PROGRAM MODIFICATION PROPOSAL FORM

Name of Institution: University of South Carolina Columbia

Briefly state the nature of the proposed modification (e.g., adding a new concentration, extending the program to a new site, curriculum change, etc.):
The purposes of this modification are to:

1. Change the name of the concentration in Pharmacy Administration to Pharmaceutical Outcomes Sciences and specify areas of specialization within the Pharmaceutical Outcomes Sciences concentration.
2. Consolidate concentrations in Medicinal Chemistry, Pharmacology, and Pharmaceutics into Drug Discovery and Biomedical Sciences (this concentration includes areas of emphasis in Biomedicinal Chemistry, Synthetic Medicinal Chemistry, Pharmaceutics, and Pharmacology)
3. Correct the CHE Inventory to remove the joint with MUSC designation as both institutions have been offering the program separately for some time.

Current Name of Program (include degree designation and all concentrations, options, and tracks):
Ph.D. in Pharmaceutical Sciences with concentrations in Pharmacy Administration; Medicinal Chemistry; Pharmacology; and Pharmaceutics

Proposed Name of Program (include degree designation and all concentrations, options, and tracks):
Ph.D. in Pharmaceutical Sciences with concentrations in 1. Pharmaceutical Outcomes Sciences and 2. Drug Discovery and Biomedical Sciences

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 currently qualify for supplemental Palmetto Fellows and LIFE Scholarship awards?

- ☐ Yes
- ☒ No

If No, should the program be considered for supplemental Palmetto Fellows and LIFE Scholarship awards?

- ☐ Yes
- ☒ No

Proposed Date of Implementation: Fall 2022

CIP Code: 512003
Current delivery site(s) and modes: 51102
Proposed delivery site(s) and modes: 51102

Program Contact Information (name, title, telephone number, and email address):
C.E. Reeder, RPh, PhD, Professor and Director of Outcomes Research
803-777-4151 or reeder@cop.sc.edu

Institutional Approvals and Dates of Approval:

College of Pharmacy: 9/9/2021
Graduate Council Sciences Committee: 12/10/2021
Graduate Council: 12/13/2021
Board of Trustees Academic Excellence and Student Experience Committee: 2/18/2022 (expected)
Board of Trustees: 2/18/2022 (expected)

Background Information

Provide a detailed description of the proposed modification, including target audience, centrality to institutional mission, and relation to strategic plan.

The proposed modifications will clarify, simplify, and increase the flexibility of the existing program as well as reflect a more contemporary view of the goals and objectives of the program. The program leading to the degree of Doctor of Philosophy in Pharmaceutical Sciences with a concentration in Pharmaceutical Outcomes Sciences is designed for students who wish to pursue advanced work in preparation for careers in teaching and research, the pharmaceutical industry, health care consulting, or government. The concentration in Drug Discovery and Biomedical Sciences is designed to provide research training which encompasses the understanding of disease mechanisms and drug toxicity and the design and development of pharmaceutical and anti-cancer agents. This training in the physical and biological sciences applies to health-related research, enabling degree holders to pursue careers in academia, pharmaceutical and biotechnology industry, or government agencies. To achieve these objectives, the program provides an advanced, specialized education and intensive training in research methods applicable to pharmacy practice and research. More specifically, the program is designed to:

- provide a thorough knowledge and understanding of the major theoretical disciplines underlying the student's field of specialization.
- develop the skills, professional ethics, and competence required to design, execute, and evaluate creative and meaningful research in the student's field of specialization.
- promote individual programs of study which encourage students to focus their research and teaching interests and expertise to better prepare them for successful roles as researchers, educators, and policy makers.

Assessment of Need

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

The proposed modifications will clarify, simplify, and increase the flexibility of the existing program as well as reflect a more contemporary view of the goals and objectives of the program. In addition, the change to the name of the concentration in Pharmacy Administration to Pharmaceutical Outcomes Sciences is needed because Pharmacy Administration is a legacy term that no longer describes the content and focus of the department's teaching and research. The Ph.D. in Pharmaceutical Sciences prepares the graduate for numerous careers in academia, health care consulting, and the pharmaceutical industry. The program is designed to meet the specific needs and objectives of the student and provide a strong foundation of course work and experiences in the areas of pharmaceutical sciences research. In addition to the core coursework, students select areas of specialization or emphasis to develop additional expertise. The program has a strong emphasis on developing skills in quantitative and qualitative data analysis, and large data management. The program uses a multidisciplinary approach in teaching and research activities.

