



**Program Planning Summary
For New Program**

University of South Carolina Beaufort

**Title of Program: Bachelor of Science
Major: Mathematics
With Tracks in
Mathematical Sciences and Teacher Certification**

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Date

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2. Classification

a. Program title

Bachelor of Science with a Major in Mathematics
CIP code: 27.0101

b. Tracks: 1) Mathematical Sciences, 2) Teacher Certification

c. Designation of Undergraduate Program

Baccalaureate, Four-year

This is a New Program Proposal for the degree of Bachelor of Science in Mathematics at USCB. The degree will require a minimum of 120 credit hours of coursework, which includes approximately 50 hours of general education and 70 hours of coursework in the mathematics major and electives and will allow for tracks in 1) Mathematical Sciences or 2) Teacher Certification.

d. Proposed Date of Implementation: Fall 2014

e. Program qualifies for supplemental Palmetto Fellows Scholarship and LIFE Scholarship awards: Yes

f. Delivery mode: Traditional instruction

3. Justification

a. A discussion of the Need for the Program in the state

The mission of the University of South Carolina Beaufort is to “offer baccalaureate degrees that respond to regional needs, draw upon regional strengths, and prepare graduates to participate successfully in communities here and around the globe.” The B.S. in Mathematics with tracks in 1) Mathematics and 2) Teacher Certification responds directly to both “regional needs” and the call to “prepare graduates to participate successfully in communities here and around the globe.” The National Science Board (a component of the National Science Foundation) in its 2007 document: A National Action Plan for Addressing the Critical Needs of the U.S. Science, Technology, Engineering, and Mathematics [STEM] Education System, addresses “Ensuring an adequate supply of well-prepared and highly effective STEM teachers” as one of two central challenges to the United States in constructing a strong, coordinated STEM education system.

On a regional level, Mathematics, and specifically, mathematics training of future teachers, is critical to the economic development of the Lowcountry of South Carolina. The Lowcountry, a region on the southeastern coast of the state, includes the counties of Beaufort, Jasper, Colleton and Hampton. The need for a Mathematics program with a track in teacher education is driven by a number of illustrative factors. Perhaps foremost, is a regional need for the training of high-quality high-school math teachers; while mathematics education makes headlines for lackluster progress on a national scale, it is a shortage of competent, modernly-trained, highly-qualified mathematics educators that continues to raise concern in the local region. Indeed, an article from the Beaufort Gazette dated June 28, 2007 begins “To help plug a nagging shortage of math and science teachers, the Beaufort County School District is recruiting in India”. The article goes on to state that the practice is not an isolated temporal incident, but has been the ongoing practice since 2000. It should be pointed out that none of the recruited teachers under the program is permanent (by design); all must return to India after three years. The shortage is, thusly, manifested on an ongoing basis. Students in South Carolina, and more particularly in the Lowcountry region of South Carolina, deserve the chance to compete nationally in colleges, universities and post-graduate programs within or outside of a STEM discipline as well as to compete for the quality jobs in the US that require mathematical prowess, whether they be in business, manufacturing, healthcare or the like. Without a quality mathematics education, opportunities for these students are diminished in a profound manner.

The current economy of the Lowcountry is based heavily on agriculture and the hospitality/tourism industry, both of which rely primarily on low paying jobs. In response to these conditions, the Lowcountry Council of

Governments (LCOG) has prepared an Economic Diversification Plan, based on expansion in the Lowcountry of five types of industry: Logistics/Distribution (including a planned expansion of the Port of Savannah into neighboring Jasper County), Health Care/Medical, Construction, Wholesale Trade, and Manufacturing. Each of these industries will require employees skilled in the use of mathematics and computational technology, from security and logistical analyses of the port, to the CAD design processes used in architecture and manufacturing, to medical database mining and analyses to financial modeling and forecasting. If USCB students fail to have ample opportunity to acquire the mathematically requisite skills necessary to compete for technologically intensive positions within these fields, they will be at a considerable disadvantage when competing for high paying jobs even within their own home region.

b. A discussion of the relationship of the Proposed Program to Existing Programs at the Proposing Institution

The Mathematics program will be supported by highly qualified USCB faculty in Mathematics and Computer Science as well as by faculty in Education and the Natural Sciences. While USCB is small (approximately 1500 FTE students in Fall 2010) it is rapidly growing and has increased enrollment substantially in the last 3 years; a growth trend is expected to continue into the foreseeable future. The newness of USCB with its modern technological classroom environment together with the rapid rise of enrollment indicate that USCB is well-poised to construct a truly unique and modern high-quality training program for educators in secondary mathematics. It should be noted that close-knit relationships between those teaching in the disciplines of mathematics, statistics, computer science, physics, as well as the biological and chemical sciences will serve to enhance the degree by providing cognate relevancies for students intending to seek secondary mathematics licensure in the state. Courses overlapping with the needs of the Computational Science program at USCB will enhance the cross-disciplinary depth of exposure to mathematical concepts and applications. Besides the USCB Faculty Senate, Department Chairs as well as the Academic Administration all support the development of the program as furthering the mission of USCB in the Lowcountry region of South Carolina.

c. Assessment of Extent to Which the Proposed Program Duplicates Existing Programs in the State

As a prevalent subject area in P-16 education, mathematics and mathematics education are traditionally offered at liberal arts institutions. While there are programs in mathematics across the state of South Carolina, no South Carolina program is within commuting distance. Moreover, as a program that specifically addresses the local need for quality mathematics educators, local students represent a significant asset to helping regional districts recruit effective teachers.

