulations, promote learner reflection using collaborative game tools to clarify learners' conceptual understanding and thinking, incorporate game tools to promote learning and creativity, utilize game tools to address the diverse needs of all learners, analyze and apply instructional game and stimulation theories to games developed in class, analyze commercial games and simulations to identify key characteristics and technical, practical, and pedagogical limitations; develop game evaluation rubrics, and collaborate with others using game tools and resources to support learner success and innovation. Course assessment includes a learning journal, forum discussions, homework assignments, and a group project.

EDIT 677: Assessment Technology and Learning Analytics (3 credits)

This course examines technologically supported strategies for designing effective assessments to inform instructional decisions and improve learner performance. Students will explore evidence-based practices for developing formative and summative digital assessments that optimize feedback systems, promote academic integrity, and personalize learning. Course assessment includes quizzes, homework exercise, and an action research project that requires students to deliver an instructional technology innovation and collect and analyze data to determine its impact on target learners in a clinical setting.

EDIT 680: Special Topics in Instructional Technology Curricula (3 credits)

This course examines emerging instructional technologies and associated trends, issues, research, theories and practices that impact education and training setting. Designed as a real-world analytical experience, the course uses a problem-based framework that requires students to identify technological barriers and problematic issues in specific instructional contexts, review evidence-based practices in the scholarly literature, evaluate potential instructional technology solutions, and propose potential implementation processes. The course emphasizes just-in-time training, product-impact analysis and organizational change theory as essential applied models. Students conduct literature reviews and administer surveys to collect and analyze data to articulate informed solutions.

IST 610: Networking and Cybersecurity Fundamentals (3 credits)

This course provides students with the fundamentals in networking and cybersecurity. The course discusses the principles of networking including protocols, topologies, circuit and packet switching, routing, and related topics. The course also provides students with a foundation in cybersecurity topics such as security threats, vulnerability analysis, firewalls, intrusion detection, and access control. This course is designed for students with little or no prior networking or security experience.

STEM 610: STEAM Instructional Design* (3 credits)

Focus on STEAM practices such as inquiry and project-based learning in PK-12 classrooms and educational sites. Topics covered include integrating STEAM across the disciplines, technology-integration, use of problem-solving, project-based learning, and alignment with standards and learning trajectories.

STEM 620: Applications of Project Based Learning in Instruction* (3 credits)

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An instructional methods course focusing on the implementation of project-based learning and inquiry in lessons and activities. Learn about various methods of instruction, including how to enact design processes with students. A 15-hour practicum is required.

STEM 630: STEAM Assessment* (3 credits)

This course focuses on knowledge and application of STEAM assessment practices and use of data when making decisions that promote instructional outcomes for students. Participants develop and use STEAM-based formal and informal assessments and interpret and appropriately communicate assessment results.

STEM 640: STEAM Implementation* (3 credits)

This course focuses on the implementation of project-based learning and inquiry in STEAM lessons and activities, either in the classroom or other educational settings. Participants will implement STEAM practices and reflect on their experiences, as well as provide feedback to colleagues. A 15-hour practicum is required.

STEM 650: Understanding the Nature of Science* (3 credits)

The goal of this course is to investigate science as a discrete way of understanding the external world. Participants investigate the discrepancies between intuitive and scientific thinking, how the invention and methods of science influence how humans perceive the external world, and the impact of science on human societies.

STEM 670: STEAM Instructional Methods (3 credits)

Focus on the implementation of Science, Technology, Engineering, Arts, and Mathematics (STEAM) using various pedagogical methods, including cognitively guided instruction, guided exploration, inquiry, project-based learning, and other strategies. Learn how to engage students in STEAM using relevant, real-world based problems. A 15-hour practicum is required.

NOTE: *Applicable courses have been reviewed and approved by the SC Department of Education (see Appendix C) to meet specific curriculum requirements for adding teaching fields/endorsements as follows:*

- *To apply for the SC Teaching Endorsement in STEAM Education, students must complete STEM 610, STEM 630, STEM 640, STEM 670.*
- *To apply for the SC Teaching Endorsement in Project Based Learning, students must complete STEM 600, STEM 620, STEM 690.*
- *To apply for the SC Teaching Add-on certification in Computer Science, students must complete EDIT 604, CSED 605, CSED 607, CSED 608, IST 610*

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Total Credit Hours Required: 30 hours

Curriculum by Year					
Course Name	Credit Hours	Course Name	Credit Hours	Course Name	Credit Hours
Year 1					
Summer		Fall		Spring	
STEM 600	3	CSED 605 or STEM 620*	3	CSED 608 or STEM 640*	3
STEM 660	3	CSED 607 or STEM 630*	3	IST 610 or STEM 670*	3
Total Semester Hours	6	Total Semester Hours	6	Total Semester Hours	6
Year 2					
Summer		Fall		Spring	
ELECTIVE (EDIT 604, EDIT 610, EDIT 650, STEM 650)	3	ELECTIVE (EDIT 640, EDIT 670, EDIT 680, STEM 610)*	3		
EDST 685	3	STEM 690	3		
		EDIT 604 (if not taken in Y2 summer)	3		
Total Semester Hours	6	Total Semester Hours	6-9	Total Semester Hours	

*Choice depends on add-on licensure or endorsement sought.

