

**New Program Proposal
 Master of Science in Cardiovascular Perfusion
 Medical University of South Carolina**

Summary

The Medical University of South Carolina (MUSC) requests approval to offer a program leading to the Master of Science in Cardiovascular Perfusion to be implemented in Fall 2016. The proposed program is to be offered through traditional instruction. The following chart outlines the stages of review for the proposal; the Committee on Academic Affairs and Licensing (CAAL) voted to recommend approval of the proposal. The full program proposal is attached.

Stages of Consideration	Date	Comments
Program Proposal Received	5/1/15	Not Applicable
ACAP Consideration	6/11/15	ACAP discussed the length of the proposed program as well as the need for the program, explaining that the proposed master's program will replace the existing bachelor's degree program. ACAP members then expressed support for the proposed program.
Comments and suggestions from CHE staff sent to the institution	6/15/15	Staff requested the proposal be revised to: <ul style="list-style-type: none"> • Explain in more detail why such length (87 credit hours) is necessary. • Provide the total FTE needed for the program for each role. • Clearly state that the existing bachelor's degree program will be terminated once the new program is implemented as well as explain the overall transition or phase-out plan of the existing program.
Revised Program Proposal Received	6/24/15	The revised proposal satisfactorily addressed all of the requested revisions.

Stages of Consideration	Date	Comments
CAAL Consideration	7/15/15	<p>The University's representative explained cardiovascular perfusion, described the need for the program, and responded to a Commissioner's question about the need to move the program to the master's degree level. The representative also explained the difference between the two programs being proposed: the traditional master's degree program and the post-professional master's degree program.</p> <p>Commissioners asked about the use of and pay for adjunct faculty. The University's representative stated that adjunct faculty for the program will be faculty employed in other departments at the institution.</p>

Recommendation

The Committee on Academic Affairs and Licensing recommends the Commission approve the program leading to the Master of Science in Cardiovascular Perfusion to be implemented in Fall 2016.

Name of Institution: Medical University of South Carolina

Name of Program (include concentrations, options, and tracks)
Masters of Science Degree in Cardiovascular Perfusion

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
Fall 2016

CIP Code
510901

Delivery Site(s)
College of Health Professions
Medical University of South Carolina

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

This proposal has been reviewed and approved by the following internal review bodies at MUSC:

College of Health Professions Leadership Council	August 21, 2014
Education Advisory Committee	February 3, 2015
Deans' Council	February 16, 2015
Senior Leadership Council	February 24, 2015
Board of Trustees	April 9, 2015

Background Information

State the nature and purpose of the proposed program, including target audience and centrality to institutional mission. (1500 characters)

The College of Health Professions at MUSC proposes to offer an 87-credit hour Master of Science in Cardiovascular Perfusion. This program is consistent with the mission of MUSC to preserve and optimize human life in South Carolina and beyond. The current Cardiovascular Perfusion Program at the Medical University of South Carolina, which was first established in 1979, continues to offer a baccalaureate degree and is fully accredited by the Accreditation Committee for Perfusion Education.

The role of the perfusionist as the operator of the heart-lung machine during complex open heart surgery demands a highly skilled, knowledgeable and mature individual and this is compatible with graduate level education. Therefore, as the technology has advanced and with an increased demand for the clinical skills to manage high risk patients, additional training has been added to the undergraduate curriculum. The course content in the current MUSC bachelor's degree program has evolved to a graduate level, with clinical research being an integral part of the curriculum. The number of credit hours (CH) in the current MUSC bachelor's degree program (Total CH 84, didactic CH 54 and clinical CH 30) exceeds the mean for the 7 existing graduate perfusion programs in the U.S (total CH 56, didactic CH 38, clinical CH 18). Of the current 16 cardiovascular perfusion training programs in the U.S., 12 (75%) are already at a post-baccalaureate level (7 graduate level and 5 post baccalaureate certificate programs). The proposed new Master's Degree program will have a total of 87 CH, of which 57 CH will be didactic and 30 CH clinical training. We recognize this is a high number of total credit hours; however, the didactic hours are necessary to meet the research requirements of the program and to deliver increased course content related to heart assist device technology. The clinical hours are necessary as clinical training requires one on one training during multiple operative procedures in order to develop the competencies related to the operation of the heart-lung machine during complex cardiac surgical procedures. There is a tremendous responsibility in operating the heart-lung machine and intensive training through clinical experiences is necessary to meet the required competencies.

