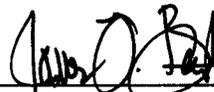


Clemson University

Program Modification
Bachelor of Science in Health Sciences

Cardiovascular Imaging Leadership Concentration

Submitted: November 15, 2010



signature of chief executive officer

Program Contact:
Lee A. Crandall, Ph.D.
Department of Public Health Sciences
501 Edwards Hall
Clemson, SC 29634
(864) 656-3082
LAC@Clemson.edu

University Contact:
Debra B. Jackson, PhD
Vice Provost for Academic Affairs
302 Sikes Hall
Clemson, SC 29634
dbj@clemson.edu
864-656-4592

Classification

Program Title: Bachelor of Science in Health Science – Cardiovascular Imaging Leadership Concentration

Academic Unit: Department of Public Health Sciences, College of Health, Education and Human Development, Clemson University

Designation, type and level of degree: New concentration within existing Bachelor of Science in Health Science degree program. Four year degree, 124 credit hours total, 35 new credit hours in this concentration.

Proposed date of implementation: August 2011

Current CIP Code: 519999

Proposed CIP Code after modification: 519999

Identification of program as New or Modification: modification

Site: Clemson (main campus) *and* Institute for Vascular Health – Greenville Hospital System/University Medical Center. **Memorandum of Understanding with this clinical partner is appended.**

Program qualifies for supplemental Palmetto Fellows Scholarship and LIFE Scholarship awards:
Yes X No ___

Delivery Mode - traditional

Justification:

Offered in collaboration with the Institute for Vascular Health (IVH) at Greenville Hospital System/University Medical Center (GHS), this baccalaureate degree will offer a strong concentration in public health leadership as well as the technical training required for certification as a Registered Vascular Technologist (RVT) and Registered Diagnostic Cardiac Sonographer (RDCS) (hereafter referred as Cardiovascular Sonographer – CVS). Persons certified to perform CVS conduct cardiovascular diagnostic tests that do not involve insertion of tubes or other objects into a patient’s body. For example, ultrasound equipment is used to create images of the vascular system by sending high-frequency sound waves into the patient’s body and recording echoes.

Cardiovascular disease (CVD) is America’s most prevalent cause of death and is likely to increase rapidly in prevalence with the aging of the Baby Boomer generation. The South Carolina elderly population is increasing at a rapid rate, particularly in the upstate which is a retirement destination. Noninvasive cardiovascular technology (NCVT) is a widely used tool for diagnosing and managing CVD, and its use is growing. Piedmont Technical College reported to the CHE last year that there was an immediate need for over 75 full time technicians in the area that they proposed to serve. The niche that Clemson proposes to fill is narrower. Our emphasis will be on producing approximately ten graduates per academic year who will be trained for leadership roles in this rapidly growing field in South Carolina and the nation.

Persons trained in CVS typically lack a baccalaureate degree and lack training specific to leadership positions in complex health care organizations. Currently many individuals trained in CVS only receive narrowly focused technical training in clinical sonography and related fields. Nationally, most CVS training occurs in the context of a hospital-based non-degree program or a two year (Associate) degree program. Piedmont Tech has recently implemented the first two year Associate Degree program in CVS in South Carolina. Such training is focused heavily on technical proficiency. While these programs provide excellent technical training, a two year degree often limits the practitioner's opportunities for professional advancement. The Bachelors of Health Science degree at MUSC, which formerly served as a route to a post-hoc baccalaureate degree for employed adult practitioners in a wide variety of technical fields has been suspended. Coastal Carolina has been approved to offer a similar degree online. However, few of those admitted are likely to be specifically trained in CVS. Lack of a baccalaureate degree for technically trained CVS practitioners attenuates opportunities for professionalization of this field. USC does offer a baccalaureate degree in Cardiovascular Technology, (described below). That degree offers a broad background in liberal arts and sciences in addition to the technical training. It does not incorporate a public health perspective with specific requirements in epidemiology, health care systems, or human health behavior.

