CAAL
1/08/15
Agenda Item 5c

New Program Proposal
Bachelor of Science in Mathematics
With tracks in Mathematical Sciences and Secondary Mathematics Certification
University of South Carolina Beaufort

Summary

University of South Carolina Beaufort requests approval to offer a program leading to the Bachelor of Science in Mathematics with tracks in Mathematical Sciences and Secondary Mathematics Certification to be implemented in Fall 2015. The proposed program is to be offered through traditional instruction. The following chart outlines the stages for approval of the proposal; the Advisory Committee on Academic Programs (ACAP) voted to recommend approval of the proposal. The full program proposal and a letter of response from Dr. Jane Upshaw is attached.

Stages of Consideration	Date	Comments
Program Planning Summary received and posted for comment	2/15/13	Not Applicable
Program Planning Summary considered by ACAP through electronic review	4/1/13	Dr. Robert Mignone, Chair of the Department of Mathematics, at the College of Charleston expressed concerns about the mathematics content courses in Secondary Mathematics Certification track, but Dr. Lynne Ford, Associate Provost at the College, stated that she supported moving the proposal forward. CHE staff requested more recent and additional data be included in the proposal (local districts, CERRA Supply and Demand data, and job market for mathematical sciences graduates). Staff also asked for justification for waiting until the third year of the program to hire a secondary education faculty member.
Program Proposal Received	9/15/14	The proposal addressed the concerns expressed by the College of Charleston regarding the curriculum. As a result, the required credit hours for the Secondary Mathematics Certification track were increased from 36 to 44. The revised proposal also updated current employment data. Finally, it responded to CHE staff questions about faculty by stating that institution plans to hire two new mathematics education faculty members, one in 2014-15 and the other in 2015-16.
ACAP Consideration	10/16/14	ACAP approved the full proposal.

Stages of Consideration	Date	Comments
Comments and suggestions from CHE staff sent to the institution	10/28/14	CHE staff sent a list of additional questions regarding the proposal, including suggested revisions.
Revised Program Proposal Received	12/1/14	CHE Staff received a letter from Dr. Jane Upshaw, Chancellor of USC Beaufort, on December 1, 2014. The letter was a response to the questions and concerns CHE staff sent on October 28, 2014. The letter served in place of any additional revisions, as Dr. Upshaw responded to all CHE staff concerns. A copy of the letter from Dr. Upshaw is attached.

Recommendation

The staff recommends that the Committee on Academic Affairs and Licensing commend favorably to the Commission the program leading to the Bachelor of Science in Mathematics with tracks in Mathematical Sciences and Secondary Mathematics Certification at USC Beaufort to be implemented in Fall 2015.

UNIVERSITY OF
SOUTH CAROLINA
BEAUFORT

November 25, 2014

Jane T. Upshaw
Chancellor

Paula A. Gregg, Ph.D.
Program Manager, Academic Affairs
SC Commission on Higher Education
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Columbia, SC 29201

Dear Dr. Gregg

The University of South Carolina Beaufort Faculty and Administration have reviewed the comments and concerns you sent from the CHE staff about the proposal for the B.S. in Mathematics with tracks in Mathematical Sciences and Secondary Mathematics Certification that was approved at ACAP on October 16, 2014. This letter provides USCB's response to each of the key concerns you have articulated in your email:

CHE Staff Concern #1
Staff have concluded that this program is not ready to go forward as submitted. USCB doesn't currently have a mathematical sciences undergraduate degree program and attempting to begin a new program with concentrations in both mathematical sciences and secondary mathematics certification without the support of appropriate faculty in both mathematics and education is not recommended.

a. *Staff recommends USCB consider requesting a new program in mathematics initially.*
b. *Once the mathematics degree is approved; hire an appropriate education faculty member with expertise and degrees in secondary mathematics to help develop the secondary mathematics certification track.*
c. *Submit a program modification of the track in secondary mathematics certification after the B.S. in mathematics is implemented.*

Institutional Response:
USCB does not wish to defer the proposal to a later date. The proposal has been in the approval process since December 2012. CHE staff has had the Program Planning Summary for this new degree program since April 2013. The ACAP Electronic Review Distribution was on April 1, 2013 at which time USCB made suggested edits. The full program proposal has been approved by the USC President, Board of Trustees, and ACAP. "Requesting a new program in mathematics initially" then "submit[ting] a program modification of the track in secondary mathematics" as CHE staff suggests, would require the institution to begin the approval process all over again which will take two to three years. USCB has local support for the program including funding from Beaufort County. Beaufort and Jasper County School Districts are in full support of the program because secondary mathematics is a critical needs area in this part of the state, and they need qualified secondary education mathematics teachers. More information on need is included under item #4b below. Nowhere in undergraduate curricula is the symbiotic relationship between teacher education and discipline-specific study perhaps stronger than in

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mathematics. Evidence for this statement is garnered from the fact that of the 29 institutions in the state with undergraduate mathematics programs, only two do not also have South Carolina Department of Education (SCDE) approved educator preparation programs in secondary mathematics as well. More information can be found in the table under item #5 below. The proposed tracks serve to bolster each other and we do not wish to disengage them.

The Commission's document *Perspectives on Program Duplication*, authored by Dr. Gail M. Morrison in 2010, provides clarity on several important aspects of USCB's proposal as well. That document describes "acute shortages" of mathematicians and teachers in the state. The assertion presented in the document is that more programs, even at the graduate level, are desirable in these areas. Certainly, locally, there is demand for teacher preparation; again, a more full response to the issue of demand is presented under item #4b below. The Commission's historical support for the "*development of institutions into full-service institutions that offer an array of traditional arts and sciences programs as well as professional programs*" is recognized and applauded. Additionally, the statement "*access to higher education through full-service associate-degree and baccalaureate-degree granting institutions should be considered a tremendous asset*" is likewise to be commended. As such, and in meeting the needs of the Lowcountry of South Carolina, the proposal for a B.S. in Mathematics in both tracks is warranted. USCB has the faculty, planning, and resources to provide service to the region by responding to needs in both parallel tracks as described more fully in the program proposal. Secondary mathematics teacher preparation is part of USCB's 5-year strategic plan for fulfilling the institution's mission and it is our directed intention to strive to achieve that objective.

CHE Staff Concern #2
Page 1 – Classification – b. Concentrations, options, and tracks. The name "certification" may change to "licensure" within the next year. Consider calling the track for teachers, "secondary teacher education" or "secondary education."
Institutional Response:
The name "certification" is currently used in the South Carolina Education Licensure Manual (September 2003 and revised in October 2013). The name "certification" was the appropriate word to use when the Program Planning Summary was submitted to CHE on February 15, 2013, when it was distributed to ACAP electronically on April 1, 2013, and when ACAP approved it on October 16, 2014. Changing the name "*certification*" because it "*may change to licensure within the next year*" should not be a key concern for the proposal.

CHE Staff Concern #3
Page 1 - Institutional Approval. The dates for approval from USC need to be completed in the chart.
Institutional Response:
The institutional approval table was not completed because the proposal left USCB on April 21, 2014. On April 21, 2014, USCB did not know the date the President or the Board of Trustees would approve the proposal. Once it leaves USCB, we never handle the proposal again. Completing the rest of the table would require USCB to give approximate approval dates, not actual dates. If the staff requests anticipated approval dates, we will be happy to provide those approximations in the future.

Table 1.

Evaluating Unit	Approval Date
USCB Courses & Curricula	November 16, 2012
USCB Faculty Senate	November 30, 2012
USCB Chancellor	December 4, 2012

USC System President	May 8, 2014
USC System Academic Affairs & Faculty Liaison Committee	June 13, 2014
USC System Board of Trustees	June 20, 2014

CHE Staff Concern #4
Page 2, Section 5. Justification. The majority of the discussion focuses on the teacher certification track.
a. Much more discussion and data is needed for the mathematical sciences concentration. Employment data for graduates in the mathematical sciences concentration is needed. The justification section for the mathematics concentration is weak.
b. P.3 - CERRA data needs to focus on secondary mathematics. The data provided in the narrative was about education, in general, in the state. Staff would also recommend getting data from the local school districts about the need for mathematics teachers.
Institutional Response:
a) Mathematics constitutes one of the oldest and most fundamental sciences and forms a core component of a liberal arts curriculum. As the backbone of science in general, mathematics study provides opportunities for students to make powerful impacts in business, finance, manufacturing, communications, engineering and the sciences. Mathematics majors in the Mathematical Sciences track will use the theory of mathematics together with computational techniques and algorithms to solve economic, scientific, engineering, physics, and business problems utilizing computer technology. It should be pointed out that undergraduate mathematics graduates do not typically gain employment as "mathematicians". Instead, they frequently hold positions titled "analyst" or "analytics manager" or a variety of other such nomenclatures. Indeed, it is the problem-solving and critical thinking skills that make mathematics majors highly marketable to employers. Information compiled by Duke University at http://www.math.duke.edu/major/whyMajor.html indicates that mathematics majors rank #1 on the GMAT and LSAT exams (approximately 13% above the mean) as compared to all other majors, have starting salaries 37% above the mean (ranking #1 as compared to all other majors) and rank #1 in total job satisfaction. Besides graduate opportunities in education, mathematics majors are sought for a variety of skilled positions in business, finance, insurance, and other sectors.

Perhaps one of the most substantial and lucrative fields of employment for mathematically-skilled graduates is in a field barely recognized a few years ago: *Big Data*. It is clear that "data scientists" are in exceptional demand with multiple job offers and virtually 100% placement. Mathematics majors are being sought to fill openings in these fields because of their skill sets in pattern recognition and inference. With advanced degrees required for premier positions, an undergraduate mathematics major has much potential to offer. Further, as reported by Forbes, the "Bureau of Labor Statistics projects that job opportunities for mathematicians will grow 23% between 2012 and 2022 and it pegs the median 2012 mathematician's salary at $110,000. Those statistics land mathematicians at the top of career advice and job listing website CareerCast's 2014 list of the 10 best jobs in the U.S." (http://www.forbes.com/sites/susanadams/2014/04/15/the-best-jobs-for-2014/). While a graduate degree may be necessary for some "mathematician" jobs, the most common route, by far, to earning such a degree is through an undergraduate degree in mathematics.

Locally, in the Lowcountry of South Carolina, healthcare, engineering, and transportation & logistics all have need for mathematically-skilled employees. Specifically, USCB has made connections with Gulfstream Aerospace, a General Dynamics company which manufactures the world's premier business jets. USCB students have attained internships and several computational science graduates have received job offers (with at least one current full-time

employee). From on-campus discussions with Gulfstream executives, the demand for capable STEM graduates is more than the area can provide. With recent announcements of a new family of jets and the increased manufacturing processes involving the building of the jet aircraft wings on site, Gulfstream's impact on the area is well-forged into the future.

Regarding healthcare, the need for mathematically-skilled graduates in areas from bioinformatics to data analytics is vast. CareCore National, which has a local healthcare management company office in Bluffton, SC currently lists at least five, full-time local openings specifying mathematics in the job description. USCB has partnered with the company as part of our Computational Science degree via student internships as well as through an advisory board member. Data science is playing an important role in the healthcare sector and mathematics majors are in demand in this sector for that reason.

Further assessments by the Charleston Metro Chamber of Commerce and separately by University of South Carolina economists project a shortage of 25,000 skilled workers, including STEM disciplines, in the Lowcountry of South Carolina within the next five years. According to Jack Jones, the top executive at Boeing's 787 assembly plant in North Charleston, lawmakers need to put money in the right programs to set up businesses for success in South Carolina. "These [programs] are critical curriculums we need to support STEM," he said, "especially in the rural areas where the pool for new talent could come." "Major industries in the Charleston area, such as Boeing Co., require workers with highly specified skills, and those with STEM backgrounds are critical to success."

As technology continues its advance and cyber-security impacts society in profound manners, mathematicians with training in cryptographic methods as well as metric and biometric techniques will contribute substantially to public and private enterprises. These items point to the clear need for mathematicians for the benefit of society in our local community and in our state as well as on a larger stage.

b) The CERRA data, *A Report on the Fall 2013 Supply and Demand Survey*, indicates that the largest category of newly hired teachers in South Carolina high schools during the 2013-14 school year was in mathematics at 239.5 FTE (Table 2A). Moreover, regarding vacant positions in South Carolina high schools at the start of the 2013-14 year, the same report (Table 4A) shows that mathematics was the largest of all categories in unfilled positions comprising about 20% of all high school vacancies (the *Sciences* category was second with an additional 13% of vacancies). The report also indicates that about 1/3 of teachers hired were new graduates from teacher education programs within the state.

As stated in the proposal, Beaufort County was seeking to fill 22 positions in secondary mathematics for the 2013-14 academic year. Updating data to this year (i.e., 2014-15), Beaufort County reports that 18 secondary mathematics positions were sought to be filled for 2014-15. Fifteen of these have been filled but three remain vacant. Similarly, Jasper County has at least one unfilled position in secondary mathematics at this time.

Further indications that mathematics teacher training is a valid component in USCB's mission in the region is the development of a new high school in Bluffton. Bluffton High School currently houses 1313 students in grades ten, eleven, and twelve. Built recently (2004), capacity is already inadequate for the region's growth. The new high school complex will be located in close proximity to the University and is expected to house 900 students upon completion with full capacity at 1400 and will allow the more-standard configuration of grades 9-12 at each school. A new PreK-8 complex is being built nearby as well due to demand. Both schools are

expected to open in 2015-16 and are indicative of future education needs of the local population.

Members of the mathematics faculty have been engaged with representatives of the various districts over the last few years. All districts have been fully supportive of the mission for USCB to prepare teachers in mathematics. Recently, the new Chief Instructional Services Officer for Beaufort County, Dr. Dereck Rhoads, has enthusiastically helped to further cooperative efforts. Faculty in the department have provided service by speaking to various mathematics classes at multiple high schools in the region during the last six months. Dr. Rhoads has helped arrange on-campus meetings with USCB mathematics faculty and local principals and school administrators. Discussions have centered on cooperative strategies, curriculum alignment, and skill training. Mathematics faculty have also been invited to participate in county-wide school mathematics teacher meetings at several local high schools, which they have done. In general, the department is building a strong relationship with local schools. Besides Beaufort County, Jasper County Schools indicate strong support as well. Please refer to the letter of support from Dr. Vashti Washington, Superintendent of Jasper County Schools, attached.

CHE Staff Concern #5

Page 7-8, Section 5d. Similar programs in the state. There should be two tables for this section: one for mathematical sciences and one for secondary mathematics education programs.

Institutional Response:

According to the South Carolina Department of Education website at http://ed.sc.gov/agency/act/se/ep/edprog.cfm?pgm=23, the following institutions each have an approved educator preparation program in secondary mathematics.

Anderson University	Furman University
Bob Jones University	Lander University
Southern Wesleyan University	Limestone College
Charleston Southern University	Morris College
The Citadel	Newberry College
Claflin University	North Greenville University
Clemson University	Presbyterian College
Coastal Carolina University	South Carolina State University
Coker College	College of Charleston
Columbia College	USC - Aiken
Converse College	USC - Columbia
Erskine College	USC - Upstate
Francis Marion University	Winthrop University
	Wofford College

As noted in the table above, USC Aiken has an approved educator preparation program in secondary mathematics. USC Aiken should also be recognized as having a degree similar to Mathematics (C.I.P. 270101): The institution offers a combined degree in Mathematics & Computer Science with C.I.P. 270301. This was not stated in the proposal as the differing C.I.P. did not initially provide the institution name in search results.

Compared with the list in the proposal (pp.7-8, Section 5d, Table 4), Allen University and Voorhees College are the only institutions in the state offering mathematics degrees that do not also have programs in secondary mathematics education. As mentioned at the outset, there is a reason for this dissimilarity; namely, the symbiosis between curricula typically serves to strengthen each. Indeed, the more technology and informatics rule our lives, the stronger the need for pairing between mathematical sciences and mathematics educator training.

CHE Staff Concern #6
Page 8, Section 5e. Similarities and differences between the proposed program and those currently at other institutions needs to be addressed.
Institutional Response:
The proposed degree in Mathematics with a track in Mathematical Sciences contains courses commonly found in mathematics curricula in successful programs throughout South Carolina and the country. For the track in Mathematical Sciences, students are required to take courses in the areas of calculus and analysis, discrete mathematics, algebra, geometry, and mathematical statistics. Moreover, courses leading to the structure and nature of mathematics are included (e.g., Introduction to Proof) as well as a course regarding the historical development of mathematics and an advanced two-semester sequence course in either Analysis or Abstract Algebra. Students are also required to take a computer programming course as well as at least the first semester of calculus-based physics. Besides the physics and programming requirements, students are required to take 17 mathematics/statistics courses at the level of calculus or above. Upper-level electives include both pure and applied mathematics courses. While most mathematics programs are similar, we believe the curriculum provided in the proposal promotes a very strong, well-rounded approach to the study of mathematics at the undergraduate level. For comparison purposes, please see more information in response to item #9 below.

For the B.S. degree in Mathematics with a track in Secondary Mathematics Certification, the same rigorous Core Major Requirements are included as above. Instead of a second semester 400-level Abstract Algebra course or a second semester 400-level Analysis course as within the Mathematical Sciences track, a course in Mathematical Modeling is required. The rationale behind this substitution is that further work in modeling helps prepare secondary teacher candidates to achieve a stronger background to relate more mathematics to more students in a more-diverse setting. The secondary mathematics certification track also includes education preparatory courses in foundations, psychology, diversity, and classroom management. Teaching with technology as well as mathematics teaching methods (including practicum) are included together with a supervised internship. All South Carolina Department of Education requirements will be met by the program as outlined in the proposal, specifically under items 17a and 17b. As with all other approved educator preparation programs in secondary mathematics in the state, this track will comply with the SPA (National Council of Teachers of Mathematics (NCTM)) standards as well. These items constitute the bulk of the full proposal and are listed under items 17a and 17b respectively, pp. 21-105. Indeed, a national template SPA example from the NCTM regarding an exemplary standards report utilizes work from Winthrop University. Our curriculum proposal is guided by this example in preparation for program approval and future accreditation. Indeed, Winthrop's recognized program is a model for this program proposal.

CHE Staff Concern #7
Page 9. The Praxis I test has been replaced with a new test: Praxis Core Academic Skills for Educators (Core) tests.
Institutional Response:

At the time the proposal was submitted, the *Praxis I* was still offered (until August 1, 2014) and had not been replaced with the new test. Again, once the proposal leaves USCB, we never handle it again. There is no opportunity for an institution to make such a change after the fact.

CHE Staff Concern #8

Page 9-10, Section 7. Enrollment. The estimates appear large compared to other mathematics programs at higher education institutions. What type of data do you have to support the large estimates? Do you have data from other institutions about the numbers of students in the secondary mathematics certification programs?

Institutional Response:

Yes, we evaluated data both internally and externally. As secondary mathematics teacher education candidates take different routes to certification in South Carolina- some within mathematics departments and some within education departments (a practice which continues through the doctoral level) - data separating students by certification track versus general mathematics at an aggregate level is obscured. However, by comparing the C.I.P. code 270101 (Mathematics, General) with either C.I.P. 131311 (Mathematics Teacher Education) or C.I.P. 131205 (Secondary Education and Teaching) depending upon the particular institution, estimates from Fall 2013 obtained at the CHE site http://www.che.sc.gov/DataPublications/SearchtheCHEDocumentCatalog.aspx contain combined mathematics and secondary mathematics certification enrollment for the following institutions as:

Name	Enrollment
Charleston Southern University	65
The Citadel	46
College of Charleston	98
Lander University	64
U. S. C. - Aiken	63
U. S. C. - Upstate	157
Winthrop University	68

Our proposal contains combined enrollment projections of 41 students in year four and 43 students in year five. These projections seem attainable and reasonable based on this external evidence. Moreover, internally, with USCB currently offering only two other STEM degrees (Biology with enrollment at 177 students and Computational Science, in its fifth year, with enrollment at 68 students); the provided projections seem further well-founded.

CHE Staff Concern #9

Page 11. Section 8. Curriculum. The curriculum for the mathematical sciences track needs to be more developed. There are 22-32 elective hours for this track which appears to be a lot based on traditional mathematics programs.

Institutional Response:

We assert that the curriculum for the Mathematical Sciences track is fully developed. The curriculum for the track is, in fact, strong by any reasonable standard. The elective hours (22-32) are not a reflection of a lack of development in program planning. For example, the following table indicates the number of MATH-designated courses required for a degree in mathematics as compared to the same institutions listed above:

Name	MATH courses required (calculus and above)
USCB Program Proposal	**16**
Charleston Southern University	13
The Citadel	14
College of Charleston	15
Lander University	15
U. S. C. – Aiken*	12
U. S. C. - Upstate	13
Winthrop University	16

* USC Aiken offers a combined Mathematics & Computer Science degree with additional requirements in CSCI.

Notes:

- Most or all programs required courses in computer programming or mathematical software as well as statistics. USCB's proposal includes both programming and mathematical statistics courses neither of which is accounted for above. Additionally, a calculus-based physics course is required as well.
- Institution programs were selected as close to the proposed degree as possible (e.g., a B.S. in pure mathematics was chosen whenever possible compared to a B.A. or as compared to an applied mathematics degree). Data was gathered from web-sites, catalogs, or bulletins as available.

While counting courses should not and cannot be the measure of program development, we are confident that anyone familiar with undergraduate college curricula in mathematics would find that the representation of courses in the proposed curriculum offers a well-rounded educational platform for mathematics study at the undergraduate level. Based on this data, the fact that the proposed track in Mathematical Sciences is able to offer students 22-32 elective hours should be applauded. It provides opportunity for students to pursue other interests, to bolster a degree with the addition of a relevant minor, to take prerequisite courses as needed for particular plans of study, or simply to take additional mathematics, statistics, or computer science courses.

CHE Staff Concern #10

Page 13. Section 9. Assessment. The GPA of 2.0 isn't high enough for the secondary mathematics certification track.

Institutional Response: This is an error. A 2.0 is required to be in good academic standing within the university. The GPA should be listed as 2.75 within the program: *Students must maintain a minimum cumulative GPA of 2.75 to be in good standing in the program and meet admission requirements for the Professional Program.* In addition, we note that the 2.75 <u>course</u> GPA listed in several places as required for the Pre-professional track for students in the Secondary Mathematics Certification track is superfluous. A "B" or better, or equivalently, a 3.0 <u>course</u> GPA in all pre-professional courses is required.

CHE Staff Concern #11

Page 15. Section 10. Faculty. Concern about faculty not being in place for a new program, especially since there isn't currently an undergraduate degree in mathematics. Faculty members in mathematics and mathematics education should be in place to develop the program. There are currently 5 faculty members listed who could teach in the proposed

program, but there are 17 proposed new courses. More detail needs to be provided about current faculty and future faculty (qualifications, department assignment, and FTE).

Institutional Response:

The Department of Mathematics and Computational Science currently (Fall 2014) consists of 12 fulltime faculty members, eight of which teach mathematics with an additional tenure-track faculty member (a computational scientist) teaching a course in mathematical statistics. Of those currently teaching mathematics courses, four faculty members have licensed classroom teaching experience in mathematics totaling more than 50 years combined with approximately half in grades 9-12 and the remainder in grades 7-12. Additionally, a search for a tenure-track faculty member with a doctoral degree in Mathematics Education for a position commencing at the program's anticipated start date of fall 2015 has been approved and is progressing. It is planned that this person will contribute to teaching within the program as well as in program development (particularly in years one and two) and administration. Dr. Jane Upshaw, Chancellor of USCB, also has an earned Ph.D. in Mathematics Education and continues to provide program direction as well. Regarding Education faculty, a tenure-track position in Education is proposed and planned with a search commencing in 2015-16 for fall 2016 hire. It should be noted that USCB hired the former Beaufort County School District Secondary Mathematics Coordinator within the Education Department this year as well. While this faculty member currently serves as a Field Placement Coordinator for the Elementary Education program at USCB, her expertise in secondary mathematics and local school policies and procedures is highly valuable. A full-time instructor position in mathematics/education is planned in year four as well, and duties will be assigned appropriately as the first cohort of students approaches program completion. As can be demonstrated in the example 4-year curricula plans for the two tracks below, the Education faculty member(s) will be teaching in the third and fourth years of the program.

Four Year USCB Degree Plan: BS in Mathematics-Secondary Education Cert. Track			
Fall Semester	**Cr hr**	**Spring Semester**	**Cr hr**
First Year			
ENGL 101/101L	3-4	ENGL 102	3
MATH 115	4	MATH 141	4
CSCI 102,104, or 105	3	MATH 174	3
Elective	3	Elective	3
Elective	3	Elective	3
Total	16-17		16
Second Year			
MATH 142	4	MATH 240	4
PHYS 211/211L	4	MATH 242	3
MATH 230	3	EDCI 243	3
Elective	3	STAT 340	3
		Elective	3
Total	14		16
Third Year			
MATH 300	3	EDEX 300	3
MATH 360	3	EDPY 335	3
EDFO 321	3	MATH 390	3

Elective	3	Elective	3
Elective	3	Elective	3
Total	15		15
Fourth Year			
MATH 410 or 450	3	EDME 469	12
MATH 421	3	EDME 476	3
EDME 430	3		
EDME 430P	2		
EDCI 441	3		
Total	14		15

Regarding mathematical sciences, as listed in the proposal, 8b p. 12, all anticipated program courses that may be added within the first five years are presented with course descriptions as required. As can be demonstrated from the table below, nine new program courses in mathematics will be required for a cohort FTE of .28125 in additional mathematics courses. With an annual .75 FTE Mathematics Education faculty member in year one and an additional mathematics/education faculty member in year four (annual .5 FTE math), departmental faculty resources are more than adequate to cover the proposed curriculum. The additional courses listed in the proposal are reasonable anticipations in the first five years to provide program flexibility in 300+ level mathematical science program electives (e.g. Combinatorics vs. Functions of a Complex Variable). Choices made may be dependent on future faculty hires and/or replacements as deemed necessary but are reasonably anticipated for now. Faculty resources for majors' courses as well as other programming electives and requirements are adequately sufficient and, indeed, the overlap in prerequisite and required courses with Computational Science (as well as other disciplines) serves to strengthen and bolster USCB's curricular offerings.

Four Year USCB Degree Plan: BS in Mathematics- Mathematical Sciences Track			
Fall Semester	**Cr hr**	**Spring Semester**	**Cr hr**
First Year			
ENGL 101/101L	3-4	ENGL 102	3
MATH 115	4	MATH 141	4
CSCI 102,104, or 105	3	MATH 174	3
Elective	3	Elective	3
Elective	3	Elective	3
Total	16-17		16
Second Year			
MATH 142	4	MATH 240	4
PHYS 211/211L	4	MATH 242	3
MATH 230	3	STAT 340	3
Elective	3	Elective	3
		Elective	3
Total	14		16

Third Year			
MATH 300	3	MATH 390	3
MATH 360	3	MATH 300+	3
Elective	3	MATH 300+	3
Elective	3	Elective	3
Elective	3	Elective	3
Total	15		15
Fourth Year			
MATH 410	3		3
Math 450	3	MATH 411 or Math 451	3
Math 300+	3	MATH 480 Senior Seminar	3
Elective	3	Elective	3
Elective	3	Elective	3
Total	15	Elective	15
Total Hours			121-122

CHE Staff Concern #12
Page 18, Section 14b. Discussion of submission of the Secondary Mathematics Certification concentration to the SC Department of Education for licensure authority is missing.
Institutional Response:
USCB is fully aware of the submission process. According to SCDE:

"The Certification Authority of new or modified program proposals from public institutions will not be considered by a SCDE peer review team until full program approval is granted by the CHE....Once a new or modified program is fully approved by CHE, public institutions should submit copies of their complete proposal (four hard copies in three-ring binders) to SCDE."