At the present time, MUSC is one of only 4 bachelor's degree programs in the US. In order for

MUSC graduates to be competitive in the job market for entry level perfusionists, it is important that their work is recognized at the graduate level.

The Master's Degree Program will begin in 2016 and the B.S. in Cardiovascular Perfusion will terminate in 2017, one year after the Master's Degree Program is started, in order to allow students that are currently enrolled in the B.S Program to complete the program. No B.S. students will be moved into the new program, but they may be eligible to enter the proposed Post Profession M.S. degree program once they finish the B. S. Program and are certified by the ABCP. If they were to choose to apply to the master's program they would incur the cost of the post-professional program.

List the program objectives. (2000 characters)

1. **To provide a strong foundation in didactic and clinical skills for the treatment of all patients requiring cardiovascular services with an emphasis on elderly and pediatric patients.** Surgery that is performed on patients with complex medical and cardiac problems requires an increased knowledge base for practicing cardiovascular perfusionists. These patients have an increased risk for mortality and post-operative complications. Increased survival with low morbidity is an important outcome that is improved by higher education.
2. **To provide a strong foundation in didactic and clinical skills in the application of cardiac assist devices.** Congestive heart failure is the fastest-growing area of cardiovascular disease with an annual at increase of nearly 5% per year. Many more patients will require cardiac assist devices in the future because of the limited number of heart transplant donors.
3. **To remain competitive in the recruitment of applicants** as many other programs already offer a graduate degree. Nearly 70% of the enrolling MUSC perfusion students today already have a baccalaureate degree. Because of this, they are unable to receive government aid for tuition in MUSC's existing BS in Cardiovascular Perfusion Program. Therefore, they depend on loans from banks at higher interest rates which significantly increase their student debt.
4. **To increase the opportunities for job placement** and advancement in the perfusion profession for graduates. Graduate level students are more competitive in the job market.
5. **To enhance the research component of the curriculum** at a level commensurate with a master's curriculum. Graduate level education provides the necessary research skills for the

delivery of evidenced-based clinical patient care. The President of the American Academy of Cardiovascular Perfusion endorsed graduate education when he said, "Graduates who possess graduate degrees are ideally suited to become the individuals who lead the next technological revolution in perfusion technology. Without trained scientists, our profession will disappear as a mere footnote in medical history." Improvement in medical and surgical care requires training in research and quality improvement.

Assessment of Need

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

1. **MUSC has graduated more than 60 % of the practicing cardiovascular perfusionists employed in South Carolina which** is situated in the center of the "stroke belt", an area of the U.S. with the highest rate of cardiac and cerebrovascular disease.
2. **South Carolina depends heavily on our graduates to fill job openings.** There are no other perfusion education programs in South Carolina or the adjoining states of Georgia or North Carolina. The closest programs are in Miami, Florida (Barry University, BS Program) and a post-baccalaureate certificate program at Vanderbilt Medical Center (Nashville, Tennessee).
3. The demand for **cardiac-related services is expected to grow** by 20% between 2015 and 2025 due to the aging of the population. By 2030, there will be an additional twenty seven million Americans with hypertension, eight million with coronary artery disease and three million with congestive heart failure.
4. Cardiac procedures are being performed in more elderly patients (>70 years) and very young patients. Greater than 25% of congenital heart surgery is performed in neonates less than one month of age. Both of these are very **high risk patient populations** undergoing complex heart surgery which requires highly skilled perfusionists.
5. Leadership training was identified in a recent needs assessment survey as an important area for training perfusionists at the graduate level. We propose to add courses on leadership and quality improvement.
6. **South Carolina does not have a graduate level perfusion education program.** The trend for cardiovascular perfusion programs nationally is towards a graduate education; therefore, to remain competitive we need to transition to a Master's degree.

Employment Opportunities

Is specific employment/workforce data available to support the proposed program?