Clemson's proposed program will be unique in that it includes components specifically designed to develop individuals poised for leadership in this growing field. Required coursework in the Department of Public Health Science will provide graduates with broad understandings of the scientific basis of health and disease, epidemiology, health program planning and administration, research and evaluation, and leadership. Clemson's emphasis on producing thinkers, leaders and entrepreneurs will produce baccalaureate degree graduates who are poised to enter graduate and professional degree programs (e.g., M.B.A., M.H.A. M.P.H.) that can further advance their careers as statewide and national leaders in this field.

This proposed new degree concentration within the broader context of the Bachelor of Science in Health Science degree offered by Clemson University's Department of Public Health Sciences will provide students with a required core of public health, science, and leadership classes on campus and will be advised by faculty of the department of Public Health Sciences. Clinical training will be provided through the Institute for Vascular Health (IVH) of Greenville Hospital System (GHS) and Phillips Medical. The proposed concentration includes both didactic and clinical classes comprised of 35 semester hours specific to performance of all aspects of cardiovascular sonography including critical hands-on training throughout the GHS system. Graduates will develop a strong science background, a broad understanding of public health and epidemiology, will be trained in leadership, will have technical competencies in noninvasive cardiovascular technology, and will meet educational standards for the American Registry of Diagnostic Medical Sonographers (ARDMS) credentialing exam. Training in cardiovascular technology will meet guidelines of the Commission on Accreditation for Allied Health Education Programs (CAAHEP).

With this type of student preparation, graduates will be able to secure employment in a variety of settings including hospitals, clinics, outpatient facilities, physician practices, and industry. Beyond immediate employment, however, concurrent completion of a baccalaureate degree opens opportunities for students to pursue graduate education in business administration, health administration, public health and related fields and will allow graduates to assume regional and national roles as leaders in this growing field.

There are 37 cardiovascular programs in the U.S accredited by the Commission on Accreditation of Allied Health Programs (CAAHEP). Only five offer the baccalaureate degree. The Clemson, GHS/UMC program would be the first to offer both noninvasive vascular and noninvasive cardiology within an undergraduate framework. This truly would be a degree that is unique not only to the region but nationwide. Although no

program exactly like the program proposed here exists in South Carolina, One related baccalaureate programs exists in South Carolina. The University of South Carolina currently offers a Bachelor of Science degree in Cardiovascular Technology through its College of Arts and Sciences. This program consist of three years of science and general education classes taught at the university followed by admission to a technical training program in cardiovascular technology through an approved CVT program that is not a formal part of the university. USC confers the baccalaureate degree upon completion of this intensive clinical training. At the Associates degree level, Piedmont Tech has recently implemented the first two year Associates Degree program in CVS in South Carolina. This program is not yet accredited by the Commission on the Accreditation of Allied Health Programs (CAAHEP). Indeed, the only CAAHEP accredit program in the state is a certificate program operated by Sisters of Charity Providence Hospitals in Columbia.

The proposed program at Clemson differs from any of these programs because it requires a strong science and technical background, but simultaneously *requires a strong core of public health, health behavior and health administration that comprises the core courses for the Bachelors of Health Sciences*. Consequently, it will make a unique contribution in that technical training and basic medical sciences will be integrated with training in epidemiology, health behavior, evaluation and research and other crucial public health skills. In addition, it incorporates a 9 credit series of classes in leadership developed by Clemson’s College of Health, Education and Human Development. Thus, it is specifically designed to prepare persons for positions of leadership in this emerging field.

Enrollment

The proposed program will enroll a maximum of ten students in each graduation cohort. Size of the program is limited by the capacity of the Institute for vascular Health to provide supervised field experiences for students. Initially all students will be recruited during the freshman year from students currently enrolled at Clemson University in departments like the Department of Public Health Sciences Preprofessional Concentration and/or preprofessional students in the Department of Biological Sciences. We anticipate that when the program is fully mature, the majority of students will continue to be recruited from students already on campus. The table below therefore reflects an estimate of the maximum impact that might occur should two additional students a year elect to attend Clemson solely for purposes of matriculating into this program.