Full SCDE guidelines are located at https://ed.sc.gov/agency/se/Educator-Services/Ed-Prep/documents/educatorguidelines.pdf

CHE Staff Concern #13
Page 19-20, Section 16. Estimated Costs. Estimated costs for accreditation and SPA recognition should be included. In addition, there will be costs associated with clinical experiences with the secondary mathematics certification track.
Institutional Response:
Estimated costs for CAEP/NCTM accreditation are currently $10,000- $12,000. These costs are subject to change as the SCDE requires a program to seek national/state approval once ten (10) candidates have completed the program. We estimate this likely to be in year six following program initiation. Moreover, with the transition to CAEP, and particularly CAEP's Accreditation 2.0 initiative, there is continued discussion about accreditation costs and financing. USCB is fully prepared to follow the guidelines to establish program accreditation during this transition. Procedurally, the department submits budget changes annually as part of USCB's *Institutional Effectiveness - Outcomes Assessment* process in conjunction with the University's five-year strategic plan. These costs will be anticipated during the next five-year strategic planning cycle.

Regarding other reasonably anticipated costs within a five-year time frame, CAEP/ NCTM training costs for program administration are expected. Estimated costs are $5000 depending

on location/delegation size, etc. While several years away and with registration details unavailable from CAEP for spring 2015, reasonable estimates from past CAEP conferences include approximately $500 registration per participant plus food/travel, etc. NCTM CAEP Program Report Compiler Training is done electronically via webinar at a cost of approximately $395 per participant. Supervised practicum/internship costs are expected in year four and beyond. As we expect a small secondary mathematics certification annual cohort (4-6 students) and with clinical faculty to supervise, clinical expenditures per year are estimated at $1000.

As was reported to the full Commission meeting held at USCB on November 6, both the mathematics degree and the secondary mathematics degree are greatly needed in our region. We will be the local pipeline for teacher preparation for our local school districts in mathematics education. This pipeline is greatly needed by not only Beaufort County School District but also Jasper and Hampton County School Districts.

Today, GulfStream, CareCore National and many small technical businesses need mathematically trained graduates. What is even more compelling is that economic development is impeded in our region precisely because USCB does not have both of these degree programs.

The process that USCB has followed is exactly the same as the one we have followed for every degree program proposal we have submitted. For example, hiring faculty after the degree program is approved is the procedure that must be followed for any institution in which 86% of its operating budget comes from tuition and fees. Thus, we must hire new faculty predicated on the new enrollment that will come from having the new degrees.

As for the concern that USCB has no mathematical sciences degrees currently, this observation is completely incorrect. Computational Science is an interdisciplinary degree between mathematics and computer science. This degree is a mathematical sciences degree, and USCB has been more successful in recruiting, retaining and graduating students than required in our original proposal. Having degrees in mathematics and in secondary mathematics education will provide synergies for Computational Sciences and vice versa.

Thank you for the opportunity to respond to your concerns. We desperately need both these degree programs and look forward to having the full approval of the SC CHE.

Sincerely,

Jane T. Upshaw, Ph.D.

cc: Mary Ann Janosik
Trena Houp
John Lane
Rachel Harvey

Program Proposal for New Program

University of South Carolina Beaufort

Title of Program: Bachelor of Science
Major: Mathematics
with tracks in
Mathematical Sciences and Secondary Mathematics Certification

2014

_____

Dr. Harris Pastides, President

_____
Date

Dr. M.J. (Bud) Sanders
Chair, Department of
Mathematics and Computational Science
University of South Carolina Beaufort
One University Blvd.
Bluffton, SC 29909
mjsander@uscb.edu
843-208-8106

2. Classification:

a) *program title:* Bachelor of Science with a major in Mathematics

b) *concentrations, options, and tracks:* Tracks in 1) Mathematical Sciences, 2) Secondary Mathematics Certification

c) *academic unit in which the program resides:* Department of Mathematics and Computational Science

d) *designation, type, and level of degree:* Bachelor of Science, 4-year

e) *proposed date of implementation:* Fall 2015

f) *CIP code:* 27.0101

g) *site:* Historic Beaufort Campus (HB) and Hilton Head Gateway Campus (HHG)

h) *whether program qualifies for supplemental Palmetto Fellows Scholarship & LIFE Scholarship awards:* Yes

i) *delivery mode:* traditional

j) *area of certification (only for programs that prepare teachers and other school professionals):* Secondary Mathematics

3. Institutional Approval

Table 1.

Evaluating Unit	Approval Date
USCB Courses & Curricula	November 16, 2012
USCB Faculty Senate	November 30, 2012
USCB Chancellor	December 4, 2012
USC System President	
USC System Academic Affairs & Faculty Liaison Committee	
USC System Board of Trustees	

4. Purpose

a) a statement of the purpose of the program:

The purpose of the Bachelor of Science with a major in Mathematics is to broadly prepare students for the multidisciplinary field of practice that is concerned with the structure and the application of mathematics. A track for students interested in pursuing secondary-education licensure as well a track for students interested in mathematical sciences is proposed.

b) A discussion of the objectives of the (degree) program:

Program objectives for students closely follow recommendations of the Mathematical Association of America and include:

- Develop mathematical thinking and communication skills
- Develop skill in a variety of technological tools including a programming course
- Provide a broad view of the mathematical sciences
- Require in-depth study of a single advanced area (a year-long sequence in analysis or completion of two closely related algebra courses

- Create a foundation of interdisciplinary study which includes an advanced data-oriented statistics course
- Encourage and nurture majors

Additionally, for majors preparing to be secondary school (9–12) teachers, program objectives include:

- Learn to make appropriate connections between advanced mathematics taught in courses and the secondary mathematics to be taught
- Learn about the history of mathematics and its applications, including recent developments
- Experience many forms of mathematical modeling and a variety of technological tools, including graphing calculators and geometry software.

5. Justification

a. A discussion of the need for the program in the state:

The mission of the University of South Carolina Beaufort (USCB) 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) Secondary Mathematics 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.

The vision of (USCB's) Department of Mathematics and Computational Science is to establish USCB as the primary resource for secondary mathematics educators and school systems in the Lowcountry districts (Beaufort, Colleton, Hampton I and II, and Jasper counties) as well as to provide a baccalaureate degree in mathematics to students interested in entering the workforce or in post-baccalaureate mathematics education.

Specifically, the unit envisions a department that educates and trains prospective secondary mathematics teachers based on accepted research and developmental practices strengthened by professional preparation experiences in the public schools of the region besides preparing graduates for the opportunities a B.S. in Mathematical Sciences offers.

On a regional level, mathematics, and specifically, mathematics training of future teachers, is critical to the economic development of the Lowcountry of SC. Students in SC, and more particularly in the Lowcountry region of SC 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 state of SC and the nation have documented teacher shortages. Combined with rapid population growth and development in the Lowcountry, and the rural/poor standing of public schools, this shortage is compounded in USCB's service area (Beaufort, Colleton, Hampton I and II, and Jasper counties). School district administrators in the USCB four-county service area have indicated that they will continue to face a teacher shortages in secondary mathematics resulting from impending teacher retirements over the next five to ten years combined with a shrinking pool of education graduates willing to work in some of the poorer, more rural school districts in South Carolina. Attracting well-

qualified teachers into rural areas is a matter of great concern and school officials in the local school districts have gone overseas to recruit teachers to work in these districts due to a lack of a qualified applicant pool.
Currently, USCB offers a degree in Early Childhood Education and began a degree in Elementary Education in fall 2013. The proposed degree in Mathematics with a track in Secondary Mathematics Certification is the initial step in expanding USCB's mission to serve its service area more fully. There are no secondary mathematics education teacher preparation programs in SC within a reasonable commuting distance (defined as the distance a reasonable person would be willing to commute to attend daily classes) from USCB that those residents can attend to earn this degree. Discussions with both Beaufort and Jasper County school district officials over the years have focused on a "grow your own" pool of teachers. This degree will make USCB more attractive for local students wanting to earn a teaching certificate and who have a desire to work in their home base. Both Beaufort and Jasper County School Districts Human Resources' managers have expressed strong support of USCB offering a program in order to meet the local demands for teachers in mathematics.

The conclusion of the Fall 2013 Teacher/Administrator Supply and Demand Survey published by South Carolina's Center for Educator Recruitment, Retention, and Advancement (CERRA) in January 2014 states that year after year, districts have difficulty filling vacant teacher positions in the same subject areas: special education (across all school levels), and mathematics and sciences in both middle and high schools. Over the last three school years, unfilled positions in these three critical need areas have explained anywhere from 34% up to 46% of all statewide teacher vacancies.

Since the January 2014 Supply and Demand report did not include data from the Public Charter School District this year, the number of allocated teacher positions decreased by 754 FTEs from the previous year but the proportions by school level remained the same. One-third of all FTEs filled this year were new graduates from teacher education programs in the state. This statistic is down a marginal amount from 36% last year. Just over 8% of the FTEs filled were new graduates from teacher education programs in another state. Teachers who transferred from one SC district to another made up 27% of the FTEs filled this year. About 15% of the new hires transferred from another state. As mirrored by the number of allocated positions, the majority of newly hired middle and high schools teachers were concentrated in just a few subject areas including English/language arts, mathematics, sciences, and social studies.

More directly to the point, CERRA reports, "64% of all unfilled special education positions are concentrated in two geographic areas in the state: the Lowcountry and the Pee Dee regions. Districts in these two regions also were responsible for more than 55% of statewide vacancies in all subject areas, yet they make up only 36% of all teacher positions in the state."
http://cerra.org/media/documents/2014/1/2013_Supply__Demand_Report2.pdf

CERRA concludes with three main themes that support the need for this program at USCB, "The numbers of vacant positions and newly hired teachers have not changed much in two years... Year after year, districts have difficulty filling vacant teacher positions in the same subject areas: special education (across all school levels), and mathematics and sciences in both middle and high schools...Vacant teacher positions also are being consistently reported at a disproportionate rate, regardless of subject or certification, by districts in two geographic areas known as the Pee Dee and Lowcountry regions of SC.

According to the National Center for Education Statistics (NCES) 2011-2017 (March 2011) report entitled "Projections of Education Statistics to 2019", "Between fall 2007, the last year of actual public school data, and fall 2019, the number of teachers in elementary and secondary schools is projected to rise. The pupil/teacher ratios are projected to decrease in both public and private schools. The annual number of new teacher hires is projected to increase in both public and private schools. Total public and private elementary and secondary school enrollment reached 55 million in fall 2007, representing

a 10 percent increase since fall 1994. Between fall 2007 and fall 2019, a further increase of six percent is expected, with increases projected in both public schools and in private schools. Increases in public school enrollment are expected for Hispanics, Asians/Pacific Islanders, and American Indians/Alaska Natives, and decreases are expected for Whites and Blacks. Increases in public school enrollment are expected in the South and West, and decreases are expected in the Northeast and the Midwest. A historic turnover in the teaching profession is on the way. More than a million veteran teachers are nearing retirement. America will need two million new teachers in the next decade, and experts predict that half the teachers who will be in public school classrooms ten years from now have not yet been hired."

On a local level, the Beaufort County School hired 18 secondary math teachers in 2010-11 for the following academic year, 20 in 2011-12, and will hire at least 22 secondary math teachers in 2012-13 for the 2013-14 year (13 hired as of June, 24, 2013 with 9 remaining vacancies and more positions likely needed (personal email: Becky Randazzo, Beaufort County School District Recruiting Coordinator, Rebecca.Randazzo@beaufort.k12.sc.us.)

Moreover, 21 schools in Beaufort County, all five schools in Jasper County, eight schools in Colleton County, and ten schools in Hampton I&II are considered critical geographic schools for the 2013-2014 school year. Compelling regional factors that contribute to this need include the following: (1) Colleton, Jasper and Hampton counties are three of the poorest counties in the state and poverty rates throughout the region are disproportionately high. These are the hardest hit areas for teacher shortages; in particular, this area of the state has been referred to as the *Corridor of Shame*. (2) Beaufort County is the fastest growing county in the state, with a burgeoning population increase of nearly 40% from 1990 (pop. 86,425) to 2000 (pop. 120,937), and another 39.5% from 2000 to 2010. Additionally, Jasper County's population increased by 33.5% (15,137 to 20,678) during this decade—both counties more than doubling the state rate of 15.1%. Projections show a slower, but continual growth pattern for the region. In Beaufort County alone, the most conservative projections anticipate the population increasing by a minimum of another 40% over the next 25 years. Sources from labor market indicators reflect varying growth projections, though all show a steady increase as indicated in the following chart.

Table 2. Part a.

Beaufort County Population Growth and Projections						
Source	**2000**	**2005**	**2010**	**2015**	**2020**	**2025**
1. LMI	120,937	137,800 (13.9% over 2000)	Actual 162,233	170,640	185,290	199,780

Cited Sources: Lowcountry Economic Network, U.S. Department of Commerce, Bureau of Census, and S.C. Office of Research and Statistical Services.
http://quickfacts.census.gov/qfd/states/45/45013.html ;
http://www.sccommunityprofiles.org/census/proj0035.php

(3) Beaufort County School District has experienced a 3.1% increase (616 students) over the past five years, and both Beaufort and Jasper County schools have had aggressive building programs over the past few years. Both districts have reported difficulty in recruiting and retaining teachers; and (4) Contributing to a recurring high turnover rate, 18% of Beaufort County teachers are members of military families, with an average military tour of three years.

Even more significant is the fact that the Bluffton community, often viewed mainly as a retirement community, has experienced significant student growth even at the early childhood and elementary levels. With Okatie Elementary as an established school (spring 2013 enrollment of 615 students), the

Michael C. Riley Early Childhood Center (PreK-1) opened in fall 2009. Along with the M. C. Riley Elementary school, the combined enrollment for spring 2013 was 696. Red Cedar Elementary opened in fall 2009, with a spring 2013 enrollment of 945 students. And, while Bluffton Elementary opened in 1999, the Bluffton Early Childhood Development Center opened in fall 2010, with a combined spring 2013 enrollment of 610 students. Recently, Pritchardville Elementary opened in fall 2010, with a spring 2013 enrollment of 650 students. As students continue the matriculation process, the need for quality local teachers at middle and secondary levels is evident. (web: South Carolina Department of Education Report Cards, school websites.)

The B.S. with a Major in Mathematics is a critical need area based on career opportunities, workforce needs, and advancement of education in the region. Based on data from the Bureau of Labor and Statistics and Projections Central State Occupational Projections websites, the demand for occupations in Middle School Teachers and Secondary Education Teachers is expected to grow nationally by 8.2% from 2012-2022. Within SC, the growth is expected to be 11.4% from 2012-2020. The average number of annual openings in SC for occupations within middle school and secondary school education is 800. Nationally, the average annual number of openings is 59,980.

Table 3. Parts a and b.

Occupational Projection National							
		Employment		Openings			
SOC Code	Occupation	2012	Projected 2022	Change	Growth	Replace	Total
25-2031	Secondary school teachers, except special and career/technical education	955,800	1,008,700	5.5%	52,900	259,700	312,600
25-2022	Middle School Teachers, Except Special and Career/Technical Education	614,400	690,400	12.4%	76,000	211,200	287,200
Total		1,570,200	1,699,100	**8.2%**	128,900	470,900	599,800

Source: U.S. Department of Labor
http://www.bls.gov/data/#projections

Occupational Projections South Carolina				
	Employment			Average Annual Openings
Occupation	Base Est 2012	Projected 2020	Change	Total
Secondary School Teachers, Except Special and Career/Technical Education	12,980	13,940	7.4%	450
Middle School Teachers, Except Special and Career/Technical Education	8,760	10,290	17.6%	350
Total	21,740	24,230	11.4%	800

State projections found at: http://www.projectionscentral.com/Projections/LongTerm

County-wide, Beaufort County's population boomed between 2000 and 2010, increasing 34.1 percent, according to U.S. Census figures released in March 2011. Only three other counties, York, Horry and Dorchester, had populations that grew faster during that period, as reported in the Beaufort Gazette on March 24, 2010 (kpeterson@beaufortgazette.org).

Data from the 2010 census, including population totals broken down by voting age, geography and race, is being released state by state. The U.S. Census Bureau is required by law to report the findings of each decennial census by April 1, so officials can begin redistricting the once-a-decade exercise to redraw their legislative boundaries. Most areas of Beaufort and Jasper counties showed growth during the past decade. Bluffton's population in particular has exploded, increasing by 883 percent. In the two-county area, Beaufort was the only municipality to fall in population. It lost 589 people between 2000 and 2010, a 4.6 percent drop. The number of Hispanic residents has also jumped, to 19,567 increasing by 138 percent in Beaufort County and 3,751, an increase of 215 percent in Jasper County http://abstract.sc.gov/chapter14/pop14.php.

Table 2. Parts b and c.

County Population Change Table (2000-2010)				
County	**Resident Population (April 1, 2000)**	**Resident Population (April 1, 2010)**	**Numeric Change**	**Percent Change**
Beaufort	120,937	162,233	41,296	34.1
Colleton	38,264	38,892	628	1.6
Hampton	21,386	21,090	-296	-1.4
Jasper	20,678	24,777	4,099	19.8
South Carolina	4,012,012	4,625,364	613,352	15.3

Municipal Population Change Table (2000-2010)				
Municipality Service area	**Resident Population (April 1, 2000)**	**Resident Population (April 1, 2010)**	**Numeric Change**	**Percent Change**
Beaufort	12,950	12,361	589	-5
Bluffton	1,275	12,530	11,255	883
Hardeeville	1,793	2,952	1159	65
Hilton Head	33,862	37,099	3237	10
Port Royal	3,950	10,678	6728	170
Ridgeland	2,518	4,036	1518	60
Yemassee	807	1027	220	27

Source: U.S. Census Bureau, Census of Population and Housing 2000 and 2010.
Read more: http://www.islandpacket.com/2011/03/23/1594433/us-census-beaufort-county-grew.html#storylink=misearch#ixzz1Jylv7mNi

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.

There is anticipated high demand for the program based on general student interest expressed at new student orientations at USCB. The teaching profession provides steady employment as well as good pay and benefits. According to the Center for Educator Recruitment, Retention, and Advancement (www.cerra.org), in SC, teachers with a bachelor's degree earn on average $38,358 per year and teachers with a master's degree earn on average $48,674 per year. Moreover, as reported in the Wall Street Journal, Forbes, the New York Times, etc., growth and above average pay is expected for workers in STEM disciplines for the foreseeable future.

b. centrality of the program to the USCB Commission-approved mission:

This Bachelor of Science degree with a major in Mathematics directly supports three key areas of USCB's mission:

1. USCB offers baccalaureate degrees that "respond to regional needs, draw upon regional strengths, and prepares graduates to contribute locally, nationally, and internationally with its mission of teaching, research, and service."

- As noted in the previous section, this program responds to regional needs. The region consists of highly differentiated communities on social levels. Its infrastructures pertaining to family, government, schools, the economy, sports, science, art, health and medicine, all warrant a trained and educated populace.
- As the region continues to grow, the need for teachers in multiple disciplines will increase. Teachers in mathematics as well as a capable pool of workers educated in STEM disciplines will be valued highly in the region.

2. USCB "offers degree programs in the arts, humanities, professions, and social and natural sciences"

- The B.S. with a major in mathematics will be a significant component of the technical programs at USCB and will interface with degrees in Biology, Computational Science, and Health Professions as well as contribute to the expanding roles of the Education Department.

3. "The University enriches the quality of life for area residents of all ages through its academic programs, continuing education, artistic and cultural offerings, community outreach, collaborations with regional initiatives, and life-long learning opportunities."

- The university is committed to a learning environment that encourages students to reach their academic and professional potential through exposure to a highly qualified faculty, professional learning environments and a supportive atmosphere in a multicultural setting.

c. 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 (with 1724 enrollments and 1457 FTE's in Fall 2013) it is rapidly growing and has increased enrollment substantially in the last 3 years; a growth trend that 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 modern high-quality training program in mathematics and for future educators interested in teaching 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 (for example, programming courses) will enhance the cross-disciplinary depth of exposure to mathematical concepts and applications. Besides the USCB Faculty

Senate, the Department Chairs, senior administration, and education service districts all support the development of the program as furthering the mission of USCB in the Lowcountry region of SC.

d. a comprehensive list of similar programs in the state:

Table 4.

Similar Programs in South Carolina	
Institution	**Program similar to a B.S. with a major in Mathematics (C.I.P. 270101)**
Allen University	Mathematics
Anderson University	Mathematics
Benedict College	Mathematics
Bob Jones University	Mathematics
Charleston Southern University	Mathematics
Claflin University	Mathematics
Clemson University	Mathematical Sciences
Coker College	Mathematics
College of Charleston	Mathematics
Columbia College	Mathematics
Converse College	Mathematics
Erskine College	Mathematics
Francis Marion University	Mathematics
Furman University	Mathematics
Lander University	Mathematics
Limestone College	Mathematics
Morris College	Mathematics
Newberry College	Mathematics
North Greenville University	Mathematics
Presbyterian College	Mathematics
South Carolina State Univ	Mathematics
Southern Wesleyan University	Mathematics
The Citadel	Mathematics
U.S.C. Columbia	Mathematics
U.S.C. Upstate	Mathematics
Voorhees College	Mathematics
Winthrop University	Mathematics, General
Wofford College	Mathematics

e) Similarities and differences between USCB's proposed program and those at other institutions in the state, region, and nation:

As a prevalent subject area in P-16 education, although there are a number of baccalaureate level mathematics degree programs in public and private colleges/universities within SC, none are proximate to USCB's four-county service area. 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. For students in this region desiring a baccalaureate degree in mathematics, a one-way commute in excess of 90 miles would be necessary from the USCB HHG Campus and 67 miles from the HB Campus to attend a similar program in Charleston, and consequently would eliminate most students interested in the degree. Duplication of programs located in other parts of the state is warranted based on the great need for mathematics teachers and workers in STEM disciplines in the region because of substantial growth and occupational trends.

An undergraduate degree in mathematics is not available through the Academic Common Market to students in SC. Although web-based institutions may offer some courses typically found in a mathematics program, teacher certification programs require observation, practica, and internship/student teaching components that cannot be accomplished through web-based instruction. Moreover, the creation of this additional teacher preparation program in this underserved region of the state of SC is both justified and needed.

6. Admission Criteria

A student who meets the University's general eligibility requirements may apply to the program in Mathematics in the track in Mathematical Sciences; additional requirements for the track in Secondary Mathematics Certification are discussed below. Admission of freshman students is based on high school rank, grades, and entrance examination scores. These factors will be used to determine the applicant's probability of completing the program requirements. Applicants who have earned a 2.0 cumulative GPA on the defined college preparatory units and who score 800 on the SAT or 17 on the ACT may be admitted to the Mathematical Sciences track. Students transferring from other programs or institutions are required to have 2.0 cumulative GPA in all previous college-level course work. In addition, they must be in good standing and eligible to return to the institution last attended. Students already enrolled at USCB may obtain the major declaration form from the Registrar's Office whereby students must select the track within the major. Students must fulfill USCB admissions requirements to enroll in general education or program specific courses. Students in good standing may enroll in upper division Mathematics and/or Education courses when appropriate, relative to meeting general education requirements and pre-requisites.

Application for admission into the Secondary Mathematics Certification track must be submitted to the Mathematics Teacher Education Committee (consisting of at least three tenured/tenure-eligible mathematics faculty members along with an additional tenured/tenure-eligible education faculty member). The student must have completed at least 45 hours of undergraduate credit together with the following conditions (as well as other USCB academic requirements):

- A cumulative Grade Point Average (GPA) of at least 2.75 in all undergraduate course work
- Completion of all Pre-Professional courses with a minimum GPA of 3.0 and a "C" or better in each course
- Grade of "C" or better in a performance-based speech course- SPCH 140: Public Communication or SPCH 230: Business and Professional Speaking
- Passing scores on all three sections of Praxis I Test. Official scores must be submitted to and received by the Department of Mathematics and Computational Science
- Attendance at the Secondary-Mathematics-Certification Orientation Session
- Criminal Background Check and Full Disclosure Statement from the State Law Enforcement Division (SLED)
- Successfully complete Professional Program Interview and Disposition Statement
- Approval by the Mathematics Teacher Education Committee

Curricula designated as professional education courses are limited to students who have been formally accepted into USCB's Bachelor of Science in Mathematics in the Secondary Mathematics Certification track.

7. Enrollment

a) projected total student enrollment for the first five years.

Table 5

Projected Total Enrollment				
Year	**Fall**		**Spring**	
	Headcount	**Credit Hours**	**Headcount**	**Credit Hours**
2014-15	12*	180	12	180
2015-16	24**	360	24	360
2016-17	36***	540	36	540
2017-18	41****	615	41	615
2018-19	43*****	645	43	645

* 6 new freshmen, 6 internal "transfer" sophomores.

** 8 new freshmen, 10 continuing students, 4 internal "transfers", 2 retained students

*** 8 new freshmen, 22 continuing students, 4 internal "transfer", 2 retained students

**** 8 new freshmen, 27 continuing students, 4 internal "transfers", 2 retained students

***** 8 new freshmen, 29 continuing students, 4 internal "transfers", 2 retained students

Note: estimate of two students lost to attrition annually after spring semester

Assumptions for the table above:

1. the program is a four-year program;
2. six students new to the institution will enroll in the first year and 8 students will enter each year thereafter;
3. 6 students from other programs (including "undeclared") within the institution will enter the program in the first year as sophomores, 4 students will internally "transfer" each subsequent year for the next 4 years; 2 students will be retained by the institution to enter the program each year that would have otherwise transferred;
4. new students will enter the program in the fall semester;
5. there will be some attrition between academic years;
6. students will take 12+ credit hours per semester.

b) how the estimates were made and academic origin of students:

Since there is presently no Mathematics major at USCB, the modest estimates in the above table are based on (1) the need for the mathematics/mathematics education degree statewide and nationally, (2) the increased yearly enrollment at USCB, (3) comparison data to other institutions (CIP 270101) available from the Commission (web: https://info.che.sc.gov/reports/cgi-bin/cognosisapi.dll?b_action=cognosViewer&ui.action=run&ui.object=%2fcontent%2ffolder[%40name%3d%27Reports%27]%2ffolder[%40name%3d%27Enrollment%27]%2freport[%40name%3d%27ENR0027-Headcount+Enrollment+by+Program+Code%2c+Institution+and+Degree+Level%27]&ui.name=ENR0027-Headcount%20Enrollment%20by%20Program%20Code,%20Institution%20and%20Degree%20Level&run.outputFormat=HTML&p_Param_Rep%20Year=2010&run.prompt=false

then select reporting year=2010, institution type=public, and CIP Program=6-Digit CIP Program). It is anticipated that once the degree is implemented, a bulk of the total enrollment projections will be from new enrollments to USCB. Credit hour calculations are based on 15 hours for fall and spring semesters.

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. In Fall 2011, the Biology program (CIP code 260101) , initiated in 2007, enrolled 173 majors and the Computational Science program (CIP code 303001) whose first cohort will graduate in 2014, enrolled 30 majors (web:

https://info.che.sc.gov/reports/cgi-bin/cognosisapi.dll?b_action=cognosViewer&ui.action=run&ui.object=%2fcontent%2ffolder[%40name%3d%27Reports%27]%2ffolder[%40name%3d%27Enrollment%27]%2freport[%40name%3d%27ENR0027-Headcount+Enrollment+by+Program+Code%2c+Institution+and+Degree+Level%27]&ui.name=ENR0027-Headcount%20Enrollment%20by%20Program%20Code,%20Institution%20and%20Degree%20Level&run.outputFormat=HTML&p_Param_Rep%20Year=2011&run.prompt=false then select report year 2011, institution type=public, CIP program=2-Deigit CIP Program). Students in the local 4-county region of the state wishing to major in other STEM fields in SC are limited without relocating 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 SC as well as those whom seek mathematically intensive careers or further education within SC or in the national arena.

b) number of new students and transfers from other degree programs:

The footnotes in Table 5 describe how the projections were made. USCB currently has a substantial pool of "undeclared" students. The modest projections above include only attracting four of these students each year.

8. Curriculum

A "C" or better is required in all courses in Sections II and III below (excluding General Education (GE) electives as allowed by the GE curriculum) (Courses numbered 300 and below comprised in Sections II and III constitute the Pre-professional courses for students in the Secondary Mathematics Certification track).

Table 6.