Yes

No

If yes, complete the table and the component that follows the table on page 4. If no, complete the single narrative response component on page 5 beginning with "Provide supporting evidence."

Employment Opportunities			
Occupation	Expected Number of Jobs	Employment Projection	Data Source
Perfusionist	No US Bureau of Labor Statistics Available		

Provide supporting evidence of anticipated employment opportunities for graduates, including a statement that clearly articulates what the program prepares graduates to do, any documented citations that suggests a correlation between this program and future employment, and other relevant information. Please cite specific resources, as appropriate. (3000 characters)

Note: Only complete this if the Employment Opportunities table and the section that follows the table on page 4 have not previously been completed.

1. Perfusion is a small and highly specialized profession. Many new technologies have become an integral part of cardiovascular perfusionists' scope of practice since the program was first established at a baccalaureate level in 1979. The entry-level skills and knowledge required of the cardiovascular perfusionist have significantly increased over the past 36 years. These include specific skills and knowledge related to myocardial protection, blood conservation, membrane oxygenators, centrifugal blood pumps, and cardiac assist devices. An increasing number of neonates (less than 1 month), and elderly patients and with chronic medical conditions now undergo complex cardiac surgical procedures and this was not possible in 1979.
2. **MUSC has filled the majority of perfusion positions in South Carolina.** The employment rate for MUSC graduates over the past five years is > 97%, with starting salaries > \$80,000. **The job market for cardiovascular perfusionists based on the number of advertised positions is the strongest in the past 10 years. Advertisements for vacant perfusion positions have increased more than 100% in each of the last 4 years (AMSECT 2014).** MUSC perfusion graduates are in high demand; most students have job offers prior to graduation due to their clinical rotations at highly recognized cardiac surgical centers.
3. Based on the age demographics of practicing cardiovascular perfusionists, retirement from the profession will increase significantly between 2015 and 2025. Based on estimations from manpower surveys (Rush University, 2014), the expected number perfusionists leaving the profession due to retirement, leaving to pursue another profession, or due to family work/balance issues **is expected to be near 5% per year for the next 10 years.** That means that 2000 perfusionists will be needed over the next 10 years. The present output of all the perfusion schools is about 50% of what will be necessary to fill these jobs in future.
4. Many perfusion departments have increased in size due to the rising volume of cardiac surgical procedures, and therefore many experienced perfusionists have assumed important leadership roles in their cardiac surgical programs and are seeking training in leadership (MUSC Needs Assessment Survey 2014).
5. MUSC leads the perfusion profession using cardiopulmonary bypass simulation and is the only perfusion training program in the country that has both the Orpheus and Biomed high fidelity simulators. **Simulation enhances students' performance during clinical rotations and increases job readiness and employment opportunities.**
6. The MUSC Cardiovascular Perfusion Program has been recognized for its significant

contributions to research in the profession with the **highest number of published scientific peer-reviewed research** from any perfusion school in the U.S. This is a testament to the level of clinical research performed by MUSC students. It also demonstrates the graduate nature of the program and thus will increase employment opportunities. (Journal of ExtraCorporeal Technology 1979-2014)

7. Outcomes from the program are excellent with **100% first time pass rate** on the American Board of Cardiovascular Perfusion Certification Exam in both 2013 and 2014. This achievement increases the rapid deployment of MUSC graduates into the workforce which is desirable to applicants, graduates, and employers. (American Board of Cardiovascular Perfusion, 2013-4)

Will the proposed program impact any existing degree programs and services at the institution (e.g., course offerings or enrollment)?

Yes

No

If yes, explain. (500 characters)

The present Bachelors in Science in Cardiovascular Perfusion Program will be terminated one year following the implementation of the Master's degree program. This will allow all enrolled students to complete their Bachelor's degree. The last class of students in the Bachelor of Science program will complete their final year in the program as the first class of Master of Science students are enrolled in their first year of the program.