Table F – New Enrollment

Estimated New Enrollment						
YEAR	FALL		SPRING		SUMMER	
	Headcount	Credit Hours	Headcount	Credit Hours	Headcount	Credit Hours
2011-2012	0	0	0	0	0	0
2012-2013	0	0	0	0	0	0
2013-2014	2	6	2	6	0	0
2014-2015	4	22	4	22	2	12
2015-2016	6	34	6	34	2	12

Curriculum

The proposed concentration will be the fourth concentration area within the Bachelor of Sciences in Health Science degree program. Existing concentrations are (1) Health Promotion and Education, (2) Health Administration and (3) Preprofessional Health Sciences. All concentrations require a core of health science classes including introduction to public health, health behavior, human health and disease, managing health

services organizations, epidemiology, and research/ evaluation methods. The concentration proposed here will add to that core an appropriate set of natural science classes taught at Clemson and a set of technical courses taught at the Institute for Cardiovascular Health at GHS/UMC. The other three concentrations require an internship in a health care delivery setting, but that will not be a component of this concentration, which will instead require both didactic classes and supervised clinical practice at GHS/UMC.

New classes will be developed between Clemson and GHS/UMC and will include Introduction to CV Ultrasound, Ultrasound Physics (taught by new faculty member at Clemson), Vascular Sonography (I & II), Echocardiography(I & II) , Vascular Lab (I & II), Echo Lab(I & II) Clinical Lab (I, II & III). These didactic and clinical classes will comprise a total of 35 credits and will substitute for the pre-internship/internship (6 credits) and 29 credits of guided requirements or health electives that currently comprise the elective portion of the Preprofessional Health Sciences concentration. Field training (included in the 124 credit hours proposed) will be scheduled for the summer session following students' third year on the Clemson campus and for the spring and summer sessions of their senior year.

New Courses:

- (1) **CVT 225 – Ultrasound Physics** - Explanation of the basic principles and characteristics associated with diagnostic ultrasound. Expanded Description: This course provides students with a detailed description of the basic principles of diagnostic ultrasound and how the concepts of these basic principles are applied. The characteristics and interactions of diagnostic ultrasound energy in the body tissues and organs are reviewed and the various types of transducers used in diagnostic imaging. Components and functions of a pulse-echo ultrasound system will be identified along with the instrumentation applications to optimize sonographic images. A description of the Doppler effect and spectral analysis, basic quality assurance measurements using an ultrasound Q.A. phantom, typical sonographic appearance of the most common artifacts, and the bioeffects and safety considerations associated with the use of diagnostic ultrasound will all be discussed.
- (2) **CVT 226 – Introduction to Cardiovascular Sonography** - Students are introduced to patient care, patient confidentiality, blood components, lymphatics, cardiovascular pharmacology, heart embryology, cardiovascular anatomy and physiology, standard sonography views, and Doppler/instrumentation.
- (3) **CVT 325 Echocardiography Principles** - A study of two-dimensional, m-mode, Doppler echocardiography and left ventricular systolic function. Also, discussion of various pathologies, the resulting echocardiographic findings and treatment. Prerequisite: CVT 226 – Introduction to Cardiovascular Sonography.
- (4) **CVT 326 Echocardiography Methods** - A study of two-dimensional, Doppler echocardiography, and transesophageal echocardiography. Also, discussion of various pathologies, the resulting echo-cardiographic findings, and treatment.
- (5) **CVT 335 – Vascular Sonography Principles** - A study of two-dimensional, color Doppler, spectral Doppler and other testing modalities in peripheral and cerebrovascular disease. Also, a discussion of various pathologies, the resulting sonographic findings treatments.
- (6) **CVT 336 Vascular Sonography Methods** - A study of two-dimensional, color Doppler, spectral Doppler and other testing modalities in peripheral arterial, abdominal vascular and intracranial cerebrovascular disease. Also, a discussion of various pathologies, the resulting sonographic findings treatments.
- (7) **CVT 424 CVS Fieldwork I** - Introduction of the student to the clinical rotation at GHS. This course is Pass/Fail only. This course is a minimum of 15 weeks (440 hours) of uninterrupted, supervised work in a

clinical care setting. Under direct supervision of GHS registered sonographers, the students will begin to apply scanning protocols and scanning techniques learned in the didactic courses. Students will be given instruction in fundamental principles, techniques and applications of multiple diagnostic modalities; including echocardiography, vascular duplex imaging, Doppler, and plethysmography. Student will obtain hands-on experience in a variety of clinical settings. Students will also begin exploring paperwork and communications within healthcare through this experience. The 440 hours completed in this class will be counted toward the cumulative total of 1,680 clinical hours required by the American Registry of Diagnostic Medical Sonographers (ARDMS). All clinical hours are required in order to qualify for ARDMS certification in vascular technology and adult echocardiography.