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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
Interdisciplinary STEM Education, M.Ed.	34	The Citadel	Both are online programs	CCU's program takes four less hours than the Citadel; CCU's program includes electives aligned to state add-on certification in Computer Science as well as teaching endorsements in Project Based Learning and STEAM Education. Citadel's does not.
Teaching and Learning (STEAM), M.Ed.	30	Clemson	Both are online programs; both can lead to the state's STEAM Endorsement	CCU's program includes electives aligned to state add-on certification in Computer Science as well as the teaching endorsement in Project Based Learning. Clemson's does not.

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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.)
Full-time, Professor	STEM 610 – STEAM Instructional Design STEM 620 – Application of PBL in STEAM Instruction STEM 630 – STEAM Assessment STEM 640 – STEAM Implementation STEM 650 – Understanding the Nature of Science	Ph.D. (Curriculum and Instruction, Science Education, Indiana University, Bloomington, IN, College of Education); Ed.M. (Secondary Science Education, University of West Florida); M.S. (Department of Zoology and Wildlife Science, Auburn University)	Research and teaching experience, scholarly publications, and presentations
Full-time, Professor	STEM 610 – STEAM Instructional Design STEM 620 – Application of PBL in STEAM Instruction STEM 630 – STEAM Assessment STEM 640 – STEAM Implementation STEM 660 - Trends and Issues in STEM Education	Ph.D. (Teacher Education, Science and Mathematics Education, UNC-Greensboro, NC); M.Ed. (Curriculum and Instruction, Science Education, UNC-Greensboro, NC)	Research and teaching experience, scholarly publications, and presentations, NC Environmental Education Certification
Full-time, Professor	STEM 690 – Practicum in Project Based Learning EDIT 604 – Teaching with Technology EDIT 610 – Instructional Design and Technology Integration	Ph.D. (Curriculum and Instruction, UNC Chapel Hill)	Research and teaching experience, scholarly publications, and presentations
Full-time, Professor	EDIT 630 – Development of Instructional Multimedia EDIT 650 – Teaching and Learning Online EDIT 670 – Educational Games and Simulations	Ph.D. (Curriculum & Instruction, Instructional Systems Design Emphasis, University of Central Florida) M.S. (Instructional Technology, University of Tennessee, Knoxville)	Research and teaching experience, scholarly publications, and presentations
Full-time, Assistant Professor	EDST 685 – Robotics Education EDIT 604 – Teaching with Technology EDIT 610 – Instructional Design and Technology Integration EDIT 680 – Special Topics in Instructional Technology Curricula	Ed.D. (Curriculum and Instruction – Educational Technology, University of South Carolina); Ed.S. (Instructional Technology, Coastal Carolina University); M.Ed. (Learning & Teaching – Instructional Technology, Coastal Carolina University)	Research and teaching experience, scholarly publications, and presentations
Full-time, Assistant Professor	CSED 605 – Foundations of Computing Systems CSED 607 – Introduction to Data Science CSED 608 – Computational Thinking and Programming	Ph.D. (Educational Psychology and Learning Technologies – Ohio State University); M.S. (Computer Science – University of the West Indies)	Research and teaching experience, scholarly publications, and presentations

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Part-time, Teaching Associate	IST 610 – Networking/Cybersecurity Fundamentals	D.C.S. (Computer Science, Colorado Technical University); M.I.T. (Information Technology and Project Management - American InterContinental University)	Research and teaching experience
Part-time, Teaching Associate	STEM 610 – STEAM Instructional Design STEM 620 – Application of PBL in STEAM Instruction STEM 640 – STEAM Implementation	Ph.D. (Teacher Education, Science Education, UNC-Greensboro, NC)	Research and teaching experience, scholarly publications, and presentations

Total FTE needed to support the proposed program: 1.77

Faculty: 1.50

Staff: 0.13

Administration: 0.14

Faculty, Staff, and Administrative Personnel

The Department of Educational Studies at Coastal Carolina University has sufficient faculty to initiate the program. The program will rely on the current department chair for leadership and administrative staff. Teaching can be accommodated by current faculty without increasing normal load because most courses are already offered at the university for other programs. No additional hires will be needed to cover the anticipated enrollments.