List of Similar Programs in South Carolina

Program Name	Institution	Similarities	Differences
NONE			

Description of the Program

Projected Enrollment						
Year	Fall		Spring		Summer	
	Headcount	Credit Hours	Headcount	Credit Hours	Headcount	Credit Hours
2016	20	400	19	361	19	380
2017	39	666	38	627	19	380
2018	39	666	38	627	19	380
2019	39	666	38	627	19	380
2020	39	666	38	627	19	380

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

Yes

No

If yes, explain. (1000 characters)

Completion of a Bachelor's degree at an accredited university which must include the following prerequisite courses:

Anatomy and Physiology (includes lab)	8
Chemistry (includes lab)	8
Medical Terminology	1
Physics (includes lab)	4
Statistics	3

Are there any special articulation agreements for the proposed program?

Yes

No

If yes, identify. (1000 characters)

Curriculum

Select one of the following charts to complete: Curriculum by Year **or** Curriculum by Category

Curriculum by Year					
Course Name	Credit Hours	Course Name	Credit Hours	Course Name	Credit Hours
Year 1					
Fall		Spring		Summer	
Transforming Healthcare	2	Perfusion Technology II/Simulation Lab	5	Principles and Practices Perfusion	5
Perfusion Technology I	4	Pathophysiology for Perfusion with Focus on Aging	4	Cardiac Assist Devices	2
Research Methodology	3	Pharmacology	4	Advanced Pediatric Perfusion	2
Applied Human Pathophysiology	5	Acid-Base Chemistry	2	Masters Research Project III	3
Clinical and Laboratory Monitoring	4	Masters Research Project II	3	Clinical Experience	6
Perioperative Blood Management	2	Seminar	1	Clinical Simulation	2
Total Semester Hours	20	Total Semester Hours	19	Total Semester Hours	20
Year 2					
Fall		Spring		Summer	
Quality Improvement and Clinical Informatics	2	Leadership and Health Services Delivery Systems	2		
Clinical Experience IIA	6	Clinical Experience IIIA	6		
Clinical Experience IIB	6	Clinical Experience IIIB (track in leadership, cardiac assist or pediatrics)	6		
Total Semester Hours	14	Total Semester Hours	14		

Total Credit Hours Required = 87

Course Descriptions for New Courses

Course Name	Description
Leadership and Health Services Delivery	This course introduces students to the management of health care facilities. Students gain an understanding of the major functions of management, governance, organizational structures, accreditation/licensure processes, and reimbursement issues in health care organizations. Students will become familiar with and understand the importance of the principles of management including planning, organizing, controlling, directing, and staffing in order to offer health care services. The course will also demonstrate the basic concepts and issues associated with the management and regulations of health care services delivery, and explore the impact of contemporary public policy issues confronting the health care system.
Quality Improvement and Informatics	This course provides students with an understanding of quality management and performance improvement. This will include quality assessment, risk management, outcomes assessment, benchmarking. The course focuses primarily on providing students with the necessary knowledge and skills for understanding systems improvement and then participating and leading quality improvement (QI) efforts. Students also gain knowledge of the importance of measuring and managing service excellence and patient satisfaction. This course also provides students with an introduction to health care information systems, with an emphasis on clinical information systems. Students are introduced to different types of clinical and administrative information systems used in health care today.
Pathophysiology with a focus on aging	This course reviews the concepts of human disease as they relate to cardiopulmonary bypass. The focus on the impact of cardiovascular disease in the aged population and the etiology and the effects on other organ systems. This will include a study of immunological defense mechanisms, acute and chronic inflammation, repair mechanisms, modes of injury, diseases of development and growth, and blood disorders and neoplasia. It also presents diseases of the organ systems and correlates the pathology of the major diseases occurring in the individual organ systems of the human body.
Advanced Pediatric Perfusion	This course introduces student to the anatomical and physiological characteristics of congenital heart defects and their implications for the conduct of perfusion. This will include both cyanotic and non-cyanotic congenital defects with a focus on their diagnosis and management. Special considerations in the conduct of perfusion for congenital heart surgery are discussed and modeled. Through analysis of case clinical reports and histories, students learn about the surgical treatment of congenital heart defects.
Cardiac Assist Devices	This course introduces student to the advanced practice associated with cardiac assist devices. Selection, operation and monitoring of various cardiac assist devices including both FDA approved and investigational devices. Other areas of focus will include patient education, community education, surgical coordination, clinical visits and managing VAD databases and clinical trials, including data analysis for presentations.
Research Methodology	This course provides a background on general principles and issues in clinical research design. These are explored through the formulation of the research objective and the research hypothesis and the specification of the study population, the experimental unit, and the outcome variables. This course integrates core clinical perfusion principles to provide experience in the development and critique of the methodological aspects of clinical research protocols and the clinical research literature. Assigned readings are drawn from contemporary perfusion scientific literature.