4. Program Demand and Productivity

a. A discussion of the anticipated enrollment in the planned program in its fourth year

In STEM fields, USCB currently offers a Bachelor of Science degree in Biology as well as a Bachelor of Science in Computational Science. Both programs have attracted significant enrollments. Currently, the Biology program, initiated in 2007, enrolls 187 majors and the Computational Science program, begun in 2010, enrolls 50 majors. Students in the local 4-county region of the state wishing to major in other STEM fields in South Carolina are quite limited unless they are willing to relocate to other areas of the state. If a degree in Mathematics were to be made available from USCB, the university would be able to train students that desire to provide secondary mathematics education to students in the Lowcountry of South Carolina as well as those whom seek mathematically intensive careers within South Carolina or in the national arena.

Modest expectations for initial program enrollment include 12 new students each year. When the proposed program in mathematics becomes fully operational, we expect at least 48 students to be enrolled by Spring 2018.

b. A discussion of the anticipated number of annual completions in the planned program after its fourth year.

Initially, the program is expected to graduate 12 students each year after 2018.

5. Employment Opportunities for Graduates
See guidelines page 24.

Data from the Center for Recruitment, Retention, and Advancement (CERRA) from 2011 indicate that opportunities for qualified graduates in mathematics education are abundant. While approximately thirty-five percent of all teachers hired in 2011 in South Carolina were new graduates from teacher education programs in the state, teacher vacancies in high schools in South Carolina held the largest share (39.2%) of unfilled teacher positions. Moreover, almost half of the vacancies at the high school level were in mathematics, science, and special education. More directly to the point, CERRA reports, “Similar to the data reported last year, the Lowcountry and the Pee Dee regions [of SC] had the largest number of vacant teacher positions, representing 55% of statewide vacancies. Districts in these two regions, however, accounted for only 36% of all teacher positions in South Carolina. This observation indicates a disproportionate number of unfilled positions in those particular regions when compared to their sizes.”

http://cerra.org/media/documents/2012/7/2011_Supply_x_Demand.pdf

CERRA further concludes that recruitment efforts towards teachers in the state should particularly focus on middle and high school teachers certified in special education, mathematics, science, and English/language arts.

6. Curriculum

This section must provide an outline of the curriculum for the planned program

I. USCB GENERAL EDUCATION REQUIREMENTS		37-47
II. PROGRAM REQUIREMENTS		10
BSTA 340	Introduction to Probability and Statistics	3
BCSE 102, 104, or 145	(Programming and Algorithmic Design)	3
BPHY 211, 211L	Essentials of Physics I with Laboratory	4
III. CORE MAJOR REQUIREMENTS (C OR BETTER REQUIRED)		30
BMTH 141,142,240	Calculus I, II, III	12
BMTH 174	Discrete Mathematics	3
BMTH 230	Linear Algebra	3
BMTH 242	Differential Equations	3
BMTH 300	Introduction to Proof	3
BMTH 360	History of Mathematics	3
BMTH 390	Modern Geometry	3
III A. MAJOR REQUIREMENTS- MATHEMATICAL SCIENCES TRACK		15
BMTH 410	Abstract Algebra	3
BMTH 450	Analysis I	3
9 additional BMTH hours at 300+ level		9
Electives		25-35

III B. MAJOR REQUIREMENTS- TEACHER CERTIFICATION TRACK		36
BMTH 421	Mathematics for Secondary Teachers	3
BEFN 321	Foundations of American Education	3
BEDP 334	Human Growth and Development	3
BEDC 211	Clinical Experience: Secondary	1
BEDP 335	Introduction to Educational Psychology	3
BEDX 300	Introduction to Exceptional Learner	3
BEDU 430	Teaching Mathematics in the Secondary School	3
BEDU 488	Classroom Management	2
BEDU 489	Student Teaching Seminar	3
BEDU 490	Directed Teaching	12
Electives		4-14
Total Hours Required		120

7. Articulation and inter-institutional Cooperation

Relationship of the Proposed Program to Other Institutions via Inter-Institutional Cooperation

USCB has initiated discussions with the Technical College of the Lowcountry (TCL) to plan for optimal transition of TCL graduates into USCB. Moreover, a committee of post-secondary mathematics educators from USCB and TCL has recently worked with local secondary mathematics educators to align mathematics education so as to foster a transition of well-prepared students into the college setting. The proposed USCB degree program will be developed in concert with the Common Core State Standards Initiative as well as with recommendations from the National Council of Teachers of Mathematics (NCTM).

8. Estimates of Costs

This section must provide a general estimate of the total costs associated with implementing the planned program.

Implementation of a program in mathematics with an option leading to teacher certification will require the addition of a new full-time faculty member within the Department of Education with salary and fringe costs of approximately \$80,000 per year occurring from the third year of the program forward. This faculty hire would provide expertise in teaching methods as well as overseeing an in-service component of training in secondary education and writing the NCTM SPA report. The faculty line would be expected during the 2017-18 academic year. Additionally, an Instructor in Mathematics would be necessary to continue to provide support for service courses for General Education as well as to other degree programs. Costs are estimated at \$60,000 per year and would be needed in the third year of the program as well. While technological resources such as Interactive White Boards available to the Early Childhood Education and Elementary Education programs will suffice initially for bringing the program online, it is expected that additional such technologies will be warranted by the time the first cohort of students in mathematics with concentration in teacher certification graduates. Implementation costs including basic office equipment, library materials, and other supplies for the first four years are expected to be an additional \$5000 per year. It is noted that grant funds will be sought to support all aspects of the program's implementation including a proposal for the Math and Science Partnership (MSP) sponsored by the NSF.