

PROGRAM MODIFICATION PROPOSAL

Name of Institution
University of South Carolina Aiken

Name of Program (include concentrations, options, and tracks)
Bachelor of Science-Major in Chemistry with a Concentration in Computational Chemistry

Program Designation

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

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

- Yes
 No

Proposed Date of Implementation
August 2020

CIP Code
400501

Delivery Site(s)
University of South Carolina Aiken campus

Delivery Mode

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

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

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Institutional Approvals and Dates of Approval

Dept.	13 September 2018
College Council	17 October 2018
Courses and Curricula Committee	19 November 2018
Faculty Assembly	5 December 2018
Chancellor	6 January 2019

BOT

21 June 2019

Background Information

Provide a detailed description of the proposed modification, including its nature and purpose and centrality to institutional mission. (1500 characters)

The Department of Chemistry and Physics at USC Aiken has offered our Bachelor of Science-Major in Chemistry degree for over 20 years. During this time, we have constantly updated our curriculum, but the degree has remained the same. Within the last ten years, in an attempt to further demonstrate the quality of this degree, our department sought national approval by the American Chemical Society (ACS). In Spring 2014, we received that approval and, in Spring 2015, we certified our first graduates with our ACS approved degree. Due to the growth and popularity of the sub-discipline, biochemistry, we sought approval for a modification of our nationally approved BS degree that had a concentration in biochemistry. This was approved and offered in Fall 2017. This added an attractive option for our students that seek employment in a biochemistry-related field or those seeking admittance to professional school. We also have a BS degree in chemistry with a concentration in engineering that received CHE approval in 2019.

The Comp. Sci. program at USC Aiken was recently redesigned to give students their choice of two new degree concentrations: cybersecurity and applied gaming. Developing these concentrations involved the creation of new courses that have a large amount of overlap with the field of computational chemistry. The development of a chemistry program that complements the new computer science programs would enhance our university's strength in applied computer sciences.

List the objectives of the modified program. (1500 characters)

PROGRAM MODIFICATION PROPOSAL

Computational chemistry is an increasingly important branch of chemistry that aids the work of experimental chemists by interpreting their results and predicting new avenues of study. Chemists with expertise in computational chemistry find employment in several rising industries including pharmaceutical/health, materials engineering, and catalyst development. Students who complete a chemistry degree with the computational concentration will be well-placed to pursue graduate studies in computational chemistry or to enter the job market. Because they still take the required chemistry classes as part of the major, all graduates will possess the “wet lab” skills that are valued by local industry employers.

Underlined objectives are specifically for students in the computational chemistry concentration:

Outcome 1: Knowledge and Comprehension

Students will recognize and distinguish the fundamental principles of the chemical sciences including the theory and practice of the discipline.

Students will recognize and distinguish the theory and practice of: a). Analytical Chemistry, b). Inorganic Chemistry, c). Organic Chemistry, d). Physical Chemistry, e). Biochemistry.

Students will recognize and distinguish between computational methods and the areas of study they best apply to.

Outcome 2: Application

Students will apply theory to practice participating in a senior research project.

Students will apply theory to practice participating in laboratory courses for all five subfields of chemistry.

Students will apply their computational chemistry knowledge to each of the five subfields to answer discipline-specific questions.

Students will demonstrate proficiency in using computers and other information technology during the senior research project and will demonstrate laboratory skills appropriate to the practice of chemistry.

Outcome 3: Communication

Students will communicate clearly in speech and writing.

PROGRAM MODIFICATION PROPOSAL

PROGRAM MODIFICATION PROPOSAL

Assessment of Need

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

Out of the 46 public and private colleges and community colleges in SC, we were not able to find any institutions that offer a nationally approved B.S. degree in chemistry with a concentration in computational chemistry. To allow students to be more competitive for chemical industry jobs or acceptance into graduate school, we would like to offer this concentration. Adding this concentration will increase our department's degree offerings from three to four. This will increase our institution's science offerings and bring us in line with top programs across the state and nation. This degree option will also strengthen our relationship with the American Chemical Society, which is the only national organization for chemists. Our department graduates 8-12 graduates a year. This is more than double the national average for programs our size. All of our graduates have a nationally certified degree in chemistry from ACS when they graduate from USC Aiken. Over 90% of our graduates find employment in sciences or find acceptance into graduate school within 9 months of graduation. This concentration would be part of a nationally certified degree and would help strengthen our graduation statistics by allowing these students to seek opportunities in chemical industry.

A search on Indeed.com on September 10, 2018, key word chemist, yielded 112 chemistry related jobs in industry in South Carolina and 159 related jobs in Georgia.