(8) CVT 425 CVS Fieldwork II - This intermediate level course continues to expand upon introductory skills and competencies learned in HLTH424. This course is Pass/Fail only. This course is a minimum of 15 weeks (440 hours) of uninterrupted, supervised work in a clinical care setting. Under direct supervision of GHS registered sonographers, the students will apply scanning protocols and scanning techniques learned in the didactic courses as well as skills obtained during HLTH 424. Students will be given instruction in fundamental principles, techniques and applications of multiple diagnostic modalities; including echocardiography, vascular duplex imaging, Doppler, and plethysmography. Student will obtain hands-on experience in a variety of clinical settings. Students will become proficient with all aspects paperwork and communications within the healthcare organization. The 440 hours completed in this class will be counted toward the cumulative total of 1,680 clinical hours required by the American Registry of Diagnostic Medical Sonographers (ARDMS). All clinical hours are required in order to qualify for ARDMS certification in vascular technology and adult echocardiography.

(9) CVT 426 CVS Field Experience III - This advanced level course continues to expand upon intermediate skills and competencies learned in CVT 425. This course is Pass/Fail only. This course is a minimum of 15 weeks (440 hours) of uninterrupted, supervised work in a clinical care setting. Under direct supervision of GHS registered sonographers, the students will apply scanning protocols and scanning techniques learned in the didactic courses as well as skills obtained during HLTH 425. Students will be tested in all aspects of fundamental principles, techniques and applications of multiple diagnostic modalities; including echocardiography, vascular duplex imaging, Doppler, and plethysmography. Student will begin to function independently but with supervision in obtaining the final clinical hours of hands-on experience required by the ARDMS. Students will become proficient with all aspects paperwork and communications within the healthcare organization. The 440 hours completed in this class will be counted toward the cumulative total of 1,680 clinical hours required by the American Registry of Diagnostic Medical Sonographers (ARDMS). All clinical hours are required in order to qualify for ARDMS certification in vascular technology and adult echocardiography.

Clemson will identify appropriate linkages with technical programs offering NCVT coursework to allow substitution and transfer of didactic coursework as appropriate and within residency requirements. Clinical supervision will be required to occur under the supervision of GHS.

Faculty

All instruction in the new courses listed under "Curriculum" will be provided by Masters degree level registered cardiovascular Sonographers employed by the Institute for Vascular Health at GHS/UMC. A memorandum of Understanding (appended) has been developed between Clemson University and GHS/UMC in support of this function. Teaching staff will receive adjunct Lecturer positions in Clemson's Department of Public Health Sciences. Clemson will place one new part-time lecturer at the Institute for Vascular Health who will serve as an academic advisor for all of the students in this concentration, assist the

GHS/UMC faculty with classes and serve as the program administrator. This position will be funded through differential tuition paid only for the 9 new courses identified above. There are no costs to state appropriated E&G funds for this new concentration.

Physical Plant

Space for this unique collaboration will be provided by GHS/UMC on the fourth floor of the Patewood Building in Greenville, SC. This building houses the Institute for Vascular Health and will also house cardiovascular research programs organized by Clemson's Department of Bioengineering. This program will have no impact on the physical plant of Clemson's main campus.

Equipment

Clinical Equipment:

Philips Medical Systems (Bothell, WA) is donating imaging equipment to provide students the needed hands-on experience in a lab/classroom environment. A total of four imaging systems have been donated by Philips to Clemson for the sole purpose of education. Additionally, AGFA has agreed to provide a Picture Archival and Computer System (PACS) to help simulate workflow in the classroom helping to better prepare students for their clinical experience. Other clinical equipment includes: an arterial physiologic system such as Parks Flo-Lab or Unitexis MultiLab, four patient stretchers to perform duplex exams, blood pressure cuffs, stethoscopes, ultrasound gel, and linen (flat sheets, washcloths, patient gowns, and towels).