Transfer and Articulation
Identify any special articulation agreements for the modified proposed program. Provide the articulation agreement or Memorandum of Agreement/Understanding.
None

Description of the Program

Projected Enrollment						
Year	Fall Headcount		Spring Headcount		Summer Headcount	
	New	Total	New	Total	New	Total
2022	0	5	0	5	0	5
2023	0	7	0	7	0	7
2024	0	9	0	9	0	9
2025	0	11	0	11	0	11

Explain how the enrollment projections were calculated.
Total enrollment estimates based on program history, current faculty capacity, and departmental strategic plan. The program admits 3 to 4 new students each year and likewise expects to graduate 3 to 4 each year. We do not anticipate additional new enrollment as the result of this program modification.

Curriculum

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

Curriculum Changes

Courses Eliminated from Program	Courses Added to Program	Core Courses Modified
	PHAR 749 Introduction to Implementation Science	
	PHAR 743 Grant Writing	

	PHAR 750 Introduction to Pharmacoepidemiology	

New Courses

List and provide course descriptions for new courses.

- PHAR 749 - Introduction to Implementation Science
  A range of theories and methods to identify determinants, develop implementation strategies, and evaluate outcomes of evidence-based health-related programs, interventions, and policies to ensure effective, safe, equitable, and quality care will be presented.
- PHAR 743 -Grant Writing
  Basic components of a competitive grant proposal will be presented including common pitfalls in grant writing and submission. The process of writing effective grant applications will be reviewed and practiced and strategies better position applicants to obtain NIH funding will be presented.
- PHAR 750 -Introduction to Pharmacoepidemiology
  Didactic lectures and discussions involving content from relevant textbooks and research literature to gain knowledge of the principles of pharmacoepidemiology, research design, and statistical techniques used in pharmacoepidemiologic studies.

Similar Programs in South Carolina offered by Public and Independent Institutions

Identify the similar programs offered and describe the similarities and differences for each program.

The Ph.D. in Pharmaceutical Sciences is unique in the state of South Carolina. Other programs offer majors in health policy, public health, and health care administration, but none of these programs have a focus on evaluating the clinical, economics and humanistic outcomes associated with medication utilization. This program provides an advanced, specialized education and intensive training in research methods applicable to pharmacy practice and research. The program was previously offered as a joint program by UofSC and the Medical University of South Carolina (MUSC) via the SC College of Pharmacy (SCCP) that was dissolved in 2016. Although this program is no longer a joint degree with MUSC, both institutions remain collaborators in providing appropriate expertise to educating students pursuing this Ph.D. Faculty from both schools may sit on students' dissertation committees and students from both schools may complete research with faculty from either school as well.

Program Name and Designation	Total Credit Hours	Institution	Similarities	Differences
None				

Faculty

State whether new faculty, staff or administrative personnel are needed to implement the program modification; if so, discuss the plan and timeline for hiring the personnel. Provide a brief explanation of any personnel reassignment as a result of the proposed program modification.

No new faculty, staff or administrative personnel are needed to implement the program modification.

Resources

Identify new library, instructional equipment and facilities needed to support the modified program.

No new library, instructional equipment and facilities needed to support the modified program

Library Resources: No new resources needed. Current library resources will be sufficient to support this program modification.
Equipment: No new equipment needed.
Facilities: No new facilities needed. The current classroom and office spaces will continue to be utilized.