I. USCB General Education Requirements (Secondary Mathematics Certification track requires COMM 140: Public Communication or COMM 230: Business and Professional Speaking)		27-37
II. Program Requirements		10
STAT B340	Introduction to Probability and Statistics	3
CSCI B102, B104, or B145	(Programming and Algorithmic Design)	3
PHYS B211, B211L	Essentials of Physics I with Laboratory	4
III. Core Major Requirements ("C" or better required)		33
MATH B141, B142, B240	Calculus I, II, III	12
MATH B174	Discrete Mathematics	3
MATH B230	Linear Algebra	3
MATH B242	Differential Equations	3

*MATH B300	Introduction to Proof	3
*MATH B360	History of Mathematics	3
*MATH B390	Modern Geometry	3
*MATH B410	Abstract Algebra I	3
III A. Major Requirements - Mathematical Sciences Track		18
*MATH B450	Analysis I	3
*MATH B411 or MATH B451	Abstract Algebra II or Analysis II	3
*MATH B480	Senior Seminar	3
*Nine additional MATH hours at 300+ level		9
Electives		22-32
Total Hours Required		120
III B. Major Requirements – Secondary Mathematics Certification Track		44
MATH B419	Mathematical Modeling	3
*MATH B421	Mathematics for Secondary Teachers	3
EDFO B321	Foundations of American Education	3
EDPY B335	Introduction to Educational Psychology	3
EDEX B300	Introduction to Exceptional Learner	3
EDCI B210	Observation and Analysis	3
EDCI B243	Technology Resources for Teaching	3
EDCI B441	Organization and Management in the Diverse Classroom	3
*EDME B430	Teaching Mathematics in the Secondary School	3
*EDME B430P	Practicum in Teaching Mathematics in Secondary School	2
*EDME B476	Senior Seminar in Secondary Mathematics Education	3
*EDME B469	Internship in Secondary Mathematics Education	12
Electives		0-6
Total Hours Required		120

**Hours for General Education are reduced appropriately by degree program requirements*

b. List of all new (program) courses to be added within 5 years (anticipated)

MATH B300: Introduction to Proof- (3) (Prereq: MATH B240 or consent) Introduction to proof techniques (including quantifiers and induction) with emphasis on developing abilities in construction of and writing proofs; elementary logic, set theory, functions and relations, and selected topics in major areas of mathematics.

MATH B330: Combinatorics- (3) (prereq: MATH B300) Counting principles and techniques, permutations, combinations, derangements, pigeonhole principle, partitions, generating functions, recurrence relations.

MATH B350: Intermediate Analysis- (3) (Prereq: MATH B300) Properties of the real numbers, continuous functions, differentiable functions, infinite series, and the topology of the real numbers.

MATH B360: History of Mathematics- (3) (Prereq: MATH B300 or consent) A survey of the historical development of mathematics.

MATH B370: Number Theory- (3) (Prereq: MATH B300) An introductory course in number theory. Divisibility, prime numbers, congruencies, linear and nonlinear Diophantine equations, quadratic residues, number-theoretic functions.

MATH B380: Functions of a Complex Variable- (3) (Prereq: MATH B300) Complex numbers, elementary functions and transformations, differentiation, analytic functions, integration Theory, series, residue theory, conformal mapping and applications.

MATH B390: Modern Geometry- (3) (Prereq: MATH B300) An axiomatic approach to the fundamental ideas of Euclidean and non-Euclidean geometries.

MATH B410: Abstract Algebra I- (3) (Prereq: MATH B300) An introduction to the theory of groups, rings and fields. Topics include normal subgroups, quotient groups, homomorphisms, Cayley's theorem, permutation groups, ideals, the field of quotients of an integral domain, and polynomial rings.

MATH B411: Abstract Algebra II- (3) (Prereq: MATH B410) A continuation of MATH B410 including additional topics in group theory and ring theory, extension fields, straight-edge and compass constructions, Galois Theory, and solvability by radicals.

MATH B421: Mathematics for Secondary Teachers- (3) (Prereq: Acceptance into Mathematics-Teaching Certificate track, and, Senior Standing or consent) Survey of properties and algebra of real numbers and complex numbers; properties and representations of polynomial, rational, exponential, logarithmic, trigonometric functions; concepts of calculus including limits, derivatives, integrals. Euclidean and non-Euclidean geometries, including analytic geometry; concepts and applications of probability and data analysis; concepts and applications of discrete mathematics, including number theory.

MATH B450: Analysis I- (3) (Prereq: MATH B300) A rigorous treatment of topics in the theory of functions of a real variable. Topics include properties of the real numbers, convergence, sequences and series, continuity, uniform continuity, sequences of functions, differentiation, and the Riemann integral.

MATH B451: Analysis II- (3) (Prereq: MATH B450) A continuation of MATH B450; further development of the theory of real functions, including functions of several variables, metric spaces, function spaces, Riemann-Stieltjes integrals.

MATH B480: Senior Seminar- (3) (Prereq: Consent of Instructor) Oral presentations on topics in mathematics, including current mathematics literature. EDME B430: Teaching Mathematics in the Secondary School

EDME B430: Teaching Mathematics in the Secondary School-(3) (Prereq: consent of department chair; Coreq: EDME B430P) This methods course includes the basic content of the academic area of mathematics to be presented in secondary education. Developmentally appropriate experiences, learning activities, materials and equipment to aid in the development of mathematical concepts are presented. Diversity-related influences and needs of exceptional learners are also addressed.

EDME B430P: Practicum in Teaching Mathematics in the Secondary School- (2) (Coreq: EDME B430) Supervised clinical experience in a secondary mathematics setting. Observation and

participation in a classroom setting is required with a focus on mathematical learning experiences, materials and equipment. Seminar and group discussions are included.

EDME B469: Internship in Secondary Mathematics Education- (12) (Prereq: Consent) A program of observation and teaching secondary mathematics in the public schools under the supervision of university and public school personnel.

EDME B476: Senior Seminar in Secondary Mathematics Education- (3) (Prereq: Consent) The synthesis and critical evaluation of professional studies in secondary mathematics education.

9. Assessment

a) the assessments of student learning outcomes that will be used:

Student achievement in the Mathematics program will be measured in a number of ways using both direct and indirect assessment methods. These methods will be used to measure achievement of student learning outcomes. Many of the same assessment tools in other science disciplines at USCB will be used in the proposed Mathematics program. Measurable assessments may include:

1. Direct assessment methods of how well students have met learning outcomes will be performed primarily through the review of assessment tools from individual courses. Course assessment tools include graded homework, quizzes, exams, final exams, project evaluations, portfolio reviews, research/expository papers, and simulations.

- Students in the program must maintain a GPA of 2.0 or higher to remain in good academic standing.
- Semester and annual reviews of students' academic progress, which include course theory, assignments, and projects.

2. Indirect assessment methods, which include focus groups, exit and other interviews, graduation rates, transfer rates, written surveys and questionnaires to include student perception, alumni perception, internship perception, employer perceptions, the Rising Junior Survey, graduating student survey and alumni surveys will be used to assess student learning outcomes.

- Student satisfaction with the program will be surveyed every semester.
- Upon graduation from USCB, students will be tracked in terms of the rate of acceptance to related graduate programs, the successfulness in obtaining (or enhancing) employment, and the number of students pursuing and succeeding, as well as success rates on the Praxis II Mathematics: Content Knowledge for those in the Secondary Mathematics Certification track. Much more information regarding assessment for students in the Secondary Mathematics Certification track is included under item 17 of this proposal.

b) the plan for programmatic assessment and program learning outcomes:

The Department and University acknowledges that program evaluation is an important aspect of their ability to communicate to various constituencies that academic programs are strong, relevant to the mission, continuously improving, and performing at a level worthy of institutional, state and regional support. In 2003, the University implemented an Institutional Effectiveness & Strategic Planning Framework (IESPF) that includes a series of activities and a timeline to ensure a continuous planning process and a feedback loop in regard to the desired outcomes of its educational programs and its academic and educational support services.

All academic programs are reviewed internally using USCB's annual Institutional Effectiveness and Outcomes Assessment (IE-OA) process where program objectives and student learning outcomes are assessed and results used for program improvement. All academic programs draft annual IE-OA Plans and Close-out Reports that are used to articulate their purposes, goals, student learning outcomes, program objectives and action plans with budget implications for the coming year. Close-out reports are due at the end of each academic year and include findings based on assessment activities. The

reports are reviewed by the Institutional Effectiveness Council and a final report is sent to the Chancellor, Administrative Council, and Budget Committee for review.

In addition, USCB faculty developed an Academic Program Review process with guidelines and a timeline for university-wide internal assessment of programs. The Academic Program Review Committee (APRC) reviews and analyzes each academic program's Program Review Report (self-study). The APRC meets with the Department Chair to discuss the report. Final comments are submitted by the Chair of the APRC to the Department Chair and the Chair of the Institutional Effectiveness Council (IE). The IE Council reviews all final reports. The Chair of the IE Council submits a summary with recommendations and concerns to the Department Chair and the Chancellor. Recently, the USC Board of Trustees developed a program review plan that will commence in May 2014. Lastly, students are afforded the opportunity to evaluate the course and course instructor both qualitatively and quantitatively each semester. Faculty and their Department Chair are given access to collated data in order to assess the strengths and weaknesses of the course both in terms of course content and teaching approach. Department Chairs are also tasked with evaluating faculty in the classroom in order to determine whether the instructor's approach is apt to meet the courses learning objectives as specifically stated in the syllabi. After the in-class evaluation, the Department Chair meets with the instructor to offer feedback and discuss continuous improvement strategies.

Commencing with the first class of graduates from the B.S. in Mathematics degree program, the Department of Mathematics and Computational Science in collaboration with the Director of Career Services will develop, administer, and evaluate surveys to gauge graduate employment rates, student satisfaction, successful admission to graduate school, and employer satisfaction. Feedback from the surveys will be used to make program improvements. Lastly, an external advisory board will be developed to provide guidance in program development and improvement, to include ways to enhance USCB's service to public, private, and non-profit sectors and impart a competitive advantage to the state of SC.
Note that accreditation from the Council for the Accreditation of Educator Preparation (CAEP), formerly NCATE, will be sought for the Secondary Mathematics Certification track. Detailed information on key outcomes/assessments is provided in section 17. b. IV. *SPA or Other National Specialized and/or Professional Association Standards* of this proposal. These outcomes/assessments are aligned with the appropriate Specialized Accreditation Agency (National Council of Teachers of Mathematics (NCTM).

c) how program evaluation and student performance assessment data will be used to initiate changes to the program:
In the proposed program, student progress and performance will be monitored on a continuing basis by departmental faculty. USCB will routinely review feedback from the previously mentioned assessments and revise policies, curriculum and recruitment and retention efforts accordingly. The program will be reviewed using USCB's annual IE-OA process where program objectives and student learning outcomes are assessed annually and results used for program improvement.

10. Faculty
a) Faculty List Table

Table 7.

Faculty			
Faculty	**Highest Degree**	**Field of Study**	**Teaching in Field**
Associate Professor 1	Ph.D.	Mathematics	Yes
Associate Professor 2	Ph.D.	Mathematics	Yes
Assistant Professor 3	Ph.D.	Mathematics	Yes
Assistant Professor 4	Ph.D.	Mathematics	Yes

Assistant/Associate Professor 5	Ph.D./Ed.D.	Mathematics Education	TBA
Assistant/Associate Professor 6	Ph.D./Ed.D.	Sec Ed Mathematics Education	TBA
Instructor 1	M.A.	Mathematics	Yes
Instructor 2	M.S.	Mathematics	Yes
Instructor 3	TBA	Mathematics/Mathematics Education	TBA

a) qualifications of new faculty and staff:

There will be three new faculty hires for the program. Assistant/Associate Professor 5 will be hired in 2014-2015, Assistant/Associate Professor 6 will be hired 2015-2016, and Instructor 3 will be hired in 2016-2017. As the program grows, adjunct and full-time faculty will be added. Some program requirement courses and elective options are not reflected in Table 7 and will be taught by qualified, existing full-time faculty in other disciplines (e.g. Physics and Speech). All new adjunct and instructor hires will have, at a minimum, a Master's degree in mathematics or a closely related field. Tenure-track faculty will be terminally degreed.

b) changes in assignment for currently-employed faculty and administrators:

A Program Coordinator, reporting to the Chair of the Department of Mathematics and Computational Science, will be appointed to manage the day-to-day operations of the degree program and serve as a liaison with the Department of Education. The Program Coordinator will serve in a ¼ administration and ¾ teaching role.

b) the plan for faculty development:

The current faculty development plan is outlined in the USCB Faculty Manual. Professional development funds are available for faculty members each academic year, budget permitting. There is also a pool of competitive professional development funds available. Assignments such as teaching loads and other university service requirements for faculty will be allocated as necessary to ensure that the Program Coordinator has sufficient time for curriculum development, assessment, and scholarship.

e) the institutional definition of full-time equivalent (FTE):

Full-time faculty members in mathematics are defined as those teaching at **least 12 hours during** fall semester and, additionally, 12 hours during spring semester subject to reductions for administrative or other purposes. To determine full-time equivalents, the total number of course hours taught each semester is divided by 12 hours for the fall semester and 12 hours for spring semester, resulting in FTEs for each of these semesters. For an annual FTE, the total course hours for fall and spring semesters are added together and then divided by 24.

f) unit administration, faculty, and staff support:

Table 8 – Unit Administration, Faculty & Staff Support

Unit Administration, Faculty, and Staff Support						
Year	**New**		**Existing**		**Total**	
	Headcount	FTE	Headcount	FTE	Headcount	FTE
Administration						
2014 - 15	1	.25	0	0	1	.25
2015 - 16	0	0	1	.25	1	.25
2016 - 17	0	0	1	.25	1	.25
2017 - 18	0	0	1	.25	1	.25
2018 - 19	0	0	1	.25	1	.25
Faculty						
2014 - 15	1	.5	7	5.25	8	5.75
2015 - 16	1	.75	8	5.75	9	6.5
2016 - 17	1	.75	9	6.5	9	7.25
2017 - 18	0	0	10	7.25	10	7.25
2018 - 19	0	0	10	7.25	10	7.25
Staff						
2014 - 15	0	0	1	.16	1	.16
2015 - 16	0	0	1	.16	1	.16
2016 - 17	0	0	1	.16	1	.16
2017 - 18	0	0	1	.16	1	.16
2018 - 19	0	0	1	.16	1	.16
TOTAL	3	2.25	11	7.66	11	7.66

11. Physical Plant

a) physical plant adequacy for the first five years:

The physical plant will be adequate for the proposed program for at least the first five years. USCB presently has two campus sites, the HB Campus and the HHG Campus. Each campus has fully equipped smart classrooms and computer and science laboratories.

b) additional physical plant requirements:

Current infrastructure is adequate for the proposed program. No additional physical plant requirements or modifications to existing facilities are expected for program implementation.

12. Equipment

a) major equipment items which will be needed for the first five years

While technological resources such as Interactive White Boards available to the Early Childhood 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 Secondary Mathematics Certification graduates. No other major equipment expenditures are anticipated for the proposed program.

13. Library Resources

a) A qualitative and quantitative (i.e., number of monographs, number of serials, etc.) assessment of current holdings in view of the new program being proposed:

Quantitatively, USCB's students have access to a rich array of resources, including 91,000+ books on campus, plus 200,000+ E-books, subscriptions to over 100 databases and the availability of 200,000+ online journals in all discipline areas. In the subject area of Mathematics specifically, USCB has over 4,600 monograph titles available relating to the proposed degree tracks, Mathematical Sciences and Secondary Mathematics Certification. Also through comprehensive interlibrary loan services and delivery systems through regional consortia, USCB students have access to rich resources available nationwide. In SC alone, by being a member of PASCAL, students and faculty have access to over 9 million books and other academic materials. USCB also is a member of KUDZU, a group of 17 southeastern university research libraries that shares resources among its members.

Qualitatively, the USCB Library subscribes to "Bowker's Book Analysis System, an online quality assessment tool that allows USCB to compare its library collection to *Resources for College Libraries* (RCL), the premier core list for academic libraries. Two subject specific analyses were performed comparing RCL's recommended core titles to the USCB library collection (2013). The first was a comparison using the subject term "Mathematics" from the RCL classification system. The results indicate that USCB owns 13.6% of the recommended titles in this subject area. The second comparison was performed using the Library of Congress classification system which is more inclusive in nature in regard to the subject term "Mathematics," and therefore resulted in more titles overall with percentages remaining the same. Data for both analyses are included in the chart below.

Table 9.

USCB Collection Analysis – Mathematics				
Classification/Term	**Owned and in RCL**	**Percent Owned**	**In RCL, Not Owned**	**Total**
RCL - Mathematics	105	13.6%	668	773
LC – Mathematics (QA1 – QA)	134	13.6%	856	990

An even more detailed title breakdown of the collection analysis has been made available to the faculty. This will allow the university to select for purchase those books that will directly support the proposed program. Acquiring more of the recommended titles will insure that the base collection can adequately support the academic aspirations of our students. In addition to the monograph collection, the USCB Library provides access to all four basic Mathematics research journals recommended specifically for academic libraries by Magazines for Libraries, 21th ed. (2013), as well as, full or partial[i] access to 27 of the 37 general Mathematics journals recommended for libraries. The USCB Library also provides access to MathSciNet, the sole basic abstract/indexing service recommended for Mathematics.

b) A quantitative estimate of independent acquisitions needed annually for at least the first three years for associate degree programs and for the first five years for all other degree programs and the estimated additional cost of these acquisitions:

USCB's annual "library materials budget" is slightly over $200,000. Each degree program at USCB has an annual base budget of $8,000. With a per-book cost approximating $61, the university will be able to add around 131 books per annum to support the Mathematics program.

c) A description of how the statewide higher education electronic library (PASCAL) impacts the proposed program (include both PASCAL's universal borrowing and electronic databases). PASCAL should be included as part of the library's resource base when making calculations of need for library resources for a new program and should be noted in the proposal narrative. Although PASCAL brings substantial resources to bear, it does not obviate the need or desirability of additional library resources for a new program.

The USCB Library benefits greatly by PASCAL's aforementioned universal borrowing services and electronic databases, as well as, DISCUS resources available through the State Library. USCB has borrowed hundreds of books through PASCAL's universal borrowing services this year alone. Of particular importance are the highly specialized research monographs essential to faculty research and teaching; this service will undoubtedly be an important source for obtaining specialized materials central to the Mathematics degree. The USCB Library also takes advantage of PASCAL's database package offers that allow for customizing electronic resources according to curricula needs and provides USCB with advantages through central licensing, improved user agreements, and essential pecuniary benefits.

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[1] Access to current content is limited by publisher's moving wall of five years through the JSTOR database, however, Magazines for Libraries highlights the importance of longevity to mathematical papers and published proofs, and states, "Access to mathematical articles even over 100 years old is still vital to current research...Rarely is publication speed a concern among mathematicians, but rather, rigorous review of the work is most important."

14. Accreditation, Approval, Licensure, or Certification

a) a brief description of the accreditation or approval process:

Upon SC CHE approval, USCB will seek accreditation from CAEP using the NCTM (2012-approved) standards. Planning this process will be initiated in 2015-2016 as the program begins its first full academic year. USCB will request CAEP approval after documenting 10 program completers as per NCTM guidelines.

b) licensure or certification process and how the program will ensure that such certification or licensure can reasonably be expected to be achieved:

The proposed Mathematics program with track leading to secondary certification addresses the requirements of the National Council of Teachers of Mathematics (NCTM) standards as well as the South Carolina Department of Education Standards. Please refer to Parts III and IV of this proposal for detailed information.

15. Articulation

This section must describe the institution's efforts to link the proposed program to similar programs offered by other institutions in the state.

a) **NA**
b) **Proposed baccalaureate-level programs should show an entry path for students from two-year institutions, as appropriate.**

USCB has already established the PASSPORT program with the Technical College of the Lowcountry (TCL) to plan for optimal transition of TCL graduates into USCB. Once the Mathematics degree program has been approved by the SC CHE and SACS, USCB will work with TCL and other two-year colleges on articulation agreements to build a path for graduates to gain entrance to USCB.

USCB and USC Salkehatchie established a collaborative program combining the strengths of a regional and four-year campus in the University of South Carolina system and engaging in best practices for increasing student academic success by participation in a learning community. The Sand Shark Scholars Program is an exciting new one-year residential program offered jointly by Beaufort

and Salkehatchie. Students selected to participate in this program will matriculate as a cohort, enrolling in USC Salkehatchie classes on the USCB campus during their freshmen year with the aim of transitioning to sophomore status as a USCB student. Designed for a select group of freshmen, this program provides first-time college students with comprehensive support from both institutions; it offers affordability, access, and the eventual opportunity to enroll at USCB. During this time, they will receive hands-on guidance to help them adjust to college, get involved with campus life and be successful in the classroom. The Sand Shark Scholars Program welcomed its first group of participants in fall 2013.

For ease of transfer, the Statewide Articulation Agreement of 86 courses approved by the SCCHE for transfer from two-to-four-year public institutions is applicable to all public institutions, including two-year institutions and institutions within the same system. This list of courses is available on the SCCHE and SC TRAC websites. Additionally, coursework (i.e., individual courses, transfer blocks, and statewide agreements) covered within this transfer policy will be transferable if the student has completed the coursework with a "C" grade (2.0 on a 4.0 scale) or above.

c) The institution should state if the proposed program leads to a degree that is normally considered to be a terminal degree.

The B.S. in Mathematics with tracks in Mathematical Sciences and Teacher Certification is not considered a terminal degree.

d) Institutions should highlight collaboration with other state institutions. If the collaboration requires an MOU, a signed copy of the MOU must be provided.

USCB has already established the Passport (Appendix A) program with the Technical College of the Lowcountry (TCL) to plan for optimal transition of TCL graduates into USCB. The Sand Shark Scholars Program (Appendix B) is a one-year residential program offered jointly by USCB and USC Salkehatchie. The Sand Shark Scholars Program is an academic transfer program that targets academic advising, student support services and a student life component — all of which are designed to help students succeed in meeting academic requirements for transferring to USCB. USCB has a history of collaboration with other state institutions in numerous areas. USCB intends to work closely with USC Columbia and other institutions to ensure that USCB students are properly advised and prepared for graduate studies in fields related to Mathematical Sciences and Mathematics Education should they choose to do so.

e) inter-institutional collaboration:

See previous response

f) If an institution cannot provide articulation agreements or demonstrate inter-institutional collaboration, an explanation should be provided. Institutions are encouraged to review the State Policy on Transfer, available on the Commission's website and on the South Carolina Transfer and Articulation Center at www.sctrac.org.

USCB abides by the intent and provisions of the State Policy on Transfer, available on the SCCHE and SC TRAC websites.

16. Estimated Costs and Sources of Financing by Year

a) See Table 10

Table 10

Estimated Costs By Year						
CATEGORY	**1st**	**2nd**	**3rd**	**4th**	**5th**	**TOTALS**
Program Administration	19,500	19,500	19,500	19,500	19,500	97,500
Faculty Salaries	59,400	125,400	178,200	178,200	178,200	719,400
Graduate Assistants	NA	NA	NA	NA	NA	NA
Clerical/Support Personnel	6,667	6,667	6,667	6,667	6,667	33,333
Supplies and Materials	2,500	5,000	5,000	5,000	5,000	22,500
Library Resources	4,000	8,000	8,000	8,000	8,000	36,000
Equipment	0	0	0	0	0	0
Facilities	0	0	0	0	0	0
Other (Identify)	0	0	0	0	0	0
Totals	92,067	164,567	217,367	217,367	217,367	908,733
Sources Of Financing By Year						
Tuition Funding	$90,168	$180,336	$270,504	$308,074	$323,102	1,172,184
Program-Specific Fees	1,800	2,100	2,100	2,100	2,100	10,200
State Funding	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 (Specify)	0	0	0	0	0	0
Totals	$91,968	$182,436	$272,604	$310,174	$325,202	1,182,384

b) the estimated number of students, both in-state and out-of-state:
Assumes all students are in-state.

c) whether or not any unique cost or state appropriations will be requested:
There are no plans to request "unique cost" or other special state appropriations.

d) how estimated program costs will be financed:
All funds to be generated through tuition and fees.

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17. Programs for Teachers and Other School Professionals

a. South Carolina Department of Education Requirements

Items I and II of the *South Carolina Department of Education New or Modified Program Proposal Guidelines for Educator Preparation Programs for Public and Private Institutions of Higher Education* are addressed by the CHE New Program Proposal items identified in 1-16 above.

III. South Carolina Department of Education Requirements

Description of how and when the new program will meet all state requirements as outlined in the *Policy Guidelines for South Carolina Educator Preparation Units*, (http://www.scteachers.org/educate/edpdf/boardpolicy.pdf) including the following:

A. ADEPT (http://www.scteachers.org/Adept/ihe.cfm)

The Unit's assessment system for initial educator preparation programs effectively incorporates the ADEPT system. The infusion of the ADEPT competencies into the undergraduate program can be viewed in the following table:

ADEPT Performance Dimension	Course Where Addressed	Assignment/Task Addressing the APS
Introduction to ADEPT Evaluation	EDCI B210 Observation and Analysis	ADEPT APS 1-10 Orientation provided by certified ADEPT trainer
APS 1 Long-Range Planning	EDME B469 Internship in Secondary Mathematics Education	APS 1: Long-Range Planning (LRP) Rubric
APS 2 Short-Range Planning	EDCI B243 Technology Resources for Teachers	Smart Notebook Lesson
	EDME B430 Practicum in Teaching Mathematics in the Secondary School	Practicum Midterm and Final Evaluation Rubric (Domain 1)
	EDME B469 Internship in Secondary Mathematics Education	Internship Midterm and Final Evaluation (SRP) Teacher Work Sample (TWS)
APS 3 Planning Assessments and Using Data	EDME B469 Internship in Secondary Mathematics Education	Internship Midterm and Final Evaluation
APS 4 Establishing and Maintaining High Expectations for Learning	EDCI B243 Technology Resources for Teachers	Smart Notebook Lesson
	EDME B469 Internship in Secondary Mathematics Education	Practicum Midterm and Final Evaluation Rubric
	EDME B469 Internship in Secondary Mathematics Education	Internship Midterm and Final Evaluation
APS 5 Using Instructional Strategies to Facilitate Learning	EDCI B210 Observation and Analysis	Observation Notebook
	EDCI B243 Technology Resources for Teachers	Interactive Whiteboard lesson
	EDME B430 Practicum in Teaching Mathematics in the Secondary School	Practicum Midterm and Final Evaluation Rubric
	EDME B469 Internship in Secondary Mathematics Education	Internship Midterm and Final Evaluation
APS 6 Providing Content for Learners	EDME B469 Internship in Secondary Mathematics Education	Internship Midterm and Final Evaluation Teacher Work Sample (TWS)

APS 7 Monitoring and Enhancing Learning	EDME B469 Internship in Secondary Mathematics Education	Internship Midterm and Final Evaluation Teacher Work Sample (TWS)
APS 8 Maintaining an Environment that Promotes Learning	EDCI B441 Organization and Management in the Diverse Classroom	Classroom Management Plan (CMP) Rubric
	EDME B469 Internship in Secondary Mathematics Education	Internship Midterm and Final Evaluation
APS 9 Managing the Classroom	EDCI B441 Organization and Management in the Diverse Classroom	Classroom Management Plan (CMP) Rubric
APS 10 Fulfilling Professional Responsibilities	EDME B430 Practicum in Teaching Mathematics in the Secondary School	Practicum Midterm and Final Evaluation Rubric
	EDME B469 Internship in Secondary Mathematics Education	Internship Midterm and Final Evaluation APS 10: Fulfilling Professional Responsibilities Rubric

The Unit is effectively implementing the ADEPT system in field and clinical experiences. ADEPT Standards are integrated in the practica for all initial programs through use of the following assessments:
USCB Formative Observation Form (Practicum)
Secondary Mathematics Education Practicum Midterm/Final Evaluation Report
Secondary Mathematics Education Practicum Midterm/Final Evaluation Report Rubric

ADEPT Standards are integrated into the clinical experience (internship) for all initial programs

through the use of the following assessments:

USCB Formative Observation Form (Internship)
Secondary Mathematics Education Internship Midterm/Final Evaluation Report
Secondary Mathematics Education Internship Midterm/Final Evaluation Report Rubric
Teacher Work Sample (TWS) Description
Teacher Work Sample (TWS) Rubric
ADEPT APS 1: Long Range-Plan Template
ADEPT APS1: Long-Range Plan Rubric
ADEPT APS 10: Fulfilling Professional Responsibilities Form
ADEPT APS 10: Fulfilling Professional Responsibilities Rubric

ADEPT Performance Standards (APSs)

- All required lesson and unit plans submitted to LiveText by teaching candidates and the intern are developed to align with the Common Core State and South Carolina Academic Curriculum Standards.
- The Teacher Work Sample (TWS) submitted to LiveText by the intern is aligned with ADEPT Performance Standards 1-10. The TWS is assessed by the University Supervisor and data is entered into LiveText using the Teacher Work Sample Rubric.