Resources

Kimbel Library holds about 1.1 million items in all formats, including over 375,000 eBooks provided by PASCAL, a statewide consortium. The library subscribes to about 230,000 periodicals, including magazines, newspapers, scholarly journals, and proceedings in print and online formats. The library provides access to its print holdings, 175 online citation, full-text, and reference resources, via the library website at www.coastal.edu/library. All electronic resources, including books, articles, and videos, are available to Coastal students, faculty, and staff from off campus.

Course-integrated library instruction sessions are available to all academic departments; the library also offers one-credit information literacy courses. Librarians offer appointments for in-depth research help. Kimbel Library is open 98 hours per week during the fall and spring semesters; during that time, library staff members are available to assist students via phone, chat, or in-person at the help desk.

Teaching faculty provide input regarding selection of library resources, including both print and electronic resources. The Education departments have a designated library liaison who takes order requests and communicates with faculty when new resources are available. Library holdings are as follows:

Monographs

Subjects for STEM and education or teaching were identified for this program. Kimbel Library has access to over 6,000 relevant titles in print or eBook format.

Audiovisual

The library provides access to streaming video supporting the STEM education curriculum and currently has access to over two thousand STEM education films.

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Serials and Subscriptions

Kimbel Library provides access to over 700 peer-reviewed and trade journals classified with STEM (science, technology, engineering, or math) and teaching or learning. Online access is provided via aggregator databases, publisher packages, open access titles, and direct online subscriptions.

A few of these journals are listed below:

- *American Educational Research Journal*
- *Cultural Studies of Science Education*
- *European Journal of STEM Education*
- *The International Journal of Science, Mathematics and Technology Learning*
- *International Journal of Science and Mathematics Education*
- *International Journal of Science Education*
- *International Journal of STEM Education*
- *Journal for STEM Education Research*
- *Journal of College Science Teaching*
- *Journal of Research in Science Teaching*
- *Journal of Science Education and Technology*
- *Journal of STEM education*
- *Research in Science Education*
- *Science & Education*
- *Science Education*
- *Themes in Science and Technology Education*

Current access points for math education journals include, but are not limited to:

- Academic Search Complete
- ACM Digital Library
- ACS Publications
- Brill Online Journals
- Education Full Text
- Education Source
- ERIC
- IEEE Xplore
- JSTOR
- Professional Development Collection
- ScienceDirect
- SciFinder Scholar
- SpringerLink
- Web of Science

Curriculum Collection

There are about 100 STEM education realia and other items available for checkout, including number rods, gravity drops, engineering activity sets, circuit boards, science kits, coding games, robot kits, and math games. The library also has more than five hundred children's books on subjects related to STEM available in the curriculum collection.

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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.

All CCU students have access to university-sponsored student support services including Accessibility and Disability Services, Student Computing Services, Kimbel Library, Student Health Services, and the Coastal Student Success Center including the Tutoring and Learning Center. Direct links to all student support services are included on the landing page for the university learning management system, Moodle, where all online courses are managed. Online students can access all services from these direct links.

Majors in this program will receive academic advising from the STEM Education Faculty.

Physical Resources/Facilities

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

The program will not require any additional physical resources/facilities beyond the faculty offices currently provided by CCU.

Equipment

Identify new instructional equipment needed for the proposed program.

The program will not require any equipment beyond what is currently provided by CCU.

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

The proposed program will boost enrollments in courses that support related programs, including the M.Ed. in Instructional Technology, the M.S. in Information Systems, as well as the certificate program in Computer Science Education. Additionally, several courses in the program stand alone for teachers to earn add-on endorsements or licensure; the state has approved coursework offered for the Project Based Learning endorsement, the STEAM endorsement, and the Computer Science add-on license. Each of these endorsements/add-ons are built into the program and already offered at Coastal, with the goal of encouraging those enrolled to continue on and complete the master's degree.