Impact on Existing Programs
Will the proposed program impact existing degree programs or services at the institution (e.g., course offerings or enrollment)? If yes, explain

☐ Yes

☒ No

Financial Support

Estimated Sources of Financing for the New Costs						
Category	**1st**	**2nd**	**3rd**	**4th**	**5th**	**Total**
Tuition Funding	$0	$0	$0	$0	$0	$0
Program-Specific Fees	$0	$0	$0	$0	$0	$0
Special State Appropriation	$0	$0	$0	$0	$0	$0
Reallocation of Existing Funds	$0	$0	$0	$0	$0	$0
Federal, Grant, or Other Funding	$0	$0	$0	$0	$0	$0
Total						
Estimated New Costs by Year						
Category	**1st**	**2nd**	**3rd**	**4th**	**5th**	**Total**
Program Administration and Faculty and Staff Salaries	$0	$0	$0	$0	$0	$0
Facilities, Equipment, Supplies, and Materials	$0	$0	$0	$0	$0	$0
Library Resources	$0	$0	$0	$0	$0	$0
Other (specify)	$0	$0	$0	$0	$0	$0
Total	$0	$0	$0	$0	$0	$0
Net Total (i.e., Sources of Financing Minus Estimated New Costs)	$0	$0	$0	$0	$0	$0

Budget Justification
Provide a brief explanation for all new costs and sources of financing identified in the Financial Support table.

As a modification in name and program organization, no financial impact is expected. No new faculty, staff or administrative personnel are needed to implement the program modification, nor will any new library, instructional equipment and facilities be needed to support the modified program. In addition, we do not anticipate any new enrollment as a result of this modification to better clarify the areas of concentration for the program.

Evaluation and Assessment

Program Objectives	Student Learning Outcomes Aligned to Program Objectives	Methods of Assessment
Gain the required knowledge of the theories and methods in the core areas of pharmaceutical outcomes research.	Demonstrate knowledge and application of the theories, principles, and methods underlying the pharmaceutical sciences.	Satisfactory completion of all required and elective courses. Satisfactory completion of qualifying and comprehensive examinations.
Be able to conduct and disseminate research that advances the state of knowledge in the field of inquiry.	Identify pertinent research problems and formulate a research plan.	Satisfactory completion of analytical courses, graduate seminars, research methods and grant writing classes, and defense of research proposal.
	Critically analyze relevant literature and communicate scientific findings through oral presentations.	Satisfactory completion of grant writing class, seminar presentations and abstract/publication submissions.
	Generate and analyze original research and communicate findings to the scientific community.	Satisfactory completion and defense of dissertation; presentation of original research findings at professional and scientific meetings; publication of research findings in relevant journals.

Will any the proposed modification impact the way the program is evaluated and assessed? If yes, explain.

☐ Yes

☒ No

Will the proposed modification affect or result in program-specific accreditation? If yes, explain; and, if the modification will result in the program seeking program-specific accreditation, provide the institution's plans to seek accreditation, including the expected timeline.

☐ Yes

☒ No

Will the proposed modification affect or lead to licensure or certification? If yes, identify the licensure or certification.

☐ Yes

☒ No

Explain how the program will prepare students for this licensure or certification.

If the program is an Educator Preparation Program, does the proposed certification area require national recognition from a Specialized Professional Association (SPA)? If yes, describe the institution's plans to seek national recognition, including the expected timeline.

☐Yes

☐No

Curriculum Outline

Degree Requirements

The Ph.D. in Pharmaceutical Sciences offers two areas of concentration: Drug Discovery and Biomedical Sciences (DDBS) and Pharmaceutical Outcomes Sciences (POS). Each concentration requires a minimum of 60 hours beyond the baccalaureate degree or a minimum of 30 hours beyond the master's degree (DDBS concentration) or a minimum of 34 hours beyond the master's degree (POS concentration) as approved by advisement. At least 12 credit hours of dissertation preparation are required. The Ph.D. degree requirements include an admission-to-candidacy examination, a comprehensive examination, and a dissertation.

In the Department of Drug Discovery and Biomedical Sciences

1. A research advisor must be chosen by the end of the first year.

2. Admission to candidacy must occur by the end of the second year, and includes the following:

a. Submission of a doctoral program of study form. Satisfactory completion of all coursework taken in the first two years will be evaluated by the committee.

b. Submission of a written initial research proposal, followed by an oral presentation and defense of the proposal to the dissertation committee.