Masters Research Project II	In this course the student develops a research project relating to cardiovascular perfusion resulting in a substantive paper that involves original collection or treatment of data and/or results in a research paper. Students select a clinical hypothesis to test and complete a research proposal in a topic pertinent to perfusion. The capstone project must evidence scholarly and/or professional analysis informed by the sustained and appropriate application of analytical methodologies. The final product of the research project must be a paper of publishable quality. This research project involves original research and exemplifies an original contribution to scholarship.
Masters Research Project III	In this final research course, the student submits their research project for presentation and publication. The course requirements will include editorial changes suggested during peer review process. The capstone project will be completed by submitting the final paper for publication in a peer-reviewed perfusion related journal.
Perfusion Technology I	This course is designed to give the beginning student a practical and theoretical orientation to the environment of extracorporeal circulation. This course presents the history, basic components, equipment, and physiology related to extracorporeal circulation. The students will be exposed to ethical issues facing health care providers in today's environment.
Perfusion Technology II	This course will focus on clinical devices used for cardiopulmonary bypass and the development of key clinical skills used on a daily basis in clinical perfusion. Students are taught equipment selection, set-up, and steps required for the safe operation of a life support system in a simulated operating room environment.
Clinical and Laboratory Monitoring	This introductory course presents the principles of electronic physiological monitoring and measurement. The practical application of monitoring equipment is stressed during the laboratory sessions with exposure to various monitoring devices currently used in the operating room.
Pharmacology	This course presents the fundamental principles of pharmacology necessary for an understanding of the mechanisms of action of drugs and knowledge for their rational and effective use or monitoring. These principles include pharmacokinetics, pharmacodynamics, pharmacogenetics, and introductory therapeutics. A discussion of the impact of aging and disease on drug safety and the drug development process will be included..
Acid-Base Chemistry	This course allows the student to master the principles of acid base physiology and the interpretation and treatment of clinical acid base blood gas disorders through lecture and self-study modules.
Principles and Practices of Perfusion	This course prepares the student for their clinical experience. The principles of extracorporeal circulation are presented in lecture and practices in simulation and the animal laboratory. Instructions are provided in the aspects of extracorporeal circulation including device theory, physiology, and diseases of the heart, pathophysiology, fluids, and electrolytes. Hands-on lab experience and reporting in these techniques prepares the student for the clinical experience.
Clinical Simulation	This course prepares the student for clinical experience utilizing a perfusion simulator and a mock operating room. Students are exposed to both common events and to uncommon events. Each student is able to practice their clinical skills in an environment that promotes confidence and competency.
Evidenced Based Medicine	This course will review research based on the classifications of evidenced based medicine and will include examples from the cardiovascular surgery and perfusion literature.

Faculty

Faculty and Administrative Personnel				
Rank	Full- or Part-time	Courses Taught or To be Taught, Including Term, Course Number & Title, Credit Hours	Academic Degrees and Coursework Relevant to Courses Taught, Including Institution and Major	Other Qualifications and Comments (i.e., explain role and/or changes in assignment)
Associate Professor	Full Time	Perfusion Technology I (4) FALL ECT 501 Perfusion Technology II(5) SPRING ECT 535 Research Methodology (3) FALL ECT 510 Evidence Based Medicine (1) FALL ECT 625 Fundamentals of Acid-Base Chemistry (2) SPRING ECT 540 Principles and Practices of Perfusion (5) SUMMER ECT 531 Pediatric Perfusion (2) SUMMER ECT 664 Masters Research Project II (3) SPRING ECT 555 Masters Research Project III (3) SUMMER ECT 600 Clinical Experience I (6) SUMMER ECT 545 Clinical Experience II A (6) SUMMER ECT 653 Clinical Experience II B (6) SUMMER ECT 654 Clinical Experience III A (6) SUMMER ECT 656 Clinical Experience III B (6) SUMMER ECT 657	Medical University of South Carolina – Ph.D. in Health and Rehabilitation Science (2012) Dissertation Topic: The Influence Of The Method Of Cerebral Protection During Neonatal Cardiac Surgery on The Development Of Attention Deficit/Hyperactivity Disorder Medical University of South Carolina – M.S. Degree in Clinical Research (2005) Long Island University – Master in Public Administration in Health Care (1980) State University of New York - School of Allied Health Professions - B.S. in Cardiopulmonary Technology/Respiratory Therapy (1974) Certified Clinical Perfusionist, Fellow of Pediatric Perfusion Courses: Perfusion	Teaching these courses for the past 20 years, 40 years clinical perfusion experience.