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Financial Support

Sources of Financing for the Program by Year												
Category	1 st		2 nd		3 rd		4 th		5 th		Grand Total	
	New	Total	New	Total	New	Total	New	Total	New	Total	New	Total
Tuition Funding	\$160,560	\$160,560	\$523,333	\$1,492,227	\$533,800	\$1,977,480	\$544,476	\$2,017,030	\$555,366	\$2,057,370	\$2,317,535	\$7,704,667
Program-Specific Fees											\$0	\$0
Special State Appropriation											\$0	\$0
Reallocation of Existing Funds											\$0	\$0
Federal, Grant or Other Funding											\$0	\$0
Total	\$160,560	\$160,560	\$523,333	\$1,492,227	\$533,800	\$1,977,480	\$544,476	\$2,017,030	\$555,366	\$2,057,370	\$2,317,535	\$7,704,667
Estimated Costs Associated with Implementing the Program by Year												
Category	1 st		2 nd		3 rd		4 th		5 th		Grand Total	
	New	Total	New	Total	New	Total	New	Total	New	Total	New	Total
Program Administration and Faculty/Staff Salaries		\$136,192		\$256,420		\$341,451		\$389,030		\$396,811	\$0	\$1,519,904
Facilities, Equipment, Supplies, and Materials											\$0	\$0
Library Resources											\$0	\$0
Other (specify)												
Total	\$0	\$136,192	\$0	\$256,420	\$0	\$341,451	\$0	\$389,030	\$0	\$396,811	\$0	\$1,519,904

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Net Total (Sources of Financing Minus Estimated Costs)	\$160,560	\$24,368	\$523,333	\$1,235,808	\$533,800	\$1,636,029	\$544,476	\$1,627,999	\$555,366	\$1,660,559	\$2,317,535	\$6,184,763
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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.

Program cost-effectiveness and return-on-investment are evaluated institutionally using an induced revenue/expense model. As shown in the Financial Support table, tuition revenues are based on a 6-credit course load for each student projected to enroll in the program. These revenues represent course revenues derived from all courses taken by the student. The expenses shown in the Financial Support table represent only direct expenses necessary for delivering program courses and administration. The university uses a 50% gross academic margin assessment to ensure that new graduate programs will provide sufficient revenues to support their expense impact on institutional operations.

To derive gross academic margin, total induced revenue (\$7,704,667 for the period) is calculated minus total direct expenses (\$1,519,904 for the period) divided by total induced revenue (\$7,704,667 for the period). [(Revenue-Expenses)/Revenue]

For a program to be considered cost-effective, the University looks for graduate programs to produce a gross academic margin of 50% or better. This program’s gross academic margin is 80.27% for the period, which indicates that this program has a high likelihood of producing sustainable revenues.

Evaluation and Assessment

Program Objectives	Student Learning Outcomes Aligned to Program Objectives	Methods of Assessment
To provide PK-12 teachers and other educational professionals advanced training in the implementation of STEM content and pedagogy to improve teaching practice, learner performance, and professional productivity.	1. Demonstrate professional knowledge of STEM content.	Comprehensive exam Professional portfolio
	2. Integrate knowledge of STEM content and scientific inquiry to solve problems.	Capstone project Professional portfolio
	3.Communicate solutions using data and technology tools.	Comprehensive exam Professional portfolio
	4.Apply project-based pedagogy to design and implement STEM instruction.	Capstone project Professional portfolio

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.

The college monitors completer performance in several ways. First, students complete an exit survey for the College of Education and Social Sciences, indicating where they will be employed for the coming academic year. Those coming into the program will also identify their certification status and place of employment. The college also receives hiring information from the five partnering districts, which post hiring approvals on their websites from monthly board meetings.

For understanding of content and pedagogy, those in the program will be evaluated using both in-class assessments and summative program assessments, including the capstone project and professional portfolio, which are aligned

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with appropriate state and national standards. For their portfolio, students will compile documentation from their work across the program, including evidence of their abilities to plan, implement, and evaluate STEM-based lessons, work documenting their understanding of theory and pedagogy related to STEM, and other evidence pieces. The capstone project will serve as a culminating assignment for the program, where students will utilize the theory and pedagogy learned across all coursework in a scalable, education-setting based project. Finally, the comprehensive exam will require students to demonstrate their understanding of program and course student learning outcomes (SLOs) through responses to summative exam questions. Data from the assessments will be used to identify areas of strength and areas for further support for students.

Programmatic student learning outcome assessment is completed yearly, and is reviewed and evaluated at the college level by a college assessment committee. The University uses Anthology Planning, an online planning module, to collect the data, and to review and provide feedback on programmatic assessment. The college assessment committee makes recommendations for improvement to the department concerning both the structure of the assessment plan, and the outcomes of the assessment. At the University level, completion of yearly assessment is monitored by the University-Wide Assessment Committee – Educational Programs (UWAC-EP) Subcommittee. In addition, every three years, each program completes a three-year summary of their assessment outcomes, including an evaluation of the degree to which the program is meeting its student learning outcomes, and plans for improvements based on these outcomes. The three-year summaries are evaluated by the UWAC-EP, who also provides feedback and suggestions for improvement. In this way, the University ensures that yearly program assessment is completed, and also that programs close the loop leading to learning improvements.