General office supplies:

Furniture including desks, chairs, bookcases, and shelving was budgeted in the cost of upfit for PWC 4th floor. Computer supplies include printer, scanner, and laptop with docking station. Supplies such as printer cartridges, copy paper, paper clips, staples, etc. will be budgeted from the differential tuition approved by Clemson for CVT rubric classes.

Library Resources

The following additional library materials will be ordered over the first three years of the program. Differential tuition revenue will support and maintain materials that will be located in Greenville at the clinical education site.

The Practice of Clinical Echocardiography; Otto (SDMS 224.10)
*Textbook of Clinical Echocardiography; Otto (SDMS 148.50)
*Introduction to Vascular Ultrasonography; Zwiebel (SDMS 116.10)
Diagnostic Ultrasound – Principles and Instrumentation; Kremkau (SDMS 72.86)
Ultrasound: The Requisites; Middleton (SDMS 89.95)
Echo Made Easy; Kaddoura (SDMS 36.86)
Diagnostic Imaging: Ultrasound; Ahuka et al (SDMS 261.00)
Peripheral Vascular Ultrasound - How, Why and When; Thrush (SDMS 77.36)
Fetal Echocardiography, 2nd Edition; Drose (SDMS 88.16)
Ultrasound Physics and Instrumentation 4th Edition; Hedrick et al (SDMS 72.86)
Pocket Guide to Sonography; Swearingin (SDMS 32.36)
Ethical and Legal Issues for imaging Professionals; Towsely-Cook (SDMS 40.46)
Clinical Doppler Ultrasound w CD-ROM; Allan (SDMS 107.10)
Essentials of Sonography and Patient Care; Craig (SDMS 49.46)

Sonography: Introduction to Normal Structure and Function: 2nd Ed; Curry and Tempkin (SDMS 99.00)
Exercises in Sonography: Workbook; Curry and Tempkin (SDMS 54.86)
*Techniques in Noninvasive Vascular Diagnosis: 3rd Ed.; Daigle (SDMS 71.50)
Knock 'em Dead! The Complete Guide to Public Speaking in the Medical Community; Daigle (SDMS 13.45)
Physiologic Testing Techniques and Interpretation; Neumyer (SDMS 36.00)
Introduction to Vascular Scanning; Ridgway (SDMS 62.95)
Venous Imaging Techniques; Talbot (SDMS 71.95)
Techniques of Abdominal Vascular Sonography; Neumyer (SDMS 71.95)
Vascular Anatomy and Physiology; Belanger (SDMS 38.65)
Congenital Heart Defects, Simplified; Abraham (SDMS 98.95)
Vascular Technology: An Illustrated Review; Rumwell & McPharlin (SVU 79.95)
Echocardiography; Feigenbaum (ASE 210.00)

The program also will purchase a continuing annual membership to the Society for Vascular Ultrasound (SVU \$115), American Society of Echocardiography (ASE ~\$150) and the Society of Diagnostic Medical Sonographers (SDMS \$145). Each annual membership includes professional journals distributed either bi-monthly or quarterly.

Accreditation, Approval, Licensure or Certification

Programmatic accreditation is necessary to meet industry minimum standards for preparing students to enter the field and will be sought through the Commission on Accreditation of Allied Health Education Programs, henceforth referred to as CAAHEP. CAAHEP sets minimum standards and guidelines for Cardiovascular Technology programs nationwide. Their process is peer-reviewed by other CAAHEP accredited program directors and ensures that graduating students are properly prepared to sit for their national exam boards through the American Registry of Diagnostic Medical Sonography (ARDMS). Students prepared in this collaborative will be eligible to sit for both the Registered Vascular Technologist (RVT) and Registered Diagnostic Cardiac Sonographer (RDCS) exams, a feat that most other programs cannot provide due to their single track approach.