			<p>Perfusion Technology I Perfusion Technology II Fundamentals of Acid-Base Chemistry Principles and Practices of Perfusion Intro to Research Pediatric Perfusion Independent Study Clinical Experience I, II, & III</p>	
<p>Assistant Professor* (replacing current faculty who is retiring Summer 2015)</p>	Full-Time	<p>Clinical and Laboratory Monitoring (4) FALL ECT 513 Perioperative Blood Management (2) FALL ECT 548 Pathophysiology for Perfusion (4) SPRING ECT 560 Pharmacology for Perfusion (4) SPRING ECT 610 Cardiac Assist Devices (2) SUMMER ECT 665 Clinical Simulation (2) SUMMER ECT 600 Clinical Experience I (6) SUMMER ECT 545 Clinical Experience II A (6) SUMMER ECT 653 Clinical Experience II B (6) SUMMER ECT 654 Clinical Experience III A (6) SUMMER ECT 656 Clinical Experience III B (6) SUMMER ECT 657</p>	<p>Active certification as a clinical perfusionist (CCP). Minimum of five years clinical experience; graduate preparation in the basic and clinical sciences relevant to perfusion practice; and prior classroom teaching experience. The ideal candidate will have completed a doctorate or be in the process of obtaining a terminal degree.</p>	<p>Knowledge of clinical practice and professional issues. The most competitive candidates will have a record of expertise in clinical and/or didactic education, experience in curriculum development, academic scholarship, and professional association involvement. Academic rank will be commensurate with credentials and experience.</p>
<p>Assistant Professors* (2)</p>	Adjunct	<p>Quality Improvement and Clinical Informatics (2) FALL ECT 662 Leadership and Health Services Delivery Systems (2) SPRING ECT 663</p>	<p>Most likely PhD faculty</p>	<p>These 2 courses are derived from 4 courses in the Doctoral Program in Healthcare leadership. They are already well developed and will be tailored to meet the needs of the perfusion profession.</p>
<p>Professor</p>	Adjunct	<p>Applied Human Physiology ECT 510</p>	<p>PhD in Physiology</p>	<p>Teaching this course for the past 10 years with excellent student evaluations.</p>

Note: Individuals should be listed with program supervisor positions listed first. Identify any new faculty with an asterisk next to their rank.

Total FTE needed to support the proposed program (i.e., the total FTE devoted just to the new program for all faculty, staff, and program administrators):

Faculty: 1.7 FTE, plus 3 adjuncts (2 of whom are new adjuncts over present faculty)
Staff: Part time Admin Assistant 0.2 FTE, Part time Student Services Coordinator 0.2 FT
(0 new)
Administration: 0.3 FTE (one faculty member is Division Director) (0 new)

The number of unpaid clinical preceptors will be the same as currently available in the bachelor's degree program. New clinical sites will be added as needed and emphasis will be on clinical sites that that will provide pediatric and heart assist device experience. All new clinical sites have to be approved by AC-PE and all preceptors have to meet their requirements. There are currently 20 clinical sites with a total of approximately 80 clinical preceptors.

Faculty /Administrative Personnel Changes

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

The structure of the Division will remain the same with 2 full time faculty and the present support staff. Two new additional adjunct faculty will be added. One adjunct faculty member who teaches Applied Human Physiology will continue with the new program.