3. The comprehensive written and oral examination must be completed by the end of the third year.

4. A written dissertation, along with an oral presentation and defense, is required for the completion of the Ph.D. degree.

In addition to the general requirements listed above, candidates for the Ph.D. degree with a concentration in DDBS are required to complete four departmental seminar courses.

Ph.D. Drug Discovery and Biomedical Sciences (DDBS) Concentration (60 Hours Minimum Post-Baccalaureate)

Required Courses

Course	Title	Credits
PHAR 700	Principles of Pharmacology, Medicinal Chemistry, and Pharmaceutics	4
PHAR 701	Current Topics in Pharmaceutical Sciences	4
PHAR 712A	Seminar in Pharmaceutical Sciences [1]	1
PHAR 712B	Seminar in Pharmaceutical Sciences [1]	1

PHAR 712C	Seminar in Pharmaceutical Sciences [1]	1
PHAR 712D	Seminar in Pharmaceutical Sciences [1]	1
Select 12 hours of electives[2]		12
Total Credit Hours		**24**

[1] A maximum of 4 hours credit can be earned for PHAR 712.

[2] Electives will be chosen based on the needs of the graduate student. Areas of emphasis include Biomedicinal Chemistry, Synthetic Medicinal Chemistry, Pharmaceutics, and Pharmacology. Electives will be chosen based on the area of emphasis and must be approved by the Ph.D. advisory committee and the Graduate Program Director. Electives must be 700 level and above, or any course approved by the Graduate School for Graduate Credit.

Doctoral Directed Research (24 Hours)

Course	Title	Credits
PHAR 896	Doctoral Directed Research [1]	1-6
Total Credit Hours		**1-6**

[1]Other courses may be applied as electives toward the total credit hours required for PHAR 896 if approved by the Ph.D. advisory committee and the Graduate Program Director.

Dissertation Preparation (12 Hours)

Course	Title	Credits
PHAR 899	Dissertation Preparation	12
Total Credit Hours		**12**

In the Department of Clinical Pharmacy and Outcomes Sciences

The Ph.D. in Pharmaceutical Sciences with a concentration in Pharmaceutical Outcomes Sciences prepares the graduate for numerous careers in academia, health care consulting, and the pharmaceutical industry. The program is designed to meet the specific needs and objectives of the student and provide a strong foundation of coursework and experiences in the areas of pharmaceutical outcomes research. In addition to the core coursework, students select an area of specialization to develop additional expertise in pharmacoeconomics, pharmacoepidemiology, or implementation science and health policy. The program has a strong emphasis on developing skills in quantitative and

qualitative data analysis as well as large database management. The program uses a multidisciplinary approach in teaching and research activities.

Students who enter the Ph.D. program with a concentration in Pharmaceutical Outcomes Sciences with a post-baccalaureate degree (B.S. or Pharm.D.) must successfully complete at least 60 hours of graduate coursework. Students who enter the Ph.D. program with a master's degree in a related field must successfully complete at least 34 hours of graduate coursework.

After enrolling in the program, the student must choose a research advisor by the end of the first year of enrollment. Admission to candidacy must occur by the end of the second year after passing a qualifying examination based on all courses completed during the first year of the program. A comprehensive written and oral examination must be completed by the end of the third year of the program. A written dissertation, along with an oral presentation and defense is required for the completion of the Ph.D. degree.

Ph.D. Pharmaceutical Outcomes Sciences (POS) Concentration (60 Hours Minimum Post-Baccalaureate)

Pharmacy Core (22 hours)

Course	Title	Credits
PHAR 711A	Seminar in Pharmaceutical Outcomes Research[1]	1
PHAR 711B	Seminar in Pharmaceutical Outcomes Research[1]	1
PHAR 711C	Seminar in Pharmaceutical Outcomes Research[1]	1
PHAR 711D	Seminar in Pharmaceutical Outcomes Research[1]	1
PHAR 740	Socioeconomics of Pharmacy Practice	3
PHAR 741	Pharmaceutical Outcomes Database Development	3
PHAR 742	Research Methods in Pharmaceutical and Health Outcomes Sciences	3
PHAR 743	Grant Writing	2
PHAR 748	Principles of Pharmacoeconomics	3
PHAR 749	Introduction to Implementation Science	2
PHAR 750	Introduction to Pharmacoepidemiology	2
Total Credit Hours		**22**

[1] A maximum of 4 hours credit can be earned for PHAR 711.