- The USCB Formative Evaluation Form for APS Standards 1-10 is submitted electronically from teachers and supervisors to LiveText. Data will be downloaded to Excel® spreadsheets to more easily aggregate and summarize data. Cooperating Teachers and University Supervisors enter their own USCB Formative Evaluation Form data electronically into LiveText.
- The Secondary Mathematics Practicum Midterm/Final Evaluation Report Rubrics and Secondary Mathematics Internship Midterm/Final Evaluation Report Rubrics align with APS Standards 1-10. Cooperating teachers and University Supervisors work in tandem to evaluate the teacher candidate. The University Supervisor enters data in LiveText using the Secondary Mathematics Practicum and Secondary Mathematics Internship Evaluation Report Rubrics.

Clinical Practice: Formal Assessments and Assistance

- University supervisors will meet with clinical interns a minimum of six times in accordance with state guidelines. The university supervisor's initial visit is required to occur during the first 5 days of the intern placement.
- Formal Observations: University Supervisors will conduct three formal observations of the candidate and the cooperating teacher will conduct three formal observations.
- Self-evaluation and video analysis on ADEPT Key Elements (APS 4-9): In order to prepare candidates who are reflective and assist candidates for formal evaluation in the field with SAFE-T, USCB requires a video analysis and self-evaluation of pedagogical skills for at least one lesson during the clinical experience. This evaluation will be collected using the LiveText Lesson Plan Form in order to electronically manage the data.

Clinical Experiences will include a minimum of the following:
Candidate Orientation

- Review of updated *USCB Department of Education Clinical Internship Handbook* with all required forms, responsibilities, and requirements

Cooperating Teacher Orientation

- Review of updated *USCB Department of Education Clinical Internship Handbook* with all required forms, responsibilities, and requirements

University Supervisor Orientation

- Review of updated *USCB Department of Education Clinical Internship Handbook* with all required forms, responsibilities, and requirements

B. PADEPP (Applicable to Educational Leadership Programs Only) - N/A
(http://www.scteachers.org/leadership/principalperformance.cfm)

C. Education Economic Development Act (EEDA)
(http://www.scteachers.org/educate/edpdf/PerformancebasedStandards.pdf)

Candidates in teacher educator preparation programs have the knowledge, skills, and dispositions to achieve the EEDA performance standards for teacher education programs.
EEDA competencies are assessed across courses in the initial preparation program. The EEDA Unit Assessment for the Undergraduate Teacher Education Program Matrix below shows the coverage of standards and assessments across the program.

EEDA Performance Standard	ACTIVITY/COURSE in Curriculum Where Addressed	ASSESSMENT
Standard 1: Career Guidance	EDME B476 Senior Seminar in Secondary Mathematics Education	Pre-Post Assessment
Standard 2: Career Clusters and Individual Graduation Plan	EDME B476 Senior Seminar in Secondary Mathematics Education	Pre-Post Assessment
Standard 3: Career Guidance Model	EDFO B321 Foundations in American Education	Educational Philosophy Paper/ Presentation
	EDME B476 Senior Seminar in Secondary Mathematics Education	Pre-Post Assessment
Standard 4: Character Education	EDFO B321 Foundations in American Education	Educational Philosophy Paper/ Presentation
	EDCI B441 Organization and Management in the Diverse Classroom	Test rubric
Standard 5: Contextual Teaching	EDCI B210 Observation and Analysis	Teacher Dispositions Rubric
	Professional Program Admission Application	Teacher Dispositions Rubric
	EDME B469 Internship in Secondary Mathematics Education	Teacher Work Sample Rubric
Standard 6: Cooperative Learning	EDME B430 Teaching Mathematics in the Secondary School	Lesson Plan Rubric
	EDME B469 Internship in Secondary Mathematics Education	Internship Midterm and Final Evaluation Rubric Teacher Work Sample Rubric
Standard 7: Accommodating Diverse Learning Styles	EDME B430 Teaching Mathematics in the Secondary School	Lesson Plan Rubric
	EDME B469 Internship in Secondary Mathematics Education	Internship Midterm and Final Evaluation Rubric Teacher Work Sample Rubric

The majority of the assignments for EEDA will be new.

D. South Carolina Standards of Conduct
(http://ed.sc.gov/agency/se/Educator-Certification-Recruitment-and Preparation/Certification/documents/standardsofconduct.pdf)

Candidates are informed in writing of the state Standards of Conduct (59-25-160; 59-25-530; 63-17-

1060) required for initial certification. All initial licensure candidates attend a mandatory Education Majors Orientation session on admission to the professional education unit. The South Carolina Code of Conduct is addressed during this session and the Code of Conduct Handout is reviewed with candidates. The Code of Conduct Handout will also be provided to candidates in hardcopy format two times during their program. First, the document is distributed to students in EDCI B210 – Observation and Analysis, the program introductory course. All students must complete a Student Contract Acknowledging Receipt of Code of Conduct. In addition, the Code of Conduct Handout is also given to candidates in EDME B476 – Senior Seminar in Secondary Mathematics Education that accompanies the candidates' internship.

E. South Carolina Safe School Climate Act
(http://www.scteachers.org/Educate/edpdf/climateact.pdf)
Candidates in all initial certification programs have the knowledge, skills and dispositions to identify and prevent bullying, harassment, and intimidation in schools. After classroom instruction on the Safe School Climate Act, all candidates in initial programs will demonstrate knowledge and skills related to this act through completion of various assessments as noted in the table below:

South Carolina Safe School Climate Act	
Activity/Course in Curriculum Where Addressed	**Assessment**
EDPY B335 Introduction to Educational Psychology	Bullying Awareness Quiz
EDCI B441 Organization and Management in the Diverse Classroom.	Bullying Reflection (Blackboard Online Threaded Discussion) Classroom Management Plan Rubric
EDME B430 Teaching Mathematics in the Secondary School	Bullying Reflection Rubric

The majority of the assignments noted above will be new. However, the Bullying Awareness Quiz given in EDPY B335: Introduction to Educational Psychology will remain the same.

F. P-12 Academic Standards

(https://www.ed.sc.gov/agency/standards-and-learning/academic-standards/) *Candidates in all certification programs know, understand, and can apply Common Core State and South Carolina P-12 Academic Curriculum Standards in the area in which they seek certification.* Candidates in all programs align their lessons with the *Common Core State and South Carolina P-12 Academic Curriculum Standards* for their certification area.
The Lesson Plan Template demonstrates this alignment. In addition, all interns are required to include *Common Core State and South Carolina P-12 Academic Curriculum Standards* in their TWS instructional plan and lesson plans. See TWS Dimension 2 Description.

G. Admission Requirements (Assurance of Compliance)
Candidates admitted to initial educator preparation programs demonstrate basic academic proficiencies by meeting the standards set by the State Board of Education on Praxis™ *Core Academic Skills for Educators tests or on the SAT or ACT.* All students seeking to complete the Secondary Mathematics Certification track in the program must meet all admission requirements and be formally admitted before they are allowed to enroll in restricted professional courses.

Students must fulfill USCB admissions requirements to enroll in general education or program specific courses. Applicants who have earned a 2.0 cumulative GPA on the defined preparatory units and who score 800 on the SAT or 17 on the ACT may be admitted to USCB.

Transfer students are required to have a 2.0 cumulative GPA in all previous college-level work. They must also be in good standing and eligible to return to the institution last attended.

There are admission criteria specific to this program. Application for admission into the Secondary Mathematics Certification track must be submitted to the Mathematics Teacher Education Committee (consisting of at least three tenured/tenure-eligible mathematics faculty members along with an additional tenured/tenure-eligible education faculty member). The student must have completed at least 45 hours of undergraduate credit together with the following conditions (as well as other USCB academic requirements):

- A cumulative Grade Point Average (GPA) of at least 2.75 in all undergraduate course work
- Completion of all Pre-Professional courses with a minimum GPA of 3.0 and a "C" or better in each course
- Grade of "C" or better in a performance-based speech course- SPCH 140: Public Communication or SPCH 230: Business and Professional Speaking
- Passing scores on all three sections of *Praxis™ Core Academic Skills for Educators* tests. Official scores must be submitted to and received by the Department of Mathematics and Computational Science.
- Attendance at the Secondary-Mathematics-Certification Orientation Session
- Criminal Background Check and Full Disclosure Statement from the State Law Enforcement Division (SLED)
- Successfully complete Professional Program Interview and Disposition Statement
- Approval by the Mathematics Teacher Education Committee

Curricula designated as professional education courses are limited to students who have been formally accepted into USCB's Bachelor of Science in Mathematics program- Secondary Mathematics Certification track.

NOTE: Faculty advisors meet with candidates at least twice every academic year to assure that candidates are meeting the above requirements.

H. Field and Clinical Experiences Requirements

(http://www.scteachers.org/ADEPT/evalpdf/EducatorPreparationGuidelines.pdf)

Candidates at the initial undergraduate level have completed a minimum of 100 hours of field experiences prior to clinical practice. As the table entitled, *Secondary Mathematics Education Field Experiences and Clinical Practice Requirements* indicates, candidates complete 150 hours of field experiences prior to their internship clinical practice. During the fall semester of their senior year, candidates are enrolled in EDME B430P Practicum in Teaching Mathematics in Secondary School where they complete 120 field experience hours. During the spring semester of their senior year, candidates are enrolled in EDME B469 Internship in Secondary Mathematics Education where they complete 450 hours of clinical practice.
The total number of field experience and clinical hours is 600 contact hours in schools.

Undergraduate Initial Program		
Course	**Description of the Field Experience Of Clinical Practice (Internships)**	**# of hours**
EDCI 210, Clinical Observation and Analysis	Candidates observe for a minimum of 20 hours in a 9-12th grade classroom and complete observation instruments and reflections that address teacher behaviors such as student engagement, classroom management, and questioning techniques. Additionally, candidates examine instructional and assessment practices that reflect guidelines for developmentally appropriate practice. In addition, the candidates complete 12 of the 25 required service learning hours in this class.	20
EDEX 300, Introduction to Exceptional Learner	Candidates observe for a minimum of 10 hours in a 9-12th grade classroom and complete an analysis of the classroom learning environment for students with exceptionalities. The Learning Environment Study (report) focuses on the analysis of information learned from observations, interviews, and content from classes as well as research on issues relevant to the student's disability.	10
EDME 430P, Practicum in Teaching Mathematics in Secondary Education	Candidates are placed in 9-12th grade classrooms in a public school setting one half day a week for 15 weeks for a minimum of 60 hours. In this practicum, candidates plan, teach, and reflect on Mathematics lessons and complete assignments associated with the following discipline area methods course: EDME 430 Teaching Mathematics in the Secondary School Experiences.	120
EDME B469, Internship in Secondary Mathematics Education	Candidates are in the schools five days a week for 15 weeks for a minimum of 450 hours. In this experience, candidates have experience in the full range of responsibilities of the classroom teacher and assume full-time planning and teaching for a minimum of two weeks.	450
Total Hours		600

USCB Department of Mathematics and Computational Science Transition Points, Key Assessments and Requirements

The Department of Mathematics and Computational Science has an established plan in which the current candidates' progress through the unit via a series of progression levels. Some course assessments will change based on the requirements of the Secondary Mathematics SPA , the National Council of Teachers of Mathematics (NCTM).

Candidates' progress is formally monitored at each transition point as described in the Procedures for Monitoring Candidates' Progress in the Professional Education Programs, used in USCB's Department of Education.

The monitoring procedures are the following:
Procedures for Monitoring Candidates' Progress

Initial Undergraduate

Transition Point 1: Admission to the Secondary Mathematics Certification track in Mathematics Program

Initial Undergraduate Level:

1) The undergraduate candidate applies to the USCB Office of Admissions. Upon acceptance, the

Office of the Registrar provides the Department of Mathematics and Computational Science with a list of students identifying themselves as pre-professional majors in Mathematics.

2) Pre-professional majors are assigned an Advisor who facilitates and monitors progression through the program.

3) Pre-professional majors complete general education coursework and pre-professional coursework with a minimum GPA of 2.75, and successfully pass the *Praxis™ Core Academic Skills for Educators* tests.

4) Pre-professional majors submit a Professional Program Application prior to the semester they wish to enter the program.

5) The Advisor verifies the satisfactory completion of all requirements with the applicant, and interviews the applicant, and recommends the candidate to the Department Chair for formal admission into the professional education program as a Mathematics- Secondary Mathematics Certification track major. Disposition essays are reviewed by the Mathematics Teacher Education Committee and evaluated.

6) Letters of Acceptance into the Professional Program are mailed to the candidates. Letters of denial are mailed to those who did not meet the requirements specifying which requirements need to be met.

7) This is noted in the candidate's file so that course holds can be lifted which allows students to take professional level classes.

8) A list of candidate names documents the new cohort.

Transition Point 2: Admission to Internship

1) The candidate submits a Clinical Internship Application and the South Carolina Certification Application to the Field Experiences Coordinator on or before January 15th for fall semester internship and May 1st for spring semester internship.

2) The Coordinator of Field and Clinical Experiences enters undergraduate candidate data on an Excel® spreadsheet and monitors and verifies the completion of all requirements for admission to internship (Transition Point 2) and begins the internship placement process.

3) Candidates must pass the required Praxis II exam prior to internship placement.

4) The Mathematics Teacher Education Committee interviews each applicant and evaluates their readiness and identifies strengths and growth areas.

5) The Coordinator of Field and Clinical Experiences mails a letter of acceptance to the candidate.

6) Course holds are lifted to give permission for the undergraduate candidate to register for the 12-credit internship course and 3-credit Senior Seminar in Secondary Mathematics Education.

7) The Coordinator of Field and Clinical Experiences finalizes the internship placement and candidates are notified of their placements the first week of Senior Seminar.

Transition Point 3: Completion of Internship

1) Candidate's progress during the internship is monitored and assessed by the college university supervisor and cooperating teachers for required coursework completion.

2) The Coordinator of Field and Clinical Experiences verifies the completion of all requirements for the internship by entering the information into the designated Excel® spreadsheet.

Transition Point 4: Program Completion and Recommendation for Certification

1) The candidate submits a Graduation Application the semester prior to graduation. The Advisor reviews the form with the candidate and submits it to the Department Chair for final approval.

2) The Department Chair provides the Office of the Registrar with verification of undergraduate candidates passing the required Praxis II exam.

3) The Office of the Registrar audits the undergraduate candidate's completion of program requirements.

4) The Coordinator of Field and Clinical Experiences submits the names and evidence of the candidates to the Department Chair who recommends the candidates for South Carolina certification.

5) The signed Verification of Program Completion original is mailed to the South Carolina Department of Education Office of Certification and one copy retained in the candidate's file.

I. Eligibility for Certification

Candidates for secondary certification complete at least 30 semester hours in their area of concentration. The Bachelor of Science in Mathematics (Secondary Mathematics Certification Track) program will seek national recognition by the CAEP designated SPA (NCTM, National Council of Teachers of Mathematics). In addition, candidates must successfully complete the following Praxis II and Principle of Learning (PLT) requirements.

PRAXIS II Tests				Principle of Learning (PLT) Test			
Test Name	**CDT Code**	**PDT Code**	**Qualifying Score**	**Test Name**	**CDT Code**	**PDT Code**	**Qualifying Score**
Mathematics: Content Knowledge (On-screen graphing calculator provided)	5161	n/a	160	Principles of Learning and Teaching: Grades 7-12	5624	0624	157

J. Annual Reports (AACTE/CAEP and Title II)
Annual reports (e.g., Diversity Plan, Unit Assessment System, Title II, and AACTE/CAEP) will be completed and submitted at the required deadlines.

K. Commitment to Diversity Assurance
A Diversity Plan based on the plan already in place in the Department of Education at USCB will be utilized. Annual reports will provide evidence of implementation of the Diversity plan to include**:**

- *Candidates possess a strong knowledge of cultural diversity issues that includes global and multicultural perspectives.*
  USCB's General Education program includes a distribution requirement on global and multicultural understanding.
- *Candidates can teach all students, regardless of exceptionalities or backgrounds.*
  The Teacher Work Sample (TWS) is the primary measurement of candidate ability to teach all students, regardless of exceptionalities or backgrounds. See TWS Description and Scoring Rubric.

L. Professional Development Courses (http://www.nsdc.org/standards/index.cfm) - NA

M. Advanced Programs for the Preparation of Teachers Alignment with NBPTS (http://www.nbpts.org/the_standards/standards_by_cert) - NA

N. Experimental or Innovative Programs Policy (Assurance of compliance) - NA

O. ISTE National Educational Technology for Teachers (NETS.T) Standards Alignment
(http://www.iste.org/Content/NavigationMenu/NETS/ForTeachers/2008Standards/NETS_T_Standards_Final.pdf)
The Professional Education Unit initial preparation programs are aligned with the ISTE National Educational Technology Standards. ISTE (NETS.T) Standards are presented in in EDCI B243 Technology Resources for Teaching and are added in all appropriate course syllabi and rubrics throughout the program. To view alignment matrices, see Technology Integration in the Undergraduate Initial Preparation Program.

USCB Technology Integration in the Professional Education Unit
Undergraduate Initial Preparation Programs

ISTE NETS-T	Course Where Addressed	Assignment/Task

Facilitate and Inspire Student Learning and Creativity Teachers use their knowledge of subject matter, teaching and learning, and technology to facilitate experiences that advance student learning, creativity, and innovation in both face-to-face and virtual environments. Teachers: **a.** demonstrate fluency in technology systems and the transfer of current knowledge to new technologies and situations **b.** collaborate with students, peers, parents, and community members using digital tools and resources to support student success and innovation **c.** communicate relevant information and ideas effectively to students, parents, and peers using a variety of digital age media and formats **d.** model and facilitate effective use of current and emerging digital tools to locate, analyze, evaluate, and use information resources to support research and learning	EDCI B243 Technology Resources for Teaching EDME B430 Teaching Mathematics in the Secondary School EDME B430P Practicum in Teaching Mathematics in Secondary School EDME B476 Senior Seminar in Secondary Mathematics Education	Interactive Whiteboard lesson Thematic Web Lesson Planning Blackboard Discussion Board
Design and Develop Digital-Age Learning Experiences and Assessment Teachers design, develop, and evaluate authentic learning experiences and assessment incorporating contemporary tools and resources to maximize content learning in context and to develop the knowledge, skills, and attitudes identified in the NETS·S. Teachers: a. design or adapt relevant learning experiences that incorporate digital tools and resources to promote student learning and creativity b. develop technology-enriched learning environments that enable all students to pursue their individual curiosities and become active participants in setting their own educational goals, managing their own learning, and assessing their own progress c. customize and personalize learning activities to address students' diverse learning styles, working strategies, and abilities using digital tools and resources d. provide students with multiple and varied formative and summative assessments aligned with content and technology standards and use resulting data to inform learning and teaching	EDCI B243 Technology Resources for Teaching EDME B430 Teaching Mathematics in the Secondary School EDME B469 Internship in Secondary Mathematics Education	Active Studio Promethean Presentation Mathematics Presentation Lesson Planning Teacher Work Sample (TWS)

Model Digital-Age Work and Learning Teachers exhibit knowledge, skills, and work processes representative of an innovative professional in a global and digital society. Teachers: a. demonstrate fluency in technology systems and the transfer of current knowledge to new technologies and situations b. collaborate with students, peers, parents, and community members using digital tools and resources to support student success and innovation c. communicate relevant information and ideas effectively to students, parents, and peers using a variety of digital age media and formats d. model and facilitate effective use of current and emerging digital tools to locate, analyze, evaluate, and use information resources to support research and learning	EDCI B243 Technology Resources for Teaching EDME B469 Internship in Secondary Mathematics Education	Interactive Whiteboard Lesson Mathematics Presentation Teacher Work Sample (TWS)
Promote and Model Digital Citizenship and Responsibility Teachers understand local and global societal issues and responsibilities in an evolving digital culture and exhibit legal and ethical behavior in their professional practices. Teachers: a. advocate, model, and teach safe, legal, and ethical use of digital information and technology, including respect for copyright, intellectual property, and the appropriate documentation of sources b. address the diverse needs of all learners by using learner-centered strategies providing equitable access to appropriate digital tools and resources c. promote and model digital etiquette and responsible social interactions related to the use of technology and information d. develop and model cultural understanding and global awareness by engaging with colleagues and students of other cultures using digital age communication and collaboration tools	EDCI B243 Technology Resources for Teaching EDEX B300 Introduction to the Exceptional Learner EDME B469 Internship in Secondary Mathematics Education	Interactive Whiteboard Lesson Multi-media chapter Presentation (Diverse learners) Teacher Work Sample (TWS)

Engage in Professional Growth and Leadership Teachers continuously improve their professional practice, model lifelong learning, and exhibit leadership in their school and professional community by promoting and demonstrating the effective use of digital tools and resources. Teachers: a. participate in local and global communities to explore creative applications of technology to improve student learning b. exhibit leadership by demonstrating a vision of technology infusion, participating in shared decision making and community building, and developing the leadership and technology skills of others c. evaluate and reflect on current research and professional practice on a regular basis to make effective use of existing and emerging digital tools and resources in support of student learning d. contribute to the effectiveness, vitality, and self-renewal of the teaching profession and of their school and community	EDCI B243 Technology Resources for Teaching EDME B469 Internship in Secondary Mathematics Education EDME B476 Senior Seminar in Secondary Mathematics Education	Interactive Whiteboard Lesson Blackboard Discussions Internship Final Evaluation Video Analysis and Self-Reflection

b. SPA or Other National Specialized and/or Professional Association Standards

IV. National Council of Teachers of Mathematics (NCTM) Standards

The Program Report template for Preparation of Secondary Mathematics Teachers is available from the NCTM only in pdf format. Data collected on the form is presented below.

Program Report for the Preparation of Secondary Mathematics Teachers
National Council of Teachers of Mathematics (NCTM) Option A
NATIONAL COUNCIL FOR ACCREDITATION OF TEACHER EDUCATION

COVER SHEET

1. Institution Name

University of South Carolina Beaufort

2. State

South Carolina

3. Date submitted

4/15/2014

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4. Report Preparer's Information:

Name of Preparer: Manuel J. (Bud) Sanders

Phone: 843-208-8106

Email: mjsander@uscb.edu

5. NCATE Coordinator's Information:

NA

6. Name of Institution's Program

Secondary Mathematics Certification

7. NCATE Category

Mathematics Education

8. Grade levels for which candidates are being prepared

Secondary, 9-12

9. Program Type

First teaching license

10. Degree or award level

Baccalaureate

11. Is this program offered at more than one site?

No

12. If your answer is "yes" to above question, list the sites at which the program is offered

NA

13. Title of the state license for which candidates are prepared

Mathematics, Secondary Education, 9-12

14. Program report status (Initial Review, Response to One of the Following Decisions: Further Development Required or Recognition with Probation, or Response to National Recognition with Conditions)

Response not applicable for program consideration

15. Is your unit seeking NCATE accreditation for the first time (initial accreditation) or Continuing NCATE accreditation?

Response not applicable for program consideration

16. State Licensure requirement for national recognition: NCATE requires 80% of the program completers who have taken the test to pass the applicable state licensure test for the content field, if the state has a testing requirement. Test information and data must be reported in Section IV. Does your state require such a test?

Yes (Data on completers not applicable for program consideration)

SECTION I- CONTEXT

1. Description of any state or institutional policies that may influence the application of NCTM standards.

The *SOUTH CAROLINA EDUCATOR LICENSURE MANUAL* provides information on requirements for certification to teach in the state. The Regular Program Add-on Certification requirements for secondary mathematics certification as outlined in the MANUAL are:

(1) Bachelor's degree
(2) Initial, or professional certificate at the secondary level
(3) Minimum qualifying score(s) on the content-area examination(s) required by the State Board of Education
(4) Specialized preparation: Semester Hours

- Algebra (abstract, matrix, and linear): 6
- Modern Geometry or Foundations of Geometry: 3
- Calculus: 8
- Three electives from the following subject areas: 9
  - Probability or Statistics
  - Applied or Discrete Mathematics
  - Number Theory
  - Analysis
  - Algebra or Geometry (advanced courses) 35

(5) Endorsement in Advanced Placement Mathematics requires the successful completion of the requisite Advanced Placement Institute.

From the program curriculum as provided in *Part II. 8. Curriculum*, the above requirements are accounted for in this proposal. While field experience requirements from the South Carolina Department of Education as outlined in *Policy Guidelines for South Carolina Educator Preparation Units* are provided below in 2, other standards as required by the South Carolina Department of Education (ADEPT, EEDA, etc.) are accounted for in 17. a. III. *South Carolina Department of Education Requirements* above.

2. The document *Policy Guidelines for South Carolina Educator Preparation Units (September 2006—effective July 1, 2007)* provides requirements regarding field experiences. The relevant undergraduate data is:

B. Field Experiences and Clinical Practice

All teacher preparation programs and other school personnel preparation programs must provide field experiences (also known as the *practicum*) that provide candidates with a variety of progressive experiences in multiple and diverse settings. All candidates must complete a *minimum* of 100 hours of field experiences prior to clinical practice (student teaching) at the initial undergraduate level.

Requirements for the clinical practice experience at the initial level must include the following:

(A) The clinical practice experience must provide for the candidate's intensive and continuous involvement in a public school setting within South Carolina.

(B) In the initial preparation program, the clinical practice teaching experience must be an equivalent of a minimum of twelve weeks or sixty full days; the candidate must teach independently a minimum of ten full days in one placement/setting.

(C) During the sixty days, candidates must adhere to the daily schedule of the cooperating teachers (e.g., bus duty, faculty meetings, parent conferences, extracurricular activities, in-service activities, rehearsals). Assignments of candidates are not to include activities or duties for which a cooperating teacher receives an additional stipend.

(D) Candidates in traditional sixty-day clinical practice experiences may receive monetary compensation for their work if their teacher education programs have been given permission by the Professional Review Committee (PRC).

(E) Each candidate must be supervised by one or more institutional clinical faculty members who have preparation both in the supervision of education and in the teaching major. A single institutional faculty member may fulfill both roles if he or she is appropriately qualified. All institutional clinical faculty supervisors must be trained in the ADEPT system. Appropriate ADEPT training also is required for faculty affiliated with programs that prepare candidates as other professional school (i.e., "special area") personnel.

(F) Each candidate must be supervised by one or more school-based clinical faculty. All school-based clinical faculty must be trained in the ADEPT system. Appropriate ADEPT training also is required for school-based clinical faculty who are affiliated with programs that prepare candidates as other professional school (i.e., "special area") personnel.

(G) Candidates must receive formative evaluations and assistance from both their institutional clinical faculty supervisors and their school-based clinical faculty in terms of the ADEPT performance standards. The formative evaluations must 3 provide the candidate with written and oral feedback and assistance in terms of all ADEPT standards and evaluation processes, and must include a minimum of four classroom observations (i.e., at least two formative observations by the faculty supervisor and two formative observations by the cooperating teacher). Formative evaluations based on the appropriate ADEPT standards and evaluation guidelines also are required for candidates who are preparing to work as other professional school (i.e., "special area") personnel.

(H) Candidates must receive at least one summative evaluation in terms of the ADEPT performance standards. Both the institutional clinical faculty and the school-based clinical faculty must participate in the summative evaluation process. The summative evaluation process must be aligned with the ADEPT formal evaluation guidelines, must include all evaluation procedures (including a minimum of two classroom observations—i.e., at least one summative observation by the faculty supervisor and one summative observation by the cooperating teacher), and must ensure that the candidate receives written and oral feedback in terms of all ADEPT standards. Summative evaluations based on the appropriate ADEPT standards and evaluation guidelines also are required for candidates who are preparing to work as other professional school (i.e., "special area") personnel.