Library and Learning Resources

Identify current library/learning collections, resources, and services necessary to support the proposed program and any additional library resources needed. (1000 characters)

The MUSC Library acquires, manages, and maintains resources of knowledge in the biomedical and health sciences. The MUSC Library has available over 220 databases and over 19,000 electronic journals and provides access to a wide range of perfusion and cardiac surgery related journals.

The College of Health Professions (CHP) is housed in a state-of-the art facility with cutting edge classroom technology. The College uses the Moodle learning management system and Tegrity lecture capture system. All students are required to own a laptop that they bring to campus. All classrooms are equipped with Smart Board technology. High Definition (HD), h.624 video recording, streaming, and conferencing are available in every classroom. Classroom audio/visual is integrated with the Tegrity lecture capture system so that instruction in CHP classrooms, labs or conference rooms can be recorded and distributed online and accessible by mobile devices.

Student Support Services

Identify academic support services needed for the proposed program and any additional estimated costs associated with these services. (500 characters)

No new student support services will be required within the Division of Cardiovascular Perfusion; the existing student support services will be used. Student support services on campus that are available to all MUSC students include the Center for Academic Excellence, the Writing Center, the Wellness Center, Counseling and Psychological Services, and the availability of supplemental instruction from tutors. The current MUSC students report satisfaction with the available university support services that will be available to the students in this program.

Physical Resources

Identify any new instructional equipment needed for the proposed program. (500 characters)

No new equipment is needed

Will any extraordinary physical facilities be needed to support the proposed program?

Yes

No

Identify the physical facilities needed to support the program and the institution's plan for meeting the requirements, including new facilities or modifications to existing facilities. (1000 characters)

The Division of Cardiovascular Perfusion has excellent physical facilities including two laboratories that can be used for cardiopulmonary bypass simulation. The facilities that we are currently using in the baccalaureate program will be used for the Master's Degree program. We already have the only two cardiopulmonary bypass simulators available, Orpheus and Biomed Calafia. The Orpheus simulator is connected to the University Simulation Center through SimBridge, which allows us to record and evaluate student simulation experiences.

Students in the CHP have unlimited access to all classrooms and labs and the computer technology available there. In the Student Life and Recruitment Center in the College "A" building, several shared computer stations and printers are provided to students during business hours. Students may also go to the Library and Education Center to access printers and computer labs. IT also evaluates emerging technologies and provides access to other hardware and software, such as digital video cameras and newly released software, for check-out or pilot use.

Financial Support

Estimated New Costs by Year						
Category	1st	2nd	3rd	4th	5th	Total
Program Administration	0	0	0	0	0	0
Faculty and Staff Salaries	0	6,000	6,000	6,000	6,000	24,000
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	6,000	6,000	6,000	6,000	24,000
Sources of Financing						
Category	1st	2nd	3rd	4th	5th	Total
Tuition Funding	602,633	1,026,413	1,055,046	1,084,537	1,114,913	4,883,542
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	0	0	0	0	0	0
Net Total (i.e., Estimated New Costs Minus Sources of Financing)	602,633	1,020,413	1,049,046	1,078,537	1,108,913	4,859,542

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

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.

The additional costs for implementation of this program will be covered by tuition, there is no addition external funding required. There will be two new adjunct faculty added to the budget to teach two new courses in the 2nd year of the curriculum in the area of healthcare management, the total cost for teaching these courses will be \$12,000 annually beginning in the 2nd year of the first cohort of students. These courses will be taught annually to each cohort of students when in their 2nd year of the curriculum. They will take the courses with the students in the post-professional program; therefore, the costs will be split between the two programs resulting in the **\$6,000 annually** reflected in the budget.

Evaluation and Assessment

Programmatic Assessment: Provide an outline of how the proposed program will be evaluated, including any plans to track employment. Identify assessment tools or software used in the evaluation. Explain how assessment data will be used. (3000 characters)

Accreditation Committee for Perfusion Education requires a yearly report of programmatic outcomes. The outcomes include: pass rates on the ABCP certification exam, employment rates for graduates, retention rate for students in the program, ethnic and gender data, and a comprehensive summary of outcomes based on employer and graduate surveys. A minimum response rate of 50% for both graduates and employers is required and there are assessments in cognitive, psychomotor and affective domains. If the benchmarks for any of the assessments are not met, then the program must provide a detailed action plan and may be subject to a site visit by the accreditation agency.