Analytical Requirements

All doctoral students must also complete at least 12 credit hours in graduate level statistical and analytical coursework. Depending on the student's needs, additional courses may be required as identified and approved by the major advisor and Graduate Program Director in consultation with the student.

Analytical Core (12 hours)

Course	Title	Credits
BIOS 700	Introduction to Biostatistics (or STAT 515 Statistical Methods)	3
BIOS 757	Intermediate Biostatistics (or STAT 516 Statistical Methods II)	3
BIOS 754	Discrete Data Analysis (or STAT 518 Nonparametric Statistics)	3
EPID 701	Concepts and Methods of Epidemiology	3
Total Credit Hours		**12**

Dissertation Preparation (12 Hours)

Course	Title	Credits
PHAR 899	Dissertation Preparation	12
Total Credit Hours		**12**

Minor/Cognate (Specialization) (14 Hours Minimum)

Students in the Ph.D. in Pharmaceutical Outcomes Sciences concentration must also take at least 14 hours of elective graduate level courses in one of the following areas: pharmacoeconomics, pharmacoepidemiology, or implementation science and health policy. Elective courses will be identified and approved by the major advisor and Graduate Program Director in consultation with the student.

Specialization Areas:

Pharmacoeconomics identifies, measures, and compares the costs (resources used) and consequences (clinical, economic, and humanistic outcomes) of the use of pharmaceutical products and services. Cost-consequence, cost-minimization, cost-effectiveness, cost-utility and quality of life methodologies are applied to answer questions about the value of therapy to the patient, payer, health care system and society. Decision makers can use these methods to evaluate and compare the total costs of treatment options and the outcomes associated with these options.

Pharmacoepidemiology is the study of the utilization and effects of drugs in large numbers of people. Pharmacoepidemiology focuses on patient outcomes from medical interventions and therapeutics by applying the methods of clinical epidemiology to understanding the determinants of beneficial and adverse drug effects.

Implementation Science and Health Policy is an emerging field focused on improving the uptake of evidence-based research and practice in real-world settings. Graduates will understand and apply a range of theories and methods to identify determinants, develop implementation strategies, and evaluate outcomes of evidence-based health-related programs, interventions, and policies to ensure effective, safe, equitable, and quality care.

Concurrent Pharm.D. and Ph.D. (60 Hours Minimum Post-Baccalaureate)

All students must successfully complete at least 60 hours of graduate coursework. In addition to the general requirements listed for the Ph.D. degree, students pursuing the Pharm.D. and Ph.D. concurrently will take elective courses that are approved for graduate credit and fulfill requirements for the Ph.D. program. Up to twelve (12) credit hours from the Pharm.D. curriculum may count toward both degrees, with the following stipulations.

- The student must have completed at least 90 hours of undergraduate coursework, have a minimum GPA of 3.40, and have the Accelerated Bachelor's/Graduate Study Plan Authorization (G-ABGSP) form approved and on file in the Graduate School.
- Grades of B or higher must be earned for the course to count for graduate credit.
- At least half of the electives must be numbered 700 or above. Courses numbered 500-699 are acceptable only if they have been approved for graduate credit.
- Graduate courses taught in units other than the College of Pharmacy must be approved by the graduate faculty of the College of Pharmacy as appropriate for a Ph.D. degree in pharmaceutical sciences.
- Registration for each course requires approval of the student’s advisor, the chair of the student’s department, the Graduate Program Director of the Ph.D. program, and the dean of the UofSC Graduate School.
- Form G-ABGSP must be processed for each graduate credit course at the time of registration to permit the registrar’s office and the UofSC Graduate School to properly enroll and code the student for enrollment in a course for graduate credit.

A written dissertation based upon original research, along with an oral presentation and defense, is required for the completion of the Ph.D. degree.