(I) Prior to the candidate's clinical practice, appropriate background checks by the Federal Bureau of Investigation, including fingerprint submissions to the State Department of Education (SCDE), must be completed and cleared.

Moreover, the same document includes the following:

C. Standards of Conduct
All candidates must be provided specific written information regarding the standards of conduct (based on S.C. Code Ann. §§ 59-25-160, 59-25-530, and 20-7-945) required of South Carolina educators for initial certification.

These items are addresses in 17. a) III. *South Carolina Department of Education Requirements* above.

3. Please attach files to describe a program of study that outlines the courses and experiences required for candidates to complete the program. The program of study must include course titles. (This information may be provided as an attachment from the college catalog or as a student advisement sheet.)

Please see information in Part II. *8. Curriculum* above.

4. This system will not permit you to include tables or graphics in text fields. Therefore any tables or charts must be attached as files here. The title of the file should clearly indicate the content of the file. Word documents, pdf files, and other commonly used file formats are acceptable.

5. Candidate Information Directions: Provide three years of data on candidates enrolled in the program and completing the program, beginning with the most recent academic year for which numbers have been tabulated. Report the data separately for the levels/tracks (e.g., baccalaureate, post-baccalaureate, alternate routes, master's, doctorate) being addressed in this report. Data must also be reported separately for programs offered at multiple sites. Update academic years (column 1) as appropriate for your data span. Create additional tables as necessary.

This item is not applicable for program consideration.

6. Faculty Information

Faculty Member Name	Manuel (Bud) Sanders
Highest Degree, Field, & University(3)	Ph.D., Mathematics, Tennessee
Assignment: Indicate the role of the faculty member(4)	Teaching Faculty/Department Chair
Faculty Rank(5)	Associate Professor
Tenured/Tenure Track (Y/N)	Y

Scholarship(6), Leadership in Professional Associations, and Service (7):List up to 3 major contributions in the past 3 years(8)	Michael J. Evans and Manuel J. Sanders, *Some subclasses of the Real-Valued Honorary Baire Two Functions on R^n*, Rendiconti del Circolo Matematico Palermo (2) 61 (2012), no. 1, 79-90 Manuel J. Sanders, An n-cell in R^(n+1) that is not the attractor of any IFS in R^(n+1), Missouri Journal of Mathematical Sciences, Volume 21 Number 1 (2009), Pages 13–20 Reviewer for Mathematical Reviews
Teaching or other professional experience in P-12 schools(9)	
Faculty Member Name	Swati DebRoy
Highest Degree, Field, & University(3)	PhD in Mathematics (Mathematical Biology), University of Florida
Assignment: Indicate the role of the faculty member(4)	Teaching Faculty
Faculty Rank(5)	Assistant Professor
Tenured/Tenure Track (Y/N)	Tenure Track
Scholarship(6), Leadership in Professional Associations, and Service (7):List up to 3 major contributions in the past 3 years(8)	Swati DebRoy,Zoe Mario, Gonzalo Crespo, Miquel Navasa, Massimo DAmato, Scott J cotler, Xavier Forns, Harel Da- Vol. 58 Suppl 1, 2013, p. S330-S331. Laetitia Canini, Swati DebRoy,Zoe Mario, Gonzalo Crespo, Miquel Navasa, Massimo DAmato, Scott J cotler, Xavier Forns, Harel Dahari ., "Hepatitis C Virus Kinetic Comparison between Non-cirrhotic Patients and Patients Awaiting Liver-transplantation treated with Intravenous Silibinin Monotherapy", Hepatologyl, Vol. 58 Suppl 1, 2013, p.758A. Swati DebRoy, Ben Bolker and Maia Martcheva. "Bistability and Long-Term Cure in a Within-Host of Hepatitis C", J. Biol. Systems, Vol. 19 (4), 2011, p. 533-550.
Teaching or other professional experience in P-12 schools(9)	
Faculty Member Name	Akira Iwasa
Highest Degree, Field, & University(3)	Ph.D. in Mathematics, University of South Carolina

Assignment: Indicate the role of the faculty member(4)	Teaching Faculty
Faculty Rank(5)	Associate Professor
Tenured/Tenure Track (Y/N)	Yes
Scholarship(6), Leadership in Professional Associations, and Service (7):List up to 3 major contributions in the past 3 years(8)	"Preservation of convergence of a sequence to a set" Topology Proceedings, 44 (2014) pp. 97-105. (Co-authored with M. Kada and S. Kamo)
Teaching or other professional experience in P-12 schools(9)	
Faculty Member Name	Heather G. Haskell
Highest Degree, Field, & University(3)	M. Ed., Mathematics Education, Armstrong Atlantic State University
Assignment: Indicate the role of the faculty member(4)	Teaching Faculty
Faculty Rank(5)	Instructor
Tenured/Tenure Track (Y/N)	N
Scholarship(6), Leadership in Professional Associations, and Service (7):List up to 3 major contributions in the past 3 years(8)	
Teaching or other professional experience in P-12 schools(9)	10 years experience teaching all grade levels of mathematics in a public high school.
Faculty Member Name	Timothy Hogenboom
Highest Degree, Field, & University(3)	MA in mathematical sciences, Binghamton University

Assignment: Indicate the role of the faculty member(4)	Teaching Faculty
Faculty Rank(5)	Instructor
Tenured/Tenure Track (Y/N)	N
Scholarship(6), Leadership in Professional Associations, and Service (7):List up to 3 major contributions in the past 3 years(8)	
Teaching or other professional experience in P-12 schools(9)	Permanent certification in mathematics 7-12, New York State. High School Courses Taught: AP Statistics, Distance Learning Elementary Statistics, AP Calculus, Intro to Calculus, Physics, Physics Lab, Math 7, Sequential Math Course 1, Course 2, Course 3, Math A/B, Math B, Honors Algebra 2, Honors Algebra 3/Trigonometry, Functions Statistics and Trigonometry, Intro to Statistics, Trigonometry, Academic Intervention, Computer Programming/Applications. Math Department Head: Advised administration concerning department course offerings, led coordination and writing of math curriculum across grade levels, single-handedly designed and wrote curriculum for several math courses, advised faculty regarding new state standards and assessments through individual and group instruction, compiled statistical analysis to target program strengths and weaknesses, evaluated textbooks, software, and materials for classroom use. Data Analyst: Designed, completed, and wrote data analysis projects, studies, and presentations involving school assessments using Microsoft Office software, SPSS® statistical software, SASI student information systems and the Board of Cooperative Educational Services (BOCES) Data Warehouse database.
Faculty Member Name	Lauren Rotella
Highest Degree, Field, & University(3)	MA Ed., East Carolina University, NC
Assignment: Indicate the role of the faculty member(4)	Teaching Faculty
Faculty Rank(5)	Instructor

Tenured/Tenure Track (Y/N)	N
Scholarship(6), Leadership in Professional Associations, and Service (7):List up to 3 major contributions in the past 3 years(8)	
Teaching or other professional experience in P-12 schools(9)	Clinical supervisor – secondary Math Ed at AASU; 23 years Middle Grades Math/ Science teacher, NC; total of 39 years in education.
Faculty Member Name	Kasia Pawelek
Highest Degree, Field, & University(3)	Ph.D. in Applied Mathematics, Oakland University
Assignment: Indicate the role of the faculty member(4)	Teaching Faculty
Faculty Rank(5)	Assistant Professor
Tenured/Tenure Track (Y/N)	Tenure Track
Scholarship(6), Leadership in Professional Associations, and Service (7):List up to 3 major contributions in the past 3 years(8)	Pawelek KA, Liu S, Pahlevani F, and Rong L, (2012) A model of HIV-1 infection with two time delays: Mathematical analysis and comparison with patient data, Mathematical Biosciences, 235(1): 98-109. PMID: 22108296. Pawelek KA, Huynh GT, Quinlivan M, Cullinane A, Rong L, and Perelson AM, (2012) Modeling Within-Host Dynamics of Influenza Virus Infection Including Immune Responses, PLoS Computational Biology 8(6): e1002588. DOI: 10.1371/journal.pcbi.1002588. PMID: 22761567. NSF S-STEM Grant (Co-PI: Kasia Pawelek), USCB, 2013-2018, $601,650
Teaching or other professional experience in P-12 schools(9)	

SECTION II- LIST OF ASSESSMENTS

1.

Type and # assessment	Name of Assessment	Type or Form of Assessment	When the Assessment Is administered

Assessment #1: Licensure assessment, or other content based assessment (required)	Praxis II	ETS Examinations required for Licensure 1. Mathematics: Content Knowledge (10061) 2. Mathematics: Proofs, Models, and Problems, Part 1 (20063)	Junior and Senior Year
Assessment #2: Content knowledge in secondary mathematics education (required)	GPA in Major	This includes all courses as listed in the USCB Bulletin for major in mathematics in certification track	Throughout program (see courses to be included in description below)
Assessment #3: Candidate ability to plan instruction (required)	Lesson Plan Construction and Evaluation	Students will be required to follow state standards to set learning goals and plan for instruction by creating lesson plans and teaching materials which are then evaluated in multiple components.	Spring Semester of Senior Year (EDSE B490, Directed Teaching)
Assessment #4: Student teaching (required)	Internship Evaluations	Observational survey completed by supervising teacher indicating presence/absence of ten teaching behaviors.	Spring Semester of Senior Year (EDSE B490)
Assessment #5: Candidate effect on student leaning (required)	Impact on Student Learning Assignment	Assignment to specifically address the effects candidate's teaching has on students and address changes that may be beneficial.	Spring Semester of Senior Year (EDSE B490)
Assessment #6: Additional assessment that addresses NCTM standards (required)	Technology in Mathematics Education	The teacher candidate is introduced to technological resources relevant to the teaching profession including computer technology, educational software, and telecommunications. Candidates specifically learn to examine how applying technology in the classroom can be used to support teaching and learning in mathematics.	Spring Semester of Junior Year (EDCI B243)
Assessment #7: Additional assessment that addresses NCTM standards (optional)	History and Development of Mathematical Thought	Assessment of the candidate's knowledge and understanding of the history of ideas, persons, and cultures in the development of mathematical thought.	Spring Semester of Junior Year MATH B360

Assessment #8: Additional assessment that addresses NCTM standards (optional)	Interdisciplinary Training Project	The teacher candidate learns mathematical modeling of real world phenomena and studies interactions and dynamics. Candidates use computer software for simulations and graphing (currently, Maple® or Matlab®). Teacher candidates learn to research journal articles and develop scientific writing skills in a collaborative setting.	Spring Semester of Junior Year (MATH B419, MATH B460)

SECTION III - RELATIONSHIP OF ASSESSMENT TO STANDARDS

1. For each NCTM standard on the chart below, identify the assessment(s) in Section II that address the standard. One assessment may apply to multiple NCTM standards. [Indicators are listed at http://www.nctm.org/about/ncate/secondary_indic.htm]

Mathematical Preparation for All Mathematics Teacher Candidates	**#1**	**#2**	**#3**	**#4**	**#5**	**#6**	**#7**
1. Knowledge of Problem Solving. Candidates know, understand and apply the process of mathematical problem solving.	X	X				X	X
2. Knowledge of Reasoning and Proof, Candidates reason, construct, and evaluate mathematical arguments and develop as appreciation for mathematical rigor and inquiry.	X	X					X
3. Knowledge of Mathematical Communication. Candidates communicate their mathematical thinking orally and in writing to peers, faculty and others.		X				X	
4. Knowledge of Mathematical Connections. Candidates recognize, use, and make connections between and among mathematical ideas and in contexts outside mathematics to build mathematical understanding.		X					
5. Knowledge of Mathematical Representation. Candidates use varied representations of mathematical ideas to support and deepen students' mathematical understanding.		X				X	X
6. Knowledge of Technology. Candidates embrace technology as an essential tool for teaching and learning mathematics.		X				X	
7. Dispositions. Candidates support a positive disposition toward mathematical processes and mathematical learning.		X			X		
8. Knowledge of Mathematics Pedagogy. Candidates possess a deep understanding of how students learn mathematics and of the pedagogical knowledge specific to mathematics teaching and learning.		X	X	X	X		
9. Knowledge of Number and Operations. Candidates demonstrate computational proficiency, including a conceptual understanding of numbers, ways of representing number, relationships among number and number systems, and the meaning of operations	X	X					X

10. Knowledge of Different Perspectives on Algebra. Candidates emphasize relationships among quantities including functions, ways of representing mathematical relationships, and the analysis of change.		X					X
11. Knowledge of Geometries. Candidates use spatial visualization and geometric modeling to explore and analyze geometric shapes, structures, and their properties.	X	X					X
12. Knowledge of Calculus, Candidates demonstrate a conceptual understanding of limit, continuity, differentiation, and integration and a thorough background in techniques and application of the calculus.	X	X					X
13. Knowledge of Discrete Mathematics. Candidates apply the fundamental ideas of discrete mathematics in the formulation and solution of problems.	X	X					
14. Knowledge of Data Analysis, Statistics and Probability. Candidates demonstrate an understanding of concepts and practices related to data analysis, statistics, and probability.	X	X					
15. Knowledge of Measurement. Candidates apply and use measurement concepts and tools.	X	X					X

2. 16.1 Field-based Experience. Engage in a sequence of planned opportunities prior to student teaching that includes observing and participating in both middle and secondary mathematics classrooms under the supervision of experienced and highly qualified teachers. Information should be provided in Section I (Context) to address this standard.

Information is provided in Section I (Context).

3. 16.2 Field-based Experience. Experienced full-time student teaching secondary-level mathematics that is supervised by experienced and highly qualified teacher and a university or college supervisor with mathematics teaching experience. Information should be provided in Section I (Context) to address this standard.

Information is provided in Section I (Context).

4. For the NCTM standard on the chart below, identify the assessment(s) in Section II that address the standard. One assessment may apply to multiple NCTM standards.

	#1	#2	#3	#4	#5	#6	#7	#8
16.3 Field-Based Experience. Demonstrate the ability to increase students' knowledge of mathematics.					X			

SECTION IV - EVIDENCE FOR MEETING STANDARDS

DIRECTIONS: The 6-8 key assessments listed in Section II must be documented and discussed in Section IV. Taken as a whole, the assessments must demonstrate candidate mastery of the SPA standards. The key assessments should be required of all candidates. Assessments and scoring guides and data charts should be aligned with the SPA standards. This means that the concepts in the SPA standards should be apparent in the assessments and in the scoring guides to the same depth, breadth, and specificity as in the SPA standards. Data tables should also be aligned with the SPA

standards. The data should be presented, in general, at the same level it is collected. For example, if a rubric collects data on 10 elements [each relating to specific SPA standard(s)], then the data chart should report the data on each of the elements rather that reporting a cumulative score.

In the description of each assessment below, the SPA has identified potential assessments that would be appropriate. Assessments have been organized into the following three areas to be aligned with the elements in NCATE's unit standard 1:
• Content knowledge (Assessments 1 and 2)
• Pedagogical and professional knowledge, skills and dispositions (Assessments 3 and 4)
• Focus on student learning (Assessment 5)

Note that in some disciplines, content knowledge may include or be inextricable from professional knowledge. If this is the case, assessments that combine content and professional knowledge may be considered "content knowledge" assessments for the purpose of this report.

For each assessment, the compiler should prepare one document that includes the following items:

(1) A two-page narrative that includes the following:
a. A brief description of the assessment and its use in the program (one sentence may be sufficient);
b. A description of how this assessment specifically aligns with the standards it is cited for in Section III. Cite SPA standards by number, title, and/or standard wording.
c. A brief analysis of the data findings;
d. An interpretation of how that data provides evidence for meeting standards, indicating the specific SPA standards by number, title, and/or standard wording;
and

(2) Assessment Documentation
e. The assessment tool itself or a rich description of the assessment (often the directions given to candidates);
f. The scoring guide for the assessment; and
g. Charts that provide candidate data derived from the assessment.

The responses for e, f, and g (above) should be limited to the equivalent of five text pages each, however in some cases assessment instruments or scoring guides may go beyond five pages.

Note: As much as possible, combine all of the files for one assessment into a single file. That is, create one file for Assessment #4 that includes the two-page narrative (items a – d above), the assessment itself (item e above), the scoring guide (item f above, and the data chart (item g above). Each attachment should be no larger than 2 mb. Do not include candidate work or syllabi. There is a limit of 20 attachments for the entire report so it is crucial that you combine files as much as possible.

1. State licensure tests or professional examinations of content knowledge. NCTM standards addressed in this entry could include all of the standards 1-7 and 9-15. If your state does not require licensure tests or professional examinations in the content area, data from another assessment must

be presented to document candidate attainment of content knowledge. (Assessment Required)

Provide assessment information as outlined in the directions for Section IV

2. Assessment of content knowledge in mathematics. NCTM standards addressed in this entry could include but are not limited to Standards 1-7 and 9-15. Examples of assessments include comprehensive examinations, GPAs or grades, and portfolio tasks*. For post-baccalaureate teacher preparation, include an assessment used to determine that candidates have adequate content background in the subject to be taught. (Assessment Required)

Provide assessment information as outlined in the directions for Section IV

** For program review purposes, there are two ways to list a portfolio as an assessment. In some programs a portfolio is considered a single assessment and scoring criteria (usually rubrics) have been developed for the contents of the portfolio as a whole. In this instance, the portfolio would be considered a single assessment. However, in many programs a portfolio is a collection of candidate work—and the artifacts included*

3. Assessment that demonstrates candidates can effectively plan classroom-based instruction. NCTM standards that could be addressed in this assessment include but are not limited to Standard 8. Examples of assessments include the evaluation of candidates' abilities to develop lesson or unit plans, individualized educational plans, needs assessments, or intervention plans. (Assessment Required)

Provide assessment information as outlined in the directions for Section IV

4. Assessment that demonstrates candidates' knowledge, skills, and dispositions are applied effectively in practice. NCTM standards that could be addressed in this assessment include but are not limited to standard 8. An assessment instrument used in student teaching or an internship should be submitted. (Assessment Required)

Provide assessment information as outlined in the directions for Section IV

5. Assessment that demonstrates candidate effects on student learning. NCTM standards that could be addressed in this assessment include but are not limited to Standard 8. Examples of assessments include those based on student work samples, portfolio tasks, case studies, follow-up studies, and employer surveys. (Assessment Required)

Provide assessment information as outlined in the directions for Section IV

6. Additional assessment that addresses NCTM standards. Examples of assessments include evaluations of field experiences, case studies, portfolio tasks, licensure tests not reported in #1, and follow-up studies. (Assessment Required)

Provide assessment information as outlined in the directions for Section IV

7. Additional assessment that addresses NCTM standards. Examples of assessments include evaluations of field experiences, case studies, portfolio tasks, licensure tests not reported in #1, and follow-up studies. (Optional)

Provide assessment information as outlined in the directions for Section IV

8. Additional assessment that addresses NCTM standards. Examples of assessments include evaluations of field experiences, case studies, portfolio tasks, licensure tests not reported in #1, and

follow-up studies. (Optional)

Provide assessment information as outlined in the directions for Section IV

Assessment 1: Licensure assessment, or other content based assessment

(1) Narrative

a. Description of Assessment

The Praxis II Mathematics: Content Knowledge (CK) (061) and Mathematics: Proofs, Models, and Problems Part 1 (PMP1) (063) administered by The Educational Testing Service are the required state tests for licensure. CK (061) consists of 50 multiple choice questions with the use of a graphing calculator required. Successful completion of this exam requires the teacher candidate to understand and work with mathematical concepts, to reason mathematically, to make conjectures, to see patterns, to justify statements using informal logical arguments, to construct simple proofs. to solve problems by integrating knowledge from different areas of mathematics, to use various representations of concepts, to solve problems that have several solution paths, and to develop mathematical models and use them to solve real-world problems (ETS, 2009). PMP1 (063) consists of 4 constructed response tasks (1 proof, 1 model, and 2 problems) with the use of a graphing calculator required. Successful completion of this exam requires the teacher candidate to demonstrate knowledge of content in algebra and number theory; measurement, geometry and trigonometry; functions; data analysis, statistics (without calculus), and probability; and matrix algebra and discrete mathematics. The test places emphases on problem solving, reasoning and proof, and mathematical connections and representations (ETS, 2009). Candidates must pass at least one of the required tests before the start of the internship.

b. Alignment between NCTM Standards and Assessment 1

Topic Addressed by Assessment 5	NCTM Standard and Indicators
1. Content Knowledge	1 a
2. Mathematical Practices	2 a,b,c

c. NA

d. NA

(2) Documentation

e. NA

f. NA

g. NA

Assessment 2: GPA in Major

(Supporting *Documenting Course Grades as an Assessment of Candidate Content Knowledge*)

Instructions:
Completion of this mathematics content alignment table is one of the required components of the documentation requirements for programs using course grades as an assessment. This document is designed as a form and must be used for entering required information into each "Click here to enter text" box, which will expand as needed. Do not retype the form. Since this form is a template, it will open as a document to be renamed and saved upon completion. Separate forms by program level (e.g., undergraduate or graduate) and program type (e.g., MAT or M. Ed.) are required. Specific directions for completing the form based on the location of mathematics/mathematics education coursework completion follow:

Undergraduate Programs and Graduate Programs where Mathematics/Mathematics Education Coursework Taken at Submitting Institution

- Column 2: Specify selected course number(s) and name(s) of **required** coursework that addresses each competency listed in the first column. If no required coursework addresses a specific competency, enter "Not addressed."

- Column 3: Describe all technology and representational tools, including concrete models, used in **required** courses that address each competency listed in the first column. If required coursework does not include the use of technology and representational tools, enter "Not included."

- Column 4: Include course description(s) for all **required** courses listed in the second column. It is sufficient to include course descriptions by mathematical domain (e.g., algebra, statistics and probability) rather than by individual competency.

Graduate Program where Mathematics/Mathematics Education Coursework Taken at Another (Non-Submitting) Institution

- Column 2: Specify selected course number(s) and name(s) of **required** undergraduate coursework that addresses each competency listed in the first column. Describe the advising decision that ensures program completers have studied the required mathematics content. If no required coursework addresses a specific competency, enter "Not addressed."

- Column 3: Describe all technology and representational tools, including concrete models, used in **required** courses that address each competency listed in the first column. If not known, do not leave the cell blank; rather, enter "Not verifiable".

- Column 4: Include course description(s) for all **required** courses listed in the second column. It is sufficient to include course descriptions by mathematical domain (e.g., algebra, statistics and probability) rather than by individual competency.

- Include the transcript analysis form that is used by the program to determine sufficiency of undergraduate courses taken by a program candidate at another institution and to specify coursework required to remediate deficiencies in the mathematics acquirement of program

candidates or completers. The transcript analysis process must adhere to the *Guidelines for Documenting a Transcript Analysis*.

Institution Name	University of South Carolina Beaufort
Program Name	Mathematics- Secondary Mathematics Certification track
Program Type (e.g., Baccalaureate or M.Ed.)	Baccalaureate

A. Secondary Mathematics Teachers

All secondary mathematics teachers should be prepared with depth and breadth in the following mathematical domains: Number, Algebra, Geometry, Trigonometry, Statistics, Probability, Calculus, and Discrete Mathematics. All teachers certified in secondary mathematics should know, understand, teach, and be able to communicate their mathematical knowledge with the breadth of understanding reflecting the following competencies for each of these domains.

A.1. Number and Quantity To be prepared to develop student mathematical proficiency, all secondary mathematics teachers should know the following topics related to number and quantity with their content understanding and mathematical practices supported by appropriate technology and varied representational tools, including concrete models:	**Required Course Number(s) and Name(s)**	**Technology and Represent-ational Tools Including Concrete Models by Competenc y**	**Course Description(s)**

A.1.1 Structure, properties, relationships, operations, and representations including standard and non-standard algorithms, of numbers and number systems including integer, rational, irrational, real, and complex numbers	MATH B141: Calculus I, MATH B174: Discrete Mathematics, MATH B300: Introduction to Proof, MATH B360: History of Mathematics	Whiteboard/ calculator/ computer/ Maple® as appropriate	MATH B141 - CALCULUS I (4).(Prerequisite: qualification through placement or a grade of 'C' or better in MATH B115) Introduction to fundamental concepts and theorems of limits, continuity, and derivatives; rates of change; differentiation rules for algebraic and transcendental functions, including the chain rule; applications of derivatives; introduction to integration, including the Fundamental Theorem of Calculus and u-substitution; areas between curves. MATH B142 - CALCULUS II (4).(Prerequisite: qualification through placement or a grade of 'C' or better in MATH B141)Techniques of integration, applications of the integral, L"Hospital's Rule, improper integrals; sequences and series of real numbers, power and Taylor series, introduction to polar coordinates. MATH B174 - DISCRETE MATHEMATICS (3).(Prerequisite: qualification through placement or a grade of 'C' or better in MATH B115) Induction, complexity, elementary counting, combinations and permutations, recursion and recurrence relations, graphs and trees; discussion of the design and analysis of algorithms. MATH B230 – LINEAR ALGEBRA (3).(Prerequisite: MATH B141 or consent of instructor) Linear
A.1.2Fundamental ideas of number theory (divisors, factors and factorization, primes, composite numbers, greatest common factor, least common multiple, and modular arithmetic)	MATH B360: History of Mathematics, MATH B421: Mathematics for Secondary Teachers	Whiteboard/ calculator/ computer/ Maple® as appropriate	
A.1.3Quantitative reasoning and relationships that include ratio, rate, and proportion and the use of units in problem situations	MATH B141: Calculus I, MATH B142 Calculus II	Whiteboard/ calculator/ computer/ Maple® as appropriate	
A.1.4 Vector and matrix operations, modeling, and applications	MATH B230: Linear Algebra	Whiteboard/ calculator/ computer/ Maple® as appropriate	

A.1.5 Historical development and perspectives of number, number systems, and quantity including contributions of significant figures and diverse cultures	MATH B141: Calculus I, MATH B360: History of Mathematics, MATH B421: Mathematics for Secondary Teachers	Whiteboard/ calculator/ computer/ Maple® as appropriate	systems and matrices, vector spaces, linear independence, rank of a matrix, linear transformations, determinants, introduction to eigenvalues and eigenvectors, diagonalization and applications. MATH B300: Introduction to Proof- (3) (Prereq: MATH B240 or consent) Introduction to proof techniques (including quantifiers and induction) with emphasis on developing abilities in construction of and writing proofs; elementary logic, set theory, functions and relations, and selected topics in major areas of mathematics. MATH B360: History of Mathematics- (3) (Prereq: MATH B300 or consent) A survey of the historical development of mathematics. MATH B421: Mathematics for Secondary Teachers- (3) (Prereq: Acceptance into Mathematics-Secondary Mathematics Certification track-, and, Senior Standing or consent) Survey of properties and algebra of real numbers and complex numbers; properties and representations of polynomial, rational, exponential, logarithmic, trigonometric functions; concepts of calculus including limits, derivatives, integrals. Euclidean and non-Euclidean geometries, including analytic geometry; concepts and applications of probability and data analysis; concepts and applications of discrete mathematics, including number theory.

A.2. Algebra To be prepared to develop student mathematical proficiency, all secondary mathematics teachers should know the following topics related to algebra with their content understanding and mathematical practices supported by appropriate technology and varied representational tools, including concrete models:	**Required Course Number(s) and Name(s)**	**Technology and Representational Tools Including Concrete Models by Competency**	**Course Description(s)**
A.2.1 Algebraic notation, symbols, expressions, equations, inequalities, and proportional relationships, and their use in describing, interpreting, modeling, generalizing, and justifying relationships and operations	MATH B141: Calculus I, MATH B300: Introduction to Proof, MATH B421: Mathematics for Secondary Teachers	Whiteboard/ calculator/ computer/ Maple® as appropriate	MATH B141 - CALCULUS I (4).(Prerequisite: qualification through placement or a grade of 'C' or better in MATH B115) Introduction to fundamental concepts and theorems of limits, continuity, and derivatives; rates of change; differentiation rules for algebraic and transcendental functions, including the chain rule; applications of derivatives; introduction to integration, including the Fundamental Theorem of Calculus and u-substitution; areas between curves.