The Joint Review Committee for Cardiovascular Technology (JRC-CVT) creates, reviews, and edits the Standards and Guidelines. Most important of these guidelines is clear representation of the program to prospective students, fair practices for selection and discipline of students, and minimum standards of instruction based on modality. CAAHEP accreditation relies most heavily on attrition and ARDMS registry pass rates. Accreditation will not be granted without preliminary data in these areas. Both GHS/UMC personnel and processes will be examined through this process to ensure open communication, fair processes, and student rights throughout the educational process. Most of this will center on the clinical training and student selection process, not specifically at Clemson's processes.

CAAHEP accreditation involves an application/site visit fee as well as annual fees. The initial fees vary based on modalities but average \$3,000 to \$4,000 for the first 3-5 year period. The second accreditation process lasts for 10 years. Annual fees are a flat \$450 per year. These fees will be paid from revenue generated through the tuition differential paid by students for the CVT rubric classes.

Estimated New Costs

The Department of Public Health Sciences estimates new costs of approximately \$60,000 per annum directly related to the operation of this concentration. Although the department will not have to compensate the

IVH adjunct faculty for their instructional role, it needs additional support in order to place a part time lecturer at the Patewood campus to serve as the Program Coordinator and to serve as an academic advisor to the senior students for whom Patewood will be the primary instructional location. A stipend is also necessary to compensate a Lecturer to teach CVT 225 (Ultrasound Physics). In addition, travel funds will be needed for the Department Chair and Curriculum Committee Chair to meet on a regular basis with the IVH staff in Greenville during the academic year, and for the instructor of CVT 226 to travel from Greenville to campus for instruction. Travel funds for IVH adjunct staff to attend one national academic meeting each year are also included. Additionally, it is necessary to generate income to support office supplies, materials, copying, and other routine expenses noted above in support of the concentration because recent state budget cuts have depleted the department's operating funds to such an extent additional activities cannot be supported without generated revenue. Finally, accreditation costs will average roughly \$1000 per year for the first five years and \$450 per year thereafter.

All of these costs will be covered through a tuition differential of \$200 per credit hour that will be applied only to the 40 credits of CVT rubric courses. This total incremental cost (\$8K per student) of this concentration is less that the alternative cost should a student complete a baccalaureate degree in the preprofessional concentration and then attend a certificate program to become a Vascular Sonographer.

Table E –Costs to the Institution and Sources of Financing

ESTIMATED NEW COSTS BY YEAR						
CATEGORY	1 st	2 nd	3 rd	4 th	5 th	TOTALS
Program Administration	0	\$17,543	\$42,947	\$43,806	\$44,682	\$148,978
Faculty Salaries	\$7,218	\$7,218	\$22,808	\$38,398	\$53,488	\$129,130
Graduate Assistants	0	0	0	0	0	0
Clerical/Support Personnel	0	0	0	0	0	0
Supplies and Materials	500	\$14,397	\$14,397	\$12,500	\$12,500	\$54,294
Library Resources	\$1,000	\$1,000	\$1,000	\$500	\$500	\$4,000
Equipment	*	*	*	*	*	*
Facilities	*	*	*	*	*	*
Other	\$3,280	\$3,280	\$3,280	\$3,280	\$3,280	\$16,400
TOTALS	\$11,998	\$43,438	\$84,432	\$98,484	\$114,450	\$352,802
SOURCES OF FINANCING BY YEAR						
Tuition Funding	\$123,460	\$123,460	\$123,460	\$123,460	\$123,460	\$617,300
Program-Specific Fees	\$12,000	\$44,000	\$68,000	\$68,000	\$68,000	260,000
State funding	0	0	0	0	0	0
Reallocation of Exiting 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	\$135,460	\$167,460	\$191,460	\$191,460	\$191,460	\$877,300

Notes on Costs:

Program administration is for a salary starting mid-year in the second year for an on-site coordinator/adviser for the students who will be at the IVH GHS/UMC site. Beginning in year three this salary includes an anticipated increment of 2% per year.

Faculty salaries for years one and two include salaries only for instruction for students enrolled in this curriculum. Faculty salaries in years three through five reflect adding students to the university (shown in Table F) and anticipate additional instructional costs for core courses and for electives, general education, etc.

Supplies and materials include general departmental office supplies in support of the program and medical supplies for instructional purposes that are not billable to patients.

Library materials will be purchase incrementally in the first three years and then replaced as necessary thereafter.