Southern Association of Colleges and Schools (SACS)

The following Program and Student Learning Outcomes are reported to the Medical University of South Carolina Office of Institutional Assessment on an annual basis:

Program Outcomes:

1. Percent of students who pass the ABCP Basic Science Certification exam on first attempt
2. Percent of students who pass the ABCP Clinical Application Certification exam on first attempt
3. Percent of students employed within 6 months of graduating
4. Percent of faculty who attended a professional conference
5. Percent of faculty who presented at a professional conference

Results of the Assessment instruments are compiled and then discussed annually at program advisory meetings required by professional accrediting agency AC-PE. The program advisory committee is charged with the responsibility of meeting at least annually, to assist program and sponsor personnel in formulating and periodically revising appropriate goals and learning domains, monitoring needs and expectations, and ensuring program responsiveness to change. The committee consists of the program faculty, medical advisor, department chair, alumni, students, clinical affiliates and one public member. All program outcomes are reviewed annually at the meeting.

Teaching Effectiveness Assessments: The University uses E-Value which is an anonymous survey sent to students at the end of each course to evaluate teaching effectiveness. An 85% return rate benchmark has been set for each evaluated course. There are specific evaluations for the instructor effectiveness, and the course organization and content. The results are benchmarked against faculty evaluations in the college and are used for course improvement and in the annual faculty review process.

Student Learning Assessment

Expected Student Learning Outcomes	Methods of/Criteria for Assessment
1. Demonstrate knowledge of the patient's history, pathophysiology, laboratory values and pharmacology as evidenced by formation of a patient care plan with minimal supervision	95% of students will pass the ABCP Certification Exam 90% of students will have mean score of 4 or greater in the Employer Graduate Survey cognitive domain
2. Select the proper equipment and supplies, assemble and prime the perfusion circuit using sterile technique, and make ready for surgery with minimal supervision	90% of students will have mean score of 4 or greater in the Employer Graduate Survey psychomotor domain 90% of students will have mean score of 4 or greater (meets expectations) for the two final clinical evaluations on the evaluation of their perfusion setup
3. Initiate CPB, manage CPB including hemodynamics, blood gases, electrolytes, anticoagulation, temperature, and terminate CPB according to protocol with minimal supervision.	95% of students will pass the ABCP Certification Exam 90% of students will have mean score of 4 or greater in the Employer Graduate survey psychomotor domain
4. Demonstrate knowledge and safe operation of adjunctive devices for blood management and ultrafiltration with minimal supervision	95% of students will pass the ABCP Certification Exam 90% of students will have mean score of 4 or greater in the Employer Graduate Survey cognitive domain
5. Demonstrate knowledge and safe operation of adjunctive devices for cardiac assist, and Extra Corporeal Life support (ECLS) with minimal supervision	95% of students will pass the ABCP Certification Exam 90% of students will have mean score of 4 or greater in the Employer Graduate Survey cognitive domain
6. Maintain professional conduct and communication with patients and staff	90% of students will have mean score of 4 or greater in the Employer Graduate Survey affective domain 90% of students will have mean score of 4 or greater (meets expectations) on the evaluation of professionalism for the last 2 clinical rotations

Will the proposed program seek program-specific accreditation?

- Yes
 No

If yes, provide the institution's plans to seek accreditation, including the expected timeline for accreditation. (500 characters)

The existing Bachelor's Degree Program is accredited and no additional accreditation is required after transition to a Master's Degree per AC-PE.

Will the proposed program lead to licensure or certification?

- Yes
 No

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

The present accredited baccalaureate program now allows students to be candidates the ABCP certification exam. The transition to the Master's Degree will continue to allow students to take the exam. We will continue to meet all accreditation requirements as we do at the present time.

Teacher or School Professional Preparation Programs

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

- Yes
 No

If yes, complete the following components.

Area of Certification

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