A.2.2 Function classes including polynomial, exponential and logarithmic, absolute value, rational, trigonometric, including those with discrete domains (e.g., sequences), and how the choices of parameters determine particular cases and model specific situations	MATH B141: Calculus I, MATH B142: Calculus II, MATH B240: Differential Equations	Whiteboard/ calculator/ computer/ Maple® as appropriate	MATH B142 - CALCULUS II (4).(Prerequisite: qualification through placement or a grade of 'C' or better in MATH B141)Techniques of integration, applications of the integral, L"Hospital's Rule, improper integrals; sequences and series of real numbers, power and Taylor series, introduction to polar coordinates. MATH B174 - DISCRETE MATHEMATICS (3).(Prerequisite: qualification through placement or a grade of 'C' or better in MATH B115)Induction, complexity, elementary counting, combinations and permutations, recursion and recurrence relations, graphs and trees; discussion of the design and analysis of algorithms. MATH B230 – LINEAR ALGEBRA (3).(Prerequisite: MATH B141 or consent of instructor) Linear systems and matrices, vector spaces, linear independence, rank of a matrix, linear transformations, determinants, introduction to eigenvalues and eigenvectors, diagonalization and applications. MATH B240 – CALCULUS III (4).(Prerequisite: qualification through placement or a grade of 'C' or better in MATH B142)Parametric equations, polar coordinates, three dimensional analytic geometry, cylindrical and spherical coordinates, vector functions, functions of several variables, partial differentiation, max-min, Lagrange multipliers, multiple
A.2.3 Functional representations (tables, graphs, equations, descriptions, recursive definitions, and finite differences), characteristics (e.g., zeros, intervals of increase or decrease, extrema, average rates of change, domain and range, and end behavior), and notations as a means to describe, reason, interpret, and analyze relationships and to build new functions	MATH B141: Calculus I, MATH B174: Discrete Mathematics	Whiteboard/ calculator/ computer/ Maple® as appropriate	

A.2.4 Patterns of change in linear, quadratic, polynomial, and exponential functions and in proportional and inversely proportional relationships and types of real-world relationships these functions can model	MATH B141: Calculus I, MATH B142: Calculus II	Whiteboard/ calculator/ computer/ Maple® as appropriate	integrals and applications, integral vector calculus. MATH B300: Introduction to Proof- (3) (Prereq: MATH B240 or consent) Introduction to proof techniques (including quantifiers and induction) with emphasis on developing abilities in construction of and writing proofs; elementary logic, set theory, functions and relations, and selected topics in major areas of mathematics. MATH B360: History of Mathematics- (3) (Prereq: MATH B300 or consent) A survey of the historical development of mathematics. MATH B410: Abstract Algebra I- (3) (Prereq: MATH B300) An introduction to the theory of groups, rings and fields. Topics include normal subgroups, quotient groups, homomorphisms, Cayley's theorem, permutation groups, ideals, the field of quotients of an integral domain, and polynomial rings. MATH B421: Mathematics for Secondary Teachers- (3) (Prereq: Acceptance into Mathematics-Teaching Certificate track, and, Senior Standing or consent) Survey of properties and algebra of real numbers and complex numbers; properties and representations of polynomial, rational, exponential, logarithmic, trigonometric functions; concepts of calculus including limits, derivatives, integrals. Euclidean and non-Euclidean geometries, including analytic geometry; concepts and applications of probability and data analysis; concepts and applications of discrete mathematics, including number theory.
A.2.5 Linear algebra including vectors, matrices, and transformations	MATH B230: Linear Algebra, MATH B240: Calculus III	Whiteboard/ calculator/ computer/ Maple® as appropriate	
A.2.6 Abstract algebra, including groups, rings, and fields, and the relationship between these structures and formal structures for number systems and numerical and symbolic calculations	MATH B410: Abstract Algebra	Whiteboard/ calculator/ computer/ Maple® as appropriate	
A.2.7 Historical development and perspectives of algebra including contributions of significant figures and diverse cultures	MATH B360: History of Mathematics	Whiteboard/ calculator/ computer/ Maple® as appropriate	

A.3. Geometry and Trigonometry To be prepared to develop student mathematical proficiency, all secondary mathematics teachers should know the following topics related to geometry and trigonometry with their content understanding and mathematical practices supported by appropriate technology and varied representational tools, including concrete models:	**Required Course Number(s) and Name(s)**	**Technology and Representational Tools Including Concrete Models by Competency**	**Course Description(s)**
A.3.1 Core concepts and principles of Euclidean in two and three dimensions and two-dimensional non-Euclidean geometries.	MATH B390: Modern Geometry	Geometer's Sketchpad (or alternate), whiteboard/ calculator/ computer/ Maple® as appropriate	MATH B141 - CALCULUS I (4).(Prerequisite: qualification through placement or a grade of 'C' or better in MATH 115) Introduction to fundamental concepts and theorems of limits, continuity, and derivatives; rates of change; differentiation rules for algebraic and transcendental functions, including the chain rule; applications of derivatives; introduction to integration,

A.3.2 Transformations including dilations, translations, rotations, reflections, glide reflections; compositions of transformations; and the expression of symmetry in terms of transformations	MATH B390: Modern Geometry, MATH B421: Mathematics for Secondary Teachers	Geometer's Sketchpad (or alternate), whiteboard/ calculator/ computer/ Maple® as appropriate	including the Fundamental Theorem of Calculus and u-substitution; areas between curves. MATH B142 - CALCULUS II (4).(Prerequisite: qualification through placement or a grade of 'C' or better in MATH B141)Techniques of integration, applications of the integral, L"Hospital's Rule, improper integrals; sequences and series of real numbers, power and Taylor series, introduction to polar coordinates. MATH B230 – LINEAR ALGEBRA (3).(Prerequisite: MATH B141 or consent of instructor) Linear systems and matrices, vector spaces, linear independence, rank of a matrix, linear transformations, determinants, introduction to eigenvalues and eigenvectors, diagonalization and applications. MATH B360: History of Mathematics- (3) (Prereq: MATH B300 or consent) A survey of the historical development of mathematics. MATH B390: Modern Geometry- (3) (Prereq: MATH B300) An axiomatic approach to the fundamental ideas of Euclidean and non-Euclidean geometries. MATH B421: Mathematics for Secondary Teachers- (3) (Prereq: Acceptance into Mathematics-Teaching Certificate track, and, Senior Standing or consent) Survey of properties and algebra of real numbers and complex numbers;
A.3.3 Congruence, similarity and scaling, and their development and expression in terms of transformations	MATH B230: Linear Algebra, MATH B240: Calculus III, MATH B390: Modern Geometry	Geometer's Sketchpad (or alternate), whiteboard/ calculator/ computer/ Maple® as appropriate	
A.3.4 Right triangles and trigonometry	MATH B141: Calculus I	Geometer's Sketchpad (or alternate), whiteboard/ calculator/ computer/ Maple® as appropriate	
A.3.5 Application of periodic phenomena and trigonometric identities	MATH B141: Calculus I, MATH B142: Calculus II, MATH B242: Differential Equations	Geometer's Sketchpad (or alternate), whiteboard/ calculator/ computer/ Maple® as appropriate	

A.3.6 Identification, classification into categories, visualization, and representation of two- and three-dimensional objects (triangles, quadrilaterals, regular polygons, prisms, pyramids, cones, cylinders, and spheres)	MATH B421: Mathematics for Secondary Teachers	Geometer's Sketchpad (or alternate), whiteboard/ calculator/ computer/ Maple® as appropriate	properties and representations of polynomial, rational, exponential, logarithmic, trigonometric functions; concepts of calculus including limits, derivatives, integrals. Euclidean and non-Euclidean geometries, including analytic geometry; concepts and applications of probability and data analysis; concepts and applications of discrete mathematics, including number theory.
A.3.7 Formula rationale and derivation (perimeter, area, surface area, and volume) of two- and three-dimensional objects (triangles, quadrilaterals, regular polygons, rectangular prisms, pyramids, cones, cylinders, and spheres), with attention to units, unit comparison, and the iteration, additivity, and invariance related to measurements	MATH B421: Mathematics for Secondary Teachers	Geometer's Sketchpad (or alternate), whiteboard/ calculator/ computer/ Maple® as appropriate	
A.3.8 Geometric constructions, axiomatic reasoning, and proof	MATH B390: Modern Geometry	Geometer's Sketchpad (or alternate), whiteboard/ calculator/ computer/ Maple® as appropriate	

A.3.9 Analytic and coordinate geometry including algebraic proofs (e.g., the Pythagorean Theorem and its converse) and equations of lines and planes, and expressing geometric properties of conic sections with equations	MATH B390: Modern Geometry, MATH B421: Mathematics for Secondary Teachers	Geometer's Sketchpad (or alternate), whiteboard/ calculator/ computer/ Maple® as appropriate	
A.3.10 Historical development and perspectives of geometry and trigonometry including contributions of significant figures and diverse cultures	MATH B360: History of Mathematics , MATH B390: Modern Geometry, MATH B421: Mathematics for Secondary Teachers	Geometer's Sketchpad (or alternate), whiteboard/ calculator/ computer/ Maple® as appropriate	

A.4. Statistics and Probability To be prepared to develop student mathematical proficiency, all secondary mathematics teachers should know the following topics related to statistics and probability with their content understanding and mathematical practices supported by appropriate technology and varied representational tools, including concrete models:	**Required Course Number(s) and Name(s)**	**Technology and Representational Tools Including Concrete Models by Competency**	**Course Description(s)**
A.4.1 Statistical variability and its sources and the role of randomness in statistical inference	STAT B340: Introduction to Probability and Statistics	R, Excel®, SPSS® (or alternate), whiteboard/ calculator/ computer/ Maple® as appropriate	STAT B340 – INTRODUCTION TO PROBABILTY AND STATISTICS (3). (Prerequisite: MATH B240 or permission of instructor). Set theory; distributions of both discrete and continuous random variables; moments (including moment generating and characteristic functions); limit theorems; multivariate distributions including marginal and conditional distributions; confidence intervals and hypothesis tests. MATH B360: History of Mathematics- (3) (Prereq: MATH B300 or consent) A survey of the historical development of mathematics.
A.4.2 Creation and implementation of surveys and investigations using sampling methods and statistical designs, statistical inference (estimation of population parameters and hypotheses testing), justification of conclusions, and generalization of results	STAT B340: Introduction to Probability and Statistics	R, Excel®, SPSS® (or alternate), whiteboard/ calculator/ computer/ Maple® as appropriate	

A.4.3 Univariate and bivariate data distributions for categorical data and for discrete and continuous random variables, including representations, construction and interpretation of graphical displays (e.g., box plots, histograms, cumulative frequency plots, scatter plots), summary measures, and comparisons of distributions	STAT B340: Introduction to Probability and Statistics	R, Excel®, SPSS® (or alternate), whiteboard/ calculator/ computer/ Maple® as appropriate	
A.4.4 Empirical and theoretical probability (discrete, continuous, and conditional) for both simple and compound events	STAT B340: Introduction to Probability and Statistics	R, Excel®, SPSS® (or alternate), whiteboard/ calculator/ computer/ Maple® as appropriate	
A.4.5 Random (chance) phenomena, simulations, and probability distributions and their application as models of real phenomena and to decision making	STAT B340: Introduction to Probability and Statistics	R, Excel®, SPSS® (or alternate), whiteboard/ calculator/ computer/ Maple® as appropriate	

A.4.6 Historical development and perspectives of statistics and probability including contributions of significant figures and diverse cultures	STAT B340: Introduction to Probability and Statistics, MATH 360: History of Mathematics	R, Excel®, SPSS® (or alternate), whiteboard/ calculator/ computer/ Maple® as appropriate	
A.5. Calculus To be prepared to develop student mathematical proficiency, all secondary mathematics teachers should know the following topics related to calculus with their content understanding and mathematical practices supported by appropriate technology and varied representational tools, including concrete models:	**Required Course Number(s) and Name(s)**	**Technology and Represent-ational Tools Including Concrete Models by Competenc y**	**Course Description(s)**
A.5.1 Limits, continuity, rates of change, the Fundamental Theorem of Calculus, and the meanings and techniques of differentiation and integration	MATH B141: Calculus I	Whiteboard/ calculator/ computer/ Maple® as appropriate	MATH B141 - CALCULUS I (4).(Prerequisite: qualification through placement or a grade of 'C' or better in MATH B115)Introduction to fundamental concepts and theorems of limits, continuity, and derivatives; rates of change; differentiation rules for algebraic and transcendental functions, including the chain rule; applications of derivatives; introduction to integration, including the Fundamental Theorem of Calculus and u-substitution; areas between curves.
A.5.2 Parametric, polar, and vector functions	MATH B142: Calculus II, MATH B240: Calculus III	Whiteboard/ calculator/ computer/ Maple® as appropriate	

A.5.3 Sequences and series	MATH B142: Calculus II	Whiteboard/ calculator/ computer/ Maple® as appropriate	MATH B142 - CALCULUS II (4).(Prerequisite: qualification through placement or a grade of 'C' or better in MATH B141) Techniques of integration, applications of the integral, L"Hospital's Rule, improper integrals; sequences and series of real numbers, power and Taylor series, introduction to polar coordinates. MATH B240 – CALCULUS III (4).(Prerequisite: qualification through placement or a grade of 'C' or better in MATH B142)Parametric equations, polar coordinates, three dimensional analytic geometry, cylindrical and spherical coordinates, vector functions, functions of several variables, partial differentiation, max-min, Lagrange multipliers, multiple integrals and applications, integral vector calculus. MATH B242 - ELEMENTARY DIFFERENTIAL EQUATIONS (3).(Prerequisite: qualification through placement or a grade of 'C' or better in MATH B142) Ordinary differential equations of first order, higher order linear equations, Laplace transform methods, series methods; numerical solution of differential equations. Applications to physical sciences and engineering. MATH B360: History of Mathematics- (3) (Prereq: MATH B300 or consent) A survey of the historical development of mathematics.
A.5.4 Multivariate functions	MATH B240: Calculus III	Whiteboard/ calculator/ computer/ Maple® as appropriate	
A.5.5 Applications of function, geometry, and trigonometry concepts to solve problems involving calculus	MATH B141: Calculus I, MATH B142: Calculus II, MATH B240: Calculus III, MATH B242: Differential Equations	Whiteboard/ calculator/ computer/ Maple® as appropriate	
A.5.6 Historical development and perspectives of calculus including contributions of significant figures and diverse cultures	MATH B141: Calculus I, MATH B142: Calculus II, MATH B240: Calculus III, MATH B242: Differential Equations, MATH B360: History of Mathematics	Whiteboard/ calculator/ computer/ Maple® as appropriate	

A.6. Discrete Mathematics To be prepared to develop student mathematical proficiency, all secondary mathematics teachers should know the following topics related to discrete mathematics with their content understanding and mathematical practices supported by appropriate technology and varied representational tools, including concrete models:	**Required Course Number(s) and Name(s)**	**Technology and Representational Tools Including Concrete Models by Competency**	**Course Description(s)**
A.6.1 Discrete structures including sets, relations, functions, graphs, trees, and networks	MATH B174: Discrete Mathematics	Whiteboard/ calculator/computer/Maple® as appropriate	MATH B174 - DISCRETE MATHEMATICS (3).(Prerequisite: qualification through placement or a grade of 'C' or better in MATH B115)Induction, complexity, elementary counting, combinations and permutations, recursion and recurrence relations, graphs and trees; discussion of the design and analysis of algorithms. MATH B360: History of Mathematics- (3) (Prereq: MATH B300 or consent) A survey of the historical development of mathematics.
A.6.2 Enumeration including permutations, combinations, iteration, recursion, and finite differences	MATH B174: Discrete Mathematics	Whiteboard/ calculator/computer/Maple® as appropriate	
A.6.3 Propositional and predicate logic	MATH B174: Discrete Mathematics	Whiteboard/ calculator/computer/Maple® as appropriate	
A.6.4 Applications of discrete structures such as modeling and solving linear programming problems and designing data structures	MATH B174: Discrete Mathematics	Whiteboard/ calculator/computer/Maple® as appropriate	
A.6.5 Historical development and perspectives of discrete mathematics including contributions of significant figures and diverse cultures	MATH B174: Discrete Mathematics, MATH B360: History of Mathematics	Whiteboard/ calculator/computer/Maple® as appropriate	

Assessment 3: Candidate ability to plan instruction

(1)
a. Description
Teaching candidates design and implement a unit of lesson plans for teaching important mathematical ideas in a high school setting. The unit is a chapter of lesson plans for each day the candidate will be teaching, including all assessments (quizzes, unit tests) the candidate will incorporate into the unit. At least one lesson plan incorporates the investigative use of electronic technology. In their initial practicum (EDSE B490), candidates teach these units and are asked to reflect upon them.

b. Alignment between NCTM Standards and Assessment 3

Topic Addressed by Assessment 3 NCTM Standard and Indicators	NCTM Standard and Indicators
3. Content Pedagogy	3 a,b,c,e,f,g
4. Mathematical Learning Environment	4 b,c,e
5. Impact on Student Learning	5 b

c. NA

d. NA

(2) Documentation

e. Please submit the following items as your unit plan:

1. Overview (narrative or bulleted list). Create a brief (one to two pages) summary of your unit plan that includes your goals and justification for your selection of activities and teaching methods. Specifically, how does your unit conform to the process standards endorsed by NCTM? What measures are you taking to promote conceptual understanding, and how will you assess conceptual and procedural understanding? Finally, we understand that inevitably
some decisions for your unit will be dictated by school and cooperating teacher expectations. Please

address in your overview how you would change your unit plan if this were your own class.

2. Complete lesson plans for each day that you will be teaching. Use the lesson plan template that has been required for all group and individual lesson plans in class. Please be sure to indicate whether you are planning for block or traditional schedules, and always include time estimates for the major parts of your lessons. *You are required to incorporate mathematics curricula and teaching materials from print and on-line resources of professional organizations where appropriate (cite your source). At least one lesson plan should incorporate the investigative use of electronic technology (e.g., Geometer Sketchpad demonstration, graphing calculator or computer activity).*
3. Copies of all handouts that you create to support your lessons.

4. Copies of all classwork and homework assignments, completely worked out. If you are giving homework assignments out of the textbook, please include copies of the textbook pages so that we can see your choices in problems.

5. Completely worked out copies of your unit test and quizzes, with point values and scoring policies indicated. Include your rubrics for grading these assessments.

You will be evaluated on the following dimensions (see rubric for point values):

1. Conceptual understanding– the extent to which your unit addresses conceptual understanding.

2. Student engagement –the extent to which your unit elicits students' thinking, active participation, and engagement.

3. Formative and summative assessment– the extent to which your assessment plans provide usable information about student understanding and achievement that is aligned with your instructional plans.

4. Clarity – the extent to which your lesson plans are readable, clear, and easy to follow.

5. Mathematical correctness – the extent to which your unit is mathematically correct.

6. Completeness – the extent to which your lesson plans contain required elements (learning outcomes, standards alignment, materials and resources, motivation/warm up, lesson procedure (all activities clearly detailed and problems completely worked out), closure, and assignment (completely worked out).

f. Basic Rubric/ Scoring Outline-

To be refined during EDSE B490 course development

Criteria	**L1**	**L2**	**L3**	**L4**
Conceptual Understanding				
Student Engagement				
Formative and Summative Assessment				
Clarity				
Mathematical Correctness				
Completeness				

L1 (0pt)– Candidate's submission does not demonstrate sufficient understanding
L2 (1pt)– Candidate's submission provides limited understanding
L3 (2pt)– Candidate's submission demonstrates adequate understanding
L4 (3pt)– Candidate's submission demonstrates mastery of topic

g. NA

Assessment 4: Student Teaching

(1)
a. Description

The internship experience is the culmination of the teacher preparation program and represents a bridge between theory and practice. The knowledge, skills, and dispositions developed through

formal course work, observational opportunities, and the field internship experience are put into practice through an intensive practical application of professional attributes as a teacher candidate.

Assisting, Developing, and Evaluating Professional Teaching (ADEPT) legislation passed by the South Carolina Legislature, requires that certain guidelines are followed in working with student interns.

ADEPT is designed to measure teacher performance in ten ADEPT Performance Standards (APS) pertain to planning, instruction, assessment and professionalism and is carefully aligned with nationally recognized professional standards.

ADEPT evaluators are trained to evaluate candidates' performance during informal and formal observations. University supervisors and mentor teachers must attend a one day ADEPT training session (if not already trained by their school districts) and participate in an orientation program designed to prepare the university supervisor and mentor teacher to supervise and evaluate the intern. Specifically, this training session involves an overview of all the ADEPT Performance Standards and of the related teaching tasks (with evaluation instruments) that Winthrop University has designed for the internship experience. In this way, university supervisors and mentor teachers are fully aware of the relationship between the state's ADEPT system and corresponding evaluations particular to the Winthrop program. Training of mentor teachers may also be implemented within each district.

Candidates receive an introduction to ADEPT in their fall semester Field Experience. They are evaluated a minimum of two times by both the university supervisor and mentor teacher. Additionally candidates are also evaluated at midterm and at the conclusion of the field experience. During the spring semester, candidates participate in, a three day Internship Institute where they receive ADEPT training and preparation for their Internship.

University supervisors are considered to be master teachers in their area of expertise and demonstrate the professional dispositions required. Whenever possible, interns are placed under the supervision of a full-time faculty member. If a person is not a full-time faculty member, the following qualifications must be met for part-time supervision: a) former teacher and/or administrator in public school division; b) at least 5 years of successful teaching within content of supervision; c) written or verbal recommendations of former supervisors or administrative colleagues; d) current or former state teacher's license; e) endorsement in the same level and broad-subject area as intern; and f) Master's degree.

Mentor teachers who evaluate teacher candidates using the ADEPT instrument must have the following

qualifications: 1) approval by principal and district office; 2) model excellence in teaching; 3) exhibit high expectations for students; 4) demonstrate strong skills in planning, oral/written communications, collaborative decision making, judgment, and human relations; 4) possess strong instructional skills and current content knowledge; 5) Display strong skills in collaborating with other teachers and parents; 6) have received an outstanding performance evaluation for the last two years of teaching; 7) have attained continued contract status; and 8) commit to the time and effort needed to serve as a mentor.

During the internship semester, formal observations of each candidate are conducted by a university supervisor and a mentor teacher. University supervisors conduct a minimum of three formal ADEPT

observations and mentor teachers conduct a minimum of five formal ADEPT observations. In addition to formal observations, both the mentor teacher and university supervisor collaborate in the evaluation of the intern's performance at midterm and at the conclusion of the internship period. If a candidate experiences difficulty in an internship, an action plan is developed in coordination with Student Academic Services, to assist the intern in meeting expectations for improvement.

The observations and evaluations of the intern's classroom teaching performance address all but two of the ADEPT Performance Standards. APS 1, long-term planning, is one of those standards; APS 10, fulfilling professional responsibilities, is the other standard not addressed through classroom observations.

In order to fulfill APS 1 (Long-range planning), interns complete a long-range plan for mathematics. This plan spans the entire semester in which the intern is in the school setting, and includes an overview of the assessment processes in use, a description of the classroom management system, and an analysis of contextual factors (including class demographics) that influence the approach to teaching. The APS 1 assignment, based on a template provided by the state ADEPT system is utilized.

For APS 10 (Fulfilling professional responsibilities), interns complete a questionnaire (based on a template provided by the state ADEPT system) in which they reflect on their own professional involvement in terms of, for example, advocating for students, working for organizational (school) goals, and continuing to be an active learner in the profession.

b. Alignment between ADEPT and/or NCTM Standards and Assessment 4

ADEPT PERFORMANCE STANDARD	NCTM STANDARD	HOW IS DATA COLLECTED?	WHO REVIEWS DATA?	HOW IS FEEDBACK GIVEN?
APS1: Long-range Planning	3 a,b,c,e,f 4 a,b,e 5 b,c 7 b,c	Long-range Plan	University Supervisor	Assistance from mentor Verbal and Written feedback
APS2: Short Range Planning of Instruction	3 a,c,d,e,f,g 4 a,b,c,d,e 7 b,c	Teacher Work Sample Short range plans developed by interns	Mentor Teacher University Supervisor	Daily Feedback Midterm Evaluation Final Evaluation Teacher Work Sample Rubric
APS3: Planning Assessments and Using Data	3 b,f,g 4e 5c 7 b,c	Teacher Work Sample	University Supervisor & EDUC 690 Capstone instructor	Daily Feedback Midterm Evaluation Final Evaluation Teacher Work Sample Rubric
APS4: Establishing and Maintaining High Expectations for Learners	3 c,g 4 b,c,d 5 a,b,c 7 b,c	Classroom Observations Midterm Evaluation Final Evaluation	Mentor Teacher & University Supervisor	Verbal Feedback Observation Records Midterm Evaluation Final Evaluation

APS5: Using Instructional Strategies to Facilitate Learning	3 b,c,d,e,g 4 b,c,e 5 b 7 b,c	Classroom Observations Midterm Evaluation Final Evaluation	Mentor Teacher & University Supervisor	Verbal Feedback Observation Records Midterm Evaluation Final Evaluation
APS6: Providing Content for Learners	3 a,b,c,d,e 4 b,c,e 5 b 6c 7 b,c	Classroom Observations Midterm Evaluation Final Evaluation	Mentor Teacher & University Supervisor	Verbal Feedback Observation Records Midterm Evaluation Final Evaluation
APS7: Monitoring, Assessing, and Enhancing Learning	3 f 5 c 6c	Classroom Observations Midterm Evaluation Final Evaluation	Mentor Teacher & University Supervisor	Verbal Feedback Observation Records Midterm Evaluation Final Evaluation
APS8: Maintaining an Environment that Promotes Learning	3 c,f 4 a,b,c,d,e 5 a,b 6b 7 b,c	Classroom Observations Midterm Evaluation Final Evaluation	Mentor Teacher & University Supervisor	Verbal Feedback Observation Records Midterm Evaluation Final Evaluation
APS9: Managing the Classroom	3 g 4 a,d 7 b,c	Classroom Observations Midterm Evaluation Final Evaluation	Mentor Teacher & University Supervisor	Verbal Feedback Observation Records Midterm Evaluation Final Evaluation
APS10: Fulfilling Professional Responsibilities Beyond the Classroom	6 a,b,c	APS 10 (Professionalism) assignment	University Supervisor	Verbal and Written Feedback

c. NA

d. NA

(2) Documentation

e. A rich description of Internship Final Evaluation of Teaching Evaluation is provided under the description section above for this assessment. Rubrics for the evaluation will be constructed upon program implementation and will be modeled on USCB's Department of Education rubrics.

f. **ADEPT APS 1 - Domain 1: Long-Range Plan**

ADEPT Performance Standard 1

An effective teacher facilitates student achievement by establishing appropriate long-range learning goals and by identifying the instructional assessment and management strategies necessary to help all students progress toward meeting these goals.

Key Elements	**1.A**	The teacher obtains **student information**, analyzes this information to determine the learning needs of all students, and uses this information to guide instructional planning.
	1.B	The teacher establishes appropriate standards-based long-range learning and developmental **goals** for all students.
	1.C	The teacher identifies and sequences **instructional units** in a manner that facilitates the accomplishment of the long-range goals.
	1.D	The teacher develops appropriate **processes for evaluating and recording** students' progress and achievement.
	1.E	The teacher plans appropriate **procedures for managing** the classroom.

Instructions to intern: Using this template, complete a Long-Range Plan for the course/content area(s) that your unit for the Teacher Work Sample (TWS) will address. While your TWS covers two weeks within the semester, your Long-Range Plan should cover the entire semester of your internship, and the entire scope of the course/content area(s) in which your TWS is completed. This Long-Range Plan is to be submitted to your university supervisor according to the timeframe she/he has scheduled for you. **Note: The *Mathematics Teacher Secondary Internship Evaluation Scoring Rubric*, from *Domain 1: Long-Range Planning* will be used to assess your Long-Range Plan.**

Section I: Student Information (Key Element APS 1.A)

Section II: Learning and Developmental Goals (Key Element APS 1.B)

List the major goals from the course/content area(s) that you are outlining.

Goals

Section III: Instructional Units and Assessments (Key Elements APS 1.C)

*In chronological order, list the units as they will occur in this course/content area(s) in the table below. Indicate in **bold** the Unit Topic or Title that is your Teacher Work Sample.*

Unit Topic or Title	Correlated Standards	Length (# days or weeks)	Assessment(s) (e.g., projects, quizzes, chapter/unit tests, homework assignments. Include weightings, if applicable.)

Section IV: Assessment Data (Key Element APS 1.D)

Describe your methods in this course/content area(s) for analyzing, evaluating, recording, and reporting student progress and achievement.

Section V: Classroom Management (Key Element APS 1.E)

Insert your classroom management plan or rules, which should include your expectations regarding student behavior during ***instructional and non-instructional*** *procedures and routines. Highlight the specific management demands of the course/content area(s) for this Long-Range Plan.*

Instructions to University Supervisor: After evaluating the intern's Long-Range Plan (using the *Internship Evaluation Scoring Rubric,* from *Domain 1: Long-Range Planning*), circle the appropriate performance level below.

<table>
<tr><td colspan="2">Supervisor name:</td><td rowspan="2">Circle one</td><td>Exceeds Expectations</td></tr>
<tr><td colspan="2"></td><td>Meets Expectations</td></tr>
<tr><td>Supervisor signature:</td><td>Date:</td><td></td><td>Does Not Meet Expectations</td></tr>
</table>

ADEPT APS 10: Fulfilling Professional Responsibilities Scoring Rubric

Using the expectation of a second-year teacher as the definition of the performance level "*Exceeds Expectations*," use your best judgment scoring the rubric below to rate the candidate's performance on <u>each</u> ADEPT key element 10.A-E.

Key Element		Data Source	*Exceeds Expectations (ADEPT expectation of 2nd year teachers)* (3 points)	Meets Expectations (2 points)	Does Not Meet Expectations (1 point)
10. A	The candidate is an advocate for the students.	APS 10 Items 1, 2	*The candidate works effectively with colleagues to help determine and meet individual student needs, and establishes appropriate professional relationships with others outside the school to support the well-being of students.*	The candidate attempts to work with colleagues to determine and meet individual student needs.	The candidate does not work with colleagues to determine and meet individual student needs.
10. B	The candidate works to achieve organizational goals in order to make the entire school a more positive and productive learning environment for the students.	APS 10 Item 3	*The candidate is an active contributor to school initiatives, and supports school-related organizations and activities.*	The candidate attempts to contribute to school initiatives, organizations, and/or activities as appropriate given the placement.	The candidate does not contribute to school initiatives, organizations, or activities.
10. C	The candidate is an effective communicator.	*Formative Observations & Internship Midterm/Final Evaluation Reports* APS 10 Item 4	*The candidate uses clear and correct oral and written language; and communicates effectively and regularly with parents.*	The candidate uses clear and correct oral and written language; and attempts to communicate with parents.	The candidate does not consistently use clear and correct oral and written language.

10. D	The candidate exhibits professional demeanor and behavior.***	*Formative Observations & Internship Midterm/ Final Evaluation Reports*	*The candidate: maintains all required professional credentials; adheres to all Standards of Conduct for South Carolina Educators and maintains ethical standards demonstrates self-management skills (e.g., responsibility, initiative, time management, appearance) and a high quality of work (e.g., completing required tasks in an accurate, timely and effective manner).* ****** Documented on Domain 5 of the Internship Midterm/Final Evaluation Report***	The candidate: adheres to all *Standards of Conduct for South Carolina Educators* and maintains ethical standards; demonstrates some self-management skills and a high quality of work.	The candidate: adheres to all *Standards of Conduct for South Carolina Educators* and maintains ethical standards; does not demonstrate self-management skills or a high quality of work.
10. E	The teacher is an active learner.	APS 10 Items 5, 6, 7	*The candidate: accurately identifies his or her own professional strengths and challenges; sets appropriate professional development goals; regularly seeks out, participates in, and contributes to activities that promote professional collaboration and that support his or her continued professional growth and development.*	The candidate: is able to identify professional strengths and challenges; and sets some appropriate professional development goals.	The candidate: is not able to identify his or her own professional strengths and challenges; and does not attempt to set professional development goals.

ADEPT Domain 5: Professionalism
APS 10: Fulfilling Professional Responsibilities

Candidate:	Semester:	Year:	Subject:
School/District:	Cooperating Teacher:	Supervisor:	Grade Level(s):

ADEPT Performance Standard 10		
An effective teacher is an ethical, responsible, contributing, and ever-learning member of the profession.		
Key Elements	**10. A**	The teacher is an **advocate** for the students.
	10. B	The teacher works to achieve **organizational goals** in order to make the entire school a positive and productive learning environment for the students.
	10. C	The teacher is an **effective communicator**.
	10. D	The teacher exhibits **professional demeanor** and behavior.
	10. E	The teacher is an **active learner**.

Instructions to the teacher candidate: *In narrative format, under each numbered item below, please reflect on your professional performance (APS 10.A, B, C, and E). Provide specificity and clear examples. Responses to each of the following items below should be limited to 100 words or less.*

1. Describe ways you collaborate with faculty in the school to help determine and meet individual student needs. (APS 10.A)

2. Describe two ways in which you demonstrate that all students can learn. (APS 10.A)

3. Describe the extent to which you actively participate in your school's professional learning community (e.g., attends and contributes to grade level meetings, faculty meetings, etc.). Your response should include the ways your participation helps make the school a positive and productive learning environment for all students. (APS 10.B)

4. The teacher candidate should be an effective communicator with faculty, staff, students, and parents. Elaborate on the variety of ways that you have communicated with the students' parents and attach a copy of a recent written communication to those parents (e.g., parent conferences, letters/newsletters, notes, e-mails, etc.). (APS 10.C)

5. In reference to the *ADEPT Performance Standards*, describe your professional strengths. How have you built on these strengths so far, and how do you plan to do so in the future? (APS 10.E)

6. In reference to the *ADEPT Performance Standards*, what are your professional challenges? How do you plan to address these challenges? (APS 10.E)

7. Based on your professional self-assessment, describe one important professional goal to support your professional growth (e.g., member of professional organization, participation in professional associations, courses, conferences, workshops, seminars, etc.). Explain why. (APS 10.E)

g. NA

Assessment 5: Candidate Effect on Student Learning

(1)
a. Description
The teaching intern is required to complete an Teacher Work Sample (TWS) during the internship which demonstrates proficiency in short and long range planning for instruction and analysis of student learning. The TWS is prepared under the guidance of the mentor teacher, the university supervisor, and the EDSE B490 instructor. The university supervisor and the EDSE B490 instructor are responsible for grading the work sample using the Teacher Work Sample (TWS) Rubric. In addition**,** the TWS provides evidence of candidates' mastery of the Conceptual Framework Organizing Concepts: III-The Curriculum and IV-The Teacher and the NCTM Standards. The TWS is designed to document the specific activities interns engage in to help students learn.

b. Alignment between NCTM Standards and Assessment 5

Topic Addressed by Assessment 5	NCTM Standard and Indicators
3. Content Pedagogy	3 b,f,g
4. Mathematical Learning Environment	4 b,c,d,e
5. Impact on Student Learning	5 a,b,c
6. Professional Knowledge and Skills	6 b,c
7. Secondary Mathematics Field Experiences and Clinical Practices	7 a,b,c

c. NA

d. NA

(2) Documentation

e. The TWS contains four sections (*Unit Context, Assessment Plan, Design for Instruction, Analysis of Student Learning Over Time*) identified by research and best practice as fundamental to improving student learning. Each section contains a task, a description of requirements, and a rubric that defines various levels of performance. These rubrics will be used to evaluate the TWS.

Candidates are required to teach a comprehensive unit. For the unit, candidates will describe contextual factors, identify learning goals based on the state content standards, create an assessment plan designed to measure student performance before (pre-assessment), during (formative assessment), and after (post-assessment) the unit, and plan for their instruction. After they teach the unit, the will analyze student assessment data and then reflect upon and evaluate their teaching as related to student learning.

f. *Description of Teacher Work Sample (TWS)*
The TWS details the development and implementation of the *TWS*. The *Teacher Work Sample Rubric* will be used to assess the *TWS*. These documents are below.

Teacher Work Sample

University of South Carolina Beaufort
Department of Mathematics and Computational Science

Introduction

The Teacher Work Sample (TWS) provides you with a structured experience to document the impact of your teaching on learners in your classroom. Knowing how to effectively document your progress with students is critical for teacher accountability. The TWS is designed to document the specific activities interns engage in to help students learn. These activities provide evidence that you can apply in the classroom what you have learned in your course of study in the university and the Departments of Education and Mathematics and Computational Science.

Analysis of the strengths and weaknesses of the TWS will be used for instructional and programmatic improvements. Annually, data will provide the Department with important information that we use to improve our programs. For all instructional and programmatic improvements, your confidentiality will be maintained. Candidates' work will not be identified by name in any samples or publications.

Material for the TWS was adapted from The Renaissance Partnership for Improving Teacher Quality, a Title II federally funded project with offices at Western Kentucky University. The Teacher Work Sample was also modified from Winthrop University's *Teacher Work Sample* (2011).

Assignment

There are five dimensions identified by research and best practice as fundamental to improving student learning that are contained in the TWS. Each dimension contains a task, a description of requirements, and a rubric that defines various levels of performance. These rubrics will be used to evaluate your TWS.

You are required to teach a comprehensive two-week unit. To provide a brief overview, you will describe contextual factors, identify unit goals based on South Carolina Academic and NCTM Standards, create an assessment plan designed to measure student performance before (pre-assessment), during (formative assessment), after (post-assessment), and plan for your instruction. **One lesson must also include integration of technology.** After you teach the unit, you will analyze student assessment data and reflect upon and evaluate your teaching as related to student learning.

Format

- **Overview.** The TWS product should conform to the following outline:

  D.1 Contextual Factors
  D.2 Unit goals
  D.3 Assessment Plan and Pre-assessment Results
  D.4 Lesson Plans
  D.5 Post-assessment Plan and Results

- **Tables and assessment instruments**. Tables and assessment instruments are required as part of the TWS document. Each table should be consecutively labeled with a number and a short description (e.g., Table 4: Assessment Plan Overview). Computational tables must be completed in Excel®.

- **Narratives.** A **suggested** page length for your narrative is provided at the beginning of each dimension. You have some flexibility for length across components, but the total length of your written narrative **(excluding lesson plans and assessments)** should not exceed **14 word-processed pages in Microsoft Word**, double-spaced in **12-point font**, with 1-inch margins, and a header with name and page number. Narratives within lesson plans may be single-spaced.

- **References and credits.** Make sure to cite any information or ideas you obtain from published material or the Internet using the American Psychological Association (APA) style. APA guidelines can be located at the following website: http://www.apastyle.org/ and in the manual entitled *Publication Manual of the American Psychological Association Sixth Edition (2009) Washington, DC: American Psychological Association*).

- **Anonymity.** In order to ensure the anonymity of students in your class, do not include actual student names or identification (e.g., initials) or their work samples in any part of your TWS. Identify students by number (e.g., 1, 2, 3, etc.) only.

- **Mechanics.** Throughout the TWS, mastery of English language usage and writing skills and appropriate format are expected. Please note that mechanics are a part of the rubric score for each dimension.

- **Submission.**
  - You will submit the final copy of your TWS to LiveText. Include a title page, Table of Contents, and summary Reference page. All pages should be consecutively numbered from Dimension 1 through Dimension 5. ***Make sure that the LiveText submission is your final draft and includes all parts of the TWS clearly following the TWS Outline***.

  - Throughout the semester, individual dimensions of the TWS will be submitted in a variety of ways to your University Supervisor. As the dimension is assigned, you will be given submission directions.

Instruction for and Grading of the TWS

EDSE B490 University Supervisors and the EDSE B490 professor will provide instruction for Dimensions 1 - 5. In addition, cooperating teachers will provide guidance throughout the TWS. University Supervisors will grade the TWS with input from the EDSE B490 professor. A grading rubric for each dimension will be used to grade the TWS. There are a total of 5 dimensions and 5 rubrics. **To pass the TWS (and EDEC B469), you must score at least Acceptable on all 5 dimensions.** The final score on each dimension is the earned score based on the descriptors in the rubrics. University Supervisors will forward final TWS grades to the EDSE B490 professor.

Note: To pass EDSE B490 teacher candidates must score at least *Meets Expectations* on all ADEPT Domains included on the *Internship Midterm/Final Evaluation Report* and *Acceptable* on all 5 dimensions of the *TWS*.

Rewriting: You are permitted no more than one rewrite of each dimension. After you receive feedback on a dimension from your University Supervisor, you have the option of rewriting the dimension following the time frame established. If the first submitted product is deemed not gradable by your University Supervisor, he/she will score that dimension(s) as unacceptable. If any component is deemed unacceptable, regardless of your overall score, the unacceptable component must be

rewritten. The next submitted version is considered the one rewrite. The final score on each dimension is the earned score based on the descriptors in the rubrics.

Timeline for Teacher Work Sample by Dimension

The TWS is a recurrent process that requires time before, during, and after instruction; you cannot wait until you are finished teaching the unit to begin the TWS. This timeline is designed to guide you through the dimensions related to the planning, implementation and reflection for your unit. Your University Supervisor and cooperating teacher will give guidance as needed.

Cooperating teachers should always play a part in helping you develop appropriate lesson plans with appropriate assessments. In addition, cooperating teachers are particularly valuable in giving you information on students in the classroom for input on the contextual factors dimension and helping you make sure that your TWS goal(s) fit into the overall instructional program of the classroom.

Article I. Suggested Timeframe Table

	Dimension	Sequence
1	Contextual factors	**Before** unit starts (your first task)
2	Unit goals	**Before** unit starts
3.1	Pre-assessment	**Before** unit starts and after unit goals developed: pre-assessment instrument designed, approved, and administered.
3.2	Assessment plan and pre-assessment results	**Before** unit starts, after pre-assessment administered: pre-assessment data and analysis used to inform instruction; unit assessment plan developed. **During** unit: adjustments made.
4	Detailed lesson plans	**Before** unit starts and **during** unit
5	Post-assessment plan and results	**After** unit: post-assessment data and final analysis

Article II. Dimension 1. Contextual Factors

Suggested Page Length: 4-5 pages including Contextual Factors Table

Task
Discuss information about the learning-teaching context and how it will inform your instruction.

Through a variety of sources, such as conversations with school personnel, surveys of students and the cooperating teacher, build a contextual factors' background. After the information is gathered, complete a contextual factors table and write a narrative:

- Briefly describe relevant and most current characteristics of the **school** (e.g. AYP status and goals relating to student performance, parent involvement).
- Next, describe resources available in the schools and community relevant to your students and to your instruction (e.g. after school programs, sports programs, parks, libraries).
- Describe the physical **classroom** and the environmental demands (see glossary) that may affect student learning.
- Using a variety of documented sources, complete the Contextual Factors Table.

- Describe how specific relevant characteristics of **students** in your class and their functioning on critical assessments impact your decisions when designing your instruction and assessments.

- Use information from the Contextual Factors Table (see next page) and other sources to provide specific information on these categories. For example, if you have students who are identified as special education or gifted/talented in your class, note the number of students and type of exceptionalities and relevant Individual Education Plan (IEP) goals. If you have students who are native speakers of other languages, note the number of students and their approximate level of language proficiency [ex.: Limited English Proficiency (LEP) vs. English Language Learners (ELL), Gifted and Talented (G/T)] including all factors relevant to your classroom, and write a narrative. Keep in mind that this information is for the class for which you are teaching the unit.

- Describe general and specific implications for instruction and assessments throughout the work sample. Base these implications on information about the considerations (e.g. instructional, language, communication, social, behavior accommodations) needed for specific students. This is the bridge between the contextual factors and the work sample's content. Specify how the information you have gathered might affect your instruction and assessments.

Reference the sources you used to obtain this information. (Note that sources such as school documents are more reliable sources than your personal observations.) Along with in text citations, you should have a Reference page at the end of this section. However, as you add Dimensions to your TWS, the Reference page should move to the last page of the TWS document.

Table #1: Contextual Factors Table

***Student Number**	***Relevant Cultural Background Info ****	***Special Interests or Hobbies (Student Interview, Interest Inventory)***	***Math Level Scores and Test Used***	***Differentiation Needs (IEP, ELL, G/T)***	***Other Relevant Student Information***

**Devise own code not related to student SSN or official school ID.*

***Maintaining an asset perspective (see glossary) of your students, include meaningful information regarding culture/ family, that might help you better meet the students' needs (e.g. travel experiences, living in other states/countries, family professions, cultural traditions, beliefs).*

Article III. Dimension 2. Unit Goal(s)

Suggested Page Length: 2 pages including unit goals chart aligned with state and/or national standards and unit rationale

Task
The unit goal(s) guide the planning, delivery, and assessment of your unit. The unit goal(s) should be significant in that goals (see glossary) reflect all of the big ideas or concepts of the unit. The Unit goal(s) should be measurable, challenging, varied, and appropriate. From your unit goal(s), you will later formulate lesson objectives, which are more narrow and specific, but aligned with the achievement of the unit goal(s).

- Identify the South Carolina Academic Standard(s) or Common Core State Standard(s) and/or NCTM standards that will direct your unit. Use the standard(s) to create your unit goal(s). Limit the number of unit goals to <u>no more than 4</u>. If you have more than one unit goal, number your unit goals so they may be easily referenced throughout the unit. South Carolina Academic and Common Core State Standards list indicators after each standard. In some cases, those indicators may be used as unit goals.

- Consult your University Supervisor and cooperating teacher to help you select appropriate standards. They will guide you in developing the unit goal(s).

- Create a table where the standard(s) is/are listed with the related unit goal(s).

- <u>Construct a unit rationale</u>. In a paragraph, explain <u>why</u> students should learn about the topic of the unit. Describe real-life application (see glossary) for the learning. Merely stating that the lesson is part of the standards is not sufficient. Why should students be required to learn this material—what, beyond the standards, warrants the inclusion of the material in the unit? Explain how this information will connect to your students' lives.

Dimension 3. Assessment Plan and Pre-assessment Results

Suggested page length: 4-5 pages including table of pre-assessment results and table of assessment plan overview, plus a copy of pre-assessment.

Task
Design a pre-assessment (see glossary) and analyze the resulting student data. Use this information to develop an assessment plan for monitoring student progress toward the unit goal(s). Design **multiple** assessments that are aligned with the unit goal(s) to assess student learning during and after instruction. These assessments should authentically (see glossary) measure student learning and may include performance-based tasks, paper-and-pencil tasks, observation checklists, and/or others.

1. Designing a Pre-Assessment

Design a diagnostic pre-unit assessment that you will administer to your class **before** teaching the new unit you are planning. This brief assessment is a systematic way to gather information on what your students already know about the unit and what skills they already have related to the unit.

- Prioritize the content from your unit goal(s).

- Design a ***brief*** measure of the highest priority content central to mastering the unit goal(s). Your measure(s) should address both demonstration of *understanding/knowledge* **and** the performance of key *skills* addressing a range of understanding and skills from easy to difficult associated with the unit. **Label** each item or element of the pre-assessment with the unit goal(s) it measures. The assessment should contain directions for students to follow as well as point values for each question type.

- The pre-assessment should be reviewed by your cooperating teacher prior to the submission to University Supervisor. The pre-assessment should be submitted to your University Supervisor prior to the administration of the assessment and with ample time to make necessary corrections.

Design a simple, clear scoring method. For example, use 3, 4, or 5 items per task, so you can convert scores easily to percentage correct. Other hints: Be sure to include *difficult* knowledge and skills to avoid a ceiling effect (see glossary). Also steer clear of time-consuming tasks such as essay questions or lengthy multiple choice tests on material you do not expect students to know yet. This helps prevent wasting time and avoids pain or embarrassment for students. Clearly explain how you will evaluate or score the pre-assessment **(including mastery levels as defined on cooperating teacher's grading scale)** to determine if the students' performance meets the unit goal(s). **Include all scoring instruments such as rubrics, observation checklists, rating scales, item weights, and/or answer keys.**

2. Pre-Assessment Results and Analysis

Summarize the results of the pre-assessment and analyze the data to develop an assessment plan for monitoring student progress toward the unit goal(s).

- Create a table (example below) in Excel® showing the pre-assessment results **for the unit goal(s) or each unit goal**. (Complete only columns 1 & 2). Compute the averages and report classroom results for each unit goal. **You will need a separate table for each unit goal.**

- Analyze the data and link to contextual factors to find patterns of student performance. Describe the patterns you find and how this information will guide specific instructional decisions. **If necessary, revise the unit goal(s), pre-assessment and/or instructional decisions based on pre-assessment results.** Describe the reasoning behind the revision of the goal and instructional revisions. Using your pre-assessment data and the Contextual Factors Table, list individual students and ideas for differentiation (see glossary). Make sure to include any applicable IEP, ELL, reading, math, communication difficulties or extensions for highly motivated and/or advanced students in your accommodations.

Table #: Results for Unit Goal # (Excel® Table)

Column 1 *Student Number*	***Column 2*** *Differentiation Needs (ELL, IEP, G/T)*	***Column 3*** *Pre-unit measure (% of total)*	***Column 4*** *Post-unit measure (% of total)*	***Column 5*** *Change in Percentage Points*	***Column 6*** *Was unit goal met? (Yes or No)*
# of 1st student					
(List each student # on a separate line; list ALL students)					
From Col 1: Total number of students:		***Column 2: Average pre-unit score (%):***	***Column 3: Average post-unit score (%):***	***Column 5: Total number of students making gains:***	***Column 6: Total number of students meeting this unit goal:***

- Provide an overview of your assessment plan in a table (refer to example below). List the assessments by unit goal used to judge student performance **before (pre-), during,** and **after (post-)** instruction. The purpose of this table is to illustrate the alignment between unit goals and assessments. Your formative (see glossary) and post-assessments (see glossary) will depend on the size and scope of your unit and the results of your pre-instruction assessment.

Table #: Assessment Plan Overview

Unit goal Addressed	Pre-Instruction Assessment Description(s)	During Instruction Assessment (Formative) Description(s)	Post-Instruction Assessment Description(s)
Unit goal 1			
Unit goal 2			
Unit goal 3			
Unit goal 4			

Dimension 4. Detailed Lesson Plans

Suggested Page length: 3- 4 pages plus 5 representative lesson plans including lesson assessments

Task

You must include at least 5 representative lesson plans for your unit. Each unit goal should be represented in at least one lesson plan. In addition, at least one lesson plan will demonstrate use of technology by teacher candidate and/or students *.

Make a table (example below) that shows where, within the unit, these 5 lessons fall **(and bold each one of the five lesson plans only)**. Include all lessons taught during the unit in the table highlighting those included in the TWS. Along with your table, in a brief paragraph, explain why you chose these 5 lessons as representative lessons.

Table #: Lesson Plan Overview

Lesson #	Unit Goal Addressed	Brief Description

Your submitted lesson plans will follow the outline table. **Make sure that all assessments used are submitted with each lesson plan.**

Each lesson plan must follow the format for the Lesson Plan template and include *all components:*

- **Related state, CCSS and/or national standards and specific objectives** of the lesson with **aligned assessment(s).**
- **Relevance to the unit goal(s)**
- **Materials/Resources/Equipment/References** needed for the lesson (for teacher and students).
- **Introductions and Procedures/ steps of instruction including content** written in detail so anyone could teach your lesson.
- **Differentiation of Instruction (accommodations/modifications/extensions) -** Information on student needs and previous assessment results from Dimension 1 (Contextual Factors) will inform your differentiation and/or interventions (accommodations/modifications/extensions)**.** List these interventions by student number within each lesson plan. As much as possible, the interventions should be specific to each plan. Students with IEPS or who are ELL or GT should have specific

accommodations/modifications/extensions. **It may be appropriate to consult with other school personnel (special education teacher, ELL teacher) in creating interventions for special populations.**

- **All assessments,** formative or summative, formal or informal for each less are listed and attached.

- **Analysis of Student Learning and Reflection (refer to questions posed on Lesson Plan Components for each)** on each lesson that includes:

  1. **Use of data to summarize student performance and analyze** whether students learned what was intended.
  2. Explanation of what you will do to **increase student learning in future instruction** through interventions (accommodations/modifications, extensions with accommodations/modifications, etc.)

  ✓ Examples of instructional technology might include computer hardware and software, the Internet,
  "smart" board, digital cameras, digital camcorders, digital audio players, heart-rate monitors, midi keyboards, digital microscopes, handheld computers/calculators, and data collection probes.

  ✓ Examples of technology integration might include students using multimedia software to create presentations; students using spreadsheet/graphing software analyze data; students using digital video to tell a story; students with special needs/ELL using assistive technology to meet curricular objectives.

Using a word processor to type lesson plans, showing a video or using the overhead projector, or candidate e-mail communication are ***not*** considered instructional technology for this assignment.

Article IV. Dimension 5. Post-Assessment Plan and Results

Suggested Page length: 3- 5 pages including pre- and post-table(s) plus copy of post-assessment

Task

Analyze your assessment data, including pre-/post-assessments and formative assessments, to determine students' progress toward meeting the unit goal(s). You will also describe instructional decision making related to unit activities, modification, and technology.

- Design and attach a post-assessment for your unit topic. Make sure that you **align** and **label** each item of the post-assessment with the unit goal(s) and state the point value. Include prompts and/or student directions. Clearly explain how you evaluated or scored the post-assessment. Review the **mastery level** established in Dimension 3 to determine if the students' performance met the unit goal(s). Include all scoring instruments such as rubrics, observation checklists, rating scales, item weights, tests, and/or **answer key(s)**.

- Describe the post-assessment and how it is aligned with your unit goal(s). If the post-assessment is different than the pre-assessment, explain the differences and the rationale for modifying. If the post-assessment is the same, justify this decision.

- For each unit goal, copy and insert the table from Dimension 3. The completed table (example below) should include the following information for all students in the class: student number (Column 1), differentiation needs (Column 2), pre-unit measure (Column 3), post-unit measure (Column 4), gains (Column 5), and whether the Unit goal was met for each student (Column 6). Use percent of total correct for Columns 3 and 4. The purpose of this table is to provide an overview of the impact of your instruction on students' attainment of **each** unit goal.

Table #: Results for Unit Goal # [Sample]

Column 1 Student Number	**Column 2** Differentiation Needs (IEP, ELL, G/T)	**Column 3** Pre-unit measure (% of total)	**Column 4** Post-unit measure (% of total)	**Column 5** Change in percentage points	**Column 6** Was Mastery of the Unit Goal met?
Student #1	IEP	25%	70%	45%pts	No
Student #2	GT	80%	100%	25% pts	yes
Student #3	IEP	50%	80%	30%pts	no
Student #4	GT	60%	65%	5%pts	no
Student #5	NONE	70%	85%	15%pts	yes
Student #6	NONE	77%	80%	3%pts	no
Student #7	ELL	45%	60%	15%pts	no
Student #8	ELL	70%	88%	18%pts	yes
Student #9	GT	100%	100%	0%pts	yes
Student #10	NONE	85%	88%	3%pts	yes
Column 1 Total number of students:		**Column 3** Average pre-unit score (%):	**Column 4** Average post-unit score (%):	**Column 5** Total number of students making gains:	**Column 6** Total number of students meeting this unit goal:

- Write a **summary of the class progress** to address the following prompts:
  1. Use the overall pre- and post-assessment data to describe the impact on student learning of the entire unit. Make sure to reference the data to support your conclusions.
  2. On which unit goal or lesson objective did students do well? Why do you think so?
  3. On which unit goal or lesson objective did students do poorly? Why do you think so?
  4. On the unit goal or lesson objective on which students did poorly, what would you change instructionally and why to ensure mastery by all students?
  5. Using your Excel® data table, choose one learning goal and **sort the data by mastery or gains.** Include sorted table(s) and discuss individual students who met mastery (85%) or did not meet mastery or who made significant or minimal gains.

Table# : Results for Unit Goal# Sorted by Mastery Sample

Student Number	ELL, IEP, GT	Pre-unit assessment (% of total)	Post-unit assessment (% of total)	Changes in percentage points	Was Mastery of the Unit Goal Met?
Student #6	None	77%	80%	03%pts	no
Student #4	GT	60%	65%	05%pts	no
Student #7	ELL	45%	60%	15%pts	no
Student #3	IEP	50%	80%	30%pts	no
Student #1	IEP	25%	70%	45%pts	no
Student #9	GT	100%	90%	-10%pts	yes
Student #10	None	85%	88%	03%pts	yes
Student #5	None	70%	85%	15%pts	yes
Student #8	ELL	70%	88%	18%pts	yes
Student #2	GT	80%	100%	20%pts	yes

6. Discuss interventions (accommodations/modifications/extensions) you used for students including those described in Dimension 1 and others. Explain which were most effective, which were least effective, and why you think so.