Equipment and facilities noted with an asterisk (*) will be provided by GHS/UMC under the attached Memorandum of Understanding.

“Other” includes frequent travel by the department chair to Greenville for supervision (\$480 per year) and travel by GHS/UMC adjunct faculty to participate in professional training, academic meetings, etc. (\$1,400 each for two adjunct faculty)

Notes on Sources of Financing:

Tuition is calculated based on 10 students enrolled in the program (full time) each year. This includes currently enrolled students and new students to the campus. Current tuition and fees are \$12,346 per academic year.

All students in this concentration will pay a tuition *differential* of \$200 credit hour.

No “unique cost” or other special state appropriation is required or requested.

Assessment Plan

The goals of all undergraduate concentrations in the department of Public Health Sciences require that students acquire the ability to (1) advance the knowledge base of public health, (2) identify and apply theoretical frameworks, (3) identify public health determinants and trends and (4) Understand professional ethics. The proposed concentration will have a specific goal to attain sufficient competency in cardiovascular technology to achieve status as a registered diagnostic medical sonographer. The department employs multiple measures to assess achievement of overall goals. These include an alumni survey, which measures learner outcomes including ethics and team participation, a final written project that addresses all of these competencies and a graduation survey which addresses item (3). For each concentration there are specific learner objectives related to the concentration. Mastery of technical skills related to this concentration will be measured by successful completion of the process to become ARDMS registered. Furthermore, the JRC-CVT will require attrition and registry pass rates annually as part of the CAAHEP accreditation agreement. These standards will further enhance the success of the students and their assimilation into the workforce.

Institutional Approvals

Approved: Clemson Board of Trustees: October 2008

Approved: DPHS Curriculum Committee February 2010

Approved DPHS Full Faculty March 2010

Approved HEHD Curriculum Committee April 2010

Approved University Undergraduate Curriculum Committee September 2010



**GREENVILLE HOSPITAL SYSTEM
UNIVERSITY MEDICAL CENTER**

**ACADEMIC SERVICES
Administration**

Jerry R. Youkey, MD
Vice President Medical Services
& Dean, Academic Services
864-455-7880
864-455-8439 Fax
jyoukey@ghs.org

Brenda J. Thames, EdD
Vice President,
Academic Development
864-455-1460
864-455-8404 Fax
bthames@ghs.org

Angelo Sinopoli, MD
Assistant Dean,
Clinical Affairs
864-455-8973
864-455-6182 Fax
asinopoli@ghs.org

Spence M. Taylor, MD
Assistant Dean,
Academic Affairs
864-455-7886
864-455-1320 Fax
staylor@ghs.org

Edward W. Bray, III, MD
Assistant Dean, Graduate
Medical Education
864-455-7878
864-455-7082 Fax
ebray@ghs.org

Paul V. Catalana, MD
Assistant Dean, Undergraduate
Medical Education
864-455-3510
864-455-5267 Fax
pcatalana@ghs.org

James V. Freeman, MA, MPA
Administrator,
Academic Services
864-455-7876
864-455-8404 Fax
jfreeman@ghs.org

October 5, 2009

To Whom It May Concern:

The Bachelor of Science in Health Science – Cardiovascular Imaging Leadership Concentration provides a unique opportunity for Clemson University and Greenville Hospital System University Medical Center (GHS) to fulfill a workforce need. This has positive career development implications for students and collaborative opportunities for both institutions.

GHS is committed to providing faculty expertise to teach CVT classes as well as HLTH 226. Additionally, GHS will collaborate in offering HLTH 225. We are well positioned and prepared to offer state-of-the-art clinical training through the GHS Institute for Vascular Health (IVH) providing hands-on-training for students.

We look forward to collaborating with Clemson to make this career training opportunity available to students. It will fulfill a workforce need that has been identified in the healthcare industry.

Again, GHS commits to supporting teaching efforts necessary from the didactic and clinical perspectives. If you have questions, please do not hesitate to contact me.

Sincerely,

A handwritten signature in cursive script that reads "Brenda J. Thames".

**Brenda J. Thames, EdD
Vice President for Academic Development
Greenville Hospital System University Medical Center**