Will the proposed modification impact any existing programs and services at the institution?

Yes

No

If yes, explain. (1000 characters)

PROGRAM MODIFICATION PROPOSAL

List of Similar Programs in South Carolina

Program Name	Institution	Similarities	Differences

No undergraduate computational chemistry degree tracks were found in a survey of the colleges and universities of South Carolina. This would be the first of its kind in the state.

PROGRAM MODIFICATION PROPOSAL

Description of the Program

Projected Enrollment						
Year	Fall Headcount		Spring Headcount		Summer Headcount	
	New	Total	New	Total	New	Total
2020-2021	2	2	2	2	NA	NA
2021-2022	2	4	2	4	NA	NA
2022-2023	2	6	2	6	NA	NA
2023-2024	2	8	2	8	NA	NA
2024-2025	2	8	2	8	NA	NA

Curriculum

Attach a curriculum sheet identifying the courses required for the program.

Curriculum Changes

Note: Complete this table only if there are changes to the curriculum.

Courses Eliminated from Program	Courses Added to Program
	CHEM A350 Computational Modeling (1)
	MATH A174 Discrete Mathematics for Computer Science (3)
	CSCI A125 Introduction to Computer Science (3)
	CSCI A145 Introduction to Algorithm Design 1 (4)
	CSCI A146 Introduction to Algorithm Design 2 (4)
	CSCI A275 Physics Engine Integration (3)

PROGRAM MODIFICATION PROPOSAL

Faculty

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

We already have computer science faculty in the Department of Mathematical Sciences. All of the courses we propose for this concentration are either currently being taught on a regular basis by the faculty in this department, or will be taught by faculty hired as a result of new faculty searches carried out by the Department of Mathematical Sciences. There is room to add students into these classes from this new degree program. No additional faculty are need.

Resources

Identify any new library/learning resources, new instructional equipment, and new facilities or modifications to existing facilities needed to support the modified program. (2000 characters)

PROGRAM MODIFICATION PROPOSAL

Financial Support

Estimated New Costs by Year						
Category	1st	2nd	3rd	4th	5th	Total
Program Administration	NA	NA	NA	NA	NA	NA
Faculty and Staff Salaries	NA	NA	NA	NA	NA	NA
Graduate Assistants	0	0	0	0	0	0
Equipment	0	0	0	0	0	0
Facilities	0	0	0	0	0	0
Supplies and Materials	0	0	0	0	0	0
Library Resources	0	0	0	0	0	0
Other*	0	0	0	0	0	0
Total	0	0	0	0	0	00
Sources of Financing						
Category	1st	2nd	3rd	4th	5th	Total
Tuition Funding	20796	41592	62388	83184	83184	291144
Program-Specific Fees	0	0	0	0	0	0
State Funding (i.e., Special State Appropriation)*	0	0	0	0	0	0
Reallocation of Existing Funds*	0	0	0	0	0	0
Federal Funding*	0	0	0	0	0	0
Other Funding*	0	0	0	0	0	0
Total	20796	41592	62388	83184	83184	291144
Net Total (i.e., Sources of Financing Minus Estimated New Costs)	20796	41592	62388	83184	83184	291144

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

PROGRAM MODIFICATION PROPOSAL

Budget Justification

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

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

Tuition is \$5,199/full time semester. Year 1 tuition is \$5,199 x 2 students x 2 semesters = \$20,796, and so on until we reach a proposed steady-state of 8 students each year.

There are no new equipment, facility, or faculty costs to initiate and establish this degree program.

Evaluation and Assessment

Will any of the proposed modification impact the way the program is evaluated and assessed?

Yes

No

If yes, explain. (1000 characters)

PROGRAM MODIFICATION PROPOSAL

Will the proposed modification affect or result in program-specific accreditation?

Yes

No

If yes, explain; if the modification will result in the program seeking program-specific accreditation, provide the institution's plans to seek accreditation, including the expected timeline for accreditation. (500 characters)

Will the proposed modification affect or lead to licensure or certification?

Yes

No

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

The addition of the computational chemistry concentration will strengthen our certification standing with the American Chemical Society (ACS). USC Aiken's B.S. degree in chemistry is approved by the American Chemical Society. USC Aiken is one of only ten institutions in the state that offers a B.S. degree in chemistry that is nationally approved by the American Chemical Society. USC Aiken is the smallest institution in South Carolina to have this national approval by ACS.

PROGRAM MODIFICATION PROPOSAL

PROGRAM MODIFICATION PROPOSAL

Teacher or School Professional Preparation Programs

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

Yes

No

If yes, complete the following components.

Area of Certification

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