7. Instructional Technology:
   a. Looking over your entire unit, list all of the ways you and/or your students used instructional technology, including any Assistive Technology.
   b. Reflect on the benefits and drawbacks of the technology you chose to use.

IMPORTANT: Mastery of English language usage and writing skills and appropriate format are expected.

Glossary

Accommodations – Support provided to diverse learners needed to successfully demonstrate learning. Accommodations should not change expectations or standards and/or assessment.

Align – Showing direct connection between two ideas.

Asset perspective - An asset approach does not start with what is lacking or problematic. It focuses on what capacities the individual has, that are assets. It is referred to as the glass "half-full" approach.

Authentic – Activities and assessments that resemble real world tasks.

Ceiling effect - Occurs when a student attains the maximum score or attains the maximum score or "ceiling" on an assessment and thus prevents the appraisal of the full extent of the student's knowledge.

Contextual Factors – Description of pertinent community/school/classroom characteristics that may influence teaching and learning.

Differentiate – Recognizing students varying background knowledge, readiness, language, preferences in learning, interests, and reacting responsively in designing instruction. Differentiated instruction is a process to approach teaching and learning for students of differing abilities in the same class. The intent of differentiating instruction is to maximize each student's growth and

individual success by meeting each student where he or she is, and assisting in the learning process (http://www.cast.org/publications/ncac/ncac_diffinstruc.html).

Environmental Demands - The environment demands that can or may interfere with learning. One such demand can be the climate of the classroom, including temperature, noise, uncomfortable seating arrangements, and/or students in groups that place their back to the teacher and/or board. In addition, students working in small groups can present an environmental demand that is difficult for some group members who may have difficulty concentrating on their group's discussion since they are distracted by conversations of other groups.

Formative Assessment – Measurement of student learning taken during unit instruction in order to make necessary changes to teaching to ensure mastery of unit goals. Feedback from formative assessment should also be provided to students with opportunity for improvement.

Interventions – Accommodations or modifications made to instruction and assessment to meet the needs of diverse learners.

Unit goals – Big ideas or concepts of the unit; driven by state or national academic standards.

Lesson Objective – A measureable statement of student achievement that is within a specific lesson that leads to achieving unit goal. Includes a behavior, condition, and criterion for mastery.

Modifications – Changes made to standards and/or assessment in order to meet the needs of diverse learners that alter typical expectations or standards for the class. Modifications are made when expectations go beyond ability level of student.

National Standards – Often used in K-12 content areas because of the complexity in teaching multiple grade levels.

Pre-Assessment – Administered prior to teaching in order to measure students' prior knowledge of content. Data should be used to plan instruction and measure individual needs.

Post-Assessment – Often referred to as "summative assessment." Provides information regarding students' understanding of unit goals after unit is taught.

Rationale – Reason behind decisions made; should be convincing and related to contextual factors, application to real life, and/or educational research.

Real-life Application – How content can be related to everyday life for students.

State Content Standards – Although based upon national standards, state standards are specific to each state. These are used in the core academic areas of English Language Arts, Mathematics, Science, and Social Studies in grades kindergarten through 12.

Teacher Work Sample Rubric

D1 Rubric:

Teacher Candidate's Name: _____

Instructor: _____

Dimensions	**Exemplary**	**Acceptable**	**Unacceptable**
1. Contextual Factors **Grades are calculated using the following point scale:** **E= 12- 14 pts** **A= 7- 11 pts** **U= 0- 6 pts** ***Aligned with:*** APS 1.A APS 2.A	**2 points per element**	**1 point per element**	**0 points per element**
	Comprehensive description of the relevant and current characteristics of the **school**	General comprehensive description of the relevant and current characteristics of the **school**.	Minimal description of the relevant and current characteristics of the **school**
	Comprehensive description of resources available in the school and community relevant to students in instruction	General comprehensive description of resources available in the school and community relevant to students in instruction	Minimal or no description of resources available in the school and community relevant to students in instruction
	Contextual Factors Table with all required elements.	Contextual Factors Table with most required elements.	Incomplete or no Contextual Factors Table
	Comprehensive description of environmental and physical demands of the **classroom** that may affect learning	General description of environmental and physical demands of the **classroom** that may affect learning.	Minimal description of environmental and/or physical demands of the **classroom** that may affect learning
	Comprehensive description of specific relevant **student** characteristics based on contextual factors' data.	General description of specific relevant **student** characteristics based on contextual factors' data	Minimal or no description of specific and relevant **student** characteristics is provided.

	Comprehensive description of general strategies for unit instruction and assessment based on contextual factors.	General description of general strategies for unit instruction and assessment based on contextual factors	Minimal description of general and strategies for instruction and assessment based on contextual factors.
	Demonstrates mastery of English language usage and writing skills with no mechanical errors. All sources cited in the narrative are referenced. References are correctly cited using APA.	Demonstrates mastery of English language usage and writing skills with few mechanical errors. Most sources cited in the narrative are referenced. References are correctly cited using APA.	Errors in English language usage and writing skills interfere with readability. Few or no sources cited in the narrative are referenced. References are not cited using APA.

D2 Rubric:

Teacher Candidate's Name: _____

Instructor: _____

Dimension	**Exemplary**	**Acceptable**	**Unacceptable**
	2 points per element	**1 point per element**	**0 points per element**
2. Unit goals **Grades are figured using the following point scale:** **E= 7- 8 pts** **A= 4- 6 pts**	Unit goal(s) is/are aligned with state and/or national standards and reflect all of the big ideas of the unit.	Unit goal(s) is/are aligned with state and/or national standards and reflects some of the big ideas of the unit.	Unit goal(s) is/are unclear and is/are not properly aligned with appropriate state and/or national standards.
	Unit goal(s) is/are measurable, challenging, and appropriate.	Unit goal(s) is/are measurable. Unit goal(s) is/are somewhat challenging and appropriate.	Unit goal(s) is/are not measurable, challenging and/or appropriate.

U= 0- 3 pts **Aligned with:** APS 2.A	Compelling rationale for unit content beyond inclusion in standards.	Adequate rationale for unit content beyond inclusion in standards.	Vague rationale for unit content.
	Demonstrates mastery of English language usage and writing skills with no mechanical errors.	Demonstrates mastery of English language usage and writing skills with few mechanical errors.	Errors in English language usage and writing skills interfere with readability.

D3 Rubric:

Teacher Candidate's Name: _____

Instructor: _____

Dimension	**Exemplary**	**Acceptable**	**Unacceptable**
	2 points per element	**1 point per element**	**0 points per element**
3. Assessment plan and results **Grades are figured using the following point scale:** **E= 13-16 pts** **A= 8- 12 pts** **U= 0- 7 pts** ***Aligned with:*** APS 2.C APS 3.A APS 3.B	Content of pre-assessment targets highest priority elements of the unit goal(s). If appropriate, alternative pre-assessment and/or administration is addressed. Each item/element is labeled by unit goal and point value.	Minor changes to the pre-assessment needed to address high priority content. If appropriate, alternative pre-assessment and/or administration is addressed. Most items/elements are labeled by unit goal and point value	Significant changes to the pre-assessment needed to address content. If appropriate, alternative pre-assessment and/or administration is needed, but not addressed. Items/elements are not labeled by unit goal and/or point value
	Items (or elements) for unit goal(s) in pre-assessment are brief; they address Excellent range of knowledge and skills from basic to challenging	Items (or elements) for unit goal(s) in pre-assessment need minor modifications; **or** range of knowledge and skills needs expanding	Items (or elements) for unit goal(s) in pre-assessment need significant modifications **and** range of knowledge and skills need significant expansion

	Scoring method for pre-assessment is quick, easy, and yields organized, meaningful information. Mastery level specified. Directions included. Scoring instrument(s) is/are included	Scoring method for pre-assessment is too time-consuming **or** yields confusing information. Mastery level vague. Directions included. Scoring instrument(s) is/are included	Scoring method for pre-assessment is too time-consuming **and** yields confusing information. No mastery level included. No directions included. Scoring instrument(s) is/are not included.
	Appropriately labeled table includes all required elements for this dimension. Correct computation of averages.	Appropriately labeled table includes all required elements for this dimension. Minor problems with computation of averages.	Inappropriately labeled table with some required elements missing. Incorrect computation of averages (NCTM 3c).
	Significant patterns accurately analyzed and described based upon both pre-assessment data and contextual factors	Patterns generally analyzed and described based upon pre-assessment data or contextual factors.	Patterns vaguely described but are not based upon pre-assessment data or contextual factors.
	Specific instructional decisions linked to analysis.	Instructional decisions linked to analysis, but lack specificity.	Instructional decisions are generic.
	Overview of assessment plan contains unit goal(s) that is/are assessed before, during, and after instruction with multiple types of assessment.	Overview of assessment plan contains unit goal(s) that is/are assessed before, during, and after instruction.	Overview of assessment plan does not assess unit goal(s) before, during, and after instruction.

	Demonstrates mastery of English language usage and writing skills with no mechanical errors.	Demonstrates mastery of English language usage and writing skills with few mechanical errors.	Errors in English language usage and writing skills interfere with readability.

D4 Rubric:

Teacher Candidate's Name: _____

Instructor: _____

Dimensions	**Exemplary**	**Acceptable**	**Unacceptable**
	2 points per element	**1 point per element**	**0 points per element**
4. Detailed lesson plans and reflections **Grades are figured using the following point scale:** **E= 15- 18 pts** **A= 9- 14 pts** **U=0- 8 pts** ***Aligned with:*** *APS 2.B* *APS 5.A* *APS 5.B* *APS 7.A*	Well-developed table of lessons, with all components, and compelling rationale for selecting the lessons (if applicable).	Table of lessons, with all components, and rationale for selecting the lessons (if applicable).	Missing components in the table of lessons and/or missing rationale for selecting the lessons (if applicable).
	All state standards and/or specific learning objectives aligned with assessments. All assessments listed and attached.	State standards and/or specific learning objectives generally aligned with assessments. All assessments listed and are attached.	State standards and/or specific learning objectives are not aligned with assessments. Assessments not listed and/or not attached.
	Lessons show Excel®lent rationale/relevance to the unit goal(s).	Lessons show general rationale/relevance to the unit goal(s).	Lessons show little or no rationale/relevance to the unit goal(s).
	All needed materials listed. Procedures logical, in detail, and clearly written.	Most needed materials are listed. Most procedures logical, in some detail, and adequately written.	Few or no needed materials are listed. Procedures are illogical, lack detail, and/or vaguely written.

APS 7.B	Interventions related closely to individual student needs as outlined in Contextual Factors and specific to the individual lesson plans.	Most interventions related to individual student needs as outlined in Contextual Factors and most are specific to the individual lesson plans.	Little or no interventions related to individual student needs as outlined in Contextual Factors and few or none are specific to the individual lesson plans.
	Complete description of the use of technology in at least one lesson.	General description of the use of technology in at least one lesson.	Vague or missing description of the use of technology in at least one lesson.
	Reflections accurately use student assessment data to summarize and analyze student performance.	Most reflections accurately use student data to summarize and analyze student performance.	Reflections vaguely and/or inaccurately and/or do not use student data to summarize and analyze student performance.
	Reflections suggest specific changes to increase student learning through accommodations/modifications/ extensions.	Reflections suggest general changes to increase student learning through accommodations/modifications/extensions.	Reflections vaguely suggest or do not address changes to increase learning through accommodations/modifications /extensions.
	Demonstrates mastery of English language usage and writing skills with no mechanical errors.	Demonstrates mastery of English language usage and writing skills with few mechanical errors.	Errors in English language usage and writing skills interfere with readability.

D5 Rubric:

Teacher Candidate's Name: _____

Instructor: _____

Dimension	Exemplary	Acceptable	Unacceptable
	2 points per element	**1 point per element**	**0 points per element**
5. Post-assessment plans and results **Grades are figured using the following point scale:** **E= 19-24 pts** **A= 12- 18 pts** **U= 0- 11 pts** ***Aligned with:*** ***APS 3.C***	Post- assessment is attached and all items aligned with unit goal (s).	Post-assessment is attached and most items aligned with unit goal(s).	Post-assessment not attached or some post-assessment items lack alignment.
	Scoring and criteria for mastery clearly explained. All scoring instruments included.	Scoring and criteria for mastery lack specificity. All scoring instruments included.	Scoring and explanation of criteria for mastery are not identified or are inappropriate. Some scoring instruments included.
	Logical and complete rationale for relationship to pre-assessment.	Vague but plausible rationale for relationship to pre-assessment.	Rationale for relationship to pre-assessment is missing.
	Appropriately labeled table includes all required elements for this dimension. Correct computation of data.	Table includes most required elements for this dimension. Computation of data with minor errors.	Inappropriately labeled tables with some required elements missing. Incorrect computation of data.
	Prompt 1: Specific analysis of overall student learning of the entire unit which thoroughly references data to support conclusions.	**Prompt 1:** General analysis of student learning of the entire unit which references some data to support conclusions.	**Prompt 1:** Superficial analysis of overall student learning of the entire unit which thoroughly references data to support conclusions.
	Prompt 2: Detailed description of unit goal/ lesson objective on which students did well. Thoughtful analysis of why these results occurred.	**Prompt 2:** General description of unit goal/lesson objective on which students did well. Some analysis of why these results occurred.	**Prompt 2:** Superficial description of unit goal/lesson objective on which students did well. Little or no analysis of why these results occurred.

	Prompt 3: Detailed description of unit goal/lesson objective on which students did poorly. Thoughtful analysis of why these results occurred.	**Prompt 3:** General description of unit goal/lesson objective on which students did poorly. Some analysis of why these results occurred.	**Prompt 3:** Superficial description of unit goal/lesson objective on which students did poorly. Little or no analysis of why these results occurred.
	Prompt 4: Detailed description of instructional changes needed to ensure mastery by all students on the most difficult goal/lesson objective.	**Prompt 4:** General description of instructional changes needed to ensure mastery by all students on the most difficult goal/lesson objective.	**Prompt 4:** Superficial description of instructional changes needed to ensure mastery by all students on the most difficult goal/lesson objective.
	Prompt 5: Excel® data table sorted by either mastery or gains and displayed correctly. Detailed discussion of individual students who did not meet mastery or who made significant or minimal gains.	**Prompt 5:** Excel® data table sorted by either mastery or gains and displayed correctly. Some discussion of individual students who did not meet mastery or who made significant or minimal gains.	**Prompt 5:** Excel® data table not sorted by either mastery and/or gains or displayed incorrectly. Little or no discussion of individual students who did not meet mastery or who made significant or minimal gains.
	Prompt 6: Detailed description of interventions (accommodations /modifications/extensions) including those described in D.1. Specific explanations of which were most effective and least effective on individual student learning.	**Prompt 6:** General description of interventions (accommodations/ modifications/extensions) including those described in D.1. Some explanation of which were most effective and least effective on individual student learning.	**Prompt 6:** Superficial description of interventions (accommodations/modifications/extensions) including those described in D.1. Little or no explanation of which were most effective and least effective on individual student learning.

	Prompt 7 Complete lists of use of multiple types of instructional technology by both teacher and students. Thoughtful reflection on benefits and/or drawbacks of technology chosen.	**Prompt 7**: General lists of use of instructional technology by teacher and/or students. Some reflection on benefits and/or drawbacks of technology chosen.	**Prompt 7**: Incomplete lists or limited use of instructional technology by teacher and/or students. Little or no reflection noted on benefits and/or drawbacks of technology chosen.
	Demonstrates mastery of English language usage and writing skills with no mechanical errors.	Demonstrates mastery of English language usage and writing skills with few mechanical errors.	Errors in English language usage and writing skills interfere with readability.

g. NA

Assessment 6: Technology

(1)

a. Description of Assessment

Students will create an original interactive whiteboard lesson including video clip based on (at least) 2 MCTM standards.

b. Alignment between NCTM Standards and Assessment 6

Topic Addressed by Assessment 6	NCTM Standard and Indicators
4. Mathematical Learning Environment	4e
5. Impact on Student Learning	5b
6. Professional Knowledge and Skills	6c

c. NA

d. NA

(2) Documentation

e. EDCI B243: Technology Resources for Teaching- Final Assignment: Original Interactive Whiteboard lesson with Video Clip

Students must choose between Smart or Promethean software (both have been taught in class) and create a minimum 4 slide presentation.

Slide 1: Title, name, date

Slide 2: Standards addressed (2 only)

Slide 3: Streamline video clip inserted

Slide 4: Assessment of concept taught in video

There should be colorful backgrounds, graphics, animations, and the video must correctly teach the concept of the standards. The student will present it to the class, with a small group of students acting as mock secondary level mathematics students. The creation, presentation, and assessment of the lesson will be assessed based on the rubric below.

f. Scoring Rubric

	Exceeds Expectations (4 pts)	**Meets Expectations (3 pts)**	**Developing (1 pt)**	**Does not meet (0 pt)**
DESIGN: All characters are correctly typed. There are no spelling, spacing, or grammar errors. Capitalization is appropriate (1.000, 10%)	No spelling, grammar, spacing or capitalization errors are evident. Interactive features included in assessment page. Colorful graphics and backgrounds are used. Animations are inserted.	One to three problems with either grammar or spelling. Spacing is not consistent with examples provided. Capitalization used inappropriately. Graphics, text and backgrounds are acceptable, but not engaging. No animations.	Four to six errors present. Spacing is not consistent with proper sentence structure. Text is written in all capitals without need. Little or no use of graphics. No animations.	More than seven spelling, spacing, grammar and capitalization errors. Little or no effort to use color, graphics, or engaging text.

CONTENT: Candidate selects subject and researches and cites material. Appropriate, words describe the subject or concept of element that is being taught. Lesson plan framework used (5.000, 50%)	Candidate follows the directions of the assignment, and downloads a short video clip (less than 5 minutes) that clearly illustrates an NCTM standard. Candidate illustrates the presentation with appropriate graphics. The standard is given, then re-stated so that students can understand what is being taught. Candidate uses an opening slide, has good, flowing organization to material presented. The last slide assesses the concept being taught.	Candidate follows some of the directions given in class, but not all. The video clip chosen is not an appropriate one to illustrate the standard. Candidate uses few or inappropriate graphics to illustrate the presentation. The standard is given, but not re-stated for the mock students. Candidate uses no opening slide, has a limited vocabulary, and lack smoothness in the organization of material presented.	Candidate does not follow directions as to length or topic. The standard is not indicated, or does not relate at all to the video. Candidate creates an Interactive Whiteboard presentation of less than 4 slides to present material. Candidate uses little or no or inappropriate graphics to illustrate the presentation. Candidate demonstrates a poor vocabulary, and lack of organization of material presented.	Candidate does not produce an interactive whiteboard lesson with the content assigned.
PRESENTATION: Candidate teaches class on subject using Interactive whiteboard consisting of at least 4 slides. (3.000, 30%)	Candidate does not read from slides. Candidate shows confidence in using board to advance presentation. Candidate completes presentation of at least 4 slides with conclusion and opportunity for questions.	Candidate reads from at least half the slides. Candidate shows little confidence in using board to advance presentation. Candidate completes presentation of 4-10 slides with poor conclusion and/or no opportunity for questions.	Candidate reads from most of the slides. Candidate shows no confidence in using the board to advance presentation. Candidate completes presentation of less than 4 slides with no conclusion or opportunity for questions.	Candidate does not present to the class.

ASSESSMENT: The final slide consists of some type of interactive assessment for the concept taught. (1.000, 10%)	Candidate creates an engaging, creative assessment that is student-centered, and accurately assesses concepts taught in the video.	Candidate creates an assessment for the final slide that is somewhat engaging, but does not fully assess the desired concept.	Candidate does not create an interactive assessment and concept covered is not accurately or thoroughly measured.	There is no assessment slide.

g. NA

Assessment 7: History and Development of Mathematical Thought

(1)
a. Description
In this assessment students research and present the chronological development of specific content areas (Number & Operation, Algebra & Trig, Geometry & Measurement, Data Analysis, Statistics & Probability, Discrete Mathematics, Calculus) in mathematics emphasizing significant developments and diverse cultures/mathematicians contributing to each field. The purpose of this assignment is for students to select and describe what they consider to be three significant steps/events/contributions in the historical development of each of the above content areas. This assessment specifically addresses the candidate's knowledge of the historical development of the mathematical content areas as well as cultural contributions.

b. Alignment between NCTM Standards and Assessment 7

Topic Addressed by Assessment 7	NCTM Standard and Indicators
1. Content Knowledge	1 a (1.2,1.5,2.7,3.10,4.6,5.6,6.5)
2. Mathematical Practices	2 a,b,d,e,f
4. Mathematical Learning Environment	4 c,e

c. NA

d. NA

(2) Documentation

e. Historical Development Assignment- Detailed description

A major objective of MATH B360 is for students to understand the development of mathematical thought and major historical accomplishments in the content areas of:
(1) Number & Operation
(2) Algebra & Trigonometry
(3) Geometry & Measurement
(4) Data Analysis, Statistics & Probability
(5) Discrete Mathematics
(6) Calculus.

Learning Outcomes for the course include:

- Students will understand the chronology of mathematics, beginning with the origin of mathematics in the civilizations of antiquity and continuing until the present day.
- Students will gain knowledge of the major accomplishments of mathematics (including discoveries and proofs) as well as knowledge of the people who made the accomplishments and the conditions under which they did so.

The Historical Development Assignment includes students selecting and describing what they consider to be three significant steps/events/contributions in the historical development of each of the above content areas.

For each of the three significant steps/events/contributions chosen, the following are to be addressed:

1. What? (Description of the step/event/contribution)
2. Who? (Specific individuals or cultures involved in the development)
3. Where? (Location(s))
4. When?
5. How did this affect/improve/change the mathematics of the time?
6. Why do you consider this to be one of the most significant steps in the development of this content area?

f. Scoring Rubric:
For each content area above, the scoring rubric will be used to evaluate the student's presentation/description.

	4 pts	**2-3 pts**	**1 pt**	**0 pts**
What/who/where/ when Description	Thorough and accurate description of the event(s) that included all pertinent information, including contributions from diverse cultures.	Partial description of the event(s) that included most of the pertinent information.	Weak or inaccurate description of the event(s) that was missing much of the pertinent information.	Not included.
Effect on Mathematics of the Time	Response indicated a full understanding of the event(s) and how it impacted the mathematics of the time.	Response indicated a partial understanding of the event(s) and how it impacted the mathematics of the time.	Response indicated a weak understanding of the event(s) and how it impacted the mathematics of the time.	Not included.

Significance	Response indicated a full understanding of the historical significance of the event.	Response indicated a partial understanding of the historical significance of the event.	Response indicated a weak understanding of the historical significance of the event.	Not included.

g. NA

Assessment 8: Interdisciplinary Training Project

(1) a. Description

The Final Project Presentation will be completed as part of the required course MATH/CSCI 419: Mathematical Modeling for Mathematics majors in the Secondary Mathematics Certification track. The objectives of mathematical modeling are to describe key characteristics of real world phenomena and study their interaction and dynamics, using tractable mathematical formulations. The theoretical and numerical analysis of mathematical models provides insight and precision to understand underlying mechanisms of a phenomenon.

This course is designed to introduce the teaching candidates to the mathematical models, analysis and computational methods to study complex systems in science and/or engineering. This course utilizes graphical, numerical, and mathematical analysis techniques to describe and investigate experimental data and complex systems in science and/or engineering. Emphasis is on the advanced mathematical modeling techniques and computer programming to explore applied problems as part of a collaborative effort.

Learning about mathematical modeling is an important training to an application-oriented mathematical and computational expertise, and prepares the student capable of mastering the challenges of our modern interdisciplinary world. For instance, the course may include mathematical modeling of the infectious diseases, which remain a leading cause of morbidity and mortality worldwide. Mathematical models are used to illustrate the transmission of the disease and to evaluate the potential impact of the control strategies. In particular, mathematical models have made considerable contributions to our understanding of the HIV infection, immune responses, and antiretroviral treatment. Moreover, modeling was utilized in the recent swine flu pandemic (H1N1) to monitor the spread of infection and the potential impact of control strategies, such as school closures and vaccination.

Students who complete the course with a grade of C or better should be able to:

a) Use the principles and methods of mathematical modeling for studies of complex systems in
b) science and/or engineering

c) Develop mathematical models from real-world descriptions of problems
d) Apply various mathematical and numerical techniques to analyze the models
e) Interpret the results obtained from mathematical analysis and numerical simulations and relate them to real-world implications
f) Collect and understand journal articles to study a particular question
g) Develop their intuition and scientific outlook

h) Use LaTeX - the universal software for typesetting mathematics
i) Use a computer software, such as MAPLE® and/or MATLAB®, for symbolic computation and plotting

b. Alignment between NCTM Standards and Assessment 8

Topic Addressed by Assessment 8	NCTM Standard and Indicators
2. Mathematical Practices	2 a,c,d,e,f
4. Mathematical Learning Environment	4e

c. NA

d. NA

(2) Documentation

e. Detailed Description

Significant Course Components:

A. HOMEWORK & SCENTIFIC ARTICLE DISCUSSIONS

1. Homework will assigned and no late homework will be accepted
2. Instructor will also assign journal article readings. Students will read the articles prior to the scheduled meeting times
3. During the class meetings students will engage in the article discussions, ask questions, and talk about possible model extensions

B. MIDTERM EXAM

1. One closed-book in class midterm exam is based on theoretical materials covered in class
2. Exam is given at the beginning of class. If you have a documented accident or emergency that prevents you from taking a test, you must notify me BEFORE class and the missed exam can be rescheduled for a specific date by an instructor
3. Disputed problems on an exam must be discussed with me on the day exam is returned
4. Any indication of cheating on an exam will result in an automatic zero for that grade. In addition, all students involved will be reported to the proper USCB authority

C. FINAL PROJECT PRESENATION (Key Assessment 8)

1. Each group consists of 2 to 3 students. The topic of the project will be chosen by students or assigned by the instructor.

2. Each group need submit a written report in the form of a scientific research paper

3. and give a presentation (20 minutes per person presentation + 5 minutes for questions). Each student will be graded individually based on their presentation according to the rubric below.

4. All members of each group should participate equally.

5. The report/presentation should include: background of the studied system, motivation of the study, model formulation, analytical results of the model, numerical simulations of the model, biological/medical/engineering implications, and possible model extensions.

f. Scoring Procedure

GRADING PROCEDURE
Your final grade will be calculated from the following:

A. Homework and scientific articles discussions 35% of the final grade
B. Midterm exam 30% of the final grade
C. Final Project Presentation 35% of the final grade (scored according to the rubric below)

INDIVIDUAL SCORING RUBRIC FOR THE FINAL PROJECT PRESENATION

Criteria	**Excellent (20 points)**	**Good (15 points)**	**Needs improvement (5 points)**	**Missing (0 points)**
Presentation Style	Clear, persuasive, logical and well organized with little to no errors	Good overall; minor issues with clarity, logic, or level of detail; few errors	Poorly presented. overall confusing, lacking necessary details; excessive or significant errors	Unprepared in all aspects
Introduction/ Background	Clearly articulated why this project is important and gave detailed background information	Good effort to describe project's importance /background; could be stated more clearly	Little to no introduction /background or not-understandable	No introduction
Materials and Methods	Clearly explained the model and its underlying assumptions	Good effort to explain the model and its underlying assumptions	Little to no explanation of the model and its underlying assumptions	No explanation of the model
Results and Conclusion	Gave precise results and derived conclusions from understanding from modeling.	Gave some of the results and derived conclusions from understanding from modeling.	Gave vague description of results and conclusions	No results and no conclusions
Presentation Time-Management	Strong evidence of thought or presentation time-management planning	Good evidence of thought or presentation time-management planning	Little evidence of thought or presentation time-management planning	No evidence of planning

g. NA

SECTION V - USE OF ASSESSMENT RESULTS TO IMPROVE PROGRAM

This section is not applicable for program consideration.

SECTION VI - FOR REVISED REPORTS OR RESPONSE TO CONDITIONS REPORTS ONLY

This section is not applicable for program consideration.

End.