Accreditation and Licensure/Certification

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

☐ Yes

☒ No

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.

It is anticipated that most candidates will already hold South Carolina teaching licensure. Upon program completion, they will qualify to apply for additional credentials offered by the South Carolina Department of Education, either the add-on certification in computer science or the STEAM Education endorsement, depending on their selected electives. All program candidates will also be eligible to apply for the Project-Based Learning endorsement. This embedded curriculum design thus stacks multiple credential opportunities in a single program, which when completed, also qualifies SC teachers for master's or M-level pay because they are earning an education-related master's degree.

Specific curricular criteria for programs that qualify completers to earn add-on certification in computer science or endorsements in STEAM and PBL are published by the South Carolina State Department of Education (<https://ed.sc.gov/educators/certification/certification-legislation-and-policy/certification-regulations/add-on->

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guidelines/). The computer science curriculum in this proposal was officially approved by SCDE in May 2021, and the STEAM endorsement was approved in March 2023. The curricula for the PBL endorsement was approved in May 2023.

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

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Appendix A: Correspondence indicating interest in the MS in STEM education from Horry, Georgetown, and Marion County school districts.



Interest
Correspondence

Appendix B: Catalog Description M.Ed. in STEM Education

The Master of Education in STEM Education program supports the professional development of science, technology, engineering, and mathematics educators interested in advancing STEM pedagogy in PK-12 instructional settings. The 30-credit standards-based curriculum emphasizes project-based learning experiences that apply STEM content to solve relevant problems of practice and is aligned to South Carolina State Department of Education requirements for add-on licensure or endorsements in computer science, project-based learning, and STEAM. The program has been developed as an interdisciplinary collaboration between university faculty in multiple colleges. The program includes 1) a set of foundation courses providing the framework for teaching STEM, 2) a set of content-specific electives in STEM, and 3) a capstone course where students display their understanding of the STEM theory and pedagogy addressed through the program. Students admitted to the program receive courses and experiential education training in computer science, project-based learning, and STEAM.

Students who complete the requirements for the M.Ed. in STEM Education will be able to do the following:

1. Demonstrate professional knowledge of STEM content.
2. Integrate knowledge of STEM content and scientific inquiry to solve problems.
3. Communicate solutions using data and technology tools.
4. Apply project-based pedagogy to design and implement STEM instruction.

Degree Requirements

Foundations (9 credits)

EDST 685: Robotics Education (3 credits)
STEM 600: Introduction to Project Based Learning (3 credits)
STEM 660: Trends and Issues in STEM (3 credits)

Required Capstone (3 credits)

STEM 690: Practicum in Project Based Learning (3 credits)

Electives (18 credits)

Choose 6 of the following*

CSED 607: Introduction to Data Science (3 credits)
CSED 608: Computational Thinking and Programming (3 credits)
EDIT 604: Teaching with Technology (3 credits)
EDIT 610: Instructional Design and Technology Integration (3 credits)
EDIT 630: Development of Instructional Multimedia (3 credits)
EDIT 640: Instructional Video Production (3 credits)
EDIT 650: Teaching and Learning Online (3 credits)
EDIT 670: Educational Games and Simulations (3 credits)
EDIT 677: Assessment Technology and Learning Analytics (3 credits)
EDIT 680: Special Topics in Instructional Technology Curricula (3 credits)
IST 610: Networking and Cybersecurity Fundamentals (3 credits)
STEM 610: STEAM Instructional Design (3 credits)
STEM 620: Applications of Project Based Learning in Instruction (3 credits)
STEM 630: STEAM Assessment (3 credits)
STEM 640: STEAM Implementation (3 credits)

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STEM 650: Understanding the Nature of Science (3 credits)
STEM 670: STEAM Instructional Methods (3 credits)

NOTE: *Applicable courses have been reviewed and approved by the SC Department of Education to meet specific curriculum requirements for adding teaching fields/endorsements as follows:*

- *To apply for the SC Teaching Endorsement in STEAM Education, students must complete STEM 610, STEM 630, STEM 640, STEM 670.*
- *To apply for the SC Teaching Endorsement in Project Based Learning, students must complete STEM 600, STEM 620, STEM 690.*
- *To apply for the SC Teaching Add-on certification in Computer Science, students must complete EDIT 604, CSED 605, CSED 607, CSED 608, IST 610*

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Appendix C: Approval Correspondence for coursework from the South Carolina Department of Education.



SCDE Approval -
Computer Science



SCDE Approval -
PBL